

Algebra 1
Algebra 1 Current Activity Library | 123-Topic Bundle

123-topic bundle | 11,808 problems | Four activity formats

Included topics

The following pages list all 123 included resources in the suggested order, with a link to each product. Each resource retains its complete preview.

In every topic

Answer Bank Challenge	24 tasks
Grid Rounds	24 tasks
Match & Move	24 cards
Error Analysis & Strategy	24 tasks
Quick Answer Key and Full Worked Solutions	included
Teacher / Parent Use Guide and Terms of Use	included

Product previews

The following preview pages show the cover, all four activity formats, and worked examples for each included resource, in the listed order.

984 PDFs and 123 READMEs; 9,522 buyer PDF pages across the 123 products.

Preview pages are not included in the buyer page count. Check the list against resources you already own.

Sets & Steps

Math Practice & Worked Solutions

Algebra 1

Included topics

123-topic bundle | 11,808 problems | Four activity formats

01 Classifying Real Numbers

[View individual product and its full preview](#)

02 Ordering and Estimating Real Numbers

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03 Signed Rational Number Operations

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04 Mixed Operations with Rational Numbers

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05 Order of Operations with Grouping Symbols

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06 Units, Conversions, and Defining Quantities

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07 Reading and Translating Algebraic Expressions

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11 One-Step Multiplication and Division Equations

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12 Two-Step Equations

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14 Equations with Like Terms

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15 Linear Equations: Solving, Coefficients & Reasoning

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16 Linear Equations: One, None, or All Real Solutions

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17 Linear Equations with Fractions and Decimals

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18 Literal Equations

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19 Writing Linear Equations from Word Problems

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20 Checking Linear Models and Contextual Solutions

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38 Absolute Value and Piecewise Function Models

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40 Arithmetic Sequence Explicit and Recursive Rules

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Algebra 1
Classifying Real Numbers

Classifying Real Numbers | A1-U01-P01

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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Topic focus
Across 96 tasks this topic asks for classification with justification.
8 PDFs and a README; 48 buyer pages.

Algebra 1

Classifying Real Numbers

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Use $N = \{1, 2, 3, \dots\}$, $W = \{0, 1, 2, \dots\}$, Z for integers, Q for rational numbers, and R for real numbers. For the exact value $\sqrt{11}$, name the smallest set it belongs to and then list every containing set among N, W, Z, Q, and R. _____ Bank label: _____	Use $N = \{1, 2, 3, \dots\}$, $W = \{0, 1, 2, \dots\}$, Z for integers, Q for rational numbers, and R for real numbers. For the exact value $(2 - \sqrt{5})(2 + \sqrt{5})$, name the smallest set it belongs to and then list every containing set among N, W, Z, Q, and R. _____ Bank label: _____
Determine whether the number is rational, irrational, or not determined by the evidence. Justify your decision: 1.08333...; after 08, the digit 3 repeats forever. _____ Bank label: _____	Use $N = \{1, 2, 3, \dots\}$, $W = \{0, 1, 2, \dots\}$, Z for integers, Q for rational numbers, and R for real numbers. For the exact value $\frac{0.125}{0.5}$, name the smallest set it belongs to and then list every containing set among N, W, Z, Q, and R. _____ Bank label: _____
Determine whether the number is rational, irrational, or not determined by the evidence. Justify your decision: $0.d_1d_2d_3\dots$ where $d_n = 3$ when n is a power of 2 and 0 otherwise. _____ Bank label: _____	Use $N = \{1, 2, 3, \dots\}$, $W = \{0, 1, 2, \dots\}$, Z for integers, Q for rational numbers, and R for real numbers. For the exact value $\frac{\sqrt{12}}{\sqrt{3}}$, name the smallest set it belongs to and then list every containing set among N, W, Z, Q, and R. _____ Bank label: _____
Determine whether the number is rational, irrational, or not determined by the evidence. Justify your decision: 0.314159...; only these six digits are supplied and no continuation rule is given. _____ Bank label: _____	Use $N = \{1, 2, 3, \dots\}$, $W = \{0, 1, 2, \dots\}$, Z for integers, Q for rational numbers, and R for real numbers. For the exact value $\sqrt{0}$, name the smallest set it belongs to and then list every containing set among N, W, Z, Q, and R. _____ Bank label: _____

Algebra 1

Classifying Real Numbers

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Determine whether the number is rational, irrational, or not determined by the evidence. Justify your decision: 13.6 is exact and terminating. 	Use $N = \{1, 2, 3, \dots\}$, $W = \{0, 1, 2, \dots\}$, Z for integers, Q for rational numbers, and R for real numbers. For the exact value -2.75, name the smallest set it belongs to and then list every containing set among N, W, Z, Q, and R.
Determine whether the number is rational, irrational, or not determined by the evidence. Justify your decision: 4.000 is exact. 	Use $N = \{1, 2, 3, \dots\}$, $W = \{0, 1, 2, \dots\}$, Z for integers, Q for rational numbers, and R for real numbers. For the exact value $-\frac{4}{1}$, name the smallest set it belongs to and then list every containing set among N, W, Z, Q, and R.
Determine whether the number is rational, irrational, or not determined by the evidence. Justify your decision: $0.d_1d_2d_3\dots$ where $d_n = 1$ when n is a perfect square and 0 otherwise. 	Use $N = \{1, 2, 3, \dots\}$, $W = \{0, 1, 2, \dots\}$, Z for integers, Q for rational numbers, and R for real numbers. For the exact value $1 - \sqrt{2}$, name the smallest set it belongs to and then list every containing set among N, W, Z, Q, and R.

Algebra 1

Classifying Real Numbers

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A student gives this classification argument: (1) $\sqrt{36}$ contains a radical sign. (2) Every radical is irrational. (3) Therefore $\sqrt{36}$ is irrational. Identify the first invalid claim and repair it, or state that the argument is correct.

A student gives this classification argument: (1) 0.333... repeats forever. (2) A nonterminating decimal is irrational. (3) Therefore 0.333... is irrational. Identify the first invalid claim and repair it, or state that the argument is correct.

A student gives this classification argument: (1) $\frac{7}{2}$ is a ratio of integers. (2) Its denominator is nonzero. (3) Therefore it is rational but not an integer. Identify the first invalid claim and repair it, or state that the argument is correct.

A student gives this classification argument: (1) If x is irrational, then x is real. (2) If x is real, then x is irrational. (3) Thus every real number is irrational. Identify the first invalid claim and repair it, or state that the argument is correct.

Classifying Real Numbers

Full Worked Solutions - excerpt

Worked example

Problem. Use $N = \{1, 2, 3, \dots\}$, $W = \{0, 1, 2, \dots\}$, Z for integers, Q for rational numbers, and R for real numbers. For the exact value $\sqrt{11}$, name the smallest set it belongs to and then list every containing set among N, W, Z, Q , and R .

Answer. irrational; also R

Explanation and check.

Eleven is not a perfect square, so $\sqrt{11}$ is irrational and real.

Worked example

Problem. Use $N = \{1, 2, 3, \dots\}$, $W = \{0, 1, 2, \dots\}$, Z for integers, Q for rational numbers, and R for real numbers. For the exact value $(2 - \sqrt{5})(2 + \sqrt{5})$, name the smallest set it belongs to and then list every containing set among N, W, Z, Q , and R .

Answer. Z ; also Q, R

Explanation and check.

The conjugate product is

$$4 - 5 = -1$$

an integer.

Algebra 1
Ordering and Estimating Real Numbers

Ordering and Estimating Real Numbers | A1-U01-P02

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
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05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for allowed integer radicands, allowed integer radicands; justified checking-strategy choice, allowed real radicands, exact consecutive-integer bounds, justified strategy choice, relation symbol and exact justification and least-to-greatest list.

8 PDFs and a README; 53 buyer pages.

Algebra 1

Ordering and Estimating Real Numbers

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Use the trial-square table to estimate $\sqrt{17}$ to the nearest tenth. Explain how the midpoint row determines the rounding direction. Table: $4.1^2 = 16.81$; $4.15^2 = 17.2225$; $4.2^2 = 17.64$.

Trial	Exact square
4.1	16.81
4.15	17.2225
4.2	17.64

Bank label: _____

Order these exact rational numbers from least to greatest. Use an equals sign for any tie: $-\frac{23}{41}$, -1.5 , 0 , $\frac{39}{24}$.

Bank label: _____

Order these exact real numbers from least to greatest, showing equality if needed: $-\sqrt{39}$, -3 , 0 , $\sqrt{10}$. Use exact integer bounds and squared comparisons to justify the radical placements.

Bank label: _____

Order these exact real numbers from least to greatest, showing equality if needed: $-\sqrt{8}$, -2.8 , $\sqrt{4}$, 2 . Use exact integer bounds and squared comparisons to justify the radical placements.

Bank label: _____

Algebra 1

Ordering and Estimating Real Numbers

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Assume n is a nonnegative integer and $\frac{3}{2} < \sqrt{n} \leq 4$. Determine every possible value of n, preserving the endpoint conditions exactly. _____ _____	Assume n is a nonnegative integer and $1 < \sqrt{n} \leq \frac{7}{2}$. Determine every possible value of n, preserving the endpoint conditions exactly. _____ _____
Assume n is a nonnegative integer and $\frac{3}{2} \leq \sqrt{n} < \frac{9}{2}$. Determine every possible value of n, preserving the endpoint conditions exactly. _____ _____	Assume n is a nonnegative integer and $\frac{5}{2} \leq \sqrt{n} \leq \frac{9}{2}$. Determine every possible value of n, preserving the endpoint conditions exactly. _____ _____
Assume n is a nonnegative real number and $\frac{3}{2} \leq \sqrt{n} < 3$. Determine every possible value of n, preserving the endpoint conditions exactly. _____ _____	Without rounding either number, insert $<$, $>$, or $=$ between $\sqrt{11}$ and $\frac{10}{3}$. Justify the comparison using signs and exact squares. _____ _____

Algebra 1

Ordering and Estimating Real Numbers

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $-\sqrt{41} < -\frac{3}{2} < \sqrt{12} < 6.4$ Order these exact real numbers from least to greatest, showing equality if needed: $-\sqrt{20}$, -4.5, $\sqrt{4}$, 2. Use exact integer bounds and squared comparisons to justify the radical placements. Your response: _____	Incoming: $-4.5 < -\sqrt{20} < \sqrt{4} = 2$ Order these exact real numbers from least to greatest, showing equality if needed: $-\sqrt{24}$, $\sqrt{34}$, 4.8, $-\frac{4}{2}$. Use exact integer bounds and squared comparisons to justify the radical placements. Your response: _____
Incoming: $4 < n \leq 9$ Order these exact real numbers from least to greatest, showing equality if needed: $-\sqrt{41}$, $\sqrt{12}$, 6.4, $-\frac{3}{2}$. Use exact integer bounds and squared comparisons to justify the radical placements. Your response: _____	Incoming: $-\sqrt{5} < -\frac{7}{5} < 0 < \sqrt{15}$ Order these exact real numbers from least to greatest, showing equality if needed: $-\sqrt{37}$, -6.1, $\sqrt{4}$, 2. Use exact integer bounds and squared comparisons to justify the radical placements. Your response: _____
Incoming: $n \in \{5, 6, 7, 8, 9, 10, 11, 12\}$ Assume n is a nonnegative real number and $\frac{5}{2} \leq \sqrt{n} < \frac{9}{2}$. Determine every possible value of n, preserving the endpoint conditions exactly. Your response: _____	Incoming: $-1.1 < -\frac{19}{33} < 0 < \frac{31}{20}$ Order these exact rational numbers from least to greatest. Use an equals sign for any tie: $-\frac{37}{19}$, -0.3, $\frac{5}{4}$, 1.25. Your response: _____

Algebra 1

Ordering and Estimating Real Numbers

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Evaluate this reasoning: From $3 < \sqrt{10} < 4$, a student reports $\sqrt{10} = 3.2$ to the nearest tenth. State whether the conclusion and evidence are valid, then repair the justification with exact comparisons.

Evaluate this reasoning: A calculator shows $\sqrt{2}$ as 1.41, so a student concludes $\sqrt{2} = 1.41$ exactly. State whether the conclusion and evidence are valid, then repair the justification with exact comparisons.

Evaluate this reasoning: A student says $\sqrt{20}$ is halfway between $\sqrt{16}$ and $\sqrt{25}$, so $\sqrt{20} = 4.5$. State whether the conclusion and evidence are valid, then repair the justification with exact comparisons.

Evaluate this reasoning: A student writes $-\sqrt{12} > -3$ because $\sqrt{12} > 3$. State whether the conclusion and evidence are valid, then repair the justification with exact comparisons.

Ordering and Estimating Real Numbers

Full Worked Solutions - excerpt

Worked example

Problem. Use the trial-square table to estimate $\sqrt{17}$ to the nearest tenth. Explain how the midpoint row determines the rounding direction. Table: $4.1^2 = 16.81$; $4.15^2 = 17.2225$; $4.2^2 = 17.64$.

Trial	Exact square
4.1	16.81
4.15	17.2225
4.2	17.64

Answer. $\sqrt{17} \approx 4.1$

Explanation and check.

The table brackets the root between 4.1 and 4.2. Since 17 is below the midpoint square 17.2225, round to 4.1.

Worked example

Problem. Order these exact rational numbers from least to greatest. Use an equals sign for any tie: $-\frac{23}{41}$, -1.5 , 0 , $\frac{39}{24}$.

Answer. $-1.5 < -\frac{23}{41} < 0 < \frac{39}{24}$

Explanation and check.

Writing the values as exact fractions gives the order $-1.5 < -\frac{23}{41} < 0 < \frac{39}{24}$.

Algebra 1
Signed Rational Number Operations

Adding and Subtracting Rational Numbers | A1-U01-COMB-P03-P04

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Topic focus
Across 96 tasks this topic asks for addition-of-the-opposite rewrite and exact value, exact sum, exact sum with sign explanation, exact total or unit rate with units, exact value and efficient grouping and exact value with grouping-preserving rewrite.
8 PDFs and a README; 59 buyer pages.

Algebra 1

Signed Rational
Number Operations

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Rewrite $\frac{23}{4} - (-3)$ as addition of the opposite, then compute its exact value. _____ Bank label: _____	Evaluate $-\frac{5}{3} + \frac{9}{4} + (-\frac{3}{2}) + \frac{5}{3}$. Show an efficient regrouping that uses cancellation or compatible denominators. _____ Bank label: _____
Compute the exact sum $\frac{2}{5} + \frac{3}{5}$. Show how the common sign and magnitudes determine the result. _____ Bank label: _____	Compute the exact sum $0.6 + 0.5$. Show how the common sign and magnitudes determine the result. _____ Bank label: _____
Compute the exact sum $\frac{2}{3} + \frac{7}{9}$. Show how the common sign and magnitudes determine the result. _____ Bank label: _____	Compute $\frac{5}{3} + (-\frac{5}{3})$. Compare the two magnitudes to justify the sign of the sum. _____ Bank label: _____
Compute the exact sum $-4 + (-\frac{5}{7})$. Show how the common sign and magnitudes determine the result. _____ Bank label: _____	Rewrite $\frac{25}{6} - \frac{5}{4}$ as addition of the opposite, then compute its exact value. _____ Bank label: _____

Algebra 1

Signed Rational
Number Operations

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Evaluate $\frac{7}{5} + (-\frac{7}{5}) + \frac{1}{3} + \frac{2}{3}$. Show an efficient regrouping that uses cancellation or compatible denominators. _____ _____	Evaluate $\frac{3}{5} + (-\frac{3}{5}) + \frac{7}{2} + (-\frac{7}{2})$. Show an efficient regrouping that uses cancellation or compatible denominators. _____ _____
Evaluate $\frac{8}{3} + (-\frac{8}{3}) + 1 + \frac{2}{3}$. Show an efficient regrouping that uses cancellation or compatible denominators. _____ _____	Evaluate $\frac{7}{2} + (-\frac{7}{2}) + 1 + (-1)$. Show an efficient regrouping that uses cancellation or compatible denominators. _____ _____
Evaluate $-\frac{6}{5} + 1 + (-\frac{3}{2}) + \frac{6}{5}$. Show an efficient regrouping that uses cancellation or compatible denominators. _____ _____	Evaluate $-1 + \frac{3}{4} + (-\frac{3}{4}) + 1$. Show an efficient regrouping that uses cancellation or compatible denominators. _____ _____

Algebra 1

Signed Rational Number Operations

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Evaluate this signed-number method: Temperatures are -3°C and 5°C , so a student says their directed difference $5 - (-3)$ is -8°C . Identify the first invalid step if there is one, repair the calculation, and verify the result exactly.

Evaluate this signed-number method: A student computes $0 - (-\frac{9}{4}) = -\frac{9}{4}$ because the zero contributes no sign. Identify the first invalid step if there is one, repair the calculation, and verify the result exactly.

Evaluate this signed-number method: To check $-4 + 9 = 5$, a student subtracts 9 from 5 and obtains -4 . Identify the first invalid step if there is one, repair the calculation, and verify the result exactly.

Signed Rational Number Operations

Full Worked Solutions - excerpt

Worked example

Problem. Evaluate this method: A student says $\frac{4}{5} \div 0 = 0$ because zero makes an answer zero. Identify the first invalid step if any and repair the reasoning exactly.

Answer. incorrect

Explanation and check.

Division by zero is undefined; the zero-factor rule applies to multiplication, not a zero divisor.

Worked example

Problem. Evaluate this method: A student says a product of three negative nonzero factors is positive. Identify the first invalid step if any and repair the reasoning exactly.

Answer. incorrect

Explanation and check.

Three is odd, so the product of three negative nonzero factors is negative.

Algebra 1
Mixed Operations with Rational Numbers

Mixed Operations with Rational Numbers | A1-U01-P05

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for efficient exact representation and value, exact rational value, first invalid step and repaired exact result, missing stage and forward verification, mixed expression and exact quantity with units and supported or not supported with decisive bound.

8 PDFs and a README; 58 buyer pages.

Algebra 1

Mixed Operations with Rational Numbers

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Use the fully labeled operation diagram. A2-arrow operation machine starts with an unknown value, multiplies by $(-\frac{1}{2})$, then adds $\frac{3}{4}$, and ends at $-\frac{23}{28}$. Recover the starting value by undoing the arrows in reverse order, then verify it forward.

_____	Multiply by $-\frac{1}{2} \rightarrow$	_____	Add $\frac{3}{4} \rightarrow$	$-\frac{23}{28}$
-------	---	-------	-------------------------------	------------------

Bank label: _____

Evaluate $\frac{6}{5}(-3) - \frac{8}{3}$ exactly. Complete the multiplication or division before the addition or subtraction, and show the common-denominator step if one is needed.

Bank label: _____

Use the fully labeled operation diagram. A2-arrow operation machine starts with an unknown value, multiplies by $(-\frac{3}{4})$, then adds $(-\frac{3}{4})$, and ends at $-\frac{33}{28}$. Recover the starting value by undoing the arrows in reverse order, then verify it forward.

_____	Multiply by $-\frac{3}{4} \rightarrow$	_____	Add $-\frac{3}{4} \rightarrow$	$-\frac{33}{28}$
-------	---	-------	--------------------------------	------------------

Bank label: _____

Evaluate $\frac{5}{4} - \frac{10}{3} \div \frac{5}{2}$ exactly. Complete the multiplication or division before the addition or subtraction, and show the common-denominator step if one is needed.

Bank label: _____

Algebra 1

Mixed Operations with Rational Numbers

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Start at $\frac{6}{5}$ and follow the fixed order: divide by 5, then add one negative rational number. Construct the adjustment that reaches $-\frac{14}{25}$, and verify that the final result is noninteger. _____ _____	Evaluate $\frac{5}{6} - (-0.5) \cdot 1$ exactly. Choose fraction or terminating-decimal form to reduce the work, state why your choice avoids rounding, and give the exact value. _____ _____												
Use the quantities in the table. A position changes at a constant signed rate of 6 meters per hour for 2 hours, then has an additional signed change of $\frac{5}{2}$ meters. Write the mixed expression and find the net change in meters. <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th style="text-align: left;">Quantity</th> <th style="text-align: left;">Value</th> <th style="text-align: left;">Unit</th> </tr> </thead> <tbody> <tr> <td>signed rate</td> <td>6</td> <td>meters per hour</td> </tr> <tr> <td>time</td> <td>2</td> <td>hours</td> </tr> <tr> <td>later adjustment</td> <td>$\frac{5}{2}$</td> <td>meters</td> </tr> </tbody> </table> _____ _____	Quantity	Value	Unit	signed rate	6	meters per hour	time	2	hours	later adjustment	$\frac{5}{2}$	meters	Evaluate $1.25 \div (-\frac{7}{10}) - 2$ exactly. Choose fraction or terminating-decimal form to reduce the work, state why your choice avoids rounding, and give the exact value. _____ _____
Quantity	Value	Unit											
signed rate	6	meters per hour											
time	2	hours											
later adjustment	$\frac{5}{2}$	meters											
Evaluate $0.25 + \frac{4}{9} \cdot 3$ exactly. Choose fraction or terminating-decimal form to reduce the work, state why your choice avoids rounding, and give the exact value. _____ _____	Evaluate $1.2 + \frac{2}{7} \cdot \frac{1}{2}$ exactly. Choose fraction or terminating-decimal form to reduce the work, state why your choice avoids rounding, and give the exact value. _____ _____												

Algebra 1

Mixed Operations with Rational Numbers

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: add $(-\frac{1}{3})$: $\frac{8}{3} \rightarrow 4 \rightarrow \frac{11}{3}$ A2-arrow operation machine starts with an unknown value, divides by $\frac{3}{2}$, then subtracts $\frac{2}{3}$, and ends at $-\frac{20}{21}$. Recover the starting value by undoing the arrows in reverse order, then verify it forward. <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <tr> <td style="width: 20%; text-align: center;">_____</td> <td style="width: 20%; text-align: center;">Divide by $\frac{3}{2} \rightarrow$</td> <td style="width: 20%; text-align: center;">_____</td> <td style="width: 20%; text-align: center;">Subtract $\frac{2}{3} \rightarrow$</td> <td style="width: 20%; text-align: center;">$-\frac{20}{21}$</td> </tr> </table> Your response: _____	_____	Divide by $\frac{3}{2} \rightarrow$	_____	Subtract $\frac{2}{3} \rightarrow$	$-\frac{20}{21}$	Incoming: $-\frac{3}{7}$ Evaluate $\frac{7}{6} + \frac{1}{5} \cdot 2$ exactly. Complete the multiplication or division before the addition or subtraction, and show the common-denominator step if one is needed. Your response: _____
_____	Divide by $\frac{3}{2} \rightarrow$	_____	Subtract $\frac{2}{3} \rightarrow$	$-\frac{20}{21}$		
Incoming: $\frac{3}{10}$ Start at $\frac{8}{3}$ and follow the fixed order: divide by $\frac{2}{3}$, then add one negative rational number. Construct the adjustment that reaches $\frac{11}{3}$, and verify that the final result is noninteger. Your response: _____	Incoming: $\frac{9}{2}$ Evaluate $-\frac{7}{5} - \frac{5}{2} \div \frac{5}{2}$ exactly. Complete the multiplication or division before the addition or subtraction, and show the common-denominator step if one is needed. Your response: _____					
Incoming: $-\frac{493}{24}$ A2-arrow operation machine starts with an unknown value, adds $(-\frac{2}{3})$, then multiplies by 6, and ends at $\frac{38}{7}$. Recover the starting value by undoing the arrows in reverse order, then verify it forward. <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <tr> <td style="width: 20%; text-align: center;">_____</td> <td style="width: 20%; text-align: center;">Add $-\frac{2}{3} \rightarrow$</td> <td style="width: 20%; text-align: center;">_____</td> <td style="width: 20%; text-align: center;">Multiply by $6 \rightarrow$</td> <td style="width: 20%; text-align: center;">$\frac{38}{7}$</td> </tr> </table> Your response: _____	_____	Add $-\frac{2}{3} \rightarrow$	_____	Multiply by $6 \rightarrow$	$\frac{38}{7}$	Incoming: $\frac{71}{10}$ Evaluate $\frac{3}{4} - \frac{1}{2} \div 2$ exactly. Complete the multiplication or division before the addition or subtraction, and show the common-denominator step if one is needed. Your response: _____
_____	Add $-\frac{2}{3} \rightarrow$	_____	Multiply by $6 \rightarrow$	$\frac{38}{7}$		

Algebra 1

Mixed Operations with Rational Numbers

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Audit this worked calculation for $\frac{3}{4} + (\frac{2}{5})(\frac{5}{2})$. Step 1: Add $\frac{3}{4} + \frac{2}{5}$ first. Step 2: Multiply that result by $\frac{5}{2}$. Identify the first invalid step, preserve every valid prefix, and give the repaired exact result. If no step is invalid, say so.

Audit this worked calculation for $\frac{2}{5} + (\frac{1}{3})(\frac{3}{4})$. Step 1: Multiply $\frac{1}{3}$ by $\frac{3}{4}$ to get $\frac{1}{4}$. Step 2: Add $\frac{2}{5} + \frac{1}{4}$ as $\frac{3}{9} = \frac{1}{3}$. Identify the first invalid step, preserve every valid prefix, and give the repaired exact result. If no step is invalid, say so.

Audit this worked calculation for $\frac{3}{4} \div (\frac{5}{6}) - \frac{1}{10}$. Step 1: Rewrite as $\frac{3}{4}$ times $\frac{5}{6}$ minus $\frac{1}{10}$. Step 2: Report $\frac{21}{40}$. Identify the first invalid step, preserve every valid prefix, and give the repaired exact result. If no step is invalid, say so.

Audit this worked calculation for $(\frac{3}{4} + \frac{5}{6})(\frac{2}{3})$. Step 1: Cancel the 3 in $\frac{3}{4}$ with the outside factor $\frac{2}{3}$. Step 2: Multiply the remaining expression. Identify the first invalid step, preserve every valid prefix, and give the repaired exact result. If no step is invalid, say so.

Mixed Operations with Rational Numbers

Full Worked Solutions - excerpt

Worked example

Problem. Start at $\frac{7}{3}$. Use each operation exactly once—add $\frac{8}{3}$ and multiply by $\frac{3}{4}$ —in an order that reaches $\frac{15}{4}$. The intermediate value must be positive. Construct and verify the chain.

Answer. $\frac{7}{3} \rightarrow$ add $\frac{8}{3} \rightarrow 5 \rightarrow$ multiply by $\frac{3}{4} \rightarrow \frac{15}{4}$

Explanation and check.

Adding first gives the required positive intermediate 5; multiplying it by $\frac{3}{4}$ reaches $\frac{15}{4}$.

Worked example

Problem. Start at $\frac{3}{2}$. Use each operation exactly once—add $\frac{4}{3}$ and multiply by $\frac{3}{2}$ —in an order that reaches $\frac{17}{4}$. The intermediate value must be positive. Construct and verify the chain.

Answer. $\frac{3}{2} \rightarrow$ add $\frac{4}{3} \rightarrow \frac{17}{6} \rightarrow$ multiply by $\frac{3}{2} \rightarrow \frac{17}{4}$

Explanation and check.

Adding first gives the required positive intermediate $\frac{17}{6}$; multiplying it by $\frac{3}{2}$ reaches $\frac{17}{4}$.

Algebra 1
Order of Operations with Grouping Symbols

Order of Operations with Grouping Symbols | A1-U01-P06

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for all valid groupings or impossibility proof, all valid groupings or impossibility proof; justified strategy selection, equivalent expression or tree and exact value, equivalent expression or tree and exact value; justified strategy selection, exact value or undefined verdict and exact value or undefined verdict; justified strategy selection.
8 PDFs and a README; 63 buyer pages.

Algebra 1

**Order of Operations
with Grouping Symbols****Name:** _____ **Date:** _____ **Class:** _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Evaluate $5 + 7 \cdot 4 - 1$. At each precedence level, work from left to right; show the decisive first operation.

Bank label: _____

Evaluate $3 + 2 \cdot 5 - 1$. At each precedence level, work from left to right; show the decisive first operation.

Bank label: _____

Algebra 1

Order of Operations with Grouping Symbols

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Translate $(4 - 3) \div 4$ into an operation tree whose leaves and operation nodes preserve every grouping, and state its exact value. _____ _____	Insert grouping into $4 + 4 - 4 \div 4$ to obtain 4, without reordering operands or operations. Any full parenthesization preserving the displayed order is allowed. Give every valid grouping, or prove none works by checking the permitted structures. _____ _____
Insert grouping into $5 - 4 + 5 \cdot 3$ to obtain $\frac{33}{2}$, without reordering operands or operations. Only these grouping templates are allowed: $(5 - (4 + 5)) \cdot 3$; $5 - (4 + (5 \cdot 3))$; $(5 - 4) + (5 \cdot 3)$. Give every valid grouping, or prove none works by checking the permitted structures. _____ _____	Evaluate $(10 - 6)(2 + 1)$. Record each completed inner group before using it in the enclosing operation. _____ _____
Insert grouping into $2 - 4 + 6 \cdot 2$ to obtain 8, without reordering operands or operations. Any full parenthesization preserving the displayed order is allowed. Give every valid grouping, or prove none works by checking the permitted structures. _____ _____	A fraction bar has numerator $[8 + 1 \cdot 5]$ and denominator $[5 - 5]$. Evaluate each whole group, then evaluate the compound fraction or state that it is undefined. _____ _____

Algebra 1

Order of Operations with Grouping Symbols

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Compare $(-9)^4$ and -9^4 . Evaluate both, state whether they are equal, and explain how the parentheses and exponent parity control the sign.

Audit the evaluation of $-|4 - 9| + 2$. Step 1: Compute $4 - 9 = -5$. Step 2: Replace $|-5|$ by -5 , so the external negative gives $-(-5)$. Step 3: Add 2 and report 7. Identify the first invalid step, preserve the valid prefix, and give the corrected value. If every step is valid, say so.

Audit the evaluation of $18 \div [7 - (5 - 4)]$. Step 1: Compute $5 - 4 = 1$. Step 2: Compute $7 - 1 = 6$. Step 3: Replace the bracket by 7 and report $\frac{18}{7}$. Identify the first invalid step, preserve the valid prefix, and give the corrected value. If every step is valid, say so.

Compare $(-5)^2$ and -5^2 . Evaluate both, state whether they are equal, and explain how the parentheses and exponent parity control the sign.

Order of Operations with Grouping Symbols

Full Worked Solutions - excerpt

Worked example

Problem. Evaluate $5 + 7 \cdot 4 - 1$. At each precedence level, work from left to right; show the decisive first operation.

Answer. 32

Explanation and check.

First

$$7 \cdot 4 = 28$$

Then move left to right:

$$5 + 28 - 1 = 32$$

Worked example

Problem. Evaluate $3 + 2 \cdot 5 - 1$. At each precedence level, work from left to right; show the decisive first operation.

Answer. 12

Explanation and check.

First

$$2 \cdot 5 = 10$$

Then move left to right:

$$3 + 10 - 1 = 12$$

Algebra 1
Units, Conversions, and Defining Quantities

Operations with Measurements and Unit Conversion | A1-U01-COMB-P07-P08

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for compatibility verdict with dimensional trace, coordinate value with axis units, defect list and repaired definition, definition with datum and sign meanings, equivalent measurement with cancellation and equivalent rate with two unit cancellations.
8 PDFs and a README; 77 buyer pages.

Algebra 1

Units, Conversions, and
Defining Quantities

Name: _____ Date: _____ Class: _____

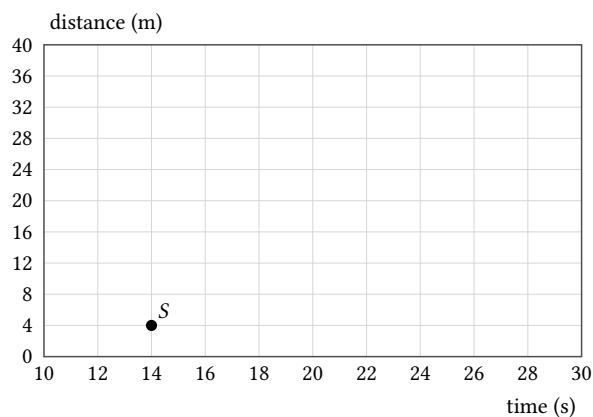
Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

One board is 6 ft 11 in long and another is 14 in long. Find their combined length in inches. Organize all quantities in one consistent unit system before calculating.

Quantity	Value	Unit
first piece feet	6	<i>ft</i>
first piece inches	11	in
second piece	14	in

Bank label: _____

A graph uses an x -axis starting at 10 s with 2 s per tick and a y -axis starting at 0 m with 4 m per tick. Point S is at tick indices (2, 1). Report its coordinate pair with units.



Bank label: _____

Algebra 1

Units, Conversions, and Defining Quantities

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: 24 in Compare these legitimate variable choices: m = elapsed time in minutes; h = elapsed time in hours. State their relationship ($m = 60h$) and decide which choice is more direct for the stated focus “minutes.” Do not construct or solve a full model. Your response: _____	Incoming: Relationship: $m = 60h$. The m definition answers a question requesting minutes directly. Compare these legitimate variable choices: u = liters used; r = liters remaining from an initial T liters. State their relationship ($r = T - u$) and decide which choice is more direct for the stated focus “remaining.” Do not construct or solve a full model. Your response: _____												
Incoming: 420 min Using 1 ft = 12 in, convert 2 ft to in. Write a ratio equal to 1 so that ft cancels, and check whether the new magnitude is sensible. Your response: _____	Incoming: Let e be the elapsed time from first alarm to all-clear, measured in seconds. A report asks for the distinct customers, not the number of purchases. Define the variable c operationally: name exactly what is counted or measured and include its unit. Clarify its scope so it cannot be confused with a nearby total, rate, object, or reference interval. Your response: _____												
Incoming: kg/m³ Material costs 4 USD/kg. What is the cost of 4 packages of 350 g each? Organize all quantities in one consistent unit system before calculating. <table border="1"> <thead> <tr> <th>Quantity</th> <th>Value</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>unit price</td> <td>4</td> <td>USD/kg</td> </tr> <tr> <td>mass per package</td> <td>350</td> <td>g</td> </tr> <tr> <td>packages</td> <td>4</td> <td>count</td> </tr> </tbody> </table> Your response: _____	Quantity	Value	Unit	unit price	4	USD/kg	mass per package	350	g	packages	4	count	Incoming: 0.158 m Using 1 lb = 16 oz, convert 21 oz to lb. Write a ratio equal to 1 so that oz cancels, and check whether the new magnitude is sensible. Your response: _____
Quantity	Value	Unit											
unit price	4	USD/kg											
mass per package	350	g											
packages	4	count											

Algebra 1

Units, Conversions, and Defining Quantities

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Audit this worked solution: $5 \text{ m} \left(\frac{100 \text{ cm}}{1 \text{ m}} \right) \left(\frac{100 \text{ cm}}{1 \text{ m}} \right) = 50000 \text{ cm}$. Identify the first invalid stage, if any, track the units, and give the corrected conclusion.

Choose the strategy that directly produces the required value and units, and justify the unit operations. Choice A: use $\left(\frac{1 \text{ km}}{1000 \text{ m}} \right) (3600 \text{ s}/(1 \text{ hr}))$. Choice B: use $(1 \text{ km}/(1000 \text{ m})) (1 \text{ hr}/(3600 \text{ s}))$. Convert 3 m/s to $\frac{\text{km}}{\text{hr}}$. Use the supplied relations $1 \text{ km} = 1000 \text{ m}$ and $1 \text{ hr} = 3600 \text{ s}$, orienting one ratio for the numerator unit and one for the denominator unit. Show both cancellations. Explain why reversing either factor would leave an unwanted unit or create a reciprocal-rate error.

Audit this worked solution: Because $A = L^2$ has area units, it must be the correct area formula for every shape. Identify the first invalid stage, if any, track the units, and give the corrected conclusion.

Audit this worked solution: Convert 6 m/s to $\frac{\text{km}}{\text{hr}}$: $6 \left(\frac{1 \text{ km}}{1000 \text{ m}} \right) = \frac{3}{500} \text{ km/hr}$. Identify the first invalid stage, if any, track the units, and give the corrected conclusion.

Units, Conversions, and Defining Quantities

Full Worked Solutions - excerpt

Worked example

Problem. Audit this worked solution: An axis starts at 0 and rises by 2.5 per tick; tick 6 is labeled 6. Identify the first invalid stage, if any, track the units, and give the corrected conclusion.

Answer. First invalid stage: axis reading. Correct conclusion: 15 units.

Explanation and check.

Multiply the tick index by 2.5.

Worked example

Problem. Diagnose the proposed definition “Let b be the bicycle.” Identify the missing semantic component or components, then rewrite it as an operational variable definition.

Answer. Missing: quantity measured. Repair: Let b be the distance the bicycle travels, in kilometers.

Explanation and check.

A symbol must represent a measurable attribute, not the physical object.

Algebra 1
Reading and Translating Algebraic Expressions

Reading and Translating Algebraic Expressions | A1-U01-COMB-P09-P10

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for contextual expression with unit rationale, correctly grouped two-stage expression, equivalent-description labels with structural reason, first error and corrected structural labels, first mismatch and repaired expression and marked subexpression role at named level.

8 PDFs and a README; 55 buyer pages.

Algebra 1

Reading and Translating Algebraic Expressions

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

In $\frac{7}{x+4} + 1$, treat the marked subexpression “$x + 4$” as one quantity. Describe its role in the whole expression at the requested level “path from marked group to the root” without expanding or evaluating. Compare its immediate role with its role after moving one level outward, and explain why both descriptions can be true. _____ Bank label: _____	Construct one expression satisfying all requirements: outer operation is division; numerator is the two-term sum $-x + 5$; denominator is $2(y + 1)$; the quotient is one outer term. Then audit your expression by listing its outer signed terms. Equivalent answers are allowed; do not simplify by expanding or combining. _____ Bank label: _____
At the outer additive level of $\frac{n+7}{13} - 6y + 2$, list the signed terms in order. Keep every product, quotient, or parenthesized factor intact; do not expand or combine anything. _____ Bank label: _____	At the outer additive level of $-(y - 5) + 9y - 4$, list the signed terms in order. Keep every product, quotient, or parenthesized factor intact; do not expand or combine anything. _____ Bank label: _____

Algebra 1

Reading and Translating Algebraic Expressions

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

The supplied model is $C = F + rn$, with definitions: C : total charge in USD; F : fixed fee in USD; r : usage price in USD/unit; n : number of usage units. Interpret F and rn in context, stating whether each is a separate contribution, a repeated-group factor, or a product and tracking its unit. Use the requested focus “grouped factor.” Do not build or solve the model.

The supplied model is $T = k(a + b)$, with definitions: T : total items; k : number of identical groups; a : red items per group; b : blue items per group. Interpret $a + b$ and k in context, stating whether each is a separate contribution, a repeated-group factor, or a product and tracking its unit. Use the requested focus “selected outer term.” Do not build or solve the model.

The supplied model is $R = S - uq$, with definitions: R : remaining material in meters; S : starting material in meters; u : meters used per piece; q : pieces made. Interpret S and uq in context, stating whether each is a separate contribution, a repeated-group factor, or a product and tracking its unit. Use the requested focus “selected product.” Do not build or solve the model.

Audit the annotation: In $4(x + 2)$, x and 2 are the two outer terms. Identify the first structural labeling error, correct all affected labels, and justify the correction using the relevant operation level.

Reading and Translating Algebraic Expressions

Full Worked Solutions - excerpt

Worked example

Problem. Audit the proposed translation of “three times the sum of x and 2”: $3x + 2$. Identify the first operator or operand-role mismatch and repair the expression while preserving every correct component.

Answer. $3(x + 2)$

Explanation and check.

The whole sum must be one factor.

Worked example

Problem. Audit the proposed translation of “five less than x ”: $5 - x$. Identify the first operator or operand-role mismatch and repair the expression while preserving every correct component.

Answer. $x - 5$

Explanation and check.

Less-than makes x the minuend and 5 the subtrahend.

Algebra 1
Expression Evaluation and Properties of Operations

Expression Evaluation and Properties of Operations | A1-U01-COMB-P11-P12

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for comparison with structural explanation, counterexample and corrected rule, equivalent rewrite, value, and property explanation, exact value, exact value or insufficiency with witnesses and exact value with grouping shown.

8 PDFs and a README; 54 buyer pages.

Algebra 1

Expression Evaluation and Properties of Operations

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

An answer may be used more than once.

Evaluate $x(x - 1) + 2x$ when $x = -5$. Replace every occurrence of x before simplifying.

Evaluate $-(x^3) + 2x$ when $x = -3$. Show the substituted negative input in parentheses so the base of each power is clear.

Bank label: _____

Bank label: _____

Use the given assignments $x = 0, y = 0$ to evaluate $4(x + y) - 3x$. Match every value to its symbol and preserve the grouping.

$$4(x + y) - 3x$$

variable	value
x	0
y	0

Use the given assignments $x = 0, y = 2$ to evaluate $x(y - 3) + 3y$. Match every value to its symbol and preserve the grouping.

$$x(y - 3) + 3y$$

variable	value
x	0
y	2

Bank label: _____

Bank label: _____

Algebra 1

Expression Evaluation and Properties of Operations

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Use the given assignments $x = -2, y = 0$ to evaluate $x(y - 3) + 3y$. Match every value to its symbol and preserve the grouping. _____ _____	Use the given assignments $x = 0, y = 0$ to evaluate $x(y - 5) + 5y$. Match every value to its symbol and preserve the grouping. _____ _____
Evaluate $\frac{x+2}{x+7}$ at $x = -2$. Check the denominator in the original expression before simplifying; if it is zero, state why the value is undefined. _____ _____	Evaluate $\frac{x+1}{x-(-2)}$ at $x = -2$. Check the denominator in the original expression before simplifying; if it is zero, state why the value is undefined. _____ _____
Evaluate $\frac{x+3}{x-(0)}$ at $x = 0$. Check the denominator in the original expression before simplifying; if it is zero, state why the value is undefined. _____ _____	Evaluate $\frac{x+5}{x-(1)}$ at $x = 1$. Check the denominator in the original expression before simplifying; if it is zero, state why the value is undefined. _____ _____

Algebra 1

Expression Evaluation and Properties of Operations

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Choose and justify a method before solving (direct substitution, an organized value table, or an equivalent-form check). Then complete the task: Use the given assignments $x = -2$, $y = -2$ to evaluate $2(x + y) - x$. Match every value to its symbol and preserve the grouping.

$$2(x + y) - x$$

variable	value
x	-2
y	-2

Choose and justify a method before solving (direct substitution, an organized value table, or an equivalent-form check). Then complete the task: Use the given assignments $x = -3$, $y = 3$, $z = 0$ to evaluate $(x + 2y)(z - x)$. Match every value to its symbol and preserve the grouping.

$$(x + 2y)(z - x)$$

variable	value
x	-3
y	3
z	0

Expression Evaluation and Properties of Operations

Full Worked Solutions - excerpt

Worked example

Problem. Evaluate $2x + x - 1$ when $x = -6$. Replace every occurrence of x before simplifying.

Answer. -19

Explanation and check.

Replace both occurrences of x by -6 : $2(-6) + (-6) - 1 = -19$.

Worked example

Problem. Evaluate $3x + x - 3$ when $x = 0$. Replace every occurrence of x before simplifying.

Answer. -3

Explanation and check.

Replace both occurrences of x by 0 : $3(0) + (0) - 3 = -3$.

Algebra 1
Distributive Property and Combining Like Terms

Distributive Property and Combining Like Terms | A1-U01-COMB-P13-P15

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for admissible witness and exact values, coefficient or inconsistency proof, collected expression, decomposition, distributed computation, exact value, equivalent form and verification and expanded and collected form.
8 PDFs and a README; 53 buyer pages.

Algebra 1

Distributive Property and Combining Like Terms

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Audit the work " $(\frac{2}{3})(6x - 9) = 4x - 9$." Identify the first missing or invalid factor-term pairing, correct the expansion or factorization, and verify the correction at the simple value stated or at a value you choose.

Bank label: _____

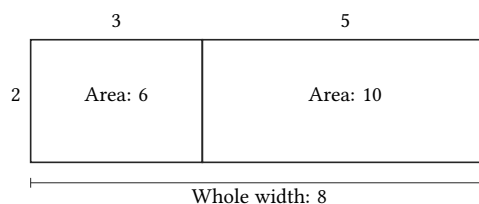
Compute $(25)(12)$ by decomposing one factor into a useful sum or difference and distributing. Show why your chosen decomposition reduces the work.

Bank label: _____

Complete or assess the distributive identity $3(\text{ } x + 2) = 6x + 6$. Recover the missing component by matching corresponding products; if no value works, explain the conflicting requirements.

Bank label: _____

A rectangle has common height 2 and is partitioned into vertical strips with widths 3, 5; the whole width is 8. Use the stated partition incidence to write the total area both as height times whole width and as the sum of strip areas. Explain why the expressions are equal.



Bank label: _____

Algebra 1

Distributive Property and Combining Like Terms

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Compute $(2)(22)$ by decomposing one factor into a useful sum or difference and distributing. Show why your chosen decomposition reduces the work. _____ _____	Audit the work "$3(x + 5) = 3x + 5$." Identify the first missing or invalid factor-term pairing, correct the expansion or factorization, and verify the correction at the simple value stated or at a value you choose. _____ _____
Audit the work "$-(x - 4) = -x - 4$." Identify the first missing or invalid factor-term pairing, correct the expansion or factorization, and verify the correction at the simple value stated or at a value you choose. _____ _____	Audit the work "$2(x + 3) + 4(y - 1) = 2x + 6 + 4y - 1$." Identify the first missing or invalid factor-term pairing, correct the expansion or factorization, and verify the correction at the simple value stated or at a value you choose. _____ _____
Audit the work "$-6x + 12 = -6(x + 2)$." Identify the first missing or invalid factor-term pairing, correct the expansion or factorization, and verify the correction at the simple value stated or at a value you choose. _____ _____	Audit the work "$8x + 12 + 4y = 4(2x + 12 + y)$." Identify the first missing or invalid factor-term pairing, correct the expansion or factorization, and verify the correction at the simple value stated or at a value you choose. _____ _____

Algebra 1

Distributive Property and Combining Like Terms

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Audit the work “ $2(a + b - 3) = 2a + b - 6$.” Identify the first missing or invalid factor-term pairing, correct the expansion or factorization, and verify the correction at the simple value stated or at a value you choose.

Audit the work “ $-4(y + 2) = -4y + 8$.” Identify the first missing or invalid factor-term pairing, correct the expansion or factorization, and verify the correction at the simple value stated or at a value you choose.

Audit the work “ $6x + 10 = 3(2x + 5)$.” Identify the first missing or invalid factor-term pairing, correct the expansion or factorization, and verify the correction at the simple value stated or at a value you choose.

Audit the simplification “ $2x + 5x^2 = 7x^2$.” Identify the first invalid grouping or state that it is valid, compare complete variable parts, and give the corrected result with a coefficient-based explanation.

Distributive Property and Combining Like Terms

Full Worked Solutions - excerpt

Worked example

Problem. Audit the work “ $(\frac{2}{3})(6x - 9) = 4x - 9$.” Identify the first missing or invalid factor-term pairing, correct the expansion or factorization, and verify the correction at the simple value stated or at a value you choose.

Answer. The scalar $\frac{2}{3}$ was not applied to -9 . Correct: $4x - 6$; at $x = 0$, both correct forms equal -6 .

Explanation and check.

Check every factor-term pairing. The scalar $\frac{2}{3}$ was not applied to -9 . Correct: $4x - 6$; at $x = 0$, both correct forms equal -6 .

Worked example

Problem. Compute $(25)(12)$ by decomposing one factor into a useful sum or difference and distributing. Show why your chosen decomposition reduces the work.

Answer. $25(10 + 2) = 250 + 50 = 300$

Explanation and check.

Use the displayed benchmark split and distribute to get easier partial products:

$$25(10 + 2) = 250 + 50 = 300$$

Algebra 1
Equality and One-Step Additive Equations

Equality and One-Step Additive Equations | A1-U02-COMB-P01-P02

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for checked solution audit, completed equation, constant with verification, contextual solution and check, effect of constant changes and equivalent transformed equation and inverse.
8 PDFs and a README; 54 buyer pages.

Algebra 1

Equality and One-Step Additive Equations

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Interpret the statement $3 + 5 = 8$. Decide whether it is true, compare the values of the two complete sides, and explain what the equals sign asserts without describing it as an instruction to compute the right side.

Bank label: _____

Interpret the statement $3 + 4 = 8$. Decide whether it is true, compare the values of the two complete sides, and explain what the equals sign asserts without describing it as an instruction to compute the right side.

Bank label: _____

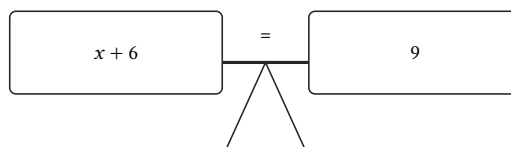
Under the stated domain $[-2, -1, 0, 1, 2]$, compare the complete solution sets of $x = 2$ and $(x - 2)(x + 1) = 0$. Use direct membership or the supplied finite domain rather than visual similarity, then state whether the equations are equivalent.

Given domain: $[-2, -1, 0, 1, 2]$

x	Equation 1	Equation 2
-2	not a solution	not a solution
-1	not a solution	solution
0	not a solution	not a solution
1	not a solution	not a solution
2	solution	solution

Bank label: _____

Starting from $x + 6 = 9$, add 7 to both sides. Write the resulting equation with the operation applied to each complete side, state the inverse operation, and explain why the transformation preserves the full solution set.



Bank label: _____

Algebra 1

Equality and One-Step
Additive Equations

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: -17 Complete $k - x = 7$ so its solution is $x = -4$. Find k , explain the signed arithmetic, and verify uniqueness. Your response: _____	Incoming: 3 A situation is represented by $45 - r = 17$, where r is the water removed from a tank measured in liters. Solve the supplied equation and interpret r with its unit. Your response: _____
Incoming: 17 What value of k makes 11 satisfy $k + x = -6$? Substitute the target first, then check the resulting equation. Your response: _____	Incoming: 14 A constant edit changes the first equation $x + \frac{1}{2} = \frac{5}{2}$ into the comparison equation $y + \frac{3}{4} = \frac{5}{2}$. Describe the resulting solution change and verify both values. Your response: _____
Incoming: 11 liters Read $\text{tau} + 1.75 = 6.5$ as an additive equation for the time already spent before another 1.75 hours. Solve for tau, attach the unit hours, and test the value in the equation. Your response: _____	Incoming: 5 Isolate t in $t + (-6) = 15$, and state the inverse additive move you used. Your response: _____

Algebra 1

Equality and One-Step Additive Equations

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Examine the proposed reasoning for $n - 9 = -4$: $n - 9 + 9 = -4$; $n = -4$. Decide whether equality was preserved; then state and check the correct result.

A student solves $x + 7 = 19$ with these steps: $x + 7 - 7 = 19 + 7$; $x = 26$. Audit the work, identify the first issue if any, give the corrected solution, and verify it.

For the equation $t + (-6) = 15$, a solution record reads $t = 15 - 6$; $t = 9$. Diagnose the inverse-operation reasoning and repair the conclusion when necessary.

Examine the proposed reasoning for $a + \frac{11}{12} = -\frac{1}{3}$: $a = -\frac{1}{3} - \frac{11}{12}$; $a = \frac{7}{12}$. Decide whether equality was preserved; then state and check the correct result.

Equality and One-Step Additive Equations

Full Worked Solutions - excerpt

Worked example

Problem. Interpret the statement $3 + 5 = 8$. Decide whether it is true, compare the values of the two complete sides, and explain what the equals sign asserts without describing it as an instruction to compute the right side.

Answer. true; both sides name the same value

Explanation and check.

The complete left value and complete right value are both 8.

Worked example

Problem. Interpret the statement $3 + 4 = 8$. Decide whether it is true, compare the values of the two complete sides, and explain what the equals sign asserts without describing it as an instruction to compute the right side.

Answer. false; the side values differ

Explanation and check.

The left side is 7, while the right side is 8.

Algebra 1
One-Step Multiplication and Division Equations

One-Step Multiplication and Division Equations | A1-U02-P03

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for allowable scale with restriction, coefficient effect with signs, completed multiplicative equation, contextual exact solution, equivalent operations and solution and exact value with substitution.
8 PDFs and a README; 48 buyer pages.

Algebra 1

One-Step Multiplication and Division Equations

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Find x in $-12x = -192$ with exact arithmetic; include the original-equation verification. _____ Bank label: _____	Use a reciprocal operation to isolate x in $\frac{x}{7} = -3$. State the exact solution and a check. _____ Bank label: _____
Read $(\frac{11}{8})u = \frac{33}{4}$ as a supplied multiplicative relation for the original length under an improper fraction scale. Determine u in meters and verify. _____ Bank label: _____	Determine the unique solution of $5x = 50$. Name the inverse multiplicative step you use. _____ Bank label: _____
For the template $\frac{x}{a} = -7$, make $x = -21$ work. Check the nonzero restriction on the coefficient or divisor. _____ Bank label: _____	Rewrite $\frac{x}{-8} = \frac{5}{8}$ with x alone by applying an equivalent reciprocal step to both sides. _____ Bank label: _____
Reverse the coefficient-solving task: $ax = 35$ is required to have target -5. Find the missing data and test admissibility. _____ Bank label: _____	Solve $(\frac{3}{4})x = \frac{15}{8}$ and verify the value in the original equation. _____ Bank label: _____

Algebra 1

One-Step Multiplication and Division Equations

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

The equation display is $0x = 9$. A solver proposes to divide both sides by 0. Is that operation permitted? Explain by inspecting the proposed divisor. 	Before solving $7x = 0$, assess the step 'divide both sides by 7'. Distinguish a zero coefficient from a zero right side.
Read $(\frac{2}{3})a = 14$ as a supplied multiplicative relation for the original measure from a two-thirds portion. Determine a in meters and verify. 	For $0x = -4$, decide whether the proposed step "multiply both sides by $\frac{1}{0}$" is permitted. State the inverse restriction without doing a full solution-set classification.
Two solvers attack $(-\frac{2}{5})x = -6$. One will divide both sides by $-\frac{2}{5}$; the other will multiply both sides by $-\frac{5}{2}$. Explain their equivalence and finish the solution. 	For the pair $3x = 36$ and $9y = 36$, determine the order of x and y. Qualify your reasoning using the coefficient signs.

Algebra 1

One-Step Multiplication and Division Equations

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $x < y$; $-8 < 4$ A coefficient changes while the product side stays 15: $1.5x = 15$; $2.5y = 15$. Compare the solutions and verify. Your response: _____	Incoming: $x > y$; $10 > 6$ The equation is $(-\frac{11}{6})x = -22$. Compare division by the coefficient with multiplication by its reciprocal, then report the checked value of x. Your response: _____
Incoming: $a = -4$ Without assuming that a larger coefficient always means a smaller signed solution, compare $-5x = 40$ with $10y = 40$. Your response: _____	Incoming: $-\frac{52}{5}$ Find x in $(\frac{4}{11})x = \frac{60}{77}$ with exact arithmetic; include the original-equation verification. Your response: _____
Incoming: 30 liters Use the given grouping equation $-0.4s = 3.2$. The variable s is the signed time under a negative change rate, measured in seconds; find and check it. Your response: _____	Incoming: 9 Reverse the nonzero scaling in $\frac{x}{-7} = 1$, then confirm both sides agree. Your response: _____

Algebra 1

One-Step Multiplication and Division Equations

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Audit this work for $4x = 28$: $x = \frac{28}{4}$; $x = 7$. Identify the first invalid reciprocal or division step, repair it, and verify.

Diagnose the multiplicative reasoning in $\frac{x}{5}$ times $5 = -4$; $x = -4$ for $\frac{x}{5} = -4$. Name any sign or reciprocal error and correct the result.

Someone claims $x = \frac{7}{-4}$; $x = -\frac{7}{4}$ solves $\frac{x}{-4} = 7$. Locate a one-sided, inverse, or sign mistake if present and verify the repaired answer.

Check the equality logic used on $(\frac{5}{8})x = -15$: $x = -15$ times $\frac{8}{5}$; $x = -24$. Report the first issue or defend the method, then substitute the conclusion.

One-Step Multiplication and Division Equations

Full Worked Solutions - excerpt

Worked example

Problem. Find x in $-12x = -192$ with exact arithmetic; include the original-equation verification.

Answer. 16

Explanation and check.

Undo the multiplier -12 on both sides. This isolates x at 16; the original relation checks.

Worked example

Problem. Use a reciprocal operation to isolate x in $\frac{x}{7} = -3$. State the exact solution and a check.

Answer. -21

Explanation and check.

Apply the reciprocal of the effective scale to the full equality. The result is $x = -21$, and substitution reproduces -3 .

Algebra 1
Two-Step Equations

Two-Step Equations | A1-U02-P04
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for exact value and verification, exact value with inverse order, exact value with unit and contextual check, first invalid step, corrected solution, and check, input, reverse path, and forward check and parameter value or feasibility classification.
8 PDFs and a README; 50 buyer pages.

Algebra 1

Two-Step Equations

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Isolate x in $-2x + 9 = -3$, preserving the equality at every step. _____ Bank label: _____	Use this operation diagram: input $x \rightarrow$ multiply by 3 $\rightarrow$ add 5 $\rightarrow$ output 17. Traverse the arrows backward to recover x, then run the machine forward as a check. _____ Bank label: _____
Determine the value of x that makes $7x + 2 = -19$ true. Show the two inverse operations. _____ Bank label: _____	Isolate x in $2x + 11 = 25$, preserving the equality at every step. _____ Bank label: _____
Complete $5(-3) + k = -22$ so that the prescribed input $x = -3$ works. Determine k and verify the resulting equality. _____ Bank label: _____	Without skipping the check, solve $5x + 15 = 15$ and explain whether $x = 0$ works. _____ Bank label: _____
Solve $9(x - 5) = -27$ by reversing the outer operation before the inner shift. _____ Bank label: _____	Isolate x in $(-\frac{7}{4})x + \frac{2}{3} = \frac{25}{6}$, preserving the equality at every step. _____ Bank label: _____

Algebra 1

Two-Step Equations

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Solve $-3x - 6 = -24$. Keep the result exact and verify it in the original equation. _____ _____	Solve $8x - 5 = -29$. Keep the result exact and verify it in the original equation. _____ _____
The complete rule is input $x \rightarrow$ multiply by $-4 \rightarrow$ add 7 $\rightarrow$ output 19. What input produced the stated output? Include the intermediate value in your verification. _____ _____	Use the given equation $64 - 5x = 24$ for this initial-minus-use situation: x measures operating intervals in hours; 64 is the initial amount and 5 is removed per unit of x. Recover x and explain both inverse steps. _____ _____
The conversion rule has already been modeled as $(\frac{9}{5})x + 32 = 77$; x is the input temperature; the conversion multiplies by $\frac{9}{5}$ and then shifts by 32. Find the source value x in degrees and check by converting forward. _____ _____	Solve $-5(x - 4) = 35$ by reversing the outer operation before the inner shift. _____ _____

Algebra 1

Two-Step Equations

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: -23 A two-stage machine applies 'divide by 4' and then 'add 3'. Its output is 5. Recover the input and list the inverse steps in reverse order. Your response: _____	Incoming: 8 The complete rule is input $x \rightarrow$ multiply by $\frac{1}{2} \rightarrow$ add $-3 \rightarrow$ output 2. What input produced the stated output? Include the intermediate value in your verification. Your response: _____
Incoming: $\frac{23}{6}$ What value of x satisfies $\frac{x+2}{7} = -3$? Show how the grouped quantity is isolated first. Your response: _____	Incoming: $\frac{7}{4}$ Complete $\frac{\frac{11}{6} - \frac{5}{4}}{d} = \frac{7}{3}$ so that the prescribed input $x = \frac{11}{6}$ works. Determine d and verify the resulting equality. Your response: _____
Incoming: $\frac{8}{3}$ Use this operation diagram: input $x \rightarrow$ add 9 $\rightarrow$ divide by $-5 \rightarrow$ output -2. Traverse the arrows backward to recover x, then run the machine forward as a check. Your response: _____	Incoming: 4 Determine the value of x that makes $4x - 7 = 13$ true. Show the two inverse operations. Your response: _____

Algebra 1

Two-Step Equations

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

For $(\frac{3}{2})(x + 4) = \frac{15}{2}$, Route A would multiply both sides by the reciprocal $\frac{2}{3}$ to isolate the group. Route B would split the rational scale into numerator and denominator and undo those two factors separately. Carry out both valid routes, compare their intermediate arithmetic, and solve.

Two valid plans for $(\frac{5}{3})(x - 2) = \frac{20}{3}$ are: A—multiply both sides by the reciprocal $\frac{3}{5}$ to isolate the group; B—split the rational scale into numerator and denominator and undo those two factors separately. Decide which better exposes the grouped quantity here and verify the common solution.

Inspect $\frac{x+5}{\frac{7}{4}} = -\frac{21}{4}$. Compare the valid full-group route (multiply both sides by the full divisor $\frac{7}{4}$) with the factor-by-factor route (rewrite division by the rational number as reciprocal multiplication, then undo that multiplier); report x and the cleaner route.

For $(-\frac{3}{2})(x + 6) = 9$, Route A would multiply both sides by the reciprocal $-\frac{2}{3}$ to isolate the group. Route B would split the rational scale into numerator and denominator and undo those two factors separately. Carry out both valid routes, compare their intermediate arithmetic, and solve.

Two-Step Equations

Full Worked Solutions - excerpt

Worked example

Problem. Isolate x in $-2x + 9 = -3$, preserving the equality at every step.

Answer. 6

Explanation and check.

First undo the full offset: the variable term equals -12 . Its effective coefficient is -2 , so division gives $x = 6$. Substitution in $-2x + 9 = -3$ reproduces -3 .

Worked example

Problem. Use this operation diagram: input $x \rightarrow$ multiply by 3 $\rightarrow$ add 5 $\rightarrow$ output 17. Traverse the arrows backward to recover x , then run the machine forward as a check.

Answer. 4

Explanation and check.

Starting at 17, subtract 5 gives the prior stage value 12; then divide by 3 gives $x = 4$. Forward verification applies multiply by 3 and add 5 and returns 17.

Algebra 1
Equations with the Distributive Property

Equations with the Distributive Property | A1-U02-P05

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for distribution, combined coefficient, exact solution, and check, equivalence classification, operation validity, and proof, first error, corrected equation, solution, and original-form check, missing value or feasibility classification with verification, recovered data or inconsistency proof with term matching and strategy justification, exact solution, and check.

8 PDFs and a README; 49 buyer pages.

Algebra 1

Equations with the
Distributive Property

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

The target solution $x = 4$ must satisfy $3(2x + b) - x = 35$. Recover the missing inside constant b, classify uniqueness, and verify. _____ Bank label: _____	Substitute $x = -3$ into the incomplete grouped equation $m(2x + 4) + x = 1$. Determine m and check the completed original form. _____ Bank label: _____
Choose k so that $x = 5$ satisfies $2(kx + 3) - 4x = 16$. Keep the group intact during substitution, then test the result. _____ Bank label: _____	Expand the grouped side of $-3(4x + 6) - 5x = 101$, solve the resulting linear equation, and verify in the unexpanded equation. _____ Bank label: _____
Solve $5(4x - 9) - 8x = -21$. Distribute across every complete group before combining the exposed variable terms, then check the original form. _____ Bank label: _____	Expand the grouped side of $-7(2x + 1) + 5x = -43$, solve the resulting linear equation, and verify in the unexpanded equation. _____ Bank label: _____
In $6(3x - 4) - 11x = -45$, the grouped variable contribution interacts with an outside variable term. Expose that interaction and solve exactly. _____ Bank label: _____	Track every sign while solving $4(-2x + 7) + 5x = 46$; state the net coefficient after distribution and confirm the answer in the original groups. _____ Bank label: _____

Algebra 1

Equations with the
Distributive Property

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $\frac{11}{4}$ Substitute $x = -5$ into the incomplete grouped equation $m(\frac{3}{2}x - \frac{7}{3}) + (\frac{4}{5})x = -\frac{209}{8}$. Determine m and check the completed original form. Your response: _____	Incoming: $\frac{9}{4}$ Track every sign while solving $5(-3x + 4) + 2x = 33$; state the net coefficient after distribution and confirm the answer in the original groups. Your response: _____
Incoming: 9 The target solution $x = 7$ must satisfy $5(-2x + b) + 3x = -\frac{141}{4}$. Recover the missing inside constant b , classify uniqueness, and verify. Your response: _____	Incoming: 4 Complete the grouped equation $(\frac{7}{4})(\frac{2}{3}x + b) - (\frac{5}{6})x = -\frac{493}{180}$ for the prescribed solution $x = -\frac{9}{5}$. Explain why the missing data are or are not uniquely determined. Your response: _____
Incoming: 1 In $4(3x + 2) - 7x = -22$, the grouped variable contribution interacts with an outside variable term. Expose that interaction and solve exactly. Your response: _____	Incoming: $-\frac{4}{7}$ In $4(-x + 6) + 3x = 19$, the grouped variable contribution interacts with an outside variable term. Expose that interaction and solve exactly. Your response: _____

Algebra 1

Equations with the Distributive Property

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Audit this work for $3(2x + 5) - x = 35$: $6x + 5 - x = 35$; $5x = 30$; $x = 6$. Identify the first incorrect distributed term, repair the equation, and verify the solution.

Track the signed distribution in $-2(3x - 4) + x = 23$. The proposed work is $-6x - 8 + x = 23$; $-5x = 31$; $x = -\frac{31}{5}$. Diagnose its first sign error and give the checked value of x .

Audit this work for $4(6 - x) + 3x = 19$: $24 - x + 3x = 19$; $2x = -5$; $x = -\frac{5}{2}$. Identify the first incorrect distributed term, repair the equation, and verify the solution.

Review the constant contribution in the attempted solution of $5(2x - 3) - 4x = -27$: $10x - 3 - 4x = -27$; $6x = -24$; $x = -4$. Locate the distribution error and solve correctly.

Equations with the Distributive Property

Full Worked Solutions - excerpt

Worked example

Problem. The target solution $x = 4$ must satisfy $3(2x + b) - x = 35$. Recover the missing inside constant b , classify uniqueness, and verify.

Answer. 5

Explanation and check.

Replace x by 4 while retaining the group. After substituting the target, the remaining nonzero coefficient on b determines $b = 5$ uniquely. Rechecking the completed group at the target confirms the unique result.

Worked example

Problem. Substitute $x = -3$ into the incomplete grouped equation $m(2x + 4) + x = 1$. Determine m and check the completed original form.

Answer. -2

Explanation and check.

At $x = -3$, first evaluate the known inside quantity and the outside x -term. After substituting the target, the remaining nonzero coefficient on m determines $m = -2$ uniquely. A direct substitution check confirms the recovered factor condition.

Algebra 1
Equations with Like Terms

Equations with Like Terms | A1-U02-P06

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for cancelled pair, surviving term, exact solution, and check, first invalid step, corrected grouping, solution, and check, missing value or identifiability classification with check, net coefficient, exact solution, and verification, route validity, efficiency, exact solution, and check and separate totals, exact solution, and verification.

8 PDFs and a README; 49 buyer pages.

Algebra 1

Equations with
Like Terms

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

In $x + 4x - 2x - 6 = 3$, include every implicit or fractional coefficient when collecting like terms. What is x? _____ Bank label: _____	Solve $3x + 7 + 5x - 4 - 2x + 9 = 36$ by collecting variable terms and constant terms as two separate groups. Show both totals and verify. _____ Bank label: _____
Substitute $x = -3$ into $-2x + 7 + 5x + d = -6$, then determine the missing constant d. Check the completed equation in its original order. _____ Bank label: _____	Some constants or coefficients in $6x - 8 - x + 3 + 3x + 5 = 16$ cancel. Identify only the true inverse pairs, then solve the reduced equation. _____ Bank label: _____
Choose k so that $x = 6$ solves $4x + kx - 3x - 8 = -14$. Explain what the target determines before simplifying the full expression. _____ Bank label: _____	In $2x + 5 - 7x - 5 + 4x + 11 = 14$, determine which additive group has total zero and which terms survive. Solve without combining unlike terms. _____ Bank label: _____
Track the signs of every x-term in $-4x + 2x - 3x + 9 = 34$. State the net coefficient, solve exactly, and verify. _____ Bank label: _____	Simplify and solve $-6x + 9 + 5x - 9 + 3 = -3$. Identify the constant inverse pair without discarding either variable contribution. _____ Bank label: _____

Algebra 1

Equations with
Like Terms

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: 11 Solve $5x - 8x + 2x - 11 = -21$. Combine the three signed coefficients before applying inverse operations, then check the original equation. Your response: _____	Incoming: 10 In $-8x + 7x + 4x - 5 = 10$, include every implicit or fractional coefficient when collecting like terms. What is x? Your response: _____
Incoming: -7 Some constants or coefficients in $7x - 8 - 13x + 8 + 9x + 17 = 50$ cancel. Identify only the true inverse pairs, then solve the reduced equation. Your response: _____	Incoming: $-\frac{5}{7}$ Solve $-(\frac{23}{21})x - \frac{13}{16} + (\frac{5}{7})x + \frac{19}{24} + (\frac{4}{15})x + \frac{1}{48} = \frac{62}{385}$ by collecting variable terms and constant terms as two separate groups. Show both totals and verify. Your response: _____
Incoming: -8 Substitute $x = -\frac{9}{5}$ into $-(\frac{3}{2})x - \frac{5}{6} + (\frac{7}{4})x + d = \frac{1}{60}$, then determine the missing constant d. Check the completed equation in its original order. Your response: _____	Incoming: -2 The prescribed solution $x = 4$ must satisfy $3x + kx - x + 5 = 21$. Recover the missing coefficient k and verify after collecting coefficients. Your response: _____

Algebra 1

Equations with Like Terms

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Audit the coefficient collection in $3x - 5x + 4x + 7 = 15$. The proposed work is $12x + 7 = 15$; $x = \frac{2}{3}$. Locate the first invalid total and provide a checked correction.

For $4x + 7 - 4x - 7 + 3x + 5 + 2x - 1 = 34$, compare Route A (pair the explicit additive inverses first, then collect the survivors) with Route B (combine terms strictly from left to right). Carry out the efficient valid collection and solve.

Choose an addition order for $2x + 4 + 5x + 6 - 3x - 2 + x + 3 = -9$: A—pair coefficients and constants into convenient small sums before adding; B—combine every term strictly from left to right. Explain the arithmetic advantage, find x , and check.

Audit two proposed grouping routes for $-6x + 8 + 2x - 3 + 5x - 5 - 2x + 7 = -2$. Route A will keep each negative sign attached while grouping variable terms separately from constants; Route B will drop subtraction signs when moving terms into new visual groups. Classify them and solve with preserved signs.

Equations with Like Terms

Full Worked Solutions - excerpt

Worked example

Problem. In $x + 4x - 2x - 6 = 3$, include every implicit or fractional coefficient when collecting like terms. What is x ?

Answer. 3

Explanation and check.

Treat the three x -terms as coefficient copies of one variable. Their total is 3, reducing the left side to $3x - 6$. Hence $x = 3$, and the original equality is true.

Worked example

Problem. Solve $3x + 7 + 5x - 4 - 2x + 9 = 36$ by collecting variable terms and constant terms as two separate groups. Show both totals and verify.

Answer. 4

Explanation and check.

The x -coefficients total 6, while the constants independently total 12. Thus $6x + 12 = 36$, giving $x = 4$; the interleaved original checks.

Algebra 1
Linear Equations: Solving, Coefficients & Reasoning

Solving Linear Equations with Variables on Both Sides | A1-U02-P07

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for balance operations, exact solution, and two-side check, coefficient comparison, operation permission, and remaining relation, coefficient value or identifiability/admissibility result, first error, corrected balance operation, exact solution, and check, local forms, cross-side coefficient, exact solution, and check and net-form comparison, exact solutions, and relation.
8 PDFs and a README; 50 buyer pages.

Algebra 1

Linear Equations: Solving, Coefficients & Reasoning

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Simplify each side of $3x + 5 + 2x - 1 = x + 7 + 3x + 1$ independently before collecting across equality. State both local totals and solve. _____ Bank label: _____	Track signs through the local simplification of $-4x + 6 + x + 3 = 2x - 5 - 3x + 18$, then compare the two resulting variable coefficients and verify x. _____ Bank label: _____
Solve $-3x + 9 - 5x - 2 = 4x + 3 - x + 48$ by comparing the simplified coefficient and constant on each side. Check in the original interleaved form. _____ Bank label: _____	Simplify each side of $6x - 8 + x + 5 = -2x - 6 + 7x + 9$ independently before collecting across equality. State both local totals and solve. _____ Bank label: _____
Complete $5x - 4 = kx + 32$ so its prescribed solution is $x = 6$. State the coefficient and prove the target is the unique solution. _____ Bank label: _____	Solve $-5x + 9 = -x - 15$ by applying the same variable and constant operations to both complete sides. Verify the result. _____ Bank label: _____
For $-6x + 13 = 4x - 37$, compare the two x-coefficients first. Use their difference to solve exactly and confirm both original sides. _____ Bank label: _____	Isolate x in $8x + 2 = -3x - 64$ without using a 'move-and-change-sign' shortcut. Name each balance-preserving operation and verify. _____ Bank label: _____

Algebra 1

Linear Equations: Solving, Coefficients & Reasoning

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Solve $3x + 5 = x + 13$ by applying the same variable and constant operations to both complete sides. Verify the result. _____ _____	Solve $7x + 9 = -x + 33$ by carrying out both cross-side collection choices. Explain why they preserve equality and where their intermediates differ. _____ _____
Equation A is $3x + 5 = x + 13$. Equation B is created when we increase the right constant by 2: $3x + 5 = x + 15$. Predict the solution change from net constants, then confirm both values. _____ _____	Substitute $x = -3$ into $-2x + 7 = kx + 25$ to determine k. Then check that the completed equation still has unequal x-coefficients. _____ _____
Equation A is $-2x + 7 = 3x + 12$. Equation B is created when we change the left constant by -3: $-2x + 4 = 3x + 12$. Predict the solution change from net constants, then confirm both values. _____ _____	Simplify the variable coefficients in $3x + 2x + 7 = 4x + x + 9$. Is division by their cross-side difference legitimate, and what constant relation remains? Stop before full solution-count classification. _____ _____

Algebra 1

Linear Equations: Solving, Coefficients & Reasoning

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: -7 Simplify each side of $9x - 11 + 5x + 3 = 6x - 4 - 2x + 16$ independently before collecting across equality. State both local totals and solve. Your response: _____	Incoming: 2 Track signs through the local simplification of $-6x + 7 + 4x - 9 = 3x + 12 + x - 62$, then compare the two resulting variable coefficients and verify x. Your response: _____
Incoming: $-\frac{3}{4}$ Solve $-5x + 13 - 2x - 6 = -3x + 8 + 4x + 55$ by comparing the simplified coefficient and constant on each side. Check in the original interleaved form. Your response: _____	Incoming: $-\frac{9}{8}$ Track signs through the local simplification of $-11x - 7 + 5x + 10 = -2x + 4 + 8x + 107$, then compare the two resulting variable coefficients and verify x. Your response: _____
Incoming: $\frac{5}{9}$ For $8x + 2 - 4x + 7 = x - 10 + 2x + 28$, expose each side's net linear expression first. Only then consolidate the variable across the equality and solve. Your response: _____	Incoming: 0 For $x + 9 = 4x + 15$, compare the two x-coefficients first. Use their difference to solve exactly and confirm both original sides. Your response: _____

Algebra 1

Linear Equations: Solving, Coefficients & Reasoning

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

For $5x + 7 = 2x + 19$, compare two first steps: *L*—subtract $2x$ from both sides, leaving coefficient 3 on the left; *R*—subtract $5x$ from both sides, leaving coefficient -3 on the right. Choose an efficient valid route and solve.

Both routes for $-3x - 5 = 4x + 9$ collect the variable on one side. Compare their resulting coefficient signs, select the cleaner path, and verify x .

Compare collecting variable terms on the left with collecting them on the right in $-6x + 11 = -2x + 31$. Give both resulting variable equations, explain why they have the same solution set despite opposite coefficient signs, and solve exactly.

Compare $5x - 3 = -x + 33$ with $10x - 6 = -2x + 66$. Explain whether the common scaling changes the solution set, and verify without resolving every step twice.

Linear Equations: Solving, Coefficients & Reasoning

Full Worked Solutions - excerpt

Worked example

Problem. Simplify each side of $3x + 5 + 2x - 1 = x + 7 + 3x + 1$ independently before collecting across equality. State both local totals and solve.

Answer. 4

Explanation and check.

Local collection gives coefficients 5 and 4 with constants 4 and 8. Their cross-side differences yield $x = 4$, verified before simplification.

Worked example

Problem. Track signs through the local simplification of $-4x + 6 + x + 3 = 2x - 5 - 3x + 18$, then compare the two resulting variable coefficients and verify x .

Answer. -2

Explanation and check.

After signed local simplification, the nonzero coefficient difference is -2 . The constant difference matches 4, so $x = -2$; both original sides agree.

Algebra 1
Linear Equations: One, None, or All Real Solutions

Multi-Step Equations: One, No, or Infinitely Many Solutions | A1-U02-P08

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for constructed equation and coefficient-constant verification, first error, corrected class, and solution-set meaning, local forms, solution class, complete set, and justification, parameter conditions and all corresponding solution classes, permitted edit or impossibility proof and resulting class and real classification, domain intersection, and actual set.

8 PDFs and a README; 50 buyer pages.

Algebra 1

Linear Equations: One, None, or All Real Solutions

Name: _____ Date: _____ Class: _____

Solve each question and match the whole requested response. If two bank entries express the same result, either label is accepted; labels may be reused. Give exact values and any requested reasoning.

Classify $-2(4x - 3) + 5 = 4(-2x + 1) + 7$ after carrying every outer factor through its group. Give the full solution set. _____ Bank label: _____	The equation $2x + 7 = 2x + 11$ is considered only for x in $\{-3, 1, 5\}$. Find the actual set after both algebra and domain restriction. _____ Bank label: _____
Break the current degeneracy in $-2x + 9 = -2x + 9$ using only the left x-coefficient so the result has one real solution. Verify the new class. _____ Bank label: _____	Find when $(k + \frac{9}{4})x + \frac{11}{8} = (-\frac{3}{5})x + \frac{11}{8}$ becomes an identity. Also state the solution class for every remaining k. _____ Bank label: _____
Analyze the cancellation in $-6x - 5 + 3x + 8 = -x + 4 - 2x - 8$. Explain what remains and classify every possible value of x. _____ Bank label: _____	For $6x + 1 = 2x + 13$, the allowed domain is $[0, 4]$. Determine the actual solution set and show whether the algebraic root is admitted. _____ Bank label: _____
Partition all real values of k by the number of solutions of $(k - \frac{7}{8})x + \frac{13}{10} = (\frac{5}{6})x - \frac{4}{7}$. Identify the exceptional coefficient condition first. _____ Bank label: _____	Reduce $2(-5x + 6) + 3 = 5(-x - 1) + 35$ to $Ax + B = Cx + D$, compare both totals, and report the entire solution set. _____ Bank label: _____

Algebra 1

**Linear Equations: One, None,
or All Real Solutions**

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

For the explicitly linear equation $3x + 5 = 3x + 5$, the table shows equality at distinct inputs $x = -2$ and $x = 4$. Evaluate the claim that the equation holds for all real x , using only justified implications.

Audit this work for $3x + 5 = x + 5$: 'The constants cancel, so $x = 0$. Therefore there are no solutions.' Identify the first conceptual error and give the correct complete solution set.

For $2x + 1 = 2x + 4$, the table reports $x = 0$, left=1, and right=4. Does this evidence support the claim that the equation is an identity? Give the strongest warranted conclusion.

A student classifies $4x + 7 = 4x + 7$ using: 'Everything cancels to $0 = 0$, so the only solution is $x = 0$.' Diagnose the meaning of $0 = 0$ and correct the conclusion.

Linear Equations: One, None, or All Real Solutions

Full Worked Solutions - excerpt

Worked example

Problem. Classify $5x - 3 = 2x + 9$ over the restricted domain $\{-4, 0, 3\}$; an algebraic root outside that set must be excluded.

Answer. empty solution set

Explanation and check.

Over the reals the equation has one real solution; solution set $\{4\}$. Intersecting that set with $\{-4, 0, 3\}$ gives empty solution set.

Worked example

Problem. Intersect the real solution set of $7x - 2 = 7x - 2$ with the interval $[-3, 5]$. Report the resulting set exactly.

Answer. $[-3, 5]$

Explanation and check.

Over the reals the equation has all real numbers. Intersecting that set with $[-3, 5]$ gives $[-3, 5]$.

Algebra 1
Linear Equations with Fractions and Decimals

Solving Linear Equations with Fractional Coefficients | A1-U02-P09

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for both routes, compared intermediate equations, and justification of equal solution sets, common multiplier, fully scaled equation, exact solution, and check, common multiplier, preserved numerator groups, exact solution, and verification, exact root, rounded result, and changed-equation verdict, first error, fully corrected scaled equation, and solution and method choice, structural justification, exact solution, and check.

8 PDFs and a README; 51 buyer pages.

Algebra 1

Linear Equations with Fractions and Decimals

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Find a common multiplier for the unrelated denominators in $(\frac{3}{4})x + \frac{2}{5} = (\frac{1}{6})x + \frac{41}{15}$, apply it to every term on both sides, and solve. _____ Bank label: _____	Clear the constant denominators in $-(\frac{5}{6})x + \frac{7}{8} = (\frac{1}{4})x + \frac{33}{8}$ while preserving all negative signs. State the exact solution. _____ Bank label: _____
Use the shared factors among the denominators of $(\frac{7}{10})x - \frac{3}{5} = -(\frac{2}{15})x + \frac{22}{5}$ to choose an efficient clearing multiplier. Solve exactly. _____ Bank label: _____	Find a common multiplier for the unrelated denominators in $(\frac{2}{9})x + \frac{5}{6} = (\frac{7}{12})x + \frac{41}{18}$, apply it to every term on both sides, and solve. _____ Bank label: _____
Clear denominators in $(\frac{5}{14})x + 3 = (\frac{1}{7})x + \frac{33}{7}$; remember that the visible integer term must receive the same multiplier. Find x. _____ Bank label: _____	Use the shared factors among the denominators of $(\frac{9}{16})x - \frac{5}{12} = (\frac{3}{8})x + \frac{43}{48}$ to choose an efficient clearing multiplier. Solve exactly. _____ Bank label: _____
Find a common multiplier for the unrelated denominators in $(\frac{11}{18})x + \frac{7}{20} = -(\frac{5}{12})x - \frac{431}{90}$, apply it to every term on both sides, and solve. _____ Bank label: _____	Find a common multiplier for the unrelated denominators in $(\frac{7}{24})x + \frac{11}{14} = (\frac{5}{16})x + \frac{67}{112}$, apply it to every term on both sides, and solve. _____ Bank label: _____

Algebra 1

Linear Equations with Fractions and Decimals

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $\frac{23}{12}$ Find a common multiplier for the unrelated denominators in $(\frac{23}{45})x + \frac{31}{56} = -(\frac{17}{30})x + \frac{8767}{2520}$, apply it to every term on both sides, and solve. Your response: _____	Incoming: $\frac{19}{7}$ For $-(\frac{29}{48})x - \frac{35}{54} = (\frac{11}{20})x + \frac{46139}{17280}$, justify a nonzero common multiplier, write the full integer-coefficient equation it creates, and solve exactly. Your response: _____
Incoming: $-\frac{17}{6}$ Choose a common denominator for all grouped fractions in $\frac{19x+7}{32} + \frac{-9x-13}{21} = \frac{6x-\frac{85357}{1344}}{26} + \frac{23}{12}$. Show the intact groups after scaling, then solve. Your response: _____	Incoming: $-\frac{29}{9}$ Choose a common denominator for all grouped fractions in $\frac{9x+25}{40} + \frac{-11x+16}{33} = \frac{5x-\frac{82789}{1760}}{36} + \frac{31}{16}$. Show the intact groups after scaling, then solve. Your response: _____
Incoming: $-\frac{17}{9}$ For $(\frac{17}{36})x - \frac{25}{42} = -(\frac{11}{27})x + \frac{1279}{756}$, justify a nonzero common multiplier, write the full integer-coefficient equation it creates, and solve exactly. Your response: _____	Incoming: 3 Clear the constant denominators in $-(\frac{2}{3})x + 1 = (\frac{1}{3})x + 3$ while preserving all negative signs. State the exact solution. Your response: _____

Algebra 1

Linear Equations with Fractions and Decimals

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

For $\frac{3x+5}{4} = 7$, choose between immediate inverse operations and clearing every denominator. Select the more efficient valid route and solve.

Compare the exact equation $(\frac{1}{3})x + 2 = (\frac{1}{5})x + \frac{38}{15}$ with the version using a rounded coefficient. Solve both exactly as written and decide whether their roots agree.

Audit the claimed clearing step $(\frac{1}{2})x + 3 = (\frac{1}{4})x + 5 \rightarrow 6x + 3 = 3x + 60$. Find the first term that failed to receive the common multiplier and repair the equation.

Which method avoids unnecessary expansion in $\frac{-2x+7}{5} = -3$: direct rational isolation or a common scale? Justify and find x .

Linear Equations with Fractions and Decimals

Full Worked Solutions - excerpt

Worked example

Problem. Find a common multiplier for the unrelated denominators in $(\frac{3}{4})x + \frac{2}{5} = (\frac{1}{6})x + \frac{41}{15}$, apply it to every term on both sides, and solve.

Answer. 4

Explanation and check.

Multiplying every term of $(\frac{3}{4})x + \frac{2}{5} = (\frac{1}{6})x + \frac{41}{15}$ by 60 gives $45x + 24 = 10x + 164$. Its coefficient difference is 35, so $x = 4$; substitution verifies the original rational equation.

Worked example

Problem. Clear the constant denominators in $-(\frac{5}{6})x + \frac{7}{8} = (\frac{1}{4})x + \frac{33}{8}$ while preserving all negative signs. State the exact solution.

Answer. -3

Explanation and check.

Multiplying every term of $-(\frac{5}{6})x + \frac{7}{8} = (\frac{1}{4})x + \frac{33}{8}$ by 24 gives $-20x + 21 = 6x + 99$. Its coefficient difference is -26, so $x = -3$; substitution verifies the original rational equation.

Algebra 1
Literal Equations

Literal Equations | A1-U02-P10
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for factored target coefficient, isolated form, and nonzero condition, first error, corrected form, and all conditions, isolated form and every denominator/divisor condition, isolated form or complete compatibility class, regular isolated form and both exceptional compatibility classes and useful solved form, units, and assumptions.
8 PDFs and a README; 50 buyer pages.

Algebra 1

Literal Equations

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

In $Y - (a + b) = (-q)v$, keep the summed symbolic coefficient or shift grouped while solving for v. State the exact divisor restriction. _____ Bank label: _____	For a laboratory reading, rearrange the conversion formula $F = (\frac{9}{5})C + 32$ for the requested input F in degrees Fahrenheit. Preserve its scale condition. _____ Bank label: _____
Isolate s in $M = (5k)s + u - v$. Undo the shift before the symbolic scale and state the condition required for division. _____ Bank label: _____	For a short-term loan, which solved form of $I = Prt$ directly finds t in years? Rearrange it and state the operating assumption. _____ Bank label: _____
Solve $(-2p)h + c + d = B$ for h. Track the negative symbolic coefficient and state when the final quotient is defined. _____ Bank label: _____	For a fabric conversion, rearrange the conversion formula $y = kx + b$ for the requested input x in yards. Preserve its scale condition. _____ Bank label: _____
Rearrange $B = \frac{c}{(d)n}$ for n, treating the product in the denominator as a whole. List every factor that must be nonzero. _____ Bank label: _____	A surveyed parcel requires dimension b in meters. Isolate it from $A = \frac{bh}{2}$ and state why the divisor must be nonzero. _____ Bank label: _____

Algebra 1

Literal Equations

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $m = \rho V$; units grams; condition $V \neq 0$ In $G - (c + d) = (a - b)n$, keep the summed symbolic coefficient or shift grouped while solving for n. State the exact divisor restriction. Your response: _____	Incoming: $L = \frac{P - 2W}{2}$; units feet; condition $2 \neq 0$ In $N - (g + h) = (3a - b)u$, keep the summed symbolic coefficient or shift grouped while solving for u. State the exact divisor restriction. Your response: _____
Incoming: $b = \frac{2A}{h}$; units feet; condition $h \neq 0$ Solve the literal equation $\frac{m+a+b}{c} + \frac{d}{e} = H$ for m. Use a common symbolic scale and state every original exclusion. Your response: _____	START Analyze $(a - (b))x = c$ under condition $a - (b) = 0$ and $c \neq 0$. Do not call failed division an answer; state the complete x-set. Your response: _____
Incoming: $f = a\left(C - \left(-\frac{b}{c}\right)\right)$; conditions $a \neq 0$, $c \neq 0$ Isolate h in $E = (2a)h + (3b)h + c$. Combine its separate coefficients, factor once, and state the vanishing-coefficient condition. Your response: _____	Incoming: $r = \frac{d}{t}$; units units per hour; condition $t \neq 0$ Rearrange $(m + 2n)f + v + w = U$ for f, regardless of which side contains it. Give the solved form and its nonzero assumption. Your response: _____

Algebra 1

Literal Equations

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Audit this rearrangement of $y = (a)x + b$: $x = \frac{y}{a} - (b)$. Identify the first invalid division and give the corrected condition-aware form.

Check the target factoring in the proposed work $Q = (m)t + (n)t + c \rightarrow t = \frac{Q-(c)}{m-(n)}$. Repair the first coefficient error and state the divisor restriction.

For $v = \frac{(k)u+h}{j}$, a student writes $u = (j)\frac{v}{k} - (h)$. Diagnose the lost grouping, restore the complete numerator, and list original exclusions.

Audit this rearrangement of $B = (c + d)n + e$: $n = \frac{B}{c+d} - (e)$. Identify the first invalid division and give the corrected condition-aware form.

Literal Equations

Full Worked Solutions - excerpt

Worked example

Problem. Isolate v in $(h - (k))v = s$ for the nondegenerate parameter case, naming the exact combined coefficient condition.

Answer. $v = \frac{s}{h-(k)}$; condition $h - (k) \neq 0$

Explanation and check.

In $(h - (k))v = s$, the decisive target coefficient is $h - (k)$. The combined coefficient is nonzero, so division gives $v = \frac{s}{h-(k)}$.

Worked example

Problem. Solve $v = d - (k)u$ for u . Track the negative symbolic coefficient and state when the final quotient is defined.

Answer. $u = \frac{d-v}{k}$; condition $k \neq 0$

Explanation and check.

From $v = d - (k)u$, remove the complete shift on both sides, leaving the target multiplied by k . Division by that whole factor gives $u = \frac{d-v}{k}$, valid when $k \neq 0$.

Algebra 1
Writing Linear Equations from Word Problems

Modeling with Linear Equations (Mixture and Applications) | A1-U02-P11

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for all correct equations and a term-to-context justification, average equation and missing value, conservation equation and component amount, context, variable meaning and units, solved interpretation, and feasibility check, equality equation and matching input and equation and original reference amount.

8 PDFs and a README; 58 buyer pages.

Algebra 1

Writing Linear Equations from Word Problems

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

A quantitative relationship is described by these labeled values: A25-liter blend uses 80% and 30% solutions and contains 12.5 liters of active ingredient. Let x be liters of the 80% solution. Account for both component weights without treating their counts as independent; then solve and check the total. _____ Bank label: _____	A quantitative relationship is described by these labeled values: A12-kilogram mixture uses powders labeled 0.06 g/g and 20 g/kg and contains 400 g of active material. Let x be kilograms of the first powder. First reconcile the concentration units, then use the fixed total to write and solve one equation for x. _____ Bank label: _____
A lab has 50 grams of salt. Each identical batch uses 2.75 grams, and 28 grams remain. Build a one-variable equation for this total. Explain the sign of the rate before interpreting the root. _____ Bank label: _____	A tank starts with 94 liters and drains 7 liters each minute until 45 liters remain. Define the unknown, translate the fixed and repeated contributions into one equation, solve, and attach the requested unit. _____ Bank label: _____
Four sample masses average 12.5 grams. Three masses are 10.5, 13, and 11.5 grams. Write one average equation and determine the unknown observation or common group average. _____ Bank label: _____	A quantitative relationship is described by these labeled values: An account balance becomes \$270 after an 8% increase. Identify which quantity the rate is applied to, construct the equation, and solve for the base. _____ Bank label: _____
Five batches average 12.4 liters and three batches average x liters. The combined eight-batch average is 13 liters. Translate the mean into a total for the stated count, then solve for the missing contribution. _____ Bank label: _____	A price is reduced 20% and then increased 25% of the reduced price; the final price is \$100. Let x denote the correct reference base. Write and solve an equation that keeps the percent tied to that base. _____ Bank label: _____

Algebra 1

Writing Linear Equations from Word Problems

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Equation: $5x + 2(x - 4) = 62$. Required interpretation: x and $x - 4$ are positive measured lengths. Construct and solve a real situation matching the complete equation, making the fixed term, rate, and total explicit. 	A quantitative relationship is described by these labeled values: Six route counts average 7. Five counts are 3, 5, 8, 11, and 9. Translate the mean into a total for the stated count, then solve for the missing contribution.
Two teams have 91 volunteers; the smaller team has 13 fewer than the larger team. Write a single equation that preserves the stated part relationship. Find every part, not only the reference value. 	Equation: $0.75p = 48$. Required interpretation: p is an original price in dollars. Construct and solve a real situation matching the complete equation, making the fixed term, rate, and total explicit.
A48-kilogram alloy order uses materials costing \$30 or \$18 per kilogram for \$1,080. Let x be kilograms of the \$30 material. Build a one-variable conservation model for the two unequal contributions. Determine the amount named by x. 	A quantitative relationship is described by these labeled values: Two angles forming a line are labeled $7x - 12$ degrees and $2x + 3$ degrees. Construct the additive constraint represented here; solve and check that the component measures form the stated whole.

Algebra 1

Writing Linear Equations
from Word Problems

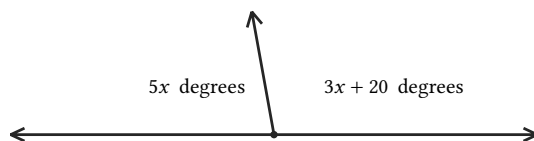
Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A student copies the numerical values into an equation in the order they appear without defining the unknown or checking units. Diagnose the specific reasoning error, then complete the original task: A data table summarizes the quantities as follows: Two reservoirs each start at 15 liters and both drain 2 liters per minute. Construct the equality and decide whether the descriptions match once, never, or for every admissible input. State the relevant domain.

Reservoir	Initial volume (L)	Drain rate (L/min)
A	15	2
B	15	2

A student treats every stated measure as an independent addend and ignores the geometric relationship. Diagnose the specific reasoning error, then complete the original task: A labeled diagram gives this information: A straight angle is divided into parts measuring $5x$ degrees and $3x + 20$ degrees. Translate the labeled parts into the appropriate perimeter or angle relation and solve for the shared variable.



Writing Linear Equations from Word Problems

Full Worked Solutions - excerpt

Worked example

Problem. A quantitative relationship is described by these labeled values: A 25-liter blend uses 80% and 30% solutions and contains 12.5 liters of active ingredient. Let x be liters of the 80% solution. Account for both component weights without treating their counts as independent; then solve and check the total.

Answer. 10 liters of the 80% solution

Explanation and check.

Because the combined quantity is fixed, the second component is the total minus x . Weighting both parts gives $0.80x + 0.30(25 - x) = 12.5$. Solving yields $x = 10$ liters of 80% solution; the complementary amount and both weighted contributions reproduce the given total.

Worked example

Problem. A quantitative relationship is described by these labeled values: A 12-kilogram mixture uses powders labeled 0.06 g/g and 20 g/kg and contains 400 g of active material. Let x be kilograms of the first powder. First reconcile the concentration units, then use the fixed total to write and solve one equation for x .

Answer. 4 kilograms of the first powder

Explanation and check.

Put both concentrations in units compatible with the chosen component amount: $0.06 \text{ g/g} = 60 \text{ g/kg}$. The conserved mixture then gives $60x + 20(12 - x) = 400$, so $x = 4$ kilograms of first powder. The complementary amount makes the active-material total check.

Algebra 1
Checking Linear Models and Contextual Solutions

Checking Linear Models and Contextual Solutions | A1-U02-P12

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for justified interpretation.
8 PDFs and a README; 49 buyer pages.

Algebra 1

Checking Linear Models and Contextual Solutions

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

A table lists a \$12 entry fee and \$0.45 per mile for m miles. A student proposes $\frac{C}{m} = 12 + 0.45$. Use the units to decide whether this is a total-cost model and state the correct equation. _____ Bank label: _____	For n equally spaced fence posts, a supplied formula gives spacing $r = \frac{360}{n-1}$ feet. The site permits at most 31 posts. Determine n's full contextual domain. _____ Bank label: _____
A30-item split defines category counts x and $30-x$. One summary says A exceeds B by 8; another says B exceeds A by 4. Classify the information. _____ Bank label: _____	Solving $3.75b + 9 = 54$ gives $b = 12$ bottles. Orders must contain complete cartons of 8 bottles. Is 12 a feasible order size? _____ Bank label: _____
A student proposes 23 and 24 for two consecutive integers whose sum is 47. Verify both 'consecutive' and the sum. _____ Bank label: _____	A calculation shows 58 items needed, 9 per pack, and $\frac{58}{9} = 6.444\dots$. A student chooses 6 packs by nearest-number rounding. Audit the decision and quantify the shortage or surplus after repair. _____ Bank label: _____
On a180-km route, one equation returns $x = 68$ for distance traveled and another returns $r = 112$ for distance remaining. Determine whether they conflict. _____ Bank label: _____	A map table gives 7.5 cm and a scale of 4 km per map centimeter. Someone writes $d = \frac{7.5}{4}$ km. Use unit cancellation to choose the correct operation and distance. _____ Bank label: _____

Algebra 1

Checking Linear Models and Contextual Solutions

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: Report 3.7 meters. A transit card balance follows $B = 85 - 6.40r$, where r counts rides and the rider cannot spend beyond the initial balance. Give the feasible domain for r. Your response: _____	Incoming: r is an integer with $0 \leq r \leq 13$. During a ten-dose treatment, d records how many doses a patient has completed, including observations before the first and after the last dose. List the domain. Your response: _____
Incoming: No. The feasible values are 4, 5, 6, and 7. A supplied equation gives cable length $x = 3.746$ meters. The measurement is to be reported to the nearest tenth of a meter. What should be reported? Your response: _____	Incoming: Display $83.5 \frac{km}{h}$. A temperature equation is valid only from 6:30<i>a.m.</i> through 3:00<i>p.m.</i> Let t measure hours since 6:30<i>a.m.</i> Translate the clock-time window into a domain for t. Your response: _____
Incoming: Report approximately 121 square centimeters. A theater sold 260 tickets in all. Let a be the number of adult tickets. State the contextual domain for a without using any price information. Your response: _____	Incoming: $-120 \leq h \leq 450$. For the supplied revenue equation $7s + 4(36 - s) = 198$, s counts \$7 seats and $36 - s$ counts \$4 seats. Identify every domain restriction imposed by those two counts. Your response: _____

Algebra 1

Checking Linear Models and Contextual Solutions

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A calculation $d = 48(2.5) = 120$ is numerically correct but reports '120 hours.' Diagnose and correct the answer unit.

A pump runs at 1.8 liters per minute for 50 seconds. A technician records 90 liters. Audit the time unit and calculate the volume.

A solution to the exact equation $5n = 38$ says, 'n=7.6', so the answer is 8 boxes.' Diagnose the final step.

A \$120 service receives a 7.5% fee. A calculation uses $F = 120 + 7.5(120)$. Identify the interpretation error and find F .

Checking Linear Models and Contextual Solutions

Full Worked Solutions - excerpt

Worked example

Problem. A table lists a \$ 12 entry fee and \$ 0.45 per mile for m miles. A student proposes $\frac{C}{m} = 12 + 0.45$. Use the units to decide whether this is a total-cost model and state the correct equation.

Answer. The proposal mixes dollars per mile with dollars; total cost is $C = 12 + 0.45m$ dollars.

Explanation and check.

Dividing total C by m changes its unit to dollars per mile, while the right side adds a dollar amount to a rate. Keeping the fixed total and multiplying the rate by miles gives compatible dollar terms.

Worked example

Problem. For n equally spaced fence posts, a supplied formula gives spacing $r = \frac{360}{n-1}$ feet. The site permits at most 31 posts. Determine n 's full contextual domain.

Answer. n is an integer with $2 \leq n \leq 31$.

Explanation and check.

A post count is integral. At least two posts are needed to create a spacing, which also keeps $n - 1$ nonzero; the site supplies the upper bound 31.

Algebra 1
Writing Inequalities from Word Problems

Writing Linear Inequalities from Context | A1-U03-P01

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for inequality interpretation with boundary justification and method choice with justification, followed by inequality interpretation with boundary justification.
8 PDFs and a README; 53 buyer pages.

Algebra 1

Writing Inequalities from Word Problems

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

A student remains eligible only while the absence count a has not reached 5. Write the direct comparison. Bank label: _____	Give an equivalent comparison to $m \leq 0$ that begins with 0. Bank label: _____						
A review is assigned when q, the number of missed questions, is 12 or fewer. Write the inequality. Bank label: _____	Test $q = \frac{1}{2}$, $q = \frac{3}{4}$, and $q = 1$ against $q > \frac{3}{4}$. <table border="1"> <thead> <tr> <th>Proposed value</th> </tr> </thead> <tbody> <tr><td>$\frac{1}{2}$</td></tr> <tr><td>$\frac{3}{4}$</td></tr> <tr><td>$\frac{3}{4}$</td></tr> <tr><td>$\frac{3}{4}$</td></tr> <tr><td>1</td></tr> </tbody> </table> Bank label: _____	Proposed value	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1
Proposed value							
$\frac{1}{2}$							
$\frac{3}{4}$							
$\frac{3}{4}$							
$\frac{3}{4}$							
1							
A lift may carry its full 900-kilogram rating but nothing heavier. Write the constraint for load w. Bank label: _____	Express $8 < x$ with x first. Bank label: _____						
Test $y = -0.1$, $y = 0$, and $y = 0.1$ in $y > 0$. <table border="1"> <thead> <tr> <th>Proposed value</th> </tr> </thead> <tbody> <tr><td>-0.1</td></tr> <tr><td>0</td></tr> <tr><td>0.1</td></tr> </tbody> </table> Bank label: _____	Proposed value	-0.1	0	0.1	If k is an integer and $k \geq -3$, identify the boundary's status and the least possible k. Bank label: _____		
Proposed value							
-0.1							
0							
0.1							

Algebra 1

Writing Inequalities from Word Problems

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $T > -3$. A specification says, 'A reading of -5 is no greater than the signed change c.' Express the permitted c-values with c on the left and explain equality. Your response: _____	Incoming: $c \geq -5$, with -5 included. A signed change c is required to be at most -4. State the inequality and do not replace the negative bound with a magnitude. Your response: _____
Incoming: $t \geq 12$. A temperature T exceeds -3 degrees Celsius. State the inequality, keeping the negative boundary. Your response: _____	Incoming: $-6 \geq c$. A reservation permits a maximum of 9 guests. Write a direct bound for g, the guest count. Your response: _____
Incoming: $L > 6.2$. Rewrite $0 \geq h$ with h as the subject on the left. Your response: _____	Incoming: $s \geq 86$. Rewrite $x < 7$ with 7 on the left while preserving exactly the same permitted x-values. Your response: _____

Algebra 1

Writing Inequalities from Word Problems

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Choose the most reliable method, briefly justify the choice, and then complete the original task. Original task: For $p \leq 250$, determine the status of $p = 0$, $p = 250$, and $p = 251$.

Proposed value
0
250
251

Label	Proposed method
A	Substitute each proposed value into the original comparison and evaluate both sides.
B	Compare only the absolute values and ignore the comparison symbol.
C	Decide only from how close each value is to the boundary.

For real x , compare $x > 2$ and $x \geq 2.5$. Which condition is stronger, and what value separates them?

Writing Inequalities from Word Problems

Full Worked Solutions - excerpt

Worked example

Problem. A student remains eligible only while the absence count a has not reached 5. Write the direct comparison.

Answer. $a < 5$.

Explanation and check.

Counts 0 through 4 have not reached five; equality at five fails.

Worked example

Problem. Give an equivalent comparison to $m \leq 0$ that begins with 0.

Answer. $0 \geq m$.

Explanation and check.

Zero being greater than or equal to m says exactly that m is at most zero.

Algebra 1

Addition and Subtraction Inequalities

Addition and Subtraction Inequalities | A1-U03-P02

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for solution inequality with order-preservation justification and solution inequality with order-preservation justification; justified method selection.

8 PDFs and a README; 48 buyer pages.

Algebra 1

Addition and Subtraction Inequalities

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Which of $0.8 > x - 0.6$ and $1.5 > x + 0.4$ permits more values? _____ _____	A student reports $x < 6$ for $x + 2 \leq 8$. Does the endpoint test support that strictness? _____ _____
A solution to $x - \frac{7}{5} < \frac{3}{5}$ is written $x \leq 2$. Test the boundary to judge the equality bar. _____ _____	The proposed solution of $x + 7 < 3$ is $x < -3$. Test the claimed boundary and determine the actual one. _____ _____
Find the signed offset a that makes $x + a \geq -2$ solve to $x \geq 5$. _____ _____	Is there a value of b for which $3 < x - b$ has the real solution $x \geq 7$? _____ _____

Algebra 1

**Addition and
Subtraction Inequalities**

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A student solves $x - 2.5 \geq -1$ as $x \geq -3.5$ by subtracting 2.5 again. Diagnose and correct.

A tenth-scaled graph proposes $x \leq -3$ for $x + 2.25 \leq -0.75$. Audit its endpoint and sides.

A proposed solution to $x - 5 \leq -2$ is $x \geq 3$. Evaluate 2, 3, and 4 to locate the direction error.

A student correctly chooses $a + 3$ translation for $x - 3 > -8$ but reverses the symbol and tests only $x = -6$. Explain why that test is misleading and repair the ray.

Addition and Subtraction Inequalities

Full Worked Solutions - excerpt

Worked example

Problem. Recover k so that $k < x + 2$ has solution $x > 6$.

Answer. $k = 8$.

Explanation and check.

Subtracting 2 gives $k - 2 < x$. The lower boundary $k - 2$ must be 6, so $k = 8$.

Worked example

Problem. Choose a so $2.4 \geq x + a$ has the upper boundary -0.6 .

Answer. $a = 3$.

Explanation and check.

Solving gives $x \leq 2.4 - a$. Requiring $2.4 - a = -0.6$ yields $a = 3$.

Algebra 1
Multiplication and Division Inequalities

Multiplication and Division Inequalities | A1-U03-P03

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for allowable scale with identifiability explanation, allowable scale with identifiability explanation; justified method selection, first error and repaired reasoning, reversed comparison with justification, reversed comparison with justification; justified method selection and set relationship with decisive witness.
8 PDFs and a README; 47 buyer pages.

Algebra 1

Multiplication and Division Inequalities

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Choose k so $kx > -9$ is equivalent to $x > -6$. _____ Bank label: _____	Determine r so x divided by r at most $\frac{3}{4}$ has boundary $\frac{9}{8}$. _____ Bank label: _____
Determine a so that $ax \leq 18$ produces the target $x \geq -6$. _____ Bank label: _____	Solve $(-\frac{5}{12})x \leq -\frac{35}{18}$ and simplify the exact boundary. _____ Bank label: _____
Determine the x-first solution of $-\frac{5}{2} \geq x$ divided by -3. _____ Bank label: _____	Solve $-7 < -x$ without losing the strict endpoint. _____ Bank label: _____
Solve $-0.06x \geq 0.9$ exactly. _____ Bank label: _____	Find the solution set of $(\frac{13}{6})x \geq 0$. _____ Bank label: _____

Algebra 1

Multiplication and Division Inequalities

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Starting from $m < n$, scale by -2 and then by -3. Track each reversal and give the final comparison. _____ _____	Find p so $px > \frac{5}{6}$ yields the target $x < -\frac{10}{3}$. _____ _____
Verify $x \leq 6$ as the solution of $18 \geq 3x$. _____ _____	Solve $ax < 6$ for every possible sign of a, including $a = 0$. _____ _____
Isolate x in $8x \leq 8$. _____ _____	What changes when $-3x \leq 12$ is made strict? _____ _____

Algebra 1

Multiplication and Division Inequalities

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A claimed solution of $-0.25x < 3$ is $x < -0.75$. Diagnose it using the true equality input and simple witnesses.

A student claims multiplying $1 < 3$ by -2 gives $-2 < -6$. Test the claim and repair it.

Use the test values $x = -8$, $x = -9$, and $x = 0$. A proposed answer for $(-\frac{3}{4})x > 6$ is $x > -8$. Use the listed values to audit its direction.

A student starts with $-2x \leq 14$, divides by -2 and reverses to $x \geq -7$, then reverses again because the boundary is negative and writes $x \leq -7$. The work reverses once for a negative divisor and again because the boundary is negative. Locate the first invalid line after the correct step.

Multiplication and Division Inequalities

Full Worked Solutions - excerpt

Worked example

Problem. Choose k so $kx > -9$ is equivalent to $x > -6$.

Answer. The scale is $k = \frac{3}{2}$.

Explanation and check.

The direction is preserved, so $k > 0$. Solving $-\frac{9}{k} = -6$ yields $k = \frac{3}{2}$.

Worked example

Problem. Determine r so x divided by r at most $\frac{3}{4}$ has boundary $\frac{9}{8}$.

Answer. The divisor is $r = \frac{3}{2}$.

Explanation and check.

The unchanged orientation requires $r > 0$; $(\frac{3}{4})r = \frac{9}{8}$ gives $r = \frac{3}{2}$.

Algebra 1
Two-Step Inequalities

Two-Step Inequalities | A1-U03-P04
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for accepted or repaired set with boundary and witnesses, construction satisfying all constraints with verification, first error and corrected chain, solution after order-safe denominator clearing, solution after value-preserving expansion and solution set with connected inverse steps.
8 PDFs and a README; 50 buyer pages.

Algebra 1

Two-Step Inequalities

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Solve $-2\frac{n}{3} + \frac{1}{4} \geq \frac{11}{12}$ for integer n. _____ Bank label: _____	Find the x-values for $-6x - 5 > 13$. _____ Bank label: _____
Solve x divided by negative 5 minus 1 greater than 2. _____ Bank label: _____	Find the solution of $\frac{5-2x}{3} - \frac{x+1}{4} > \frac{1}{6}$. _____ Bank label: _____
Clear denominators in $3\frac{x}{4} - \frac{x}{6} \geq 7$ and solve. _____ Bank label: _____	Solve x divided by negative $\frac{5}{4}$ plus 3 at least -1. _____ Bank label: _____
Expand $-2(3x - 4)$ and solve the inequality. Use the inequality $-2(3x - 4) \geq 20$. _____ Bank label: _____	Expand both groups in $5(2x - 1) - 3(x + 4) \geq -3$ and solve. _____ Bank label: _____

Algebra 1

Two-Step Inequalities

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Construct an inequality with coefficient 3 and a nonzero negative offset whose solution is $x < 4$. _____ _____	What is the solution set of $5(2-x) + 5x > 10$? _____ _____
Solve $\frac{x-1}{2} + \frac{x+2}{3} < 5$. _____ _____	Construct an inequality using the group $x - 1$ and outer factor 2 that solves to $x > 5$. _____ _____
Verify $x < -5$ for $(-\frac{3}{5})x + 2 > 5$. _____ _____	For integer n, verify $n \geq 3$ as the solution of $\frac{2n-1}{3} > \frac{5}{4}$. _____ _____

Algebra 1

Two-Step Inequalities

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Compare two order-safe routes for $-\frac{x}{3} + \frac{1}{2} \geq \frac{5}{6}$.

Proposed route A: multiply every term by positive 6. Proposed route B: isolate $-\frac{x}{3}$, then multiply by -3.

For integer n , compare both complete routes for $(-\frac{4}{3})n + \frac{1}{2} > \frac{5}{6}$.

Proposed route A: clear by positive 6, solve, then restrict. Proposed route B: isolate the fraction, use a signed reciprocal, then restrict.

Audit $x \leq \frac{5}{2}$ for $\frac{x}{3} + \frac{1}{2} \leq \frac{5}{6}$.

Compare clearing denominators first with isolating $\frac{x}{2}$ first.

Use $\frac{x}{2} + \frac{1}{3} < \frac{7}{3}$. Proposed route A: multiply every term by 6. Proposed route B: subtract $\frac{1}{3}$, then multiply by 2.

Two-Step Inequalities

Full Worked Solutions - excerpt

Worked example

Problem. Solve $-2\frac{n}{3} + \frac{1}{4} \geq \frac{11}{12}$ for integer n .

Answer. The integer set is $n \leq -1$.

Explanation and check.

Multiplying by 12 yields $-8n + 3 \geq 11$, so $-8n \geq 8$ and $n \leq -1$.

Worked example

Problem. Find the x -values for $-6x - 5 > 13$.

Answer. The solution is $x < -3$.

Explanation and check.

Adding 5 produces $-6x > 18$; division by -6 reverses $>$ and yields -3 .

Algebra 1
Multi-Step Inequalities

Solving Multi-Step Linear Inequalities | A1-U03-P05

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for classified solution set with net-coefficient reasoning and classified solution set with net-coefficient reasoning; justified method selection.
8 PDFs and a README; 49 buyer pages.

Algebra 1

Multi-Step Inequalities

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Solve $1.5(x + 2) < 0.5(x + 8)$. _____ Bank label: _____	Solve the strict decimal identity. The inequality is $1.2(5x - 1) > 6x - 1.2$. _____ Bank label: _____
Solve $2x + 7 > 4x - 1$. _____ Bank label: _____	Solve $0.05(20x + 4) > 0.2x + 1.8$. _____ Bank label: _____
Solve $2(x + 3) - 3(x - 1) > 4(1 - x)$. _____ Bank label: _____	Solve $-1.2x + \frac{3}{5} \leq 0.4x - \frac{13}{5}$. _____ Bank label: _____
Solve $-2x + 3 < -5x + 18$. _____ Bank label: _____	Find all x satisfying $5 - 2(x + 1) > x - 6$. _____ Bank label: _____

Algebra 1

Multi-Step Inequalities

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Construct a strict both-side inequality true for every x. Use these original construction conditions: equal variable coefficients; strict true constants.	Construct a strict both-side inequality with empty solution set. Use these original construction conditions: identical expressions; strict symbol.
Construct a fraction inequality whose integer solutions are $n \geq 2$. Use these original construction conditions: fraction coefficients; real boundary $\frac{3}{2}$; strict.	For integer n, classify the inequality. The inequality is $3n + 5 \leq 3(n + 2)$.
Determine all a-cases. The inequality is $(a - 1)x + a > 2x + 5$.	Construct a time inequality giving $0 \leq t \leq 6$. Use these original construction conditions: t nonnegative; closed upper bound; variable both sides. The target set is $0 \leq t \leq 6$ hours.

Algebra 1**Multi-Step Inequalities**

Name: _____ **Date:** _____ **Class:** _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

For all a , compare the two reduced routes including $a = 3$.

The inequality is $ax + 1 < 3x + 7$. Supplied route A: $(a - 3)x < 6$. Supplied route B: $(3 - a)x > -6$.

For integer n , compare the routes through the domain step.

The inequality is $5n + 1 > 2n + 10$. Supplied route A: $3n > 9$. Supplied route B: $-9 > -3n$.

Explain why the routes point to the same closed ray.

The inequality is $-x + 4 \leq 2x + 4$. Supplied route A: $-3x \leq 0$. Supplied route B: $0 \leq 3x$.

Relate the positive- and negative-net routes.

The inequality is $7x + 1 \leq 3x + 13$. Supplied route A: $4x \leq 12$. Supplied route B: $-12 \leq -4x$.

Multi-Step Inequalities

Full Worked Solutions - excerpt

Worked example

Problem. Solve $0.07x + 0.12 > 0.02x + 0.32$.

Answer. The result is $x > 4$.

Explanation and check.

Subtract $0.02x$ and 0.12 : $0.05x > 0.20$.

Worked example

Problem. Construct a strict both-side inequality true for every x .

Use these original construction conditions: equal variable coefficients; strict true constants.

Answer. Use $5x - 2 < 5x + 7$.

Explanation and check.

Cancellation leaves $-2 < 7$.

Algebra 1
Compound Inequalities

Solving Compound Inequalities | A1-U03-P06
96 problems · Four activity formats

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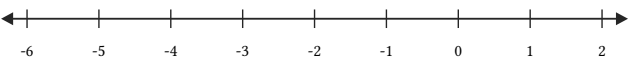
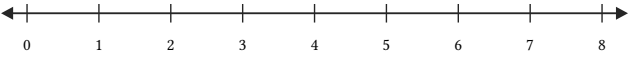
Topic focus
Across 96 tasks this topic asks for compound solution set with connector and endpoint reasoning.
8 PDFs and a README; 48 buyer pages.

Algebra 1

Compound Inequalities

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Combine the conditions $((\frac{2}{3})x - 1 \geq -3)$ AND $((\frac{1}{2})x + 2 < 5)$. Find the exact common interval. _____ Bank label: _____	Solve $x \leq 7$ AND $x < 4$. _____ Bank label: _____
A course pass requires a grade of at least 70, unless an approved alternate assessment has been passed. Let A denote alternate passed; let g denote course grade. Model the two passing routes. _____ Bank label: _____	Show the intersection of $x \leq -2$ and $x > -2$.  _____ Bank label: _____
Combine the conditions $(-4 < x \leq 7)$ AND $(-4 \leq x < 6)$. Compute the exact intersection, paying attention at -4. _____ Bank label: _____	Which scheduled hours 0, 2, 4, 6, and 8 satisfy $t < 2$ OR $t > 6$? _____ Bank label: _____
Translate every part of $2 < x - 4 \leq 10$. _____ Bank label: _____	Combine the conditions $(-2x \geq -8)$ OR $(-3x < -12)$. Solve and combine the rays.  _____ Bank label: _____

Algebra 1

Compound Inequalities

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

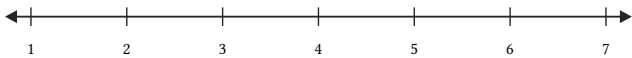
The target solution set is $(-\infty, -2]$ union $(5, \infty)$. Both displayed coefficients of x must be negative. Construct the target OR set so each component requires negative division. _____ _____	Check -5 in the condition $x < -3$ OR $x > 6$. _____ _____
Determine whether 0 belongs to $x < -4$ OR $x > 4$. _____ _____	An integer code is accepted if it is nonpositive or at least 8. Let n denote integer code. State the connector, inequalities, and domain. _____ _____
Test $x = 0$ and $x = 3$ after solving each part of $5 - 2x \geq 1$ OR $3x + 4 > 1$. _____ _____	Work with $-8 < 3x + 1 \leq 7$. Solve the mixed-endpoint chain. _____ _____

Algebra 1

Compound Inequalities

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: The interval is $(3, 5]$. The allowed values are natural numbers 1 through 8. Apply the condition $5n < 10$ OR $2n \geq 12$. Solve the OR condition and list permitted natural numbers in the window. Your response: _____	Incoming: The set is $\{1, 6, 7, 8\}$. Solve $-3 < x + 2 < 5$. Your response: _____
Incoming: The set is $x < -3$ OR $x \geq 4$. Combine the conditions $(7 < 2x + 1)$ AND $(5x - 4 \leq 21)$. Solve the oppositely written bounds and graph the result.  Your response: _____	Incoming: The overlap is $[-6, 2)$. Combine the conditions $((a + 2)x \leq -a - 2)$ OR $(x > 4)$. Given $a > -2$, solve the OR condition. Your response: _____
Incoming: The set is $\{1, 2, 3, 5, 6, 7\}$. Rewrite $7 > 2x - 1 \geq -5$ in increasing order and solve. Your response: _____	Incoming: The interval is $-1 \leq x < 3$. Solve $-2 < -x \leq 5$ and write the bounds in increasing order. Your response: _____

Algebra 1

Compound Inequalities

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

For $x > -5$ OR $x \geq 2$, a student keeps only $x \geq 2$, claiming that the stricter bound must be used. Explain why 'stricter' is the wrong union rule.

Admission is free for children under 5 or for members who are at least 65. Let a denote age in years; let m denote membership status. Translate the two eligibility routes without treating age alone as sufficient in the second route. Explicitly select AND or OR (including any nested connector), and justify why that logic matches the stated conditions.

Let A be the condition $x < 0$ and B the condition $x > 0$. Edit B to $x \geq 0$ and compare before and after.

For integer n , let A be the condition $n < 3.5$ and B the condition $n \leq 3$. Compare AND and OR over the stated integer domain.

Compound Inequalities

Full Worked Solutions - excerpt

Worked example

Problem. Combine the conditions $((\frac{2}{3})x - 1 \geq -3)$ AND $((\frac{1}{2})x + 2 < 5)$. Find the exact common interval.

Answer. The solution is $x \geq -3$ AND $x < 6$, or $[-3, 6)$.

Explanation and check.

Solving the fraction inequalities gives the two stated bounds.

Worked example

Problem. Solve $x \leq 7$ AND $x < 4$.

Answer. The result is $x < 4$.

Explanation and check.

The strict bound at 4 is the more restrictive upper condition.

Algebra 1
Absolute Value Equations and Inequalities

Solving Absolute Value Inequalities | A1-U03-P07
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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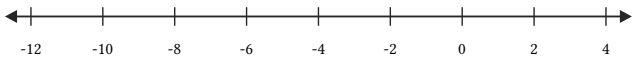
Topic focus
Across 96 tasks this topic asks for exact distance condition or solution set with complete case reasoning.
8 PDFs and a README; 58 buyer pages.

Algebra 1

Absolute Value Equations and Inequalities

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

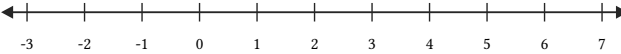
Reconstruct the parameterized symmetric interval. target set: $[a - r, a + r]$ with $r > 0$; form restriction: closed inside condition _____ Bank label: _____	Construct a valid absolute-value inequality whose solution is empty. target set: empty set; form restriction: strict inside condition with radius 0 _____ Bank label: _____
Find all x. condition: $4x \leq 12$ _____ Bank label: _____	Find all x satisfying $7 - x = 4$. _____ Bank label: _____
Solve and graph the result.  condition: $\left \left(\frac{1}{2}\right)x + 2\right < 3$ _____ Bank label: _____	Isolate and solve both branches. equation: $3 -2x - 4 + 6 = 30$ _____ Bank label: _____
Find every solution of $x - 3 = 2$. _____ Bank label: _____	Classify and solve $x - 4 = 0$. _____ Bank label: _____

Algebra 1

Absolute Value Equations and Inequalities

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

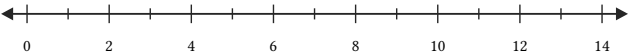
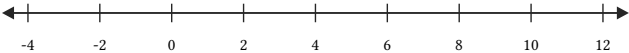
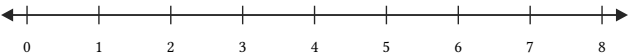
Normalize the outer operations and solve. equation: $2 x - 4 + 1 = 11$ 	Determine the solution set without an invalid case split. equation: $-2 x - 6 = 4$
Interpret the condition in x-units, giving its center and radius. condition: $2x - 6 \leq 8$ 	Construct the required scaled condition.  membership constraints: include -1, include 5, exclude 6, both included points are endpoints, interior coefficient 2
Write the model and list ages. context: An integer age is within 2 years of age 15, including both limits.; quantity: a years, integer 	Describe $t = 6$ without solving it.

Algebra 1

Absolute Value Equations and Inequalities

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: The solution is $-2 < x < 10$. Find midpoint, radius, and the corresponding condition. target set: $x \leq -\frac{2}{3}$ OR $x \geq \frac{10}{3}$; form restriction: closed outside condition Your response: _____	Incoming: Use $x - \frac{4}{3} \geq 2$. Use distance to solve and display the rays.  condition: $7 - x > 5$ Your response: _____
Incoming: The solution is $x \leq 2$ OR $x \geq 6$. Find the open interval and mark its graph endpoints.  condition: $-0.5x + 2 < 3$ Your response: _____	Incoming: The roots are $x = -6$ and $x = 4$. Clear the outer divisor and find the closed interval. condition: $\frac{ x-6 }{2} \leq 4$ Your response: _____
Incoming: The only solution is $x = 3$. Give the exact interval. condition: $x - 1 \leq \frac{5}{2}$ Your response: _____	Incoming: Use $x - 2 \leq 0.8$. Graph and state $x - 4 \leq 2$.  Your response: _____

Algebra 1

Absolute Value Equations and Inequalities

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Apply the missing contextual step.

Supplied solution steps:

1. $|t - 3| > 5$
2. $t \geq 0$ hours
3. student answer $t < -2$ or $t > 8$

Correct the center and interval.

Supplied solution steps:

1. $|x + 4| < 2$
2. student center 4
3. answer $2 < x < 6$

State and prove the containment relation.

condition A: $|x - a| \leq r$; condition B: $|x - a| \leq s$, with $0 < r < s$

Absolute Value Equations and Inequalities

Full Worked Solutions - excerpt

Worked example

Problem. Reconstruct the parameterized symmetric interval.

target set: $[a - r, a + r]$ with $r > 0$; form restriction: closed inside condition

Answer. Use $|x - a| \leq r$.

Explanation and check.

The midpoint is a and the positive half-width is r .

Worked example

Problem. Construct a valid absolute-value inequality whose solution is empty.

target set: empty set; form restriction: strict inside condition with radius 0

Answer. Use $|x - 1| < 0$.

Explanation and check.

No distance is strictly below zero.

Algebra 1
Inequality Graphs and Interval Notation

Inequality Graphs and Interval Notation | A1-U03-P08

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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Topic focus
Across 96 tasks this topic asks for exact equivalent set representation with endpoint evidence.
8 PDFs and a README; 64 buyer pages.

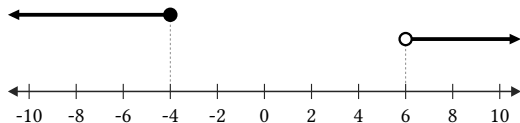
Algebra 1

Inequality Graphs and Interval Notation

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Although the displayed window stops at -10 and 10 , arrows continue. State the full set.



Bank label: _____

Represent the singleton $\{2\}$ on a number line.

Bank label: _____

From the complete menu, list every value in the represented ray. Use the declared universe: exhaustive menu $\{-1, 0, 3, 7\}$. The represented real set is $[3, \infty)$. The scope of the supplied evidence is exhaustive declared finite universe.

Bank label: _____

Classify exactly when these encodings agree and otherwise give a symbolic witness.

The two encodings to compare are $[a, b]$ and $[a, b)$ with $a \leq b$.

Bank label: _____

Algebra 1

Inequality Graphs and Interval Notation

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

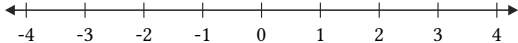
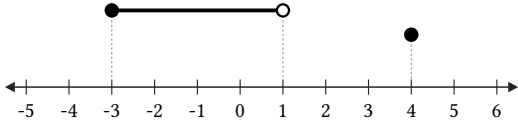
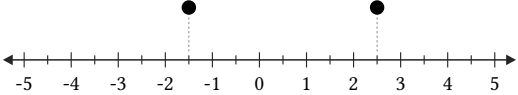
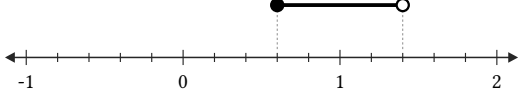
List the integer members, preserving the open upper endpoint. Use the declared universe: integers. The represented real set is $[-4, 3)$. The scope of the supplied evidence is all integers constrained by the bounded interval.	Construct the isolated fraction and the separate bounded interval on one exact scale. Represent $\{-\frac{5}{2}\} \cup [\frac{1}{2}, \frac{7}{4})$ using quarter-unit ticks from -3 to 2.
Encode the union and preserve its one-point gap. The supplied condition is $x < 2$ OR $x > 2$.	Are these sets equal? If not, exhibit a value from the differing region rather than an endpoint only. Encoding A is $[-5, -1] \cup [2, 6]$. Encoding B is $[-5, 6]$.
Determine whether the apparent parameterized interval compression is valid. Encoding A is $[a, b) \cup (b, c]$ with $a < b < c$. Encoding B is $[a, c]$.	Check every join before deciding whether the encodings are equivalent. Encoding A is $[-4, -1) \cup [-1, 2) \cup \{2\}$. Encoding B is $[-4, 2]$.

Algebra 1

Inequality Graphs and Interval Notation

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: The set is $[0, \infty)$. List every prime member of the represented interval. Use the declared universe: prime integers. The represented real set is $(0, 12]$. The scope of the supplied evidence is all prime integers in the bounded interval. Your response: _____	Incoming: The set is $\{2, 3, 5, 7, 11\}$. The exact specification contains no shading and no isolated points. What is the set?  Your response: _____
Incoming: The set is $\{-2, -1, 0, 1, 2\}$. Translate $x \geq 0$ to interval notation. The supplied condition is $x \geq 0$. Your response: _____	Incoming: The set is $[-2, 7)$. The line shades $[-3, 1)$ and separately marks 4. Encode the complete set.  Your response: _____
Incoming: The set is $\{-6, -3, 3, 6, 9\}$. Only two filled points are shown on a half-unit scale. Encode them without shading between.  Your response: _____	Incoming: The interval is $(-1, 4)$. The endpoints lie at the third and seventh ticks to the right of zero on a 0.2 scale. Read coordinates, not tick numbers.  Your response: _____

Algebra 1

Inequality Graphs and Interval Notation

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Verify the supplied graph using boundary, interior, and exterior values.

The original condition is $-1 < x \leq 4$. The proposed representation is hollow -1 , filled 4 , shading between. Use the supplied checks: -1 ; 0 ; 4 ; 5 .

Audit the proposal across all possible orderings of the real parameters.

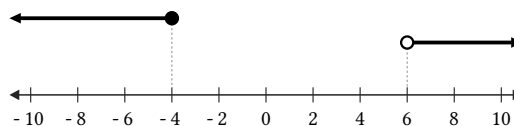
The original condition is $a \leq x \leq b$. The proposed representation is the closed segment $[a, b]$. Use the supplied checks: $a < b$; $a = b$; $a > b$.

Inequality Graphs and Interval Notation

Full Worked Solutions - excerpt

Worked example

Problem. Although the displayed window stops at -10 and 10 , arrows continue. State the full set.



Answer. Use $(-\infty, -4]$ union $(6, \infty)$.

Explanation and check.

Window edges are not endpoints; arrows indicate unbounded continuation.

Worked example

Problem. Represent the singleton $\{2\}$ on a number line.

Answer. Draw one filled point at 2 and no shaded segment or arrow.

Explanation and check.

A singleton contains one coordinate only, so adjacent values must stay unshaded.

Algebra 1
Inequality Word Problems: Plans and Constraints

Comparing Options with Inequalities (Applications) | A1-U03-P09

96 problems · Four activity formats

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Topic focus
Across 96 tasks this topic asks for inequality and exact feasible choices with units.
8 PDFs and a README; 51 buyer pages.

Algebra 1

Inequality Word Problems: Plans and Constraints

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Vendor J charges \$75 plus \$4 per item; Vendor K charges \$30 plus \$9 per item, and the order may contain at most 12 items. Let i denote number of items. Here, i is an integer with $0 \leq i \leq 12$. Determine every permitted order size for which J is no more expensive. _____ Bank label: _____	Two machines each take 6 minutes per batch and both require 14 minutes of setup. Let b denote number of batches. Here, b is a nonnegative integer. For which batch counts is Machine A no slower than Machine B? _____ Bank label: _____
A decision satisfies $x \leq 12$ and $x \leq 20$. The second cap is tightened to 9. Let x denote nonnegative real decision. Here, x is a nonnegative real number. Describe the new feasible set and the switch in the active constraint. _____ Bank label: _____	A printer balance includes a \$10 credit. Each poster costs \$6. At least 4 posters are required and net charges must be under \$50. Let p denote number of posters. Here, p is a nonnegative integer. Model the signed credit, strict budget, and count floor together. _____ Bank label: _____
A real quantity must satisfy $3 \leq x \leq 11$. The lower requirement relaxes to $x \geq 1$. Let x denote feasible quantity. Here, x is a real number. Describe the change and name the unchanged active side. _____ Bank label: _____	A count initially satisfies $n < 8.2$. A tighter limit changes it to $n < 8$. Let n denote nonnegative count. Here, n is a nonnegative integer. Quantify the effect of crossing the integer boundary. _____ Bank label: _____
A parcel is accepted if it weighs under 750 grams or at least 1.2 kg but no more than 2 kg. Let w denote parcel mass in kilograms. Here, w is a nonnegative real number. Convert units and model both acceptance routes. _____ Bank label: _____	A shelter has 440 meals and serves 36 per day. It wants at least 80 meals in reserve. Let d denote number of service days. Here, d is a nonnegative integer. Model the reserve and find the day cap. _____ Bank label: _____

Algebra 1

Inequality Word Problems: Plans and Constraints

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Each craft uses 2.5 meters of cord. At least 8 crafts are needed, and only 30 meters of cord is available. Let c denote number of crafts. Here, c is a nonnegative integer. Model both production and resource limits. 	An integer n from 0 through N qualifies when $n < L$ or $n \geq U$, where $0 \leq L \leq U \leq N$. Let n denote qualifying count. Here, n is an integer in $[0, N]$. Give the exact discrete union, including strict rounding at L.
A 96-square-meter hall reserves 24 square meters for a display. Each table needs 6 square meters. Let t denote number of tables. Here, t is a nonnegative integer. Represent the floor-space limit and interpret its solution. 	A shift begins with 120 completed parts and produces 35 each hour. The quota is at least 400 parts. Let h denote whole production hours. Here, h is a nonnegative integer. Model the quota and determine the first qualifying hour.
A \$2,000 event budget pays a fixed \$350 rental. Each meal costs \$24 plus a 12.5% service charge on that meal. Let m denote number of meals. Here, m is a nonnegative integer. Include the per-meal service charge and find the meal cap. 	A musician has practiced 55 minutes this week and adds 25 minutes per session. The requirement is 180 minutes. Let s denote number of sessions. Here, s is a nonnegative integer. Write the cumulative-time constraint and find the minimum session count.

Algebra 1

Inequality Word Problems:
Plans and Constraints

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: The minimum is $p = 5$. Plan L costs \$18 plus \$5 per GB. Plan M costs \$30 plus \$3 per GB. Let g denote data used in GB. Here, g is a nonnegative real number. Determine the data amounts for which Plan M is no more expensive. Your response: _____	Incoming: $30 + 3g \leq 18 + 5g$, so $g \geq 6$ GB. A contest accepts team sizes of at most 3 or at least 8, with a maximum of 10. Let n denote team size. Here, n is a positive integer with $n \leq 10$. List all sizes admitted by either route. Your response: _____
Incoming: The greatest count is $t = 15$. A solved production condition is $p \geq 4.2$. Let p denote number of batches. Here, p is a nonnegative integer. Find the least feasible batch count and test the previous integer. Your response: _____	Incoming: The minimum is $k = -1$. A solved seating condition is $s < 12$. Let s denote number of students. Here, s is a nonnegative integer. Determine the greatest permitted count. Your response: _____
Incoming: $48 + 6(3)c \geq 210$, so $c \geq 9$; nine cases are needed. Garage C charges \$7 plus \$2.50 per hour; Garage D charges \$4 plus \$3.25 per hour. Let h denote parked hours. Here, h is a nonnegative real number. Find the durations when Garage C is no more costly. Your response: _____	Incoming: The minimum is $r = 1$. A solved visit requirement is $v > 6$. Let v denote number of visits. Here, v is a nonnegative integer. Identify the least feasible v. Your response: _____

Algebra 1

Inequality Word Problems: Plans and Constraints

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A budget model yields $n \leq 7.6$ for the number of tables. A planner reports 7.6 tables. Let n denote number of tables. Here, n is a nonnegative integer. Diagnose the interpretation and state the valid maximum.

A decision satisfies $x \leq 12$ and $x \leq 20$. The second cap is tightened from 20 to 15. Let x denote nonnegative real decision. Here, x is a nonnegative real number. Determine whether the feasible set changes and identify the controlling rule.

Route East takes 18 minutes plus 4 minutes per traffic zone. Route West takes 30 minutes plus 2 minutes per zone. Let z denote number of traffic zones. Here, z is a nonnegative integer. When is Route West no slower than Route East?

A service costs \$18 plus \$5 per use and the budget is \$63. The proposal is $5u \leq 63$. Let u denote number of uses. Here, u is a nonnegative integer. Audit the model and resulting count limit.

Inequality Word Problems: Plans and Constraints

Full Worked Solutions - excerpt

Worked example

Problem. Vendor J charges \$75 plus \$4 per item; Vendor K charges \$30 plus \$9 per item, and the order may contain at most 12 items. Let i denote number of items. Here, i is an integer with $0 \leq i \leq 12$. Determine every permitted order size for which J is no more expensive.

Answer. $75 + 4i \leq 30 + 9i$ gives $i \geq 9$; with the domain, i is 9, 10, 11, or 12.

Explanation and check.

The comparison supplies a lower bound and the order rule supplies the active upper bound.

Worked example

Problem. Two machines each take 6 minutes per batch and both require 14 minutes of setup. Let b denote number of batches. Here, b is a nonnegative integer. For which batch counts is Machine A no slower than Machine B?

Answer. $14 + 6b \leq 14 + 6b$ is true for every nonnegative integer b .

Explanation and check.

The two time models are identical, so every allowed input is a tie.

Algebra 1
Relations and Mapping Diagrams

Relations and Mapping Diagrams | A1-U04-P01

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for chosen method, complete mapping, and a reason rejecting the information-losing method and exact finite relation with representation evidence.
8 PDFs and a README; 75 buyer pages.

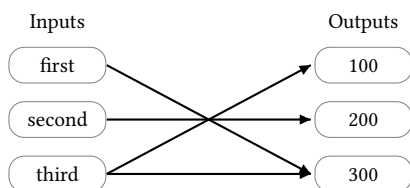
Algebra 1

Relations and Mapping Diagrams

Name: _____ Date: _____ Class: _____

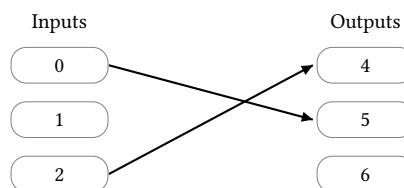
Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Use arrow incidence rather than list position to write the relation.



Bank label: _____

Convert the diagram and name labels that create no pair.



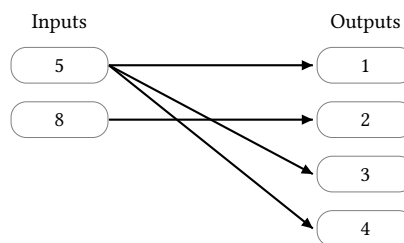
Bank label: _____

List the relation without collapsing rows that share an output.

Input	Output
-3	2
1	2
5	2
7	0

Bank label: _____

Record every destination reached from input 5 and the remaining arrow.



Bank label: _____

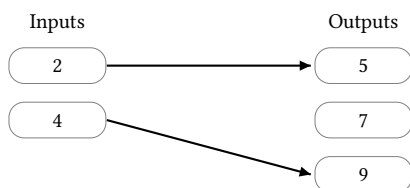
Algebra 1

Relations and Mapping Diagrams

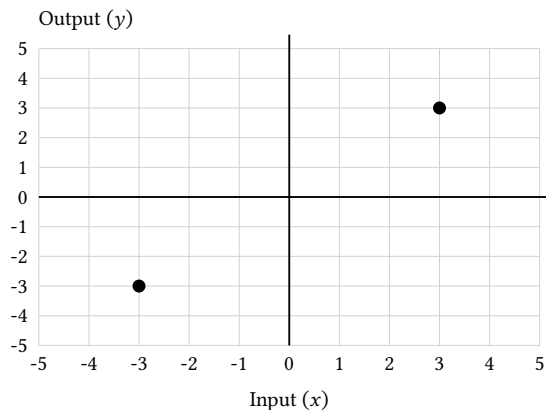
Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Read the relation and handle the unused output label correctly.



The graph window shows every integer from -5 to 5 on both axes. Which points belong to the relation?



Convert the unsorted rows without *re*-pairing them.

Input	Output
5	9
1	2
3	6

The complete diagram contains labels but no arrows. What relation is represented?



Algebra 1

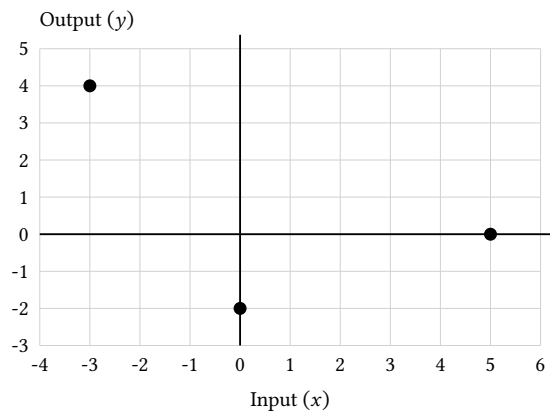
Relations and Mapping Diagrams

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $\{(7, 3), (2, 8), (7, 5)\}$

An exact plot marks the three listed coordinates. Write its relation.



Your response: _____

Incoming: $\{(-3, 4), (0, -2), (5, 0)\}$

Preserve every association when converting the table.

Input	Output
2	5
2	8
4	9

Your response: _____

Incoming: $\{(1, 4), (3, 7)\}$

Produce the distinct relation from all shown rows.

Input	Output
7	3
2	8
7	5
2	8

Your response: _____

Incoming: $\{(1, 1), (2, 2), (3, 1)\}$

Here null means no association. Form the relation set from the exhaustive rows.

Input	Output
0	-1
0	null
-1	0
-1	0

Your response: _____

Algebra 1

Relations and Mapping Diagrams

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A draft has arrows $1 \rightarrow a$ and $2 \rightarrow b$ for $R = \{(1, a), (1, b), (2, b)\}$. Choose a completion method: A, compare each required pair with the arrows already drawn; or B, draw every possible input-output arrow. Apply your choice and explain why the other method would change R .

The complete pair log is $(0, 4), (0, 4), (2, 6)$. To construct its relation diagram, choose A, remove repeated identical pairs before drawing arrows, or B, replace the two rows with input 0 by one row whose output is 8. Draw the resulting mapping and justify the choice.

For $R = \{(0, 0), (2, 0)\}$, use input labels $\{0, 1, 2\}$ and output labels $\{0, 3\}$. Choose A, omit labels equal to zero before drawing, or B, list every prescribed label and draw arrows only for the supplied pairs. Construct the diagram and explain how your method distinguishes zero from an unused label.

Represent $R = \{(A, 9), (B, 7), (B, 9)\}$ with outputs on the left and inputs on the right. Choose A, make every arrow point left-to-right, or B, make every arrow go from the first coordinate to the second coordinate. Construct the diagram and justify the direction.

Relations and Mapping Diagrams

Full Worked Solutions - excerpt

Worked example

Problem. Do matching label sets establish equality?

Answer. No; for instance (red, 1) occurs only in the first set.

Explanation and check.

Both coordinate inventories match, but every association is crossed.

Worked example

Problem. Does the repeated identical row make a different relation?

Answer. No; both represent $\{(2, 7), (4, 9)\}$.

Explanation and check.

An exact duplicate adds no new ordered pair to a set.

Algebra 1

Is It a Function

Is It a Function | A1-U04-P02

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for complete function or impossibility proof, corrected judgment with decisive evidence, definition-based justification, function verdict with decisive evidence, two function verdicts with decisive evidence and valid repair or impossibility with evidence.

8 PDFs and a README; 125 buyer pages.

Algebra 1**Is It
a Function**

Name: _____ **Date:** _____ **Class:** _____

Answer each question and record a bank letter whose complete statement correctly answers that question. A letter may be used more than once or not at all. Give exact values and all reasoning requested by the question; a letter alone is not the whole requested response.

The declared domain is empty and the complete arrow list is empty. Does the function condition hold?

Bank label: _____

Algebra 1

Is It a Function

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Can a function satisfy a pair that appears on both the required and forbidden lists?

After consolidating exact duplicate rows, decide whether a genuine conflict remains.

Input	Output
3	4
3	4
6	8
9	1
6	8
3	-4

Algebra 1

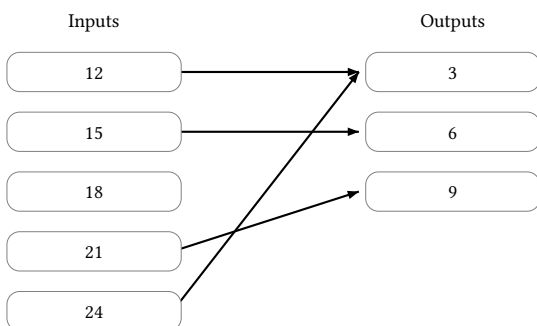
Is It
a Function

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card completely, then match the entire answer and reasoning to another card's Incoming statement. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: No. For example, $x = 2$ gives the included points $(2, 2)$ and $(2, -2)$. Reasoning: Excluding the origin does not remove the two intersections at every positive x .

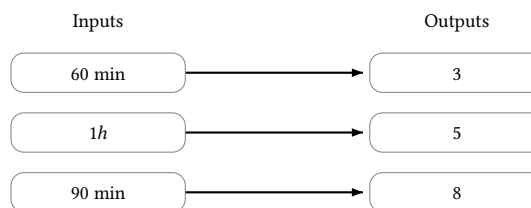
Scan all five declared inputs instead of judging only the drawn arrows.



Your response: _____

Incoming: Not a function on the stated domain; input 18 is unassigned. Reasoning: The four valid arrows do not compensate for the missing output at 18.

Interpret the declared domain as exact durations before testing output uniqueness.



Your response: _____

Algebra 1

Is It a Function

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Diagnose the error in the table verdict and give the corrected conclusion.

Input	Output
1	6
3	6
8	2

Audit whether row multiplicity creates distinct output values.

Input	Output
4	9
4	9
7	1

Is It a Function

Full Worked Solutions - excerpt

Worked example

Problem. The declared domain is empty and the complete arrow list is empty. Does the function condition hold?

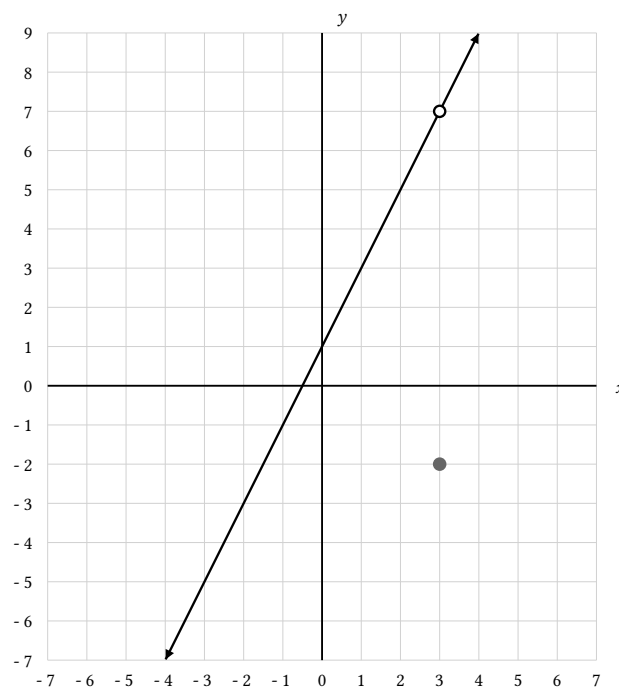
Answer. Yes. There is no declared input that lacks an output or has two outputs.

Explanation and check.

The one-output requirement is satisfied vacuously on the empty domain.

Worked example

Problem. The line has a hole and a replacement point at the same x . Apply the vertical line test to what is included.



Answer. Function. At $x = 3$ only $(3, -2)$ is included; all other x -values lie once on the line.

Explanation and check.

The open point $(3, 7)$ is not an intersection, so the closed replacement supplies one output.

Algebra 1
Interpreting Function Notation

Function Notation and Interpretation | A1-U04-P03

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for notation statement or semantic interpretation.
8 PDFs and a README; 52 buyer pages.

Algebra 1

Interpreting Function Notation

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

The argument is an identifier, not a measurement. Interpret $M(204) = 57$. $M(i)$ is mass in grams of package with item code i. _____ Bank label: _____	Name the given quantity and requested quantity in the ticket instruction. $C(n)$ is cost for n tickets. The instruction is "Find $C(5)$." _____ Bank label: _____
The number 3 appears among known outputs. Does that make $p(3)$ defined? The declared domain is $\{2, 4, 6\}$. _____ Bank label: _____	What does $P(0) = 4$ reveal about this parking charge? $P(n)$ is parking charge in dollars for n completed hours. _____ Bank label: _____
Check the endpoint, a non-whole value, and an over-limit value. The declared domain is whole numbers from 0 through 12 inclusive. Consider the given statements $P(12), P(12.5), P(13)$. _____ Bank label: _____	What is supplied and what is sought in 'determine $R(a + 1)$'? _____ Bank label: _____
Read $R(12) = 0.35$ without interpreting 12 as a count of red pieces $R(k)$ is the ratio of red pieces to all pieces in sample k. _____ Bank label: _____	Identify the role of $b + 3$ without solving the equation. The instruction is "Solve $T(x) = b + 3$ for the possible x-values." _____ Bank label: _____

Algebra 1

Interpreting Function Notation

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Use east-positive input and upward-positive output conventions $e(x)$ is elevation change in meters at x kilometers east of camp. Two kilometers west of camp, elevation is 11 meters lower than at camp.	Resolve the date offset and measurement in $R(-3) = 0.8$. $R(d)$ is rainfall in millimeters on the day d days relative to July 10.
Interpret $I(6) = 24$ using both measurement units. $I(d)$ is light intensity in lumens at depth d meters.	Treat the coordinate label as one argument and encode the reading. $Z(i)$ is pressure in kilopascals for sensor position i, where an ordered pair labels a position. Sensor position $(2, -1)$ reads 98 kilopascals.
Describe what happens after f receives a in $3(f(a) - 2)$.	Separate the roles in the two stages before any calculation. The two instructions are: First report $S(0)$. Then identify every t with $S(t) = S(0)$.

Algebra 1

Interpreting Function Notation

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: Exchanging 50 US dollars yields 7,250 yen. Use the row with input 5 to write one equation for w. <table border="1"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>-3</td> <td>9</td> </tr> <tr> <td>0</td> <td>2</td> </tr> <tr> <td>5</td> <td>-6</td> </tr> </tbody> </table> Your response: _____	Input	Output	-3	9	0	2	5	-6	Incoming: $w(5) = -6$. Treat each coordinate pair as one input object and classify both expressions. The declared domain is $\{(0, 0), (1, 2)\}$. Consider the given statements $V((1, 2)), V(1)$. Your response: _____
Input	Output								
-3	9								
0	2								
5	-6								
Incoming: $Q(3)$ and $Q(3.0)$ are undefined; $Q(-3)$ is defined State the exchange direction encoded by $Y(50) = 7250$. $Y(d)$ is yen received when d US dollars are exchanged. Your response: _____	Incoming: $(6, -11)$. Encode the instantaneous rate observation. $r(t)$ is speed in meters per second at time t seconds. At 4 seconds, the speed is 7.5 meters per second. Your response: _____								
Incoming: Divide n by 2 first and use $\frac{n}{2}$ as q's input. Convert the date to an offset and write the function statement. $R(d)$ is rainfall in millimeters d days relative to September 10. On September 13, rainfall is 4.6 millimeters. Your response: _____	Incoming: $(-2, 5)$. What graph point is represented by $m(3) = 3$? Your response: _____								

Algebra 1

Interpreting Function Notation

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Convert the graph-membership sentence to function notation.

Use the function N . The given statement is The point $(c, -d)$ is on the graph of N .

Complete the task, then compare the direct formula approach with an equivalent check. Explain why both support the same conclusion. State the generic ordered-pair form conveyed by $h(n) = 2n + 1$.

Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Write the table association $\text{small} \rightarrow \text{blue}$ using function C .

Input	Output
small	blue

Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Ignore the record ID and use the semantic headers to encode the row for Q .

Q-value	input	record ID
-8	3	R17

Interpreting Function Notation

Full Worked Solutions - excerpt

Worked example

Problem. The argument is an identifier, not a measurement. Interpret $M(204) = 57$.

$M(i)$ is mass in grams of package with item code i .

Answer. The package with item code 204 has a mass of 57 grams.

Explanation and check.

Code 204 selects the item; 57 grams is its measured output.

Worked example

Problem. Name the given quantity and requested quantity in the ticket instruction.

$C(n)$ is cost for n tickets. The instruction is "Find $C(5)$."

Answer. The count 5 tickets is given; the cost output is requested.

Explanation and check.

C takes ticket count as input and returns cost.

Algebra 1
Evaluating Functions from Representations

Evaluating Functions | A1-U04-P04
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for exact function value or justified information status.
8 PDFs and a README; 64 buyer pages.

Algebra 1

Evaluating Functions
from Representations

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Use the rule $B(x) = 2x - 3 + 1$. Its domain is all real numbers. Evaluate $B(-1)$ in the correct operation order. Bank label: _____	Interpret exact numerical equality to find $L(0.5)$. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <th style="text-align: left;">Input</th> <th style="text-align: left;">Output</th> </tr> <tr> <td>$\frac{1}{2}$</td> <td>6</td> </tr> <tr> <td>2</td> <td>9</td> </tr> </table> Bank label: _____	Input	Output	$\frac{1}{2}$	6	2	9						
Input	Output												
$\frac{1}{2}$	6												
2	9												
Find $p(4)$ even though an output repeats. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <th style="text-align: left;">Input</th> <th style="text-align: left;">Output</th> </tr> <tr> <td>1</td> <td>5</td> </tr> <tr> <td>4</td> <td>5</td> </tr> <tr> <td>7</td> <td>2</td> </tr> </table> Bank label: _____	Input	Output	1	5	4	5	7	2	Use the rule $h(x) = \frac{x^2}{2}$. Its domain is all real numbers. Evaluate $h(3) - 2h(1)$. Compute the exact combination of rule outputs. Bank label: _____				
Input	Output												
1	5												
4	5												
7	2												
Use the rule $W(x) = x + 2$. Its domain is all real numbers. Compute $W(2 - 7)$. Bank label: _____	Ignore the record number and evaluate $N(3)$. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <th style="text-align: left;">record</th> <th style="text-align: left;">input</th> <th style="text-align: left;">output</th> </tr> <tr> <td>101</td> <td>-2</td> <td>4</td> </tr> <tr> <td>205</td> <td>3</td> <td>8</td> </tr> <tr> <td>310</td> <td>7</td> <td>1</td> </tr> </table> Bank label: _____	record	input	output	101	-2	4	205	3	8	310	7	1
record	input	output											
101	-2	4											
205	3	8											
310	7	1											

Algebra 1

Evaluating Functions
from Representations

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Use the rule $W(x) = x - 2$. Its domain is all real numbers. Evaluate $\frac{W(5)}{W(1)+W(3)}$. Evaluate the denominator combination before dividing. 	Use the rule $g(x) = (x + 1)^2 - 4$. Its domain is all real numbers. Evaluate $\frac{g(-3)+g(1)}{g(0)-g(-1)}$. Evaluate all four represented outputs before simplifying the ratio. 										
$V(t)$ is volume in liters t hours after opening. The allowed domain is $0 \leq t < 2$. The requested input is 120 minutes. Convert the time and use endpoint inclusion to determine the volume value. 	Consolidate the duplicate record and state $K(5)$. <table border="1"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>8</td> </tr> <tr> <td>1</td> <td>3</td> </tr> <tr> <td>5</td> <td>8</td> </tr> <tr> <td>-2</td> <td>4</td> </tr> </tbody> </table> 	Input	Output	5	8	1	3	5	8	-2	4
Input	Output										
5	8										
1	3										
5	8										
-2	4										
Use the rule $o(x) = \frac{1}{x+1}$. Its domain is all real x except -1. Evaluate $o(-\frac{3}{3})$. Compute the quotient argument and check the excluded input. 	The declared domain is whole numbers. Is more table information needed to determine $r(1.5)$? 										

Algebra 1

Evaluating Functions
from Representations

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $P(-3) = 97$ kilopascals three days before inspection. $z(t)$ is vertical position in meters above a platform t seconds after launch. Use $z(t) = 6t - 20$. The allowed domain is $0 \leq t \leq 5$. The requested input is 2 seconds. Evaluate and interpret a negative position output. Your response: _____	Incoming: $z(2) = -8$ meters, meaning 8 meters below the platform. $L(t)$ is sea-level change in centimeters relative to a fixed reference level, t hours after 6a.m. Use $L(t) = 0.5t - 5$. The allowed domain is $0 \leq t \leq 12$. The requested input is 2p.m. Resolve the clock reference, evaluate, and interpret the level reference. Your response: _____
Incoming: $E(1.5) = 2.9$ kilowatt-hours after 90 minutes. $P(d)$ is pressure in kilopascals d days relative to an inspection. Use $P(d) = 100 + d$. The allowed domain is $-5 \leq d \leq 5$. The requested input is 3 days before inspection. Translate the relative date to an input and evaluate pressure. Your response: _____	Incoming: $h(2) = -5$. $D(t)$ is distance in miles after t hours. Use $D(t) = 55t$. The allowed domain is $t \geq 0$. Use the model to find the traveled distance after 2.5 hours. Your response: _____
Incoming: $A(2.5) = 6.25$ square meters. $P(n)$ is price in dollars for n tickets. Use $P(n) = 7n$. The allowed domain is whole numbers $n \geq 0$. The requested input is 5 tickets. Evaluate the ticket price for five tickets. Your response: _____	Incoming: $Y(32) = 4640$ yen. Use the rule $m(x) = 0.5(3x - 2)^2$. Its domain is all real numbers. Evaluate $m(2)$ with the inner linear value first. Your response: _____

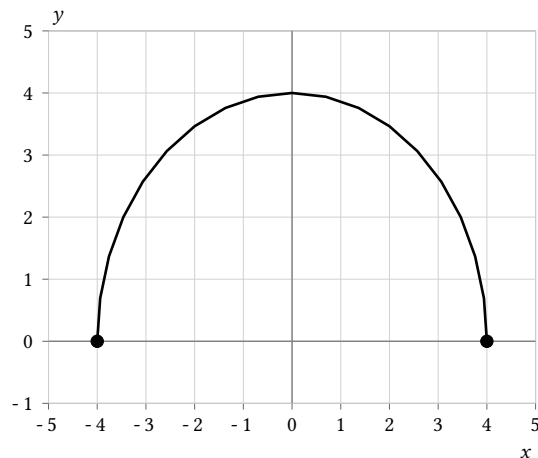
Algebra 1

Evaluating Functions from Representations

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Read $Q(0)$ from the specified upper half-circle.



Complete the task, then compare the direct table approach with an equivalent check. Explain why both support the same conclusion. Columns are displayed output first. Find $G(4)$.

output	input
8	1
3	4
-2	6

Evaluating Functions from Representations

Full Worked Solutions - excerpt

Worked example

Problem. Use the rule $B(x) = |2x - 3| + 1$. Its domain is all real numbers. Evaluate $B(-1)$ in the correct operation order.

Answer. $B(-1) = 6$.

Explanation and check.

$$2(-1) - 3 = -5$$

so

$$|-5| + 1 = 6$$

Worked example

Problem. Interpret exact numerical equality to find $L(0.5)$.

Input	Output
$\frac{1}{2}$	6
2	9

Answer. $L(0.5) = 6$.

Explanation and check.

Decimal 0.5 equals the listed input $\frac{1}{2}$.

Algebra 1
Finding Inputs from Function Outputs

Inverse Functions and Reverse Lookup | A1-U04-P05

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for all admissible inputs with justification.
8 PDFs and a README; 80 buyer pages.

Algebra 1

Finding Inputs from Function Outputs

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Retain only positive inputs. The supplied candidate inputs are $(0, 5)$. The declared domain is $x > 0$. The target output is 1.	Simplify candidates, then impose number type and endpoints. The supplied candidate inputs are $-\sqrt{4}, \frac{1}{3}, \sqrt{2}, 3$. The declared domain is rational x with $-2 < x \leq 3$. The target output is 9.
Which candidates can represent the item-count input? The supplied candidate inputs are $-2, 0, 6$. The declared domain is whole-number item counts. The target output is \$30.	Filter the candidates through the closed interval. The supplied candidate inputs are $(-3, 4)$. The declared domain is $0 \leq x \leq 6$. The target output is 5.
Which candidate times fall within operating hours? The supplied candidate inputs are $8, 14, 19$. The declared domain is hours 9 through 17 inclusive. The target output is target occupancy.	Apply all three domain conditions to the candidate set. The supplied candidate inputs are $-6, -2, 3, 8$. The declared domain is integers x with $-3 \leq x < 8$ and $x \neq 3$. The target output is 4.

Algebra 1

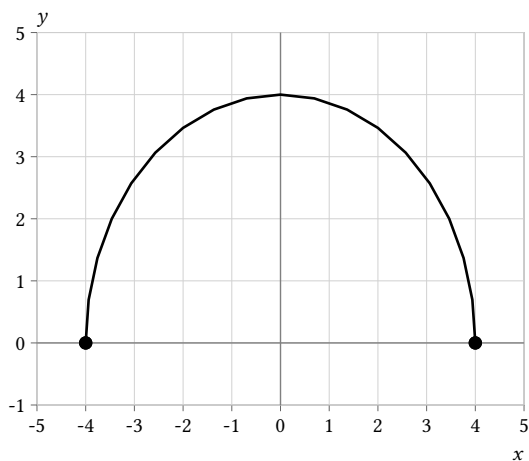
Finding Inputs from
Function Outputs

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: Every x in $[-1, 4]$.

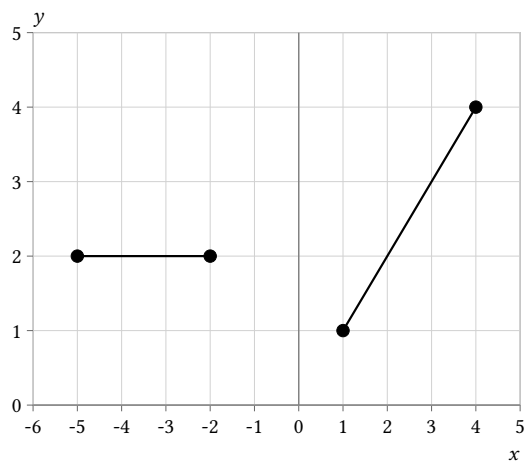
Recover the inputs at the semicircle's zero level.



Your response: _____

Incoming: $x = -4$ and $x = 4$.

Find all inputs at height 2 across both pieces.



Your response: _____

Algebra 1

Finding Inputs from Function Outputs

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Does the output bound make the observed reverse lookup complete?

rows: (1, 7), (4, 2), (8, 7); table scope: partial; additional fact: all outputs are between 0 and 10; target output: 7

Input	Output
1	7
4	2
8	7

Diagnose the direction error and recover the input.

The rule is $f(x) = 2x + 1$. The target output is 9. The supplied student work is: $f(9) = 19$, so the answer is 19.

Finding Inputs from Function Outputs

Full Worked Solutions - excerpt

Worked example

Problem. Is the extra range fact sufficient for a complete reverse lookup?

rows: $(0, 8), (2, 3), (5, 8)$; table scope: partial; additional fact: every unlisted input has output below 0; target output: 8

Input	Output
0	8
2	3
5	8

Answer. Yes. The full set is $\{0, 5\}$.

Explanation and check.

Both listed matches count, and negative unlisted outputs cannot equal 8.

Worked example

Problem. Select all candidates allowed by the even-integer domain.

The supplied candidate inputs are -4, 1, 6. The declared domain is even integers. The target output is 12.

Answer. $\{-4, 6\}$.

Explanation and check.

Both -4 and 6 are even; 1 is not.

Algebra 1
Domain and Range

Domain and Range | A1-U04-P06
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for justified domain or range set.
8 PDFs and a README; 60 buyer pages.

Algebra 1

Domain and Range

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Merge the overlapping output bands. pieces: continuous curve attaining $-3 \leq y \leq 2$, continuous curve attaining $1 \leq y \leq 6$ _____ Bank label: _____	Read the natural graph domain. graph: $y = \sqrt{x+2}$, including endpoint $(-2, 0)$ and arrow right _____ Bank label: _____
Map the restricted ray through h. rule: $h(x) = 3x - 2$; domain: $x \geq 1$ _____ Bank label: _____	Project the vertical segment onto the x-axis. graph: vertical segment at $x = -4$ from $y = -2$ to $y = 6$, endpoints filled _____ Bank label: _____
List the attained outputs from the finite restriction. rule: $r(x) = 2x$; domain: $-3, 0, 4$ _____ Bank label: _____	Determine whether the apparent break removes an input. pieces: curve on $-4 \leq x < -1$, filled point at $x = -1$, curve on $-1 < x \leq 3$ _____ Bank label: _____
Account for decreasing orientation when finding the range. rule: $g(x) = 7 - x$; domain: $-1 \leq x \leq 3$ _____ Bank label: _____	Find the range with decreasing orientation and mixed endpoints. rule: $C(x) = -3x + 1$; domain: $-2 < x \leq 3$ _____ Bank label: _____

Algebra 1

Domain and Range

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Determine the natural domain of h. rule: $h(x) = x + 4$ _____ _____	Does the formula make the cropped graph sufficient? exact rule: $f(x) = 2x + 1$ for every real x; visible window: $-2 \leq x \leq 2$ _____ _____
Separate the known full range from input evidence. known: range is exactly $[0, 10]$; two observed inputs are -1 and 4; domain: not supplied _____ _____	Which complete set can be stated? known: domain is all integers; outputs observed are 2 and 5; rule: not supplied _____ _____
Solve the radicand condition. rule: $u(x) = \sqrt{x - 2}$ _____ _____	Which projection is complete under the onto statement? known: f is onto all real outputs; observed inputs: $(0, 2)$; domain: otherwise unstated _____ _____

Algebra 1

Domain and Range

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: Range $\{-3\}$ union $[0, 6]$. Remove the undefined member of the finite domain. rule: $S(x) = \frac{2}{x+2}$; stated domain: $-4, -2, 0, 3$ Your response: _____	Incoming: Domain $\{-4, 0, 3\}$. Separate viewing window labels from the graph domain. graph: filled curve only on $-2 \leq x \leq 2$; coordinate window and tick marks extend from -10 to 10 Your response: _____
Incoming: Range $[-4, 5]$. Unite repeated vertical bands and the isolated value. pieces: segment with range $[0, 4]$, arc with range $[2, 6]$, point at height -3 Your response: _____	Incoming: Use x in $(-2, 3]$. Reverse the inequality when solving the radicand condition. rule: $J(x) = \sqrt{8 - 2x}$ Your response: _____
Incoming: Domain $(-\infty, 5]$. Account for an endpoint height restored elsewhere. graph: vertical segment with open endpoints $y = -3$ and $y = 5$, plus a filled point at $y = -3$ elsewhere Your response: _____	Incoming: The domain is $[-2, 4]$. What output set does the square-root graph attain? graph: $y = \sqrt{x+2}, x \geq -2$ Your response: _____

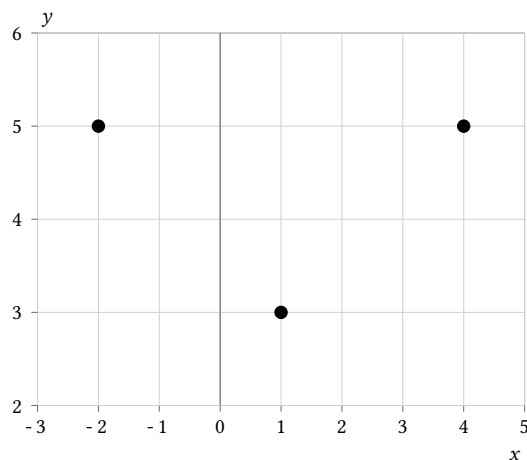
Algebra 1

Domain and Range

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Correct the swapped projections.



Supplied solution steps:

1. domain $\{3, 5\}$
2. range $\{-2, 1, 4\}$

Audit the unattained codomain label.

declaration: $f: \{a, b\} \rightarrow \{1, 2, 3\}$; values: $f(a) = 1, f(b) = 3$

Supplied solution steps:

1. range $\{1, 2, 3\}$

Domain and Range

Full Worked Solutions - excerpt

Worked example

Problem. Merge the overlapping output bands.

pieces: continuous curve attaining $-3 \leq y \leq 2$, continuous curve attaining $1 \leq y \leq 6$

Answer. Range $[-3, 6]$.

Explanation and check.

The bands overlap from 1 through 2, so their union has no vertical gap.

Worked example

Problem. Read the natural graph domain.

graph: $y = \sqrt{x + 2}$, including endpoint $(-2, 0)$ and arrow right

Answer. Domain $[-2, \text{infinity})$.

Explanation and check.

The square-root graph starts at included input -2 and continues right.

Algebra 1

Domain in Context

Domain in Context | A1-U04-P07

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for justified feasible input set and domain type.

8 PDFs and a README; 47 buyer pages.

Algebra 1

Domain in Context

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

For a runner, t is the exact elapsed time in seconds after the starting signal. Classify the domain of t and give two admissible values. _____ Bank label: _____	A cyclist's route coordinate is d kilometers from the start. The modeled segment begins at 3 km and ends just before a rest stop at 27 km. State the domain. _____ Bank label: _____
Let m be the number of text messages received during an afternoon. Identify the natural domain kind. _____ Bank label: _____	Water volume in a rectangular aquarium is $V(h) = 1800h$ cubic centimeters. The interior height is 32 cm. Restrict water depth h. _____ Bank label: _____
A banquet hall records g, the number of guests who enter. Is the natural domain of g discrete or continuous? Give two possible inputs. _____ Bank label: _____	The hours per worker are $h(n) = \frac{96}{n}$ when n workers share a job. At most 24 whole workers can be assigned. Find n's domain. _____ Bank label: _____
A dispatcher uses b for the number of buses currently at a school. Decide whether b is discrete or continuous and illustrate. _____ Bank label: _____	A yard uses n whole 2.5-m fence panels. At least 15m and at most 32m of fence are wanted. Find all feasible n. _____ Bank label: _____

Algebra 1

Domain in Context

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: Garden width has domain $4 \leq w \leq 22$ meters. A test is valid for $-10 < C \leq 35$ degrees Celsius. Using $F = 1.8C + 32$ as the new input scale, find the Fahrenheit domain. Your response: _____	Incoming: Fahrenheit input has domain $14 < F \leq 95$. Fence length remaining is $L(n) = 244 - 8n$ feet after n equal panels are placed. At least 20 feet must remain for a gate area. Restrict whole panel count n. Your response: _____
Incoming: Midnight-based input has domain $9 \leq k < 17$. A rectangle has perimeter $52m$, so its length is $26-w$ when width is w. Both side lengths must be at least $4m$. Restrict w. Your response: _____	Incoming: Brace input has domain $5 < x < 14$. A square tile area A may be any real value with $9 < A \leq 81$ square centimeters. The input is changed to side length $s = \sqrt{A}$. Find s's domain. Your response: _____
Incoming: Grain-sack input has domain n in $\{0, 1, \dots, 32\}$. A package contains 4 tickets and costs \$54. A buyer needs at least 18 tickets and has at most \$310. If p is the package count, find p's domain. Your response: _____	Incoming: Pool-filling time has domain $0 \leq t \leq 9$ hours. A triangle model uses base b and height $12-b$, with $A(b) = b(12-b)/2$. Both lengths must be positive. Restrict b. Your response: _____

Algebra 1

Domain in Context

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A room-capacity model uses c , the number of chairs set out, but proposes domain $-5 \leq c \leq 40$. Diagnose and repair it.

A graph of $N(t)$, completed repairs by time t , uses slanted segments between completion times 1.5, 4, and 6.2 hours. Repairs count only when finished. Diagnose and replace the graph behavior.

A vending controller accepts prices entered to the cent from \$0.50 to \$5.00, but its proposed domain is the full interval $[0.50, 5.00]$. Repair it.

A weather model covers 6:00a.m. through noon, but a graph restricts time to $\{6, 8, 10, 12\}$ because those were measurement hours. Audit the graph.

Domain in Context

Full Worked Solutions - excerpt

Worked example

Problem. For a runner, t is the exact elapsed time in seconds after the starting signal. Classify the domain of t and give two admissible values.

Answer. Runner time t has a continuous domain; 0 and 4.73 seconds are admissible values.

Explanation and check.

Exact elapsed time can take intermediate real values, not only the displayed whole seconds.

Worked example

Problem. A cyclist's route coordinate is d kilometers from the start. The modeled segment begins at 3 km and ends just before a rest stop at 27 km. State the domain.

Answer. Modeled route position has domain $3 \leq d < 27$ kilometers.

Explanation and check.

The segment includes its 3- km reference point but excludes the rest-stop position.

Algebra 1
Comparing Function Representations

Comparing Function Representations | A1-U04-P08

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for coordinated function representation with justification and written qualitative graph description from the given process.
8 PDFs and a README; 57 buyer pages.

Algebra 1

Comparing Function Representations

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

A table lists boundary values $(-3, 10)$ and $(5, -6)$ for a line, plus an interior row $(1, 2)$. The domain is $-3 < x < 5$ except $x = 2$. Supply every open mark required.

Bank label: _____

List the ordered pairs for $s(x) = x^2 + 1$ when $x = -4, -2, 0, 3$, and 5 .

Bank label: _____

Data at $x = 0, 2$, and 5 give $3, 7$, and 13 . Two candidates, $2x + 3$ and $2|x| + 3$, both fit. A new row is $(-4, -5)$. What follows?

Bank label: _____

Every allowed input-output pair is $(-6, -9)$, $(-2, -1)$, $(3, 9)$, and $(8, 19)$. They are collinear. Decide graph form.

Input	Output
-6	-9
-2	-1
3	9
8	19

Bank label: _____

Algebra 1

Comparing Function Representations

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

For $f(x) = 3x - 4$, a table has output 8 in one blank row and output -10 in another. Recover both inputs. 	Functions $f(x) = \frac{2x+2}{x+1}$ and $g(x) = 2$ are both declared on all real x except -1. Is their equality established despite the hole? 																
A table gives $(-1, 0)$, $(0, 2)$, and $(2, 6)$. Test candidates $2x + 1$, $x + 2$, and $x^2 + 2$. Is any consistent with every row? <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 50%;">Input</th> <th style="width: 50%;">Output</th> </tr> </thead> <tbody> <tr> <td>-1</td> <td>0</td> </tr> <tr> <td>0</td> <td>2</td> </tr> <tr> <td>2</td> <td>6</td> </tr> </tbody> </table> 	Input	Output	-1	0	0	2	2	6	Data at $x = -1, 0, 1$ are $1, 0, 1$. A solution says these rows prove the unrestricted rule is x^2 rather than x. Diagnose the reasoning. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 50%;">Input</th> <th style="width: 50%;">Output</th> </tr> </thead> <tbody> <tr> <td>-1</td> <td>1</td> </tr> <tr> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> </tr> </tbody> </table> 	Input	Output	-1	1	0	0	1	1
Input	Output																
-1	0																
0	2																
2	6																
Input	Output																
-1	1																
0	0																
1	1																
For $F(x) = (x - 3)^2 - 5$, construct an ordered table at $x = -1, 1, 3, 6$, and 8. 	A table for $y = \frac{12}{x-1}$ has output -4 and a blank input. Its declared domain is $\{-5, -2, 0, 2, 4\}$. Recover the row and verify membership. 																

Algebra 1

Comparing Function Representations

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: The valid table is $\{(-5, 0), (-4, 3), (-3, 4), (0, 5), (3, 4), (4, 3), (5, 0)\}$; $x = 1$ is excluded by the declared finite domain. Function A is $A(x) = 9 - x^2$ on $[-2, 3]$. Function B's complete table has highest output 8. Compare maximum values. Your response: _____	Incoming: A's maximum is 9 at $x = 0$, so A exceeds B's maximum 8 by 1. A partial table for $a(x) = x - 4$ omits the row at the graph's vertex input. Add it. Your response: _____
Incoming: The data select $y = -2x + 6$. A function follows $S(x) = \sqrt{25 - x^2}$ on the declared domain $\{-5, -4, -3, 0, 3, 4, 5\}$. A request also includes $x = 1$. Write the complete valid table and address $x = 1$. Your response: _____	Incoming: The missing inputs are $x = -7$ and $x = 3$, giving pairs $(-7, 5)$ and $(3, 5)$. A correct graph has points $(-2, 7)$, $(1, 4)$, and $(5, -3)$. A table sorts inputs as $-2, 1, 5$ but copies outputs in graph-reading order $-3, 4, 7$. Repair the table. Your response: _____
Incoming: Candidate A, $x^2 - 1$, is the only match; the row $x = 1$ gives 0 rather than 2 or 1. Two unknown real-domain functions both contain $(0, 1)$, $(1, 3)$, and $(2, 5)$. Is that enough to prove they are identical? Your response: _____	Incoming: The missing pair is $(4, 11)$. The formula $y = 5 - x$ is restricted to $-1 < x \leq 4$, but its graph uses a closed point at $(-1, 6)$ and an open point at $(4, 1)$. Repair the marks. Your response: _____

Algebra 1

Comparing Function Representations

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Complete the task, then compare the direct table approach with an equivalent check. Explain why both support the same conclusion. A table supplies $(0, 1)$, $(2, 5)$, $(5, 5)$, and $(7, 0)$, with straight-line travel specified between consecutive rows. Give the graph construction.

Input	Output
0	1
2	5
5	5
7	0

A table says time 2 minutes gives distance 9 meters. The graph plots the corresponding point as $(9, 2)$ while time is labeled horizontal. Diagnose it.

Comparing Function Representations

Full Worked Solutions - excerpt

Worked example

Problem. A table lists boundary values $(-3, 10)$ and $(5, -6)$ for a line, plus an interior row $(1, 2)$. The domain is $-3 < x < 5$ except $x = 2$. Supply every open mark required.

Answer. Place open boundary points at $(-3, 10)$ and $(5, -6)$, and an open hole at $(2, 0)$.

Explanation and check.

The rows determine $y = -2x + 4$; both strict bounds are open, and the removed input 2 locates the additional hole at output zero.

Worked example

Problem. List the ordered pairs for $s(x) = x^2 + 1$ when $x = -4, -2, 0, 3$, and 5 .

Answer. The square-plus-one table is $\{(-4, 17), (-2, 5), (0, 1), (3, 10), (5, 26)\}$.

Explanation and check.

Square each input first, then add one to obtain the five exact outputs.

Algebra 1
Absolute Value and Piecewise Function Models

Piecewise Functions: Modeling | A1-U04-P09

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for verified conditional rule, value, graph, or model.
8 PDFs and a README; 67 buyer pages.

Algebra 1

Absolute Value and Piecewise Function Models

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Admission is free for ages under 4, \$5 for ages 4 through 12, and \$9 for ages over 12. Model price $P(a)$ for nonnegative age a. _____ Bank label: _____	A process score starts at 100 and loses 4 points for each degree T differs from the 22°C target. Write the score model. _____ Bank label: _____
Arriving exactly at 9:00 earns 15 points. One point is lost per minute early or late. Let m be signed minutes after 9:00. Model $P(m)$. _____ Bank label: _____	Let $G(x) = x^2$ for $x < -3$, $G(x) = x + 8$ for $-3 \leq x \leq 2$, and $G(x) = 1 - x$ for $x > 2$. Evaluate $G(-3)$. _____ Bank label: _____
A rule uses $mx + 1$ for $x \leq 2$ and the constant 7 for $x > 2$. Find m so both formulas have the same joining value. _____ Bank label: _____	For $F(x) = 2x + 1$ if $x < -2$, $F(x) = 7$ if $-2 \leq x < 4$, and $F(x) = x^2$ if $x \geq 4$, find $F(1)$. _____ Bank label: _____
A ranger starts at trail coordinate 6 km and walks at $4 \frac{\text{km}}{\text{h}}$ in either direction. Model travel time to coordinate x. _____ Bank label: _____	Let $s(x) = 4x$ for $x < 5$ and $s(x) = x - 6$ for $x \geq 5$. Find $s(5)$. _____ Bank label: _____

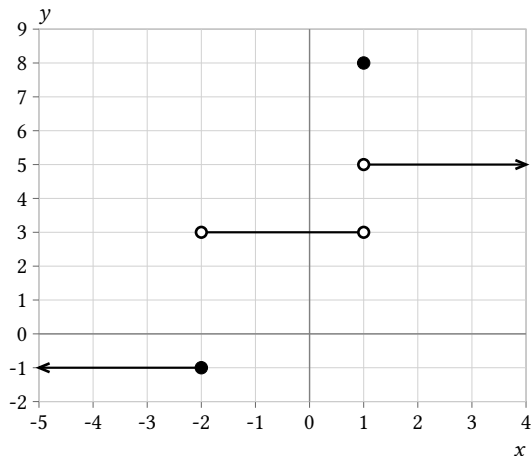
Algebra 1

Absolute Value and Piecewise Function Models

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

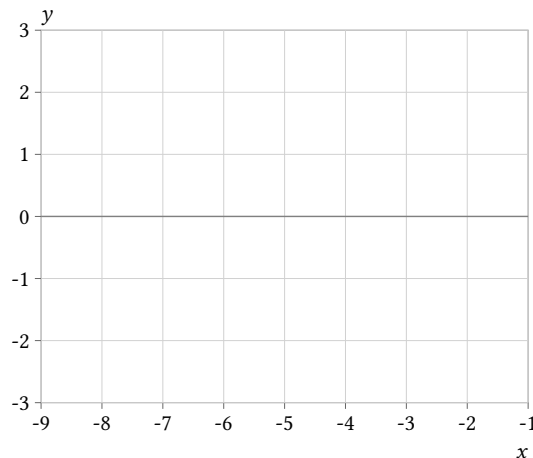
A step graph is $y = -1$ on $x \leq -2$, $y = 3$ on $-2 < x < 1$, $y = 8$ only at $x = 1$, and $y = 5$ on $x > 1$. Encode it.



A rule uses $t(x) = 4 - x$ for $x \leq 0$ and $t(x) = x + 6$ for $x \geq 0$, producing two outputs at zero. Change only one condition endpoint to make a real-domain function while preserving $t(0) = 4$.

Conditions are $x < -4$, $-4 \leq x < 1$, and $x > 1$. If each has one formula, what is the actual domain and what happens at $x = 1$?

Construct $L(x) = -|x + 5| + 2$ only for $x \leq -5$.



Algebra 1

Absolute Value and Piecewise Function Models

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: Use $E(T) = 0.2 + 0.05 T - 18$ for $5 \leq T \leq 30$. Define $U(x) = x^2 + 2$ for $x < -1$, $U(x) = 3x$ for $-1 \leq x < 4$, and $U(x) = 10 - x$ for $x \geq 4$. Find $U(-2)$ and $U(4)$. Your response: _____	Incoming: The requested values are $U(-2) = 6$ and $U(4) = 6$. A function uses $7 - 2x$ for $x \leq 4$ and $mx - 5$ for $x > 4$. Determine m for equal values at the join. Your response: _____
Incoming: The delay model is $D(h) = 2 h$ minutes. A sensor error is 0.2 plus 0.05 per degree away from 18°C, and the sensor is used only for $5 \leq T \leq 30$. Model error with its domain. Your response: _____	Incoming: The alarm index is $A(e) = 1 + 0.04 e - 250$. A function Q is $x + 1$ on $x < 0$, 4 on $0 < x < 3$, and $x - 2$ on $x \geq 3$. What is $Q(0)$? Your response: _____
Incoming: The value is $v(-6) = 5$. A rule lists $L(x) = x - 1$ for $x \geq 4$ first, then $L(x) = 2x + 3$ for $x < 4$. Evaluate $L(-2)$. Your response: _____	Incoming: The required scale is $k = 2$. Define $J(x) = -x^2$ for $x \leq -2$ and $J(x) = 3x + 1$ for $x > -2$. Evaluate $J(-4)$. Your response: _____

Algebra 1

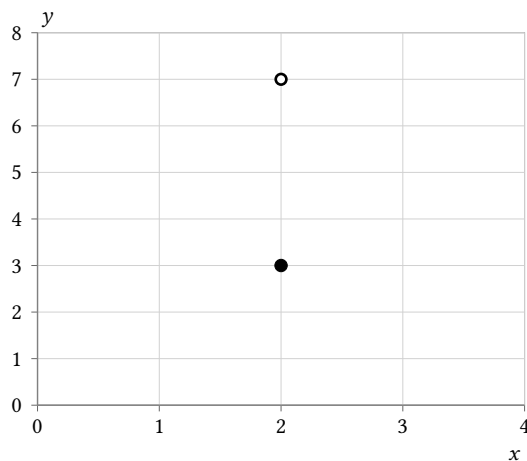
Absolute Value and Piecewise Function Models

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

For $f(x) = 2x$ for $x < 3$ and $f(x) = x + 5$ for $x \geq 3$, a student reports $f(3) = 6$. Diagnose and repair.

A graph has an open point $(2, 7)$ from one branch and a closed point $(2, 3)$ from another. A solution states $f(2) = 7$. Correct it.



Absolute Value and Piecewise Function Models

Full Worked Solutions - excerpt

Worked example

Problem. Admission is free for ages under 4, \$5 for ages 4 through 12, and \$9 for ages over 12. Model price $P(a)$ for nonnegative age a .

Answer. Use $P(a) = 0$ for $0 \leq a < 4$, $P(a) = 5$ for $4 \leq a \leq 12$, and $P(a) = 9$ for $a > 12$.

Explanation and check.

The age thresholds determine three constant branches and both stated equality owners.

Worked example

Problem. A process score starts at 100 and loses 4 points for each degree T differs from the 22°C target. Write the score model.

Answer. The score is $S(T) = 100 - 4|T - 22|$.

Explanation and check.

Absolute value measures unsigned distance from 22, and the negative rate lowers the baseline score.

Algebra 1

Sequences as Discrete Functions

Discrete vs. Continuous Functions and Domain | A1-U04-P10

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
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08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for verified sequence interpretation, value, domain, graph, or judgment.

8 PDFs and a README; 61 buyer pages.

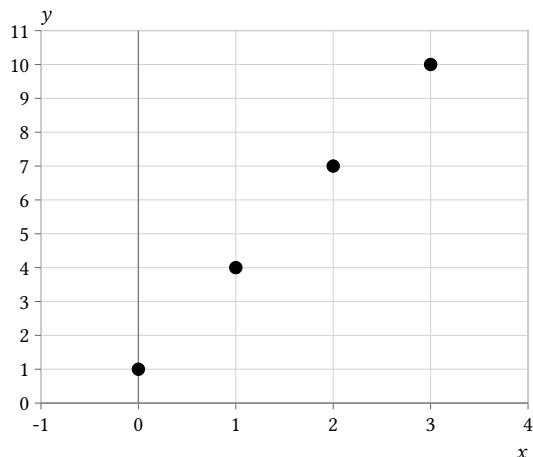
Algebra 1

Sequences as
Discrete Functions

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

A graph shows filled points $(0, 1)$, $(1, 4)$, $(2, 7)$, $(3, 10)$ and explicitly says the sequence ends at $n = 3$. Should an arrow extend the pattern?



Bank label: _____

A listed sequence starts at index 3: $x_3=20$, $x_4=17$, $x_5=14$. Which notation names the first listed value?

Index	Value
3	20
4	17
5	14

Bank label: _____

Given $d_1=20$ and $d_n=d_{n-1}-n$ for $n \geq 2$, generate d_2 , d_3 , d_4 .

Bank label: _____

A sequence starts 1, 2, 5 and is explicitly known to have constant second difference 2. Is the next term determined?

Bank label: _____

Algebra 1

Sequences as
Discrete Functions

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Given $a_n = n^2 - 3n + 5$ for positive integers, compute a_1, a_4, and a_7. _____ _____	A sequence begins at $n = 4$ and follows $t_n = 5 + 3(n - 4)$. Find t_4 and t_9. _____ _____
For $n = 1, 2, 3, \dots$, the sequence is $a_n = 3n + 2$. Find a_4. _____ _____	A sequence is defined only at perfect-square indices no greater than 25, beginning with 1. List the domain. _____ _____
For $n = 0, 1, 2, \dots$, define q_n as n plus -1 raised to the nth power. Find q_2 and q_3. _____ _____	A sequence is defined only for n in $\{1, 4, 9, 16\}$ by $d_n = \sqrt{n} + n$. Evaluate d_9 and decide whether d_{10} exists. _____ _____

Algebra 1

Sequences as
Discrete Functions

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: Sample 4 has measured temperature 18.5 degrees. The pairs for a sequence are $(1, 5)$, $(2, 8)$, $(3, 5)$. What does q_3 equal? <table border="1"> <thead> <tr> <th>Index</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>5</td> </tr> <tr> <td>2</td> <td>8</td> </tr> <tr> <td>3</td> <td>5</td> </tr> </tbody> </table> Your response: _____	Index	Value	1	5	2	8	3	5	Incoming: The lookup gives $q_3 = 5$. Let $e_0=2$ and $e_n=e_{n-1}+2n$ for $n \geq 1$. Determine e_1 through e_3. Your response: _____
Index	Value								
1	5								
2	8								
3	5								
Incoming: The table entry is $c_0 = 7$. The sequence T_k gives the temperature of sample k, and samples are numbered starting at 1. Interpret $T_4=18.5$. Your response: _____	Incoming: No. $A_3 = 9$, whereas $B_3 = 15$. The rule $d_n=5 - 4n$ applies for $n = 1, 2, 3, \dots$. Find d_3. Your response: _____								
Incoming: The rule gives $p_6 = 15$. The rule e_n is supplied for integers $2 \leq n \leq 6$. List its domain. Your response: _____	Incoming: The fifth term is $b_5 = 10$. The rule $j_n=(n-2)^2 + 1$ is defined for $n = 0, 1, \dots, 6$. Fill the entries for $n = 2$ and $n = 5$. Your response: _____								

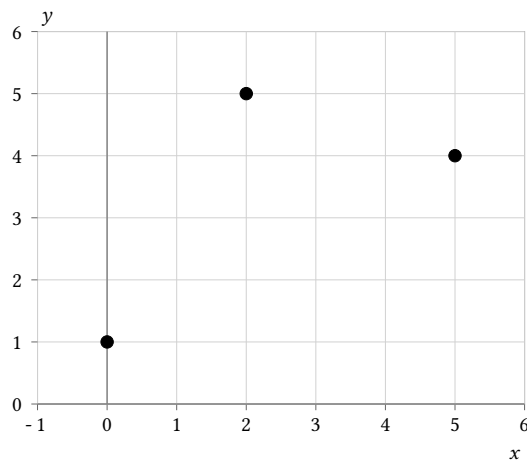
Algebra 1

Sequences as Discrete Functions

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A sequence graph has exactly $(0, 1), (2, 5), (5, 4)$. A student adds points $(1, 3), (3, \frac{14}{3}), (4, \frac{13}{3})$ by connecting segments. Diagnose all added points.

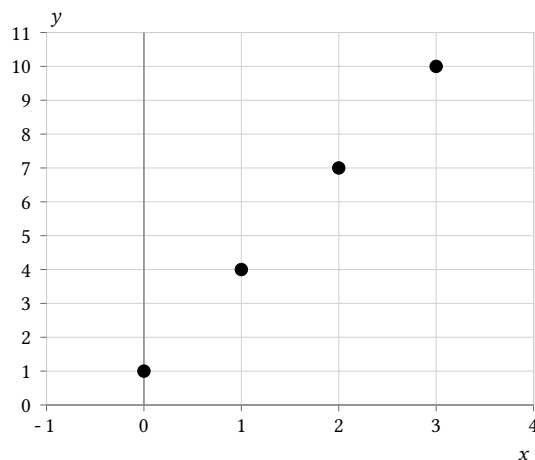


Sequences as Discrete Functions

Full Worked Solutions - excerpt

Worked example

Problem. A graph shows filled points $(0, 1), (1, 4), (2, 7), (3, 10)$ and explicitly says the sequence ends at $n = 3$. Should an arrow extend the pattern?



Answer. No. The graph is exactly those four points and has no continuation arrow.

Explanation and check.

A visible pattern does not override the stated finite domain $\{0, 1, 2, 3\}$.

Worked example

Problem. Given $d_1 = 20$ and $d_n = d_{n-1} - n$ for $n \geq 2$, generate d_2, d_3, d_4 .

Answer. The values are $d_2 = 18, d_3 = 15$, and $d_4 = 11$.

Explanation and check.

Subtract 2, then 3, then 4 from the current preceding value.

Algebra 1
Arithmetic Sequence Explicit and Recursive Rules

Arithmetic Sequence Explicit and Recursive Rules | A1-U04-P11

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for derived rule, comparison, diagnosis, or justified conclusion.
8 PDFs and a README; 46 buyer pages.

Algebra 1

Arithmetic Sequence Explicit and Recursive Rules

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

A declared arithmetic sequence has $a_1 = 4$ and $a_2 = 7$. Its domain is the integers $n \geq 1$. Derive both an explicit rule and a recursive rule. _____ Bank label: _____	A book club log has 0 pages at index 0 and changes by 15 pages per index. Here n counts finished sessions. Write matching explicit and recursive rules for the recorded quantity b_n. _____ Bank label: _____
Translate this initialized recurrence into one explicit formula: $a_6 = -2$, $a_n = a_{n-1} + 4$ for integers $n \geq 7$. _____ Bank label: _____	The same sequence is given by $c_n = -5 + 2(n - 4)$; $c_4 = -5$, $c_n = c_{n-1} + 2$. For the task 'explain the change from one stage to the next', choose a useful form and justify the choice. _____ Bank label: _____
Translate this initialized recurrence into one explicit formula: $a_1 = 3$, $a_n = a_{n-1} + 4$ for integers $n \geq 2$. _____ Bank label: _____	A planted tree row has 23 trees at index 4 and changes by 3 trees per index. Here the first supplied row is row 4. Write matching explicit and recursive rules for the recorded quantity p_n. _____ Bank label: _____
Replace the repeated update with direct index access: $a_1 = 10$, $a_n = a_{n-1} - 2$ for integers $n \geq 2$. _____ Bank label: _____	$d_2 = 6$, $d_3 = 2$, and $d_n = 2d_{n-1} - d_{n-2}$ for $n \geq 4$. Find d_4, d_5, d_6 and decide whether the observed change is constant. _____ Bank label: _____

Algebra 1

Arithmetic Sequence Explicit and Recursive Rules

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Express the same indexed sequence without predecessor notation: $a_7 = 5, a_n = a_{n-1} - 1$ for integers $n \geq 8$. _____ _____	A savings envelope has 25 dollars at index 0 and changes by 6 dollars per index. Here n counts completed weekly deposits. Write matching explicit and recursive rules for the recorded quantity a_n. _____ _____
Write a closed arithmetic rule equivalent to $a_1 = -7, a_n = a_{n-1} - 4$ for integers $n \geq 2$. _____ _____	A candle measurement has 30 centimeters at index 0 and changes by -1 centimeters per index. Here n counts elapsed hours. The record stops at index 30. Write matching explicit and recursive rules for the recorded quantity c_n. _____ _____
Express the same indexed sequence without predecessor notation: $a_1 = 8, a_n = a_{n-1} + 0$ for integers $n \geq 2$. _____ _____	A constant-additive sequence includes $a_1 = 12$ and $a_5 = 0$. Its domain is the integers $n \geq 1$. Derive both an explicit rule and a recursive rule. _____ _____

Algebra 1

Arithmetic Sequence Explicit and Recursive Rules

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $a_3 = 15$. Translate this initialized recurrence into one explicit formula: $a_{-2} = 9, a_n = a_{n-1} - 4$ for integers $n \geq -1$. Your response: _____	Incoming: For integers $n \geq -2, a_n = 9 - (4)(n + 2)$. Reverse the known additive updates to recover the anchor: $a_n = a_{n-1} + \frac{3}{2}$ for $n \geq 1$, and $a_9 = \frac{27}{2}$. The sequence begins at $n = 0$. Find a_0. Your response: _____
Incoming: For integers $n \geq 8, a_n = 17 - (3)(n - 8)$. Determine the missing initial value for this forward recurrence: $a_n = a_{n-1} + \frac{7}{3}$ for $n \geq 4$, and $a_{15} = 43$. The sequence begins at $n = 3$. Find a_3. Your response: _____	Incoming: For integers $n \geq 3, a_n = 11 - (6)(n - 3)$. Supply both parts of the recursive specification for $a_n = (0)n + 6$ for integers $n \geq 1$. Your response: _____
Incoming: For integers $n \geq 0, a_n = -\frac{3}{2} + (\frac{5}{2})(n)$. Work backward by the indexed number of steps: $a_n = a_{n-1} + 0$ for $n \geq 8$, and $a_{19} = 19$. The sequence begins at $n = 7$. Find a_7. Your response: _____	Incoming: $a_4 = 25, a_n = a_{n-1} + 6$ for integers $n \geq 5$. $b_0 = 1, b_1 = 4$, and $b_n = b_{n-1} + 2b_{n-2}$ for $n \geq 2$. Compute b_2, b_3, b_4. Your response: _____

Algebra 1

Arithmetic Sequence Explicit and Recursive Rules

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Audit this sequence work: Terms are 5, 8, 11, ... at $n = 1, 2, 3, \dots$. A student proposes $a_n = 5 + 3n$. Identify the defect and state a correction.

Audit this sequence work: A student converts $b_n = 9 + 4n$ for $n \geq 0$ to $b_0 = 9, b_n = b_{n-1} + 9$. Identify the defect and state a correction.

Audit this sequence work: A table gives $g_2 = 11, g_5 = 2$ for an arithmetic sequence. A proposed rule is $g_n = 11 - 9(n - 2)$. Identify the defect and state a correction.

Audit this sequence work: For $a_n = 7 - 2(n - 4), n \geq 4$, a student gives the recurrence $a_1 = 7, a_n = a_{n-1} - 2$. Identify the defect and state a correction.

Arithmetic Sequence Explicit and Recursive Rules

Full Worked Solutions - excerpt

Worked example

Problem. Convert the explicit arithmetic rule to a complete recurrence: $a_n = (3)n + 2$ for integers $n \geq 1$.

Answer. $a_1 = 5, a_n = a_{n-1} + 3$ for integers $n \geq 2$.

Explanation and check.

The coefficient of n is the consecutive-term difference; evaluate the formula at the first allowed index for the anchor.

Worked example

Problem. Convert the explicit arithmetic rule to a complete recurrence: $a_n = (-5)n + 20$ for integers $n \geq 6$.

Answer. $a_6 = -10, a_n = a_{n-1} - 5$ for integers $n \geq 7$.

Explanation and check.

The coefficient of n is the consecutive-term difference; evaluate the formula at the first allowed index for the anchor.

Algebra 1
Interpreting Piecewise Linear Graphs

Graphing Piecewise-Defined Functions | A1-U04-P12

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for exact behavior intervals, features, construction, or justified conclusion.
8 PDFs and a README; 105 buyer pages.

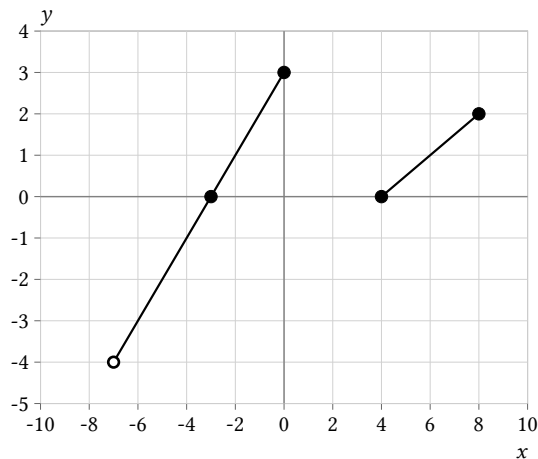
Algebra 1

Interpreting Piecewise Linear Graphs

Name: _____ Date: _____ Class: _____

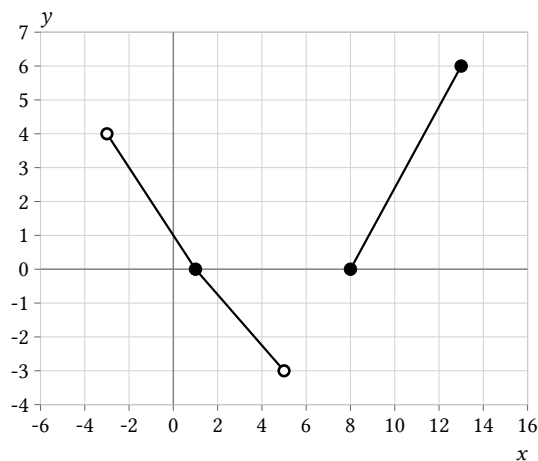
Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Use the stated line segments, not a sketch estimate: component 1: connect $(-7, -4)$ to $(-3, 0)$ to $(0, 3)$; its left endpoint is open and right endpoint is included; component 2: connect $(4, 0)$ to $(8, 2)$; its left endpoint is included and right endpoint is included. List all x -intercepts and the y -intercept, if each exists.



Bank label: _____

Read output sign, not direction of travel, from: component 1: connect $(-3, 4)$ to $(1, 0)$ to $(5, -3)$; its left endpoint is open and right endpoint is open; component 2: connect $(8, 0)$ to $(13, 6)$; its left endpoint is included and right endpoint is included. State where $f(x)$ is positive, negative, and zero.



Bank label: _____

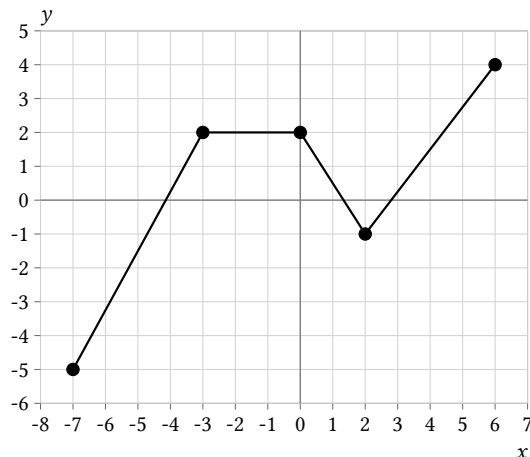
Algebra 1

Interpreting Piecewise Linear Graphs

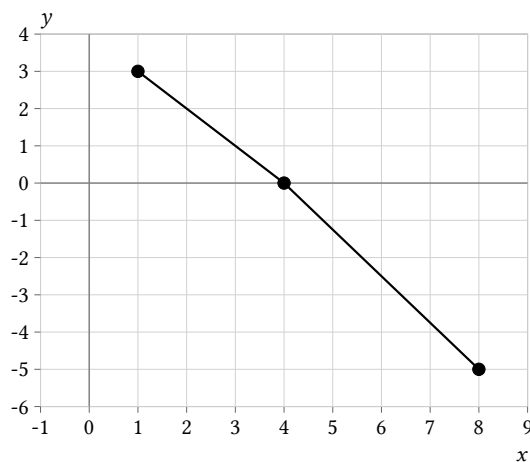
Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Use these exact vertices and no points in any domain gap: connect $(-7, -5)$ to $(-3, 2)$ to $(0, 2)$ to $(2, -1)$ to $(6, 4)$; its left endpoint is included and right endpoint is included. List the input intervals where the function is increasing, decreasing, or constant.



The function graph has the following exact connected pieces: connect $(1, 3)$ to $(4, 0)$ to $(8, -5)$; its left endpoint is included and right endpoint is included. List all x -intercepts and the y -intercept, if each exists.



Algebra 1

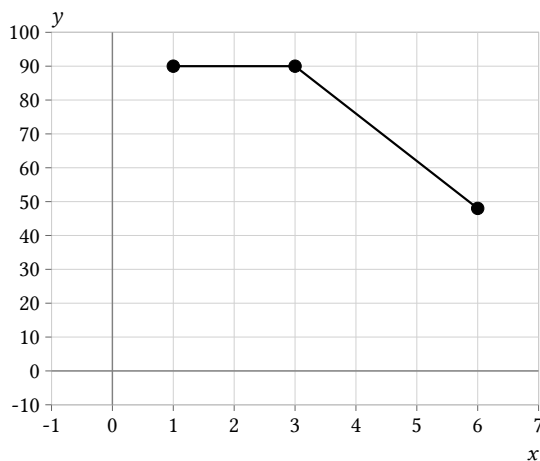
Interpreting Piecewise Linear Graphs

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: The global maximum is 3 at $x = 2$, and the global minimum is -5 at $x = -3$.

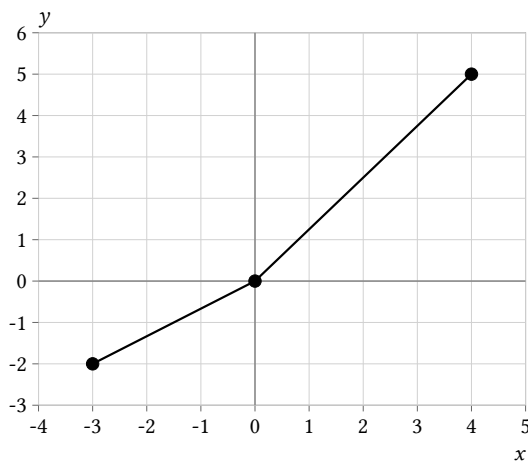
A graph shows inventory $I(d)$ in boxes at the end of day d by connecting $(1, 90)$, $(3, 90)$, $(6, 48)$ in order. Interpret the first segment and the later decrease.



Your response: _____

Incoming: Inventory stays at 90 boxes from day 1 through day 3, then falls to 48 boxes by day 6.

Determine both kinds of axis intercept from this exact graph: connect $(-3, -2)$ to $(0, 0)$ to $(4, 5)$; its left endpoint is included and right endpoint is included. List all x -intercepts and the y -intercept, if each exists.



Your response: _____

Algebra 1**Interpreting Piecewise
Linear Graphs****Name:** _____ **Date:** _____ **Class:** _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

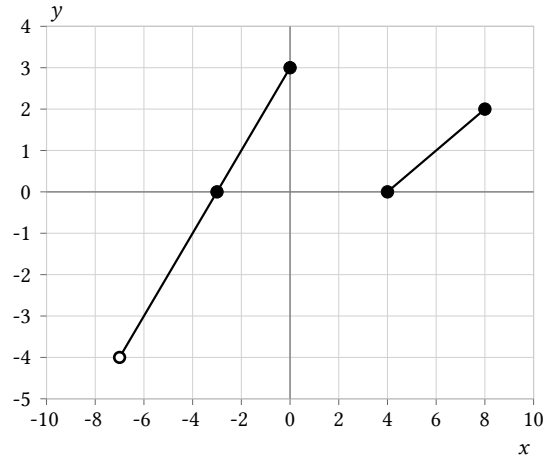
Audit this qualitative analysis: A graph rises from $(-5, -4)$ to $(2, 6)$. A student reports that it increases on $-4 < y < 6$. Correct the claim.

Interpreting Piecewise Linear Graphs

Full Worked Solutions - excerpt

Worked example

Problem. Use the stated line segments, not a sketch estimate: component 1: connect $(-7, -4)$ to $(-3, 0)$ to $(0, 3)$; its left endpoint is open and right endpoint is included; component 2: connect $(4, 0)$ to $(8, 2)$; its left endpoint is included and right endpoint is included. List all x -intercepts and the y -intercept, if each exists.



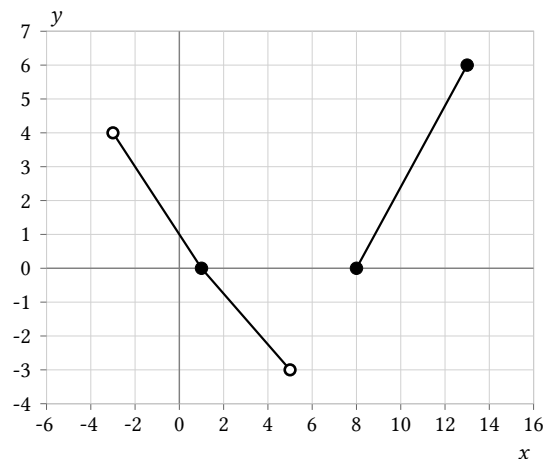
Answer. x -intercept set: $(-3, 0), (4, 0)$; y -intercept: $(0, 3)$. The exact domain is $(-7, 0]$ union $[4, 8]$.

Explanation and check.

Use the exact segment equations implicit in the listed vertices for crossings, and retain only included points at either axis.

Worked example

Problem. Read output sign, not direction of travel, from: component 1: connect $(-3, 4)$ to $(1, 0)$ to $(5, -3)$; its left endpoint is open and right endpoint is open; component 2: connect $(8, 0)$ to $(13, 6)$; its left endpoint is included and right endpoint is included. State where $f(x)$ is positive, negative, and zero.



Answer. Positive on $(-3, 1), (8, 13]$; negative on $(1, 5)$; zero on $x = 1, x = 8$.

Explanation and check.

Direction of travel is irrelevant here: only being above, on, or below $y = 0$ determines positive, zero, or negative output.

Algebra 1
Average Rate of Change in Context

Average Rate of Change in Context | A1-U05-P01
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for a rate, comparison, interpretation, or justified conclusion with units.
8 PDFs and a README; 47 buyer pages.

Algebra 1

Average Rate of Change in Context

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

A print shop quotes a variable cost rate of 4 cents per page. What changes, and by how much, when the page count rises by one? _____ Bank label: _____	Pump A fills at 3 liters per minute; pump B fills at 150 liters per hour. Which pump has the greater fill rate? _____ Bank label: _____
A connected graph passes through (0, 1), (2, 7), and (5, 16) with straight segments. Is the output rate constant from $x = 0$ to $x = 5$? _____ Bank label: _____	Battery charge is 93% at hour 2 and 69% at hour 8. Find its average rate in percentage points per hour. _____ Bank label: _____
One graph segment runs from (2, 9) to (8, 9); another runs from (−3, 1) to (1, 3). Compare average rates. _____ Bank label: _____	A concentration changes steadily at $-\frac{7}{4}(\frac{mg}{L})$ per hour for 12 hours. Find ΔC. _____ Bank label: _____
The number of people inside a hall is changing at +25 people per minute. Interpret the plus sign and the rate unit. _____ Bank label: _____	Printer R produces 5 pages per minute. Printer S produces 280 pages per hour. Which output rate is greater? _____ Bank label: _____

Algebra 1

Average Rate of
Change in Context

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

A reservoir's water depth changes at -3 centimeters per day. What does this signed rate say about the depth? 	Temperature changes constantly at -3 °C per hour for 6 hours. What is the total temperature change?
A trail profile has a rate of change of $\frac{3}{4}$ meter of elevation per horizontal meter. Explain this rate without using the word slope. 	A cart moves at a constant 8 miles per hour for $\frac{3}{2}$ hours. How much does its traveled distance change?
Snow depth is increasing at 2 inches per hour. Translate the rate into an input-output statement. 	A robot's signed position changes at $12\frac{m}{s}$ for $\frac{5}{4}$ seconds. Compute Δx.

Algebra 1

**Average Rate of
Change in Context**

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A student says, 'Reading 12 pages in 3 minutes means the rate is 12 pages.' Diagnose and correct the statement.

A calculation uses output values 2 and 8 at input values 1 and 5, then reports $\frac{2}{3}$ input units per output unit. Find the error.

A hiker is 2 km from camp at both noon and 2 p.m. A student concludes the hiker's distance never changed. Audit the conclusion.

A value rises from 14 to 38 between hour 3 and hour 9. A student computes $\frac{38-14}{9}$. Diagnose the denominator.

Average Rate of Change in Context

Full Worked Solutions - excerpt

Worked example

Problem. A print shop quotes a variable cost rate of 4 cents per page. What changes, and by how much, when the page count rises by one?

Answer. The cost increases by 4 cents when the order gains one page.

Explanation and check.

The output is cost and the input is pages, so one page adds four cents.

Worked example

Problem. Pump A fills at 3 liters per minute; pump B fills at 150 liters per hour. Which pump has the greater fill rate?

Answer. Pump A; $3L/\text{min} = 180\frac{L}{h}$, which is greater than $150\frac{L}{h}$.

Explanation and check.

Convert the denominator unit: 3 liters each minute corresponds to

$$3 \times 60 = 180$$

liters each hour.

Algebra 1
Slope from Two Points

Slope from Two Points | A1-U05-P02
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for an exact slope, coordinate, construction, comparison, or justified conclusion.
8 PDFs and a README; 46 buyer pages.

Algebra 1

Slope from
Two Points

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Use the two coordinates $(-4, -3)$ and $(2, 3)$ to calculate m. Bank label: _____	Evaluate the difference ratio for $(0, -2)$ and $(6, 1)$. Bank label: _____
A report labels the slope through $(-4, 6)$, $(9, 6)$ undefined. Diagnose the confusion. Bank label: _____	Using the points in the listed order, find the slope from $(5, 2)$ to $(1, 10)$. Bank label: _____
Show with exact differences that reversing $(4, -1)$, $(-2, 8)$ does not change the slope. Bank label: _____	Compute the slope joining $(7, -3)$ to $(9, 3)$. Bank label: _____
A student uses $\frac{2-11}{15-3}$, then swaps the points. What ratio must the student use to keep the slope unchanged? Bank label: _____	Find the slope of the distinct points $(-6, 8)$, $(9, 8)$. Bank label: _____

Algebra 1

Slope from
Two Points

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $x = -19$. A point $(x, 2)$ has slope $\frac{5}{8}$ with $(1, -3)$. Determine x. Your response: _____	Incoming: $x = 9$. Identify all equal slope outcomes among pairs A, B, and C, where A and B have repeated x-coordinates. $A: (-2, 1), (-2, 9)$; $B: (6, -5), (6, 4)$; $C: (0, 0), (1, 8)$ Your response: _____
Incoming: One pair is $(0, -5)$ and $(2, 0)$. Find x in $(x, 11)$ when the slope to $(-1, -1)$ is $-\frac{2}{3}$. Your response: _____	Incoming: For $(-4, -7)$ and $(5, -5)$, the slope is $\frac{2}{9}$. Compute the slope from $(-9, 3)$ to $(-5, 14)$. Your response: _____
Incoming: $y = 8$. Which signed slope is greater: A through $(0, 0), (5, -4)$ or B through $(2, 7), (9, 1)$? Your response: _____	Incoming: $x = 2$. If $(5, -1)$ and $(9, y)$ have slope $-\frac{3}{4}$, find the missing output coordinate. Your response: _____

Algebra 1

**Slope from
Two Points**

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

For points $(1, 2)$ and $(5, 10)$, a student writes $\frac{10-2}{1-5} = -2$. Diagnose and repair the calculation.

A solution for $(-2, 1), (4, 10)$ computes run over rise and reports $\frac{2}{3}$. Correct it.

Pairs A and B start at $(0, 0)$ and end at $(4, 4)$ and $(4, -4)$. Compare their signed slopes and magnitudes.

A student calls the slope through $(3, -5), (3, 8)$ zero because the x -values match. What is the correct conclusion?

Slope from Two Points

Full Worked Solutions - excerpt

Worked example

Problem. Use the two coordinates $(-4, -3)$ and $(2, 3)$ to calculate m .

Answer. For $(-4, -3)$ and $(2, 3)$, the slope is 1.

Explanation and check.

Rise and run are both 6, hence $m = \frac{6}{6} = 1$.

Worked example

Problem. Evaluate the difference ratio for $(0, -2)$ and $(6, 1)$.

Answer. For $(0, -2)$ and $(6, 1)$, the slope is $\frac{1}{2}$.

Explanation and check.

The ratio of changes is $\frac{1 - (-2)}{6 - 0} = \frac{3}{6} = \frac{1}{2}$.

Algebra 1
Slope from Tables and Graphs

Slope from Tables and Graphs | A1-U05-P03

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for an exact slope, missing datum, comparison, or justified linearity conclusion.
8 PDFs and a README; 87 buyer pages.

Algebra 1

Slope from Tables and Graphs

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

The graphs show the same square angle but use different horizontal units. Graph A: 4 squares right, 2 squares up; each horizontal square is 1x-units and each vertical square is 1y-units. Graph B: 4 squares right, 2 squares up; each horizontal square is 2x-units and each vertical square is 1y-units. Compare their signed coordinate slopes.

An interior output must share the common rate. The table $x = -3, y = 2; x = 1, y = ?; x = 5, y = 10$ is declared linear. Determine the missing entry, or explain why no valid unique entry follows.

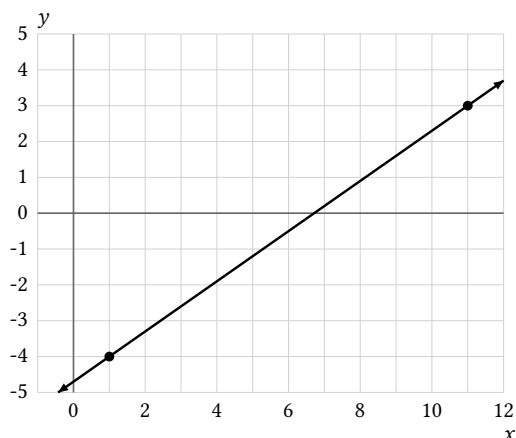
The table is declared linear.

Input x	Output y
-3	2
1	_____
5	10

Bank label: _____

Bank label: _____

An exact line graph marks the points $x = 1, y = -4; x = 11, y = 3$. Determine its slope.



An input cell must be recovered from its output. The table $x = 2, y = 0; x = ?, y = 8; x = 8, y = 12$ is declared linear. Determine the missing entry, or explain why no valid unique entry follows.

The table is declared linear.

Input x	Output y
2	0
_____	8
8	12

Bank label: _____

Bank label: _____

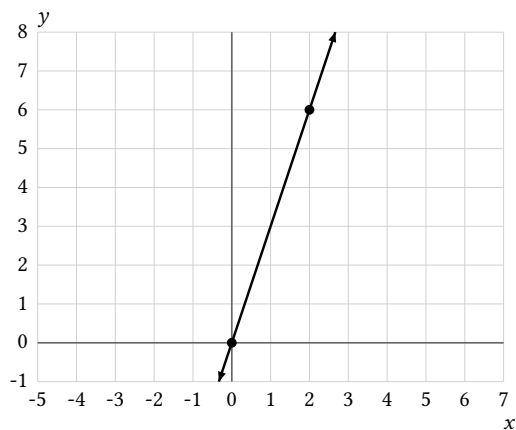
Algebra 1

Slope from Tables and Graphs

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

An exact line graph marks the points $x = 0, y = 0$; $x = 2, y = 6$. Determine its slope.

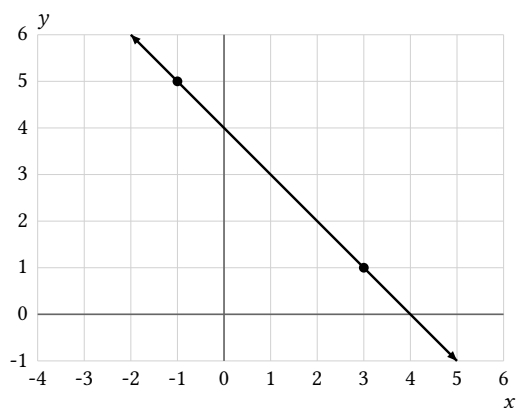


A middle output cell is blank. The table $x = 0, y = 2$; $x = 2, y = ?$; $x = 4, y = 10$ is declared linear. Determine the missing entry, or explain why no valid unique entry follows.

The table is declared linear.

Input x	Output y
0	2
2	_____
4	10

On a coordinate graph, the line passes through $x = -1, y = 5$; $x = 3, y = 1$. Read the rise and run from left to right and find m .



Does the table $x = 0, y = 1$; $x = 1, y = 3$; $x = 2, y = 5$; $x = 3, y = 7$ have a constant slope? Support the decision with interval rates.

Input x	Output y
0	1
1	3
2	5
3	7

Algebra 1

Slope from Tables and Graphs

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: The missing value in $x = -\frac{5}{2}, y = -1$; $x = ?, y = 2$; $x = \frac{7}{2}, y = 5$ is $x = \frac{1}{2}$.

The output pattern uses noninteger values. The table $x = 0, y = \frac{2}{3}$; $x = 3, y = ?$; $x = 9, y = \frac{20}{3}$ is declared linear. Determine the missing entry, or explain why no valid unique entry follows.

The table is declared linear.

Input x	Output y
0	$\frac{2}{3}$
3	_____
9	$\frac{20}{3}$

Your response: _____

Incoming: On $x = 0$ to $x = 6$, the requested slope is 1, but one global slope is not justified; adjacent average rates are 3, 0, -3.

A fractional input must be reconstructed exactly. The table $x = -\frac{5}{2}, y = -1$; $x = ?, y = 2$; $x = \frac{7}{2}, y = 5$ is declared linear.

Determine the missing entry, or explain why no valid unique entry follows.

The table is declared linear.

Input x	Output y
$-\frac{5}{2}$	-1
_____	2
$\frac{7}{2}$	5

Your response: _____

Incoming: The missing value in $x = 0, y = \frac{2}{3}$; $x = 3, y = ?$; $x = 9, y = \frac{20}{3}$ is $y = \frac{8}{3}$.

A visually flat segment competes with a steep scaled segment. Graph A: 8 squares right, 2 squares up; each horizontal square is $3x$ -units and each vertical square is $1y$ -units. Graph B: 2 squares right, 8 squares up; each horizontal square is $1x$ -units and each vertical square is $\frac{1}{4}y$ -units. Compare their signed coordinate slopes.

Your response: _____

Incoming: The slope is $-\frac{3}{5}$; the coordinate rise is 6 and the coordinate run is -10.

This table is declared linear: $x = 2, y = -8$; $x = 8, y = -4$; $x = 17, y = 2$. Determine its common slope.

The table is declared linear.

Input x	Output y
2	-8
8	-4
17	2

Your response: _____

Algebra 1

Slope from Tables and Graphs

Name: _____ Date: _____ Class: _____

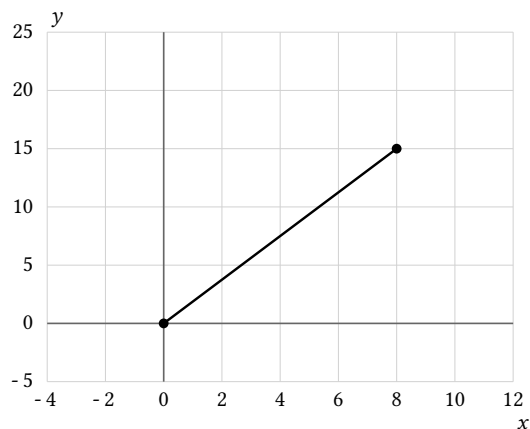
Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A student reads the table $x = 0, y = 2$; $x = 3, y = 8$ and calls the slope 6. Diagnose the answer.

slope is 6

Input x	Output y
0	2
3	8

A graph moves 4 squares right and 3 up; x -squares represent 2 units and y -squares 5 units. A student reports $\frac{3}{4}$. Audit the scale use.



Slope from Tables and Graphs

Full Worked Solutions - excerpt

Worked example

Problem. The graphs show the same square angle but use different horizontal units. Graph A: 4 squares right, 2 squares up; each horizontal square is $1x$ -units and each vertical square is $1y$ -units. Graph B: 4 squares right, 2 squares up; each horizontal square is $2x$ -units and each vertical square is $1y$ -units. Compare their signed coordinate slopes.

Answer. Graph A has slope $\frac{1}{2}$ and graph B has slope $\frac{1}{4}$; A's signed slope is greater than B's.

Explanation and check.

The graphs show the same square angle but use different horizontal units. After applying both axis scales, compare $\frac{1}{2}$ and $\frac{1}{4}$.

Worked example

Problem. An interior output must share the common rate. The table $x = -3, y = 2$; $x = 1, y = ?$; $x = 5, y = 10$ is declared linear. Determine the missing entry, or explain why no valid unique entry follows.

The table is declared linear.

Input x	Output y
-3	2
1	_____
5	10

Answer. The missing value in $x = -3, y = 2$; $x = 1, y = ?$; $x = 5, y = 10$ is $y = 6$.

Explanation and check.

An interior output must share the common rate. Known complete rows give slope 1, and propagating that rate yields 6.

Algebra 1
Positive, Negative, Zero, and Undefined Slope

Positive, Negative, Zero, and Undefined Slope | A1-U05-P04

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

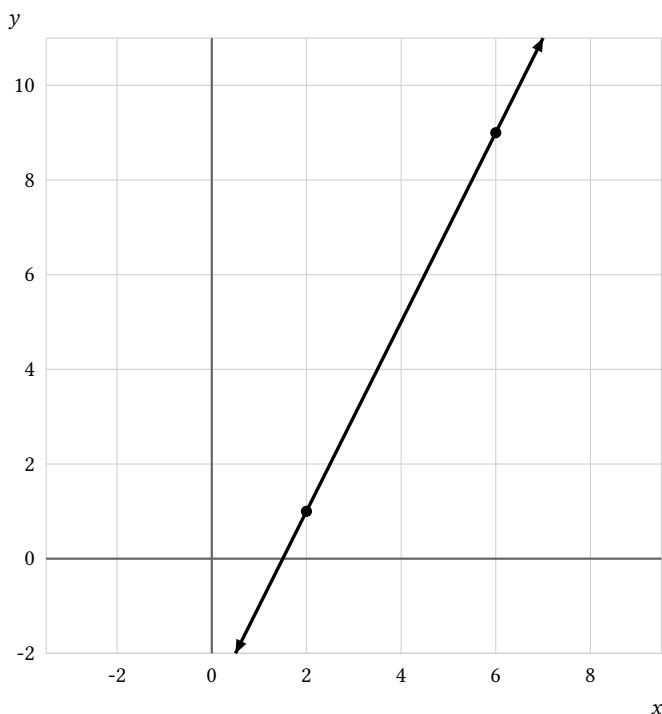
Topic focus
Across 96 tasks this topic asks for positive, negative, zero, or undefined with a decisive reason.
8 PDFs and a README; 92 buyer pages.

Algebra 1

**Positive, Negative, Zero,
and Undefined Slope**

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

An exact line graph passes through $(2, 1)$, $(6, 9)$. As x increases, classify its slope.

Bank label: _____

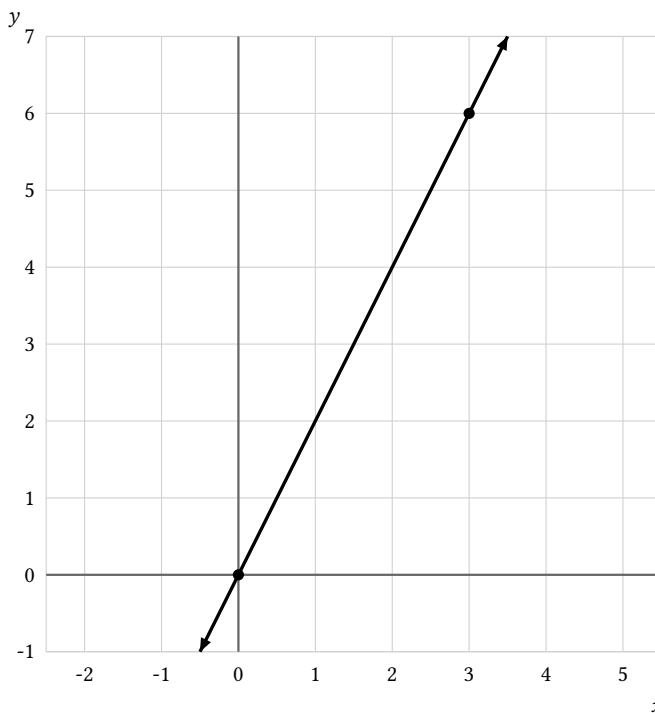
Algebra 1

**Positive, Negative, Zero,
and Undefined Slope**

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

An exact line graph passes through $(0, 0)$, $(3, 6)$. As x increases, classify its slope.



Algebra 1

Positive, Negative, Zero,
and Undefined Slope

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $s = 0$ and r is nonzero Classify the slopes of the full lines $x + y = 0$, $x - y = 0$, $x = 0$, and $y = 0$, in that order. Your response: _____	Incoming: Negative, positive, undefined, zero The graph of $y = f(x)$ is a straight line with negative slope. Put $f(-2)$, $f(0)$, and $f(5)$ in order from greatest to least. Your response: _____
Incoming: The left endpoint, $x = -2$ A distinct-point slope is written $\frac{r}{s}$, where r is the vertical change and s is the horizontal change. State exactly the conditions on r and s for an undefined slope. Your response: _____	Incoming: Check whether both changes are zero; then the repeated point does not determine a slope One full line has positive slope and another full line has zero slope. How many intersection points must they have? Your response: _____

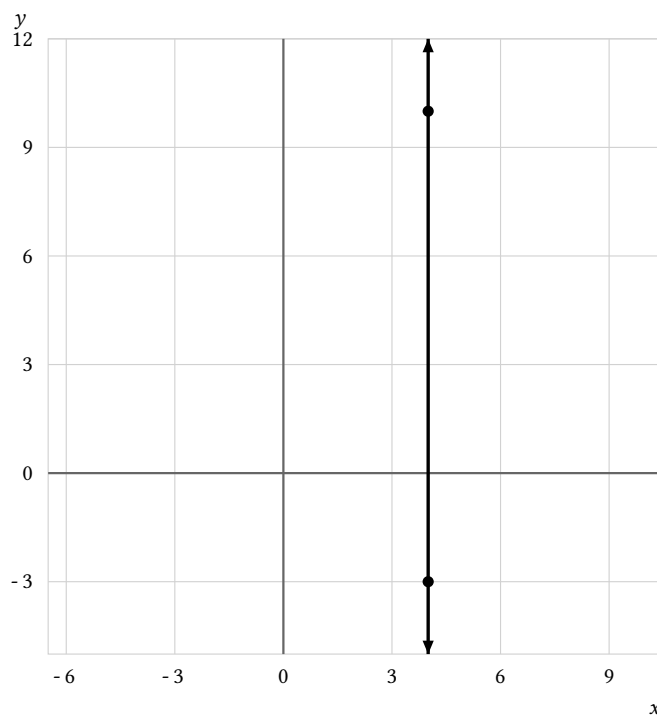
Algebra 1

**Positive, Negative, Zero,
and Undefined Slope**

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Choose and justify a method before solving (compare coordinate changes, inspect orientation, or calculate rise over run). Then complete the task: A graph through $(4, -3)$, $(4, 10)$ is labeled zero slope because x does not change. Correct the label.

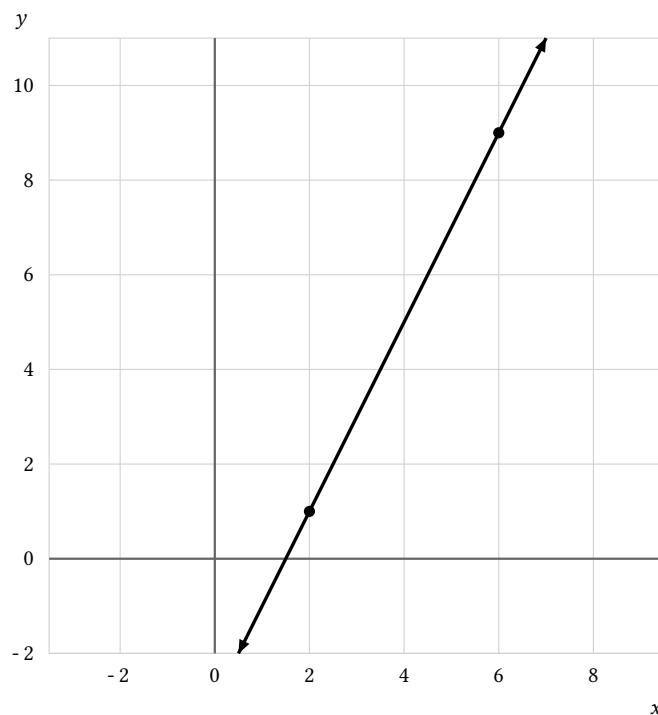


Positive, Negative, Zero, and Undefined Slope

Full Worked Solutions - excerpt

Worked example

Problem. An exact line graph passes through $(2, 1)$, $(6, 9)$. As x increases, classify its slope.



Answer. The line through $(2, 1)$, $(6, 9)$ has positive slope.

Explanation and check.

The signed changes are $\Delta x = 4$ and $\Delta y = 8$; their matching signs make the slope positive.

Algebra 1
Interpreting Slope-Intercept Form

Interpreting Slope-Intercept Form | A1-U05-P05
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for identified or interpreted slope and vertical intercept with justification.
8 PDFs and a README; 55 buyer pages.

Algebra 1

Interpreting Slope-Intercept Form

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Give the exact y-intercept point for $y = (\frac{3}{5})x + \frac{7}{2}$. _____ Bank label: _____	An account model is $B = 25m - 40$ dollars after m months. Interpret the rate and the signed zero-month value. _____ Bank label: _____
Locate the vertical intercept of $y = -(\frac{4}{7})x - \frac{5}{3}$ using exact coordinates. _____ Bank label: _____	A walker has $d = t$, with d in meters and t in seconds. Explain the implicit m and b. _____ Bank label: _____
Write the y-axis crossing of $y = 0.8x + 2.5$ as (x, y). _____ Bank label: _____	For $y = 5 - 2x$, an annotation says $m = 5$ and $b = -2$. Audit the term roles. _____ Bank label: _____
What intercept point follows from $b = -3.4$ in $y = -1.2x - 3.4$? _____ Bank label: _____	A graph for $y = 7x$ marks the origin and $(1, 7)$, but annotates $m = 7$ and vertical intercept $(0, 7)$. Which part is inconsistent? _____ Bank label: _____

Algebra 1

Interpreting Slope-Intercept Form

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

The exact graph for $y = -x$ marks $(0, 0)$, $(3, -3)$ and is annotated $m = -1$, $b = 0$. Verify the labels.

A table header for $y = -0.6x - 1.4$ lists rate 0.6 and start 1.4. Audit all signs and translate the start to a point.

A horizontal graph through $(0, 5)$, $(4, 5)$ is labeled $m = 5$ and $b = 5$ for $y = 5$. Audit the labels.

A student labels $x = 7$ with $m = 0$ and $b = 7$ as though it were $y = 0x + 7$. Explain why this is not a valid parameter reading for slope-intercept form.

Interpreting Slope-Intercept Form

Full Worked Solutions - excerpt

Worked example

Problem. Give the exact y -intercept point for $y = (\frac{3}{5})x + \frac{7}{2}$.

Answer. The vertical-intercept point for $y = (\frac{3}{5})x + \frac{7}{2}$ is $(0, \frac{7}{2})$.

Explanation and check.

At the y -axis $x = 0$. Substituting removes the x -term and leaves $y = \frac{7}{2}$, hence $(0, \frac{7}{2})$.

Worked example

Problem. An account model is $B = 25m - 40$ dollars after m months. Interpret the rate and the signed zero-month value.

Answer. In $B = 25m - 40$, when one month passes, balance increases by \$ 25; the balance is -\$ 40 at month 0.

Explanation and check.

The x -variable coefficient describes output change per one input unit: balance increases by \$ 25. The constant describes the zero-input output: the balance is -\$ 40 at month 0.

Algebra 1
Graphing Slope-Intercept Form

Graphing Slope-Intercept Form | A1-U05-P06

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

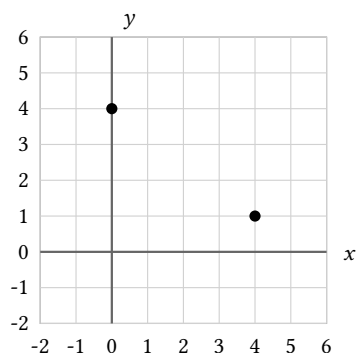
Topic focus
Across 96 tasks this topic asks for an exact graph construction or verification with stated domain.
8 PDFs and a README; 118 buyer pages.

Algebra 1

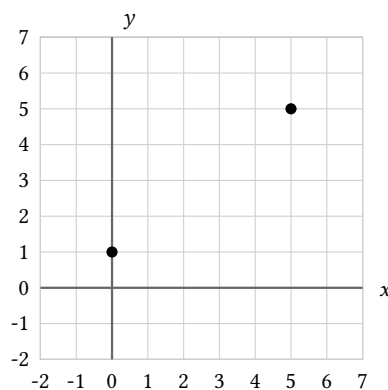
Graphing Slope-Intercept Form

Name: _____ Date: _____ Class: _____

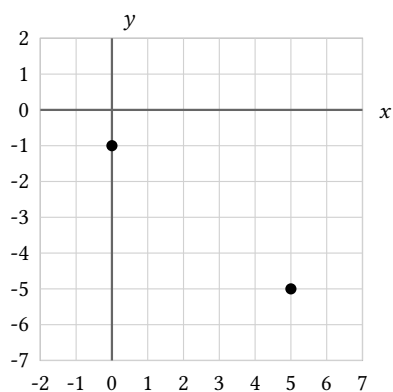
Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Graph $y = -(\frac{3}{4})x + 4$ by the intercept-and-step method. Specify the starting point and one correctly directed second point.

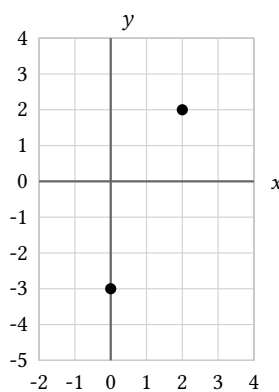
Bank label: _____

Use slope-intercept construction for $y = (\frac{4}{5})x + 1$. Which two exact points can anchor the graph?

Bank label: _____

Graph $y = -(\frac{4}{5})x - 1$ by the intercept-and-step method. Specify the starting point and one correctly directed second point.

Bank label: _____

Use slope-intercept construction for $y = (\frac{5}{2})x - 3$. Which two exact points can anchor the graph?

Bank label: _____

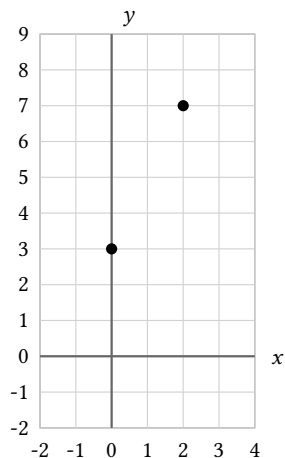
Algebra 1

Graphing Slope-Intercept Form

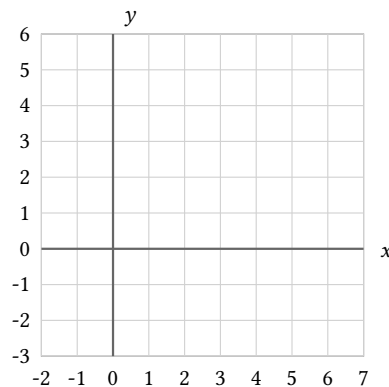
Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

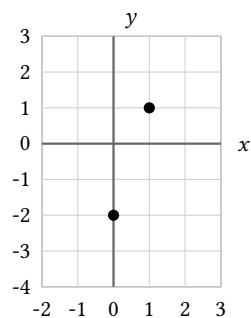
Use slope-intercept construction for $y = 2x + 3$. Which two exact points can anchor the graph?



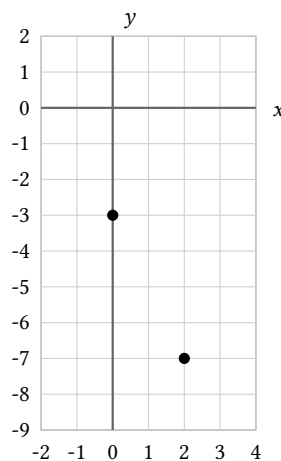
Graph $y = -x + 4$ only on the domain closed at $x = 0$ and closed at $x = 5$. Describe the exact plotted set and every endpoint style.



Use slope-intercept construction for $y = 3x - 2$. Which two exact points can anchor the graph?



Graph $y = -2x - 3$ by the intercept-and-step method. Specify the starting point and one correctly directed second point.



Algebra 1

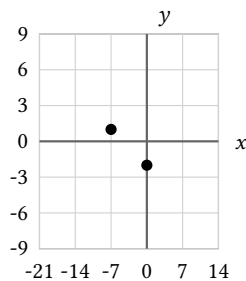
Graphing Slope-Intercept Form

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: Start at $(0, 2)$; move -2 horizontal squares and -1 vertical squares to $(-4, -3)$.

Graph $y = -\left(\frac{3}{7}\right)x - 2$ from its vertical intercept on axes scaled 7 per x -square and 3 per y -square. Describe an efficient leftward step.



Your response: _____

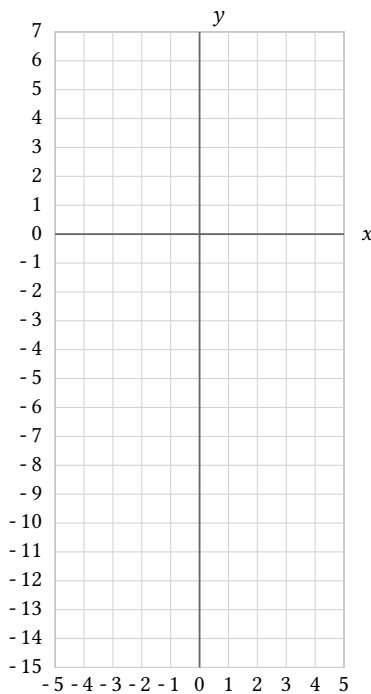
Algebra 1

Graphing Slope-Intercept Form

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A student plots $(-4, 0)$ as the first anchor for $y = 3x - 4$. Correct the construction.

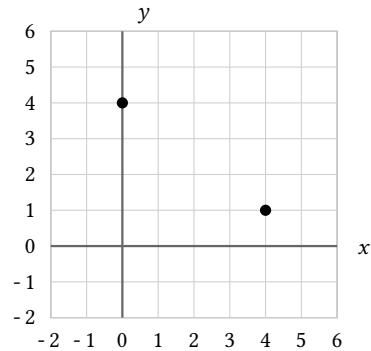


Graphing Slope-Intercept Form

Full Worked Solutions - excerpt

Worked example

Problem. Graph $y = -(\frac{3}{4})x + 4$ by the intercept-and-step method. Specify the starting point and one correctly directed second point.



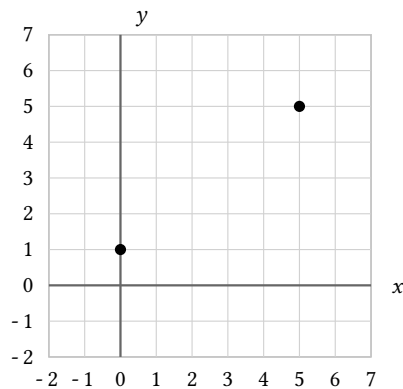
Answer. Plot $(0, 4)$ and $(4, 1)$, then extend the line for $y = -(\frac{3}{4})x + 4$.

Explanation and check.

Plot $(0, 4)$. Using run 4 and rise -3 respects the negative slope and reaches $(4, 1)$.

Worked example

Problem. Use slope-intercept construction for $y = (\frac{4}{5})x + 1$. Which two exact points can anchor the graph?



Answer. Plot $(0, 1)$ and $(5, 5)$, then extend the line for $y = (\frac{4}{5})x + 1$.

Explanation and check.

The constant gives $(0, 1)$; applying rise 4 over run 5 gives $(5, 5)$. Draw the full line through them.

Algebra 1
Writing Slope-Intercept Equations

Writing Slope-Intercept Equations | A1-U05-P07

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for an exact slope-intercept equation or justified family verdict.
8 PDFs and a README; 47 buyer pages.

Algebra 1

Writing Slope-Intercept Equations

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

The required line has slope $-\frac{2}{3}$ and passes through $(3, 1)$. A student proposes $y = -x + 3$. Verify both slope and point membership, repairing it if needed.

Choose and justify an efficient method, then complete the task. The facts are: the line contains $(0, 4)$ and $b = 4$. Do they determine m ?

Complete the task, then compare two valid approaches or representations and justify which is clearer for the supplied information. The required line has slope 3 and passes through $(-2, 4)$. A student proposes $y = 3x - 2$. Verify both slope and point membership, repairing it if needed.

Complete the task, then compare two valid approaches or representations and justify which is clearer for the supplied information. The required line has slope $\frac{5}{4}$ and passes through $(4, 3)$. A student proposes $y = (\frac{5}{4})x$. Verify both slope and point membership, repairing it if needed.

Writing Slope-Intercept Equations

Full Worked Solutions - excerpt

Worked example

Problem. A line has slope 0 and vertical intercept 9. Encode the horizontal line in slope-intercept form.

Answer. The slope-intercept equation is $y = 9$.

Explanation and check.

Insert $m = 0$ as the x coefficient and $b = 9$ as the constant; this gives $y = 9$.

Worked example

Problem. A line has slope 0 and vertical intercept -5 . Encode the horizontal line in slope-intercept form.

Answer. The slope-intercept equation is $y = -5$.

Explanation and check.

Insert $m = 0$ as the x coefficient and $b = -5$ as the constant; this gives $y = -5$.

Algebra 1
Point-Slope Form

Point-Slope Form of a Linear Equation | A1-U05-P08

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for an exact anchored equation, graph, or justified representation verdict.
8 PDFs and a README; 54 buyer pages.

Algebra 1

Point-Slope Form

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

The line is $y + 3 = (3)(x + 1)$. Test whether $(0, 0)$ can serve as an alternate anchor; if it can, write the equivalent point-slope form. _____ Bank label: _____	Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Interpret the point-slope equation $y - 2 = -(x - 6)$. State its encoded anchor point and slope, explaining every plus sign inside a difference. _____ Bank label: _____
The line is $y + 4 = -(x - 4)$. Test whether $(0, 0)$ can serve as an alternate anchor; if it can, write the equivalent point-slope form. _____ Bank label: _____	Complete the task, then compare the direct formula approach with an equivalent check. Explain why both support the same conclusion. Interpret the point-slope equation $y - 9 = 0(x - 4)$. State its encoded anchor point and slope, explaining every plus sign inside a difference. _____ Bank label: _____
Interpret the point-slope equation $y + 2 = (-5)(x - 3)$. State its encoded anchor point and slope, explaining every plus sign inside a difference. _____ Bank label: _____	The line is $y - 1 = (4)(x - 2)$. Test whether $(5, 13)$ can serve as an alternate anchor; if it can, write the equivalent point-slope form. _____ Bank label: _____
Interpret the point-slope equation $y - 8 = (6)(x + 1)$. State its encoded anchor point and slope, explaining every plus sign inside a difference. _____ Bank label: _____	Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. The line is $y - 5 = (-2)(x - 3)$. Test whether $(-1, 13)$ can serve as an alternate anchor; if it can, write the equivalent point-slope form. _____ Bank label: _____

Algebra 1

Point-Slope Form

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Write point-slope form for slope 2 through (3, 5). 	Determine whether the anchored equations $y - 1 = (2)(x)$ and $y - 7 = (2)(x - 3)$ define the same line. Compare direction and anchor incidence without converting both to slope-intercept form.
Determine whether the anchored equations $y - 4 = -(x)$ and $y - 5 = -(x - 2)$ define the same line. Compare direction and anchor incidence without converting both to slope-intercept form. 	For slope 2 through $(-3, 5)$, work writes $y - 5 = 2(x - 3)$. Diagnose the anchor sign.
A line has slope 3 and anchor $(-2, 4)$. Write point-slope form, simplifying subtraction of negative coordinates correctly. 	A line has slope 1 and anchor $(-4, -3)$. Write point-slope form, simplifying subtraction of negative coordinates correctly.

Algebra 1**Point-Slope Form****Name:** _____ **Date:** _____ **Class:** _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Interpret the point-slope equation $y - 5 = (2)(x - 3)$. State its encoded anchor point and slope, explaining every plus sign inside a difference.

Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Points $(3, -2)$ and $(3, 5)$ are vertical. Explain why finite- m point-slope form fails and give the valid equation.

Point-Slope Form

Full Worked Solutions - excerpt

Worked example

Problem. The line is $y + 3 = (3)(x + 1)$. Test whether $(0, 0)$ can serve as an alternate anchor; if it can, write the equivalent point-slope form.

Answer. Yes. The point lies on the line, and an equivalent anchored equation is $y = (3)(x)$.

Explanation and check.

The displacement from the original anchor has ratio

$$\frac{3}{1} = 3$$

retain the slope and recenter both differences.

Worked example

Problem. Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Interpret the point-slope equation $y - 2 = -(x - 6)$. State its encoded anchor point and slope, explaining every plus sign inside a difference.

Answer. The equation $y - 2 = -(x - 6)$ encodes anchor $(6, 2)$ and slope -1 .

Explanation and check.

Use the given symbolic relation directly, simplify exactly, and verify the result in the original relation. Match the form to $y - y_0 = m(x - x_0)$: the differences identify $(6, 2)$, and the direction parameter is -1 .

Algebra 1
Standard Form Linear Equations

Intercepts of Linear Equations in Standard Form | A1-U05-P09

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for exact standard-form data, points, graph, or justified validity conclusion.
8 PDFs and a README; 54 buyer pages.

Algebra 1

Standard Form Linear Equations

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Determine every x- and y-axis intersection of $2x + 3y = 12$. Distinguish unique points, no intersection, and an entire coincident axis. _____ Bank label: _____	Complete the partial point $(x, 1)$ for $3x + 2y = 11$, or explain any ambiguity caused by a zero coefficient. _____ Bank label: _____
Determine every x- and y-axis intersection of $x - y = 5$. Distinguish unique points, no intersection, and an entire coincident axis. _____ Bank label: _____	Normalize $-12y = 20$ to coprime integer standard form, using the convention that the first nonzero coefficient among A and B is positive. _____ Bank label: _____
Normalize $-18x = -3$ to coprime integer standard form, using the convention that the first nonzero coefficient among A and B is positive. _____ Bank label: _____	Normalize $10x - 80y = 30$ to coprime integer standard form, using the convention that the first nonzero coefficient among A and B is positive. _____ Bank label: _____
Normalize $30x + 75y = 105$ to coprime integer standard form, using the convention that the first nonzero coefficient among A and B is positive. _____ Bank label: _____	Normalize $27x + 12y = -6$ to coprime integer standard form, using the convention that the first nonzero coefficient among A and B is positive. _____ Bank label: _____

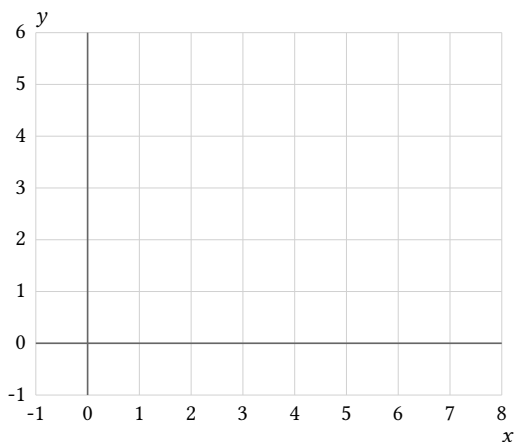
Algebra 1

Standard Form Linear Equations

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Graph $2x + 3y = 12$ while keeping standard form central. Choose two exact distinct points, handling any coincident intercepts or zero coefficient.



Normalize $4x + 6y = 12$ to coprime integer standard form, using the convention that the first nonzero coefficient among A and B is positive.

Normalize $3x - 12y = 15$ to coprime integer standard form, using the convention that the first nonzero coefficient among A and B is positive.

Check whether the full point $(3, 2)$ satisfies $2x + 3y = 12$ by using the implicit relation directly.

Algebra 1

**Standard Form
Linear Equations**

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A student divides $6x + 9y = 15$ by 3 but writes $2x + 3y = 15$. Repair the normalization.

Choose and justify an efficient method, then complete the task. A supplied constraint is $20p + 15w = 600$. In its stated setting, interpret A , B , and C with units and describe one fixed-total tradeoff: pledge p contributes \$20, walk-in gift w contributes \$15, and the target is \$600.

Choose and justify an efficient method, then complete the task. A supplied constraint is $3x - 2y = 18$. In its stated setting, interpret A , B , and C with units and describe one fixed-total tradeoff: x contributes +3 units per unit, y contributes -2 units per unit, and the signed total is 18.

A response calls $0x + 0y = 7$ a horizontal line at $y = 7$. Audit the claim.

Standard Form Linear Equations

Full Worked Solutions - excerpt

Worked example

Problem. Determine every x - and y -axis intersection of $2x + 3y = 12$. Distinguish unique points, no intersection, and an entire coincident axis.

Answer. For $2x + 3y = 12$, the x -intercept is $(6, 0)$ and the y -intercept is $(0, 4)$.

Explanation and check.

Set $y = 0$ to solve $Ax = C$, and set $x = 0$ to solve $By = C$; check whether the resulting points coincide.

Worked example

Problem. Complete the partial point $(x, 1)$ for $3x + 2y = 11$, or explain any ambiguity caused by a zero coefficient.

Answer. The missing coordinate is $x = 3$, giving point $(3, 1)$.

Explanation and check.

Substitute $y = 1$ and solve $3x = 9$.

Algebra 1
Converting Forms of Linear Equations

Converting Forms of Linear Equations | A1-U05-P10

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for an exact equation or a justified equivalence conclusion.
8 PDFs and a README; 48 buyer pages.

Algebra 1

Converting Forms of Linear Equations

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Do $y + 1 = \frac{1}{2}(x - 6)$ and $y = \frac{1}{2}x - 4$ describe the same entire line? Justify by a reversible conversion or by comparing every scaled coefficient. _____ Bank label: _____	Clear the fractional coefficient in $y = -\frac{3}{7}x + 4$ and report the primitive integer standard equation. _____ Bank label: _____
Do $4x - 2y = 8$ and $2x - y = 4$ describe the same entire line? Justify by a reversible conversion or by comparing every scaled coefficient. _____ Bank label: _____	Expand $y + 5 = -\frac{7}{4}(x + 4)$ and simplify the anchor contribution before giving $y = mx + b$. _____ Bank label: _____
Do $2x + 3y = 12$ and $y = -\frac{2}{3}x + 4$ describe the same entire line? Justify by a reversible conversion or by comparing every scaled coefficient. _____ Bank label: _____	Clear the fractional coefficient in $y = -\frac{5}{3}x + 8$ and report the primitive integer standard equation. _____ Bank label: _____
Do $y - 5 = 2(x - 1)$ and $y = 2x + 3$ describe the same entire line? Justify by a reversible conversion or by comparing every scaled coefficient. _____ Bank label: _____	Expand $y - 6 = \frac{3}{5}(x + 5)$ and simplify the anchor contribution before giving $y = mx + b$. _____ Bank label: _____

Algebra 1

Converting Forms of Linear Equations

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Rewrite $y + 6 = \frac{5}{2}(x + 4)$ in slope-intercept form and handle both anchor signs explicitly. 	The line is given by $4x + 7y = 280$. You need to interpret the two per-item weights in a fixed-total constraint. Which form—slope-intercept, point-slope, or standard—best organizes this work, and why?
For the known line $y = 2x + 3$, Use the y-intercept as the anchor. Verify the point and write the corresponding point-slope equation. 	The line is given by $3x + 2y = 12$. You need to read the slope and y-intercept before graphing. Which form—slope-intercept, point-slope, or standard—best organizes this work, and why?
Change $y + 5 = -\frac{7}{2}(x - 2)$ to $y = mx + b$ without replacing any fraction by a decimal. 	Do $-6x + 9y = 15$ and $2x - 3y = 5$ describe the same entire line? Justify by a reversible conversion or by comparing every scaled coefficient.

Algebra 1

Converting Forms of Linear Equations

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: From $6x + 3y = -9$: $y = -2x - 3$. For the known line $3x - y = 6$, Use the point on the line whose x-coordinate is -1. Verify the point and write the corresponding point-slope equation. Your response: _____	Incoming: From $3x - y = 6$, use $(-1, -9)$: $y + 9 = 3(x + 1)$. Convert $y + 9 = 0(x - 8)$ to slope-intercept form and identify what the zero multiplier does. Your response: _____
Incoming: From $y = -3x + 5$: $3x + y = 5$. Convert $6x + 3y = -9$ to $y = mx + b$ and simplify both resulting coefficients. Your response: _____	Incoming: From $-5y = 15$: $y = 0x - 3$. Clear the fractional coefficient in $y = \frac{3}{4}x - 2$ and report the primitive integer standard equation. Your response: _____
Incoming: From $5x + 2y = 10$, use $(0, 5)$: $y - 5 = -\frac{5}{2}(x)$. Rewrite $9x - 6y = 18$ as $y = mx + b$, tracking the sign introduced when y is isolated. Your response: _____	Incoming: From $y - 3 = 2(x - 1)$: $y = 2x + 1$. Convert $4x + 2y = 10$ to $y = mx + b$ and simplify both resulting coefficients. Your response: _____

Algebra 1

Converting Forms of Linear Equations

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A student converts $2x + 3y = 12$: $3y = -2x + 12$, then $y = -\frac{2}{3}x + 12$. Identify the first invalid step and repair the result.

A student claims $4x = 20$ becomes $y = 4x - 20$ after solving for y . Identify the structural mistake.

A student uses $(2, 5)$ to rewrite $y = 2x + 3$ as $y - 5 = 2(x - 2)$. Is the conversion valid? Diagnose it exactly.

A student changes $y + 4 = 3(x + 2)$ to $y = 3x + 10$. Diagnose the constant error and give the equivalent slope-intercept form.

Converting Forms of Linear Equations

Full Worked Solutions - excerpt

Worked example

Problem. Do $y + 1 = \frac{1}{2}(x - 6)$ and $y = \frac{1}{2}x - 4$ describe the same entire line? Justify by a reversible conversion or by comparing every scaled coefficient.

Answer. $y + 1 = \frac{1}{2}(x - 6)$ versus $y = \frac{1}{2}x - 4$: the same line; expansion combines -3 and -1 .

Explanation and check.

Put both equations in one form and compare the full solution sets. Since expansion combines -3 and -1 , they are the same line.

Worked example

Problem. Clear the fractional coefficient in $y = -\frac{3}{7}x + 4$ and report the primitive integer standard equation.

Answer. From $y = -\frac{3}{7}x + 4$: $3x + 7y = 28$.

Explanation and check.

Move the x -term to the left and scale the whole equation together; primitive sign normalization gives $3x + 7y = 28$.

Algebra 1
Writing Linear Equations from Two Points

Writing Linear Equations from Two Points | A1-U05-P11

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for an exact full function rule with required verification or conclusion.
8 PDFs and a README; 72 buyer pages.

Algebra 1

Writing Linear Equations from Two Points

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Two exact observations are $(-2, 6)$, $(5, 6)$. Determine the affine rule and explain what equal outputs imply.

Bank label: _____

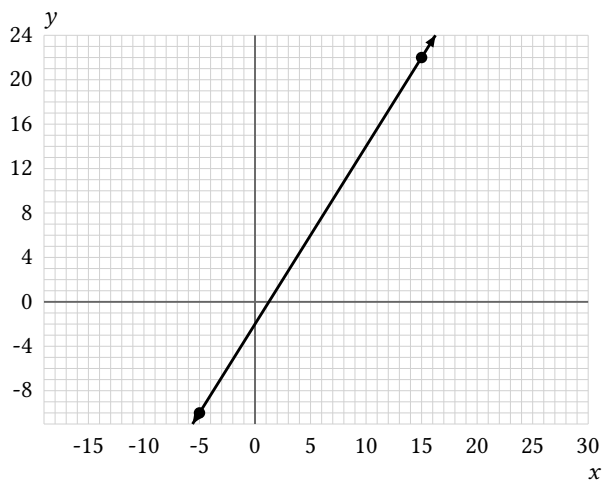
Recover the linear function through $(1, 3)$, $(4, 0)$. Keep the subtraction order consistent when finding its negative slope.

Bank label: _____

The exact points $(0, 1)$, $(3, 7)$ lie on one linear function. Derive the complete rule and verify the axis point.

Bank label: _____

A line graph supplies exact marked points $(-5, -10)$, $(15, 22)$; each horizontal grid step is 1 unit(s) and each vertical grid step is 1 unit(s). Reconstruct $f(x) = mx + b$ and verify both marks.



Bank label: _____

Algebra 1

Writing Linear Equations from Two Points

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

A table lists $(-6, 9)$, $(3, 0)$, and $(12, -9)$. A student uses the first and third rows, gets slope -1, but writes $f(x) = -x - 3$. Locate the first failed verification. 	Given the exact observations $(-5, 2)$, $(-5, -7)$, determine whether they identify one linear function of x, no such function, or insufficient evidence. Justify, and for insufficient evidence give two contrasting rules.
Assume a linear relationship for the rental balance. At 3 days, the exact remaining prepaid balance is 144 dollars; at 6 days, it is 108 dollars. Let x be days from the stated zero reference. Infer the rate with units and derive the complete model. 	Assume a linear relationship for the candle length. At 30 minutes, the exact length after lighting is 20 centimeters; at 36 minutes, it is $\frac{96}{5}$ centimeters. Let x be minutes from the stated zero reference. Infer the rate with units and derive the complete model.
Given the exact observations $(0, 2)$, $(3, 8)$, determine whether they identify one linear function of x, no such function, or insufficient evidence. Justify, and for insufficient evidence give two contrasting rules. 	Assume a linear relationship for the transit card. At 6 rides, the exact remaining value after rides is $\frac{67}{2}$ dollars; at 12 rides, it is 17 dollars. Let x be rides from the stated zero reference. Infer the rate with units and derive the complete model.

Algebra 1

Writing Linear Equations
from Two Points

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $(-6, 3), (0, 1), (12, -4)$ admits no single linear rule; the first two imply $f(x) = -\frac{1}{3}x + 1$, but $(12, -4)$ does not satisfy it.

Assume a linear relationship for the delivery distance. At 45 minutes ($\frac{3}{4}$ hour), the exact signed position from the depot is 30 kilometers; at 405 minutes ($\frac{27}{4}$ hours), it is 318 kilometers. Let x be measured in hours from the stated zero reference. Convert the input measurements, infer the rate with units, and derive the complete model.

Your response: _____

Incoming: For the balloon altitude, $Q(x) = 18x - 40$; rate 18 meters per minute, and $Q(0) = -40$ meters.

Given the exact observations $(-6, 3), (0, 1), (12, -4)$, determine whether they identify one linear function of x , no such function, or insufficient evidence. Justify, and for insufficient evidence give two contrasting rules.

Input x	Output y
-6	3
0	1
12	-4

Your response: _____

Incoming: For the delivery distance, $Q(x) = 48x - 6$; rate 48 kilometers per hour, and $Q(0) = -6$ kilometers.

Assume a linear relationship for the data allowance. At 5 days, the exact unused data after the billing period starts is 22 gigabytes; at 11 days, it is $\frac{92}{5}$ gigabytes. Let x be days from the stated zero reference. Infer the rate with units and derive the complete model.

Your response: _____

Incoming: The trusted rows give $f(x) = 2x + 3$; after verification, the missing row is $(7, 17)$.

Trusted exact rows are $x = -4, f(x) = -8$; $x = 2, f(x) = 1$, and the output at $x = 8$ is missing. First derive and state the unique complete linear function, verify every trusted row, and only then repair the labeled record.

Input x	Output y
-4	-8
2	1

Your response: _____

Algebra 1

Writing Linear Equations from Two Points

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

From points $(1, 4)$ and $(4, 10)$, a student says the slope is 6 because $10 - 4 = 6$, then writes $f(x) = 6x - 2$. Find the first invalid inference and correct the rule.

On a graph, each horizontal grid step is 2 units and each vertical step is 5 units. A student counts a rise of 3 squares over 4 squares and reports slope $\frac{3}{4}$. Correct the scale error.

A student fits $(1, 4)$ and $(5, 12)$ with $f(x) = 2x + 2$, then claims the additional exact point $(9, 21)$ confirms linearity because it is close. Audit the conclusion.

A student uses points $(-2, 7)$ and $(3, -3)$, computes $\frac{-3-7}{3-(-2)} = -2$, and writes $f(x) = -2x + 7$. Audit the intercept.

Writing Linear Equations from Two Points

Full Worked Solutions - excerpt

Worked example

Problem. Two exact observations are $(-2, 6), (5, 6)$. Determine the affine rule and explain what equal outputs imply.

Answer. For points $(-2, 6), (5, 6), f(x) = 6$.

Explanation and check.

The rate is $\frac{(6)-(6)}{(5)-(-2)} = 0$. Substitution gives $f(0) = 6$, so $f(x) = 6$; both points satisfy it.

Worked example

Problem. Recover the linear function through $(1, 3), (4, 0)$. Keep the subtraction order consistent when finding its negative slope.

Answer. For points $(1, 3), (4, 0), f(x) = -x + 4$.

Explanation and check.

The rate is $\frac{(0)-(3)}{(4)-(1)} = -1$. Substitution gives $f(0) = 4$, so $f(x) = -x + 4$; both points satisfy it.

Algebra 1
Horizontal and Vertical Lines

Horizontal and Vertical Lines | A1-U05-P12

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for an exact equation, graph description, membership set, or justified function conclusion.
8 PDFs and a README; 71 buyer pages.

Algebra 1

Horizontal and Vertical Lines

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

For $y = \frac{7}{4}$, complete $(?, \frac{7}{4})$ when the question mark is in the free-coordinate position. Describe all possible completions.

Bank label: _____

Algebra 1

Horizontal and Vertical Lines

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Test whether the complete point $(-\frac{7}{3}, \frac{8}{5})$ belongs to $x = -\frac{7}{3}$, stating which coordinate the equation actually checks. 	Test whether the complete point $(0, -17)$ belongs to $y = -17$, stating which coordinate the equation actually checks.
Consider $y = \frac{19}{5}$, restricted to the nondegenerate segment with the free coordinate from -10 through -2. Is this relation a function of x? State its exact domain and range and justify using fixed versus free coordinates. 	Test whether the complete point $(18, 0)$ belongs to $x = 18$, stating which coordinate the equation actually checks.
Every point in a line has y-coordinate 4, while the other coordinate is unrestricted. Write its equation and orientation. 	The y-axis is a vertical line containing $(0, 2)$ and the origin. Write its constant-coordinate equation.

Algebra 1

Horizontal and Vertical Lines

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A student says the horizontal line through $(4, -3)$ is $x = 4$. Identify the swapped coordinate and repair the equation.

Consider $x = 18$, restricted to the nondegenerate segment with the free coordinate from 1 through 9. Is this relation a function of x ? State its exact domain and range and justify using fixed versus free coordinates.

A student claims $(\frac{3}{2}, -4)$ cannot lie on $y = -4$ because its x -coordinate is fractional. Repair the membership reasoning.

Choose and justify a method before solving (identify the fixed coordinate, use point membership, or compare graph orientation). Then complete the task: Can any value replace the question mark in $(?, \frac{8}{3})$ to place the point on $y = -\frac{27}{11}$? Use the already displayed fixed-coordinate entry.

Horizontal and Vertical Lines

Full Worked Solutions - excerpt

Worked example

Problem. For $y = \frac{7}{4}$, complete $(?, \frac{7}{4})$ when the question mark is in the free-coordinate position. Describe all possible completions.

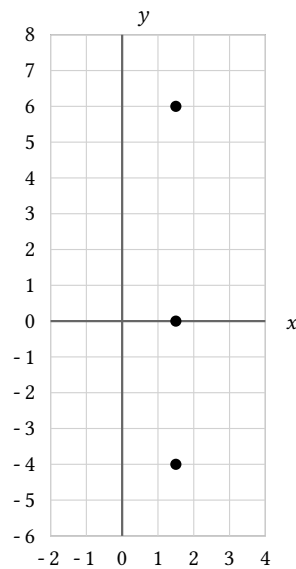
Answer. For $y = \frac{7}{4}$: Every point $(x, \frac{7}{4})$ lies on $y = \frac{7}{4}$; the missing x may be any real number.

Explanation and check.

The required coordinate already equals $\frac{7}{4}$. Every real value of the missing free coordinate therefore gives another member.

Worked example

Problem. Graph the exact fractional-coordinate line $x = \frac{3}{2}$ on a 1-unit grid without rounding. Give three points that keep the required coordinate fixed.



Answer. For $x = \frac{3}{2}$, plot $(\frac{3}{2}, -4)$, $(\frac{3}{2}, 0)$, and $(\frac{3}{2}, 6)$, then extend the vertical line up and down.

Explanation and check.

The fixed coordinate remains exactly $\frac{3}{2}$ even when it lies between integer grid labels; each listed pair satisfies $x = \frac{3}{2}$.

Algebra 1
Perpendicular Lines

Equations of Parallel and Perpendicular Lines | A1-U05-P14

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for an exact equation, coordinate, parameter set, or justified verdict.
8 PDFs and a README; 71 buyer pages.

Algebra 1

Perpendicular Lines

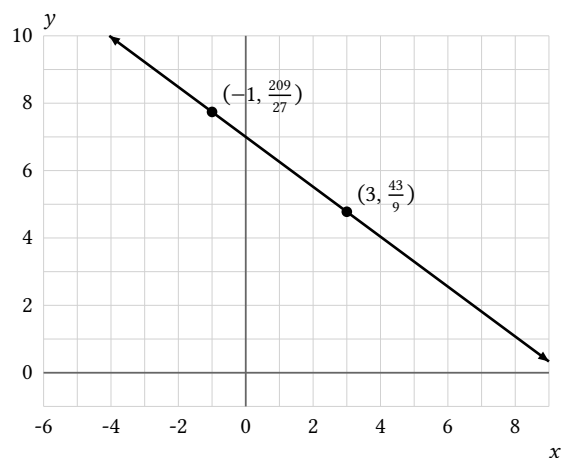
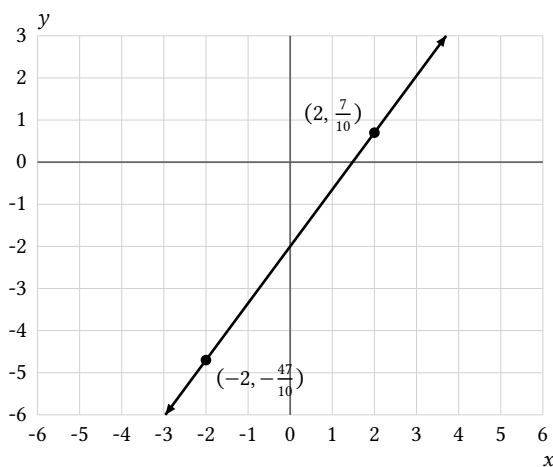
Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Construct the exact line through $(-1, 5)$ perpendicular to the reference $y - 7 = -3(x + 2)$. Show how the direction exception or negative reciprocal is used.

Bank label: _____

Determine whether line A through $(-2, -\frac{47}{10})$ and $(2, \frac{7}{10})$ and line B through $(-1, \frac{209}{27})$ and $(3, \frac{43}{9})$ are perpendicular. Recover both exact directions and account for axis-parallel exceptions.



Bank label: _____

Algebra 1

Perpendicular Lines

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Complete the second point $(u, 10)$ so its line with $(0, -3)$ is perpendicular to the reference direction. Determine u. The reference is parallel to $y = -\frac{5}{6}x$. Reject a repeated-point result. 	Reference: $y = \frac{9}{7}x - 1$. Candidate: $y = (\frac{4}{7}t + \frac{1}{7})x + 7$. Find t so the lines are perpendicular.
A line perpendicular to the reference direction must pass through $(-\frac{7}{3}, 5)$ and $(\frac{13}{6}, u)$. Recover u. The reference is parallel to vertical line $x = \frac{11}{4}$. Reject a repeated-point result. 	Construct the exact line through $(-6, \frac{5}{2})$ perpendicular to the reference $2y = 5$. Show how the direction exception or negative reciprocal is used.
Construct the exact line through $(1, 4)$ perpendicular to the reference $x = -5$. Show how the direction exception or negative reciprocal is used. 	Complete the second point $(u, 6)$ so its line with $(7, -4)$ is perpendicular to the reference direction. Determine u. The reference is parallel to $y = 0x$. Reject a repeated-point result.

Algebra 1

Perpendicular Lines

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $u = -7$; the completed second point is $(5, -7)$. Construct the exact line through $(8, -8)$ perpendicular to the reference $y - \frac{33}{4} = -\frac{13}{8}(x + 2)$. Show how the direction exception or negative reciprocal is used. Your response: _____	Incoming: The perpendicular line through $(8, -8)$ is $y = \frac{8}{13}x - \frac{168}{13}$. The displacement $\langle 4, -1 \rangle$ descends as it moves right. Make a clockwise quarter-turn and explain why the resulting direction is perpendicular. Your response: _____
Incoming: $u = 1$; the completed second point is $(1, 7)$. A line perpendicular to the reference direction must pass through $(0, 3)$ and $(5, u)$. Recover u. The reference is parallel to $y = \frac{1}{2}x$. Reject a repeated-point result. Your response: _____	Incoming: $u = \frac{6733}{2205}$; the completed second point is $(-\frac{17}{7}, \frac{6733}{2205})$. Reference: $y = \frac{1}{2}x - 2$. Candidate: $y = (\frac{3}{2}t - \frac{1}{2})x + 6$. Find t so the lines are perpendicular. Your response: _____

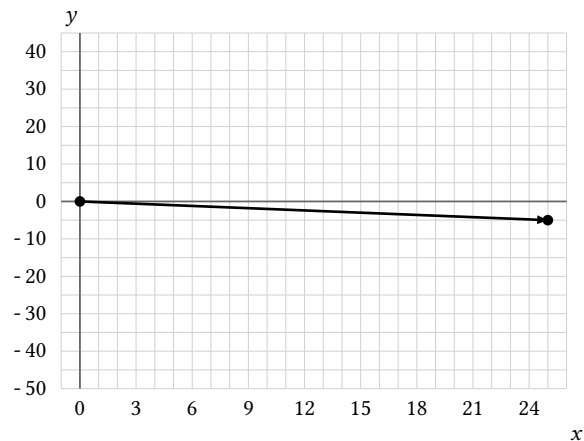
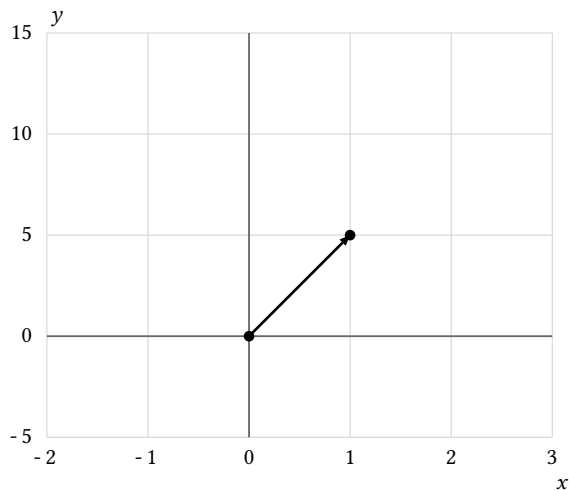
Algebra 1

Perpendicular Lines

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Evidence: A graph uses x -scale 1 per tick and y -scale 5 per tick. A moves 1 tick right and 1 up; B moves 25 ticks right and 1 down. Judge the perpendicularity claim from coordinate evidence, and explain any effect of plotting scale.



Perpendicular Lines

Full Worked Solutions - excerpt

Worked example

Problem. Construct the exact line through $(-1, 5)$ perpendicular to the reference $y - 7 = -3(x + 2)$. Show how the direction exception or negative reciprocal is used.

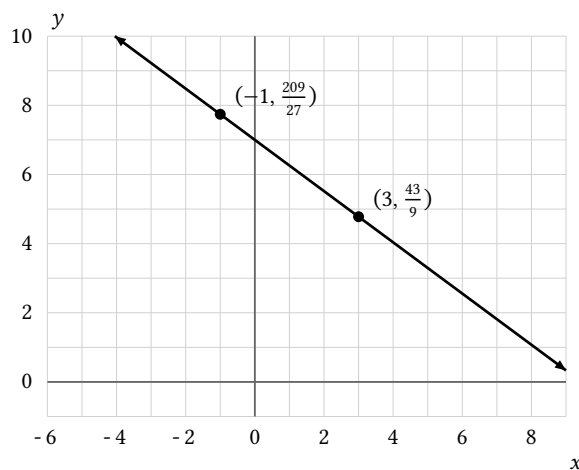
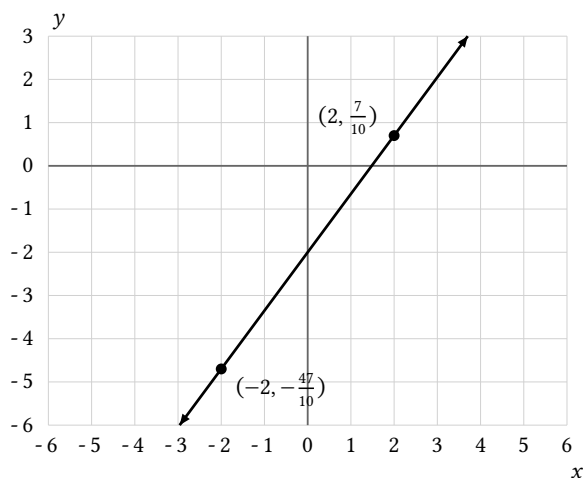
Answer. The perpendicular line through $(-1, 5)$ is $y = \frac{1}{3}x + \frac{16}{3}$.

Explanation and check.

Use the coefficient in point-slope form as the reference direction and take its negative reciprocal. The perpendicular slope is $\frac{1}{3}$; imposing the point gives intercept $\frac{16}{3}$.

Worked example

Problem. Determine whether line A through $(-2, -\frac{47}{10})$ and $(2, \frac{7}{10})$ and line B through $(-1, \frac{209}{27})$ and $(3, \frac{43}{9})$ are perpendicular. Recover both exact directions and account for axis-parallel exceptions.



Answer. For $y = \frac{27}{20}x - 2$ and $y = -\frac{20}{27}x + 7$, the verdict is perpendicular. The exact slope product is -1 , equal to -1 .

Explanation and check.

The exact slope product is -1 , equal to -1 .

Algebra 1
Direct Variation

Direct Variation | A1-U05-P15
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for an exact rule, value, graph description, or justified verdict.
8 PDFs and a README; 72 buyer pages.

Algebra 1

Direct Variation

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Scale the fractional proportional pair $(21, -14)$ to the target input $-\frac{9}{2}$.
Give the exact target output.

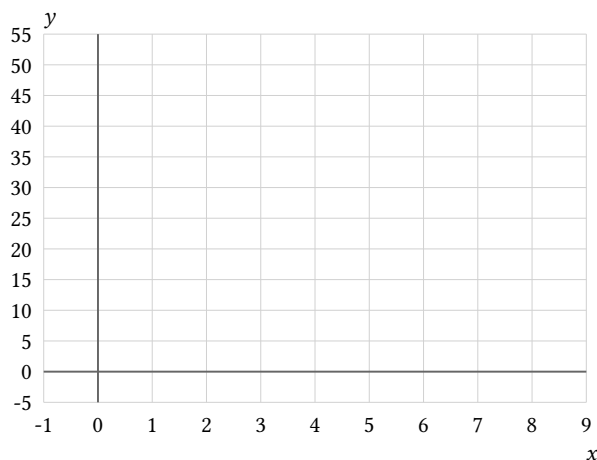
Input x	Output y
21	-14

Bank label: _____

A direct-variation constant is $\frac{17}{6}$ dollars per hour. In the new units, each output number is multiplied by 100 and each input number by 3600. Find the constant in cents per second and verify an equivalent pair.

Bank label: _____

Construct the graph of $y = 6x$ on the domain $2 \leq x < 8$. Use the exact sample inputs 2, 5, 7 and state whether points should be connected.



Bank label: _____

The declared domain currently includes only input 0, with output 0. Can the constant of direct variation be recovered uniquely? State the full set of possible constants.

Bank label: _____

Algebra 1

Direct Variation

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Determine whether this exact relation is a direct variation: the relation $6y + 3 = 12x$. Explain which required invariant is decisive. 	A declared $y = kx$ relation contains the fractional pair $(8, 6)$. Compute the exact quotient and write the rule. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <th style="padding: 5px;">Input x</th> <th style="padding: 5px;">Output y</th> </tr> <tr> <td style="padding: 5px;">8</td> <td style="padding: 5px;">6</td> </tr> </table> 	Input x	Output y	8	6				
Input x	Output y								
8	6								
The fractional direct-variation pair $(14, -\frac{11}{2})$ is known. Recover the input that would produce $y = \frac{33}{8}$. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <th style="padding: 5px;">Input x</th> <th style="padding: 5px;">Output y</th> </tr> <tr> <td style="padding: 5px;">14</td> <td style="padding: 5px;">$-\frac{11}{2}$</td> </tr> </table> 	Input x	Output y	14	$-\frac{11}{2}$	Scale the fractional proportional pair $(\frac{11}{4}, -\frac{13}{6})$ to the target input $-\frac{9}{5}$. Give the exact target output. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <th style="padding: 5px;">Input x</th> <th style="padding: 5px;">Output y</th> </tr> <tr> <td style="padding: 5px;">$\frac{11}{4}$</td> <td style="padding: 5px;">$-\frac{13}{6}$</td> </tr> </table> 	Input x	Output y	$\frac{11}{4}$	$-\frac{13}{6}$
Input x	Output y								
14	$-\frac{11}{2}$								
Input x	Output y								
$\frac{11}{4}$	$-\frac{13}{6}$								
A graph marks the origin but gives no other point or slope. Can the constant of direct variation be recovered uniquely? State the full set of possible constants. 	A declared $y = kx$ relation contains the fractional pair $(\frac{3}{2}, 9)$. Compute the exact quotient and write the rule. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <th style="padding: 5px;">Input x</th> <th style="padding: 5px;">Output y</th> </tr> <tr> <td style="padding: 5px;">$\frac{3}{2}$</td> <td style="padding: 5px;">9</td> </tr> </table> 	Input x	Output y	$\frac{3}{2}$	9				
Input x	Output y								
$\frac{3}{2}$	9								

Algebra 1**Direct Variation****Name:** _____ **Date:** _____ **Class:** _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Audit this direct-variation reasoning: From the pair $(4, 12)$, a student reports $k = \frac{x}{y} = \frac{1}{3}$ in $y = kx$. Identify the first invalid inference and correct it.

Audit this direct-variation reasoning: Two constraints demand $k = \frac{5}{3}$ and $k = \frac{10}{6}$; a student treats the fractions as different and rejects the model. Identify the first invalid inference and correct it.

Audit this direct-variation reasoning: A table includes $(0, 5), (2, 6), (4, 12)$. A student ignores the zero row because $\frac{y}{x}$ cannot be formed there. Identify the first invalid inference and correct it.

Audit this direct-variation reasoning: A student calls $y = 3x + 2$ a direct variation because its slope is constant. Identify the first invalid inference and correct it.

Direct Variation

Full Worked Solutions - excerpt

Worked example

Problem. Scale the fractional proportional pair $(21, -14)$ to the target input $-\frac{9}{2}$. Give the exact target output.

Input x	Output y
21	-14

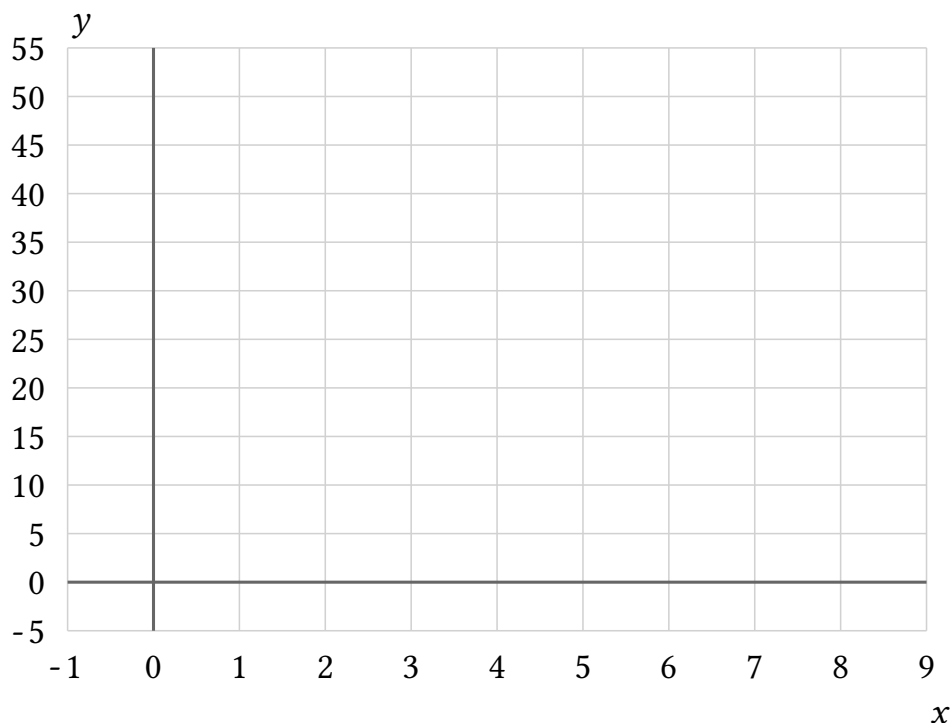
Answer. Using the known pair $(21, -14)$, $y = 3$ at $x = -\frac{9}{2}$; $k = -\frac{2}{3}$.

Explanation and check.

The exact ratio is $-\frac{2}{3}$. Fraction multiplication gives $(-\frac{2}{3})(-\frac{9}{2}) = 3$.

Worked example

Problem. Construct the graph of $y = 6x$ on the domain $2 \leq x < 8$. Use the exact sample inputs 2, 5, 7 and state whether points should be connected.



Answer. Plot $(2, 12)$, $(5, 30)$, $(7, 42)$. Use a continuous segment or ray only over the declared interval. The displayed domain excludes or does not sample 0, although the zero-offset rule is still proportional.

Explanation and check.

Each output is kx with $k = 6$. Use a continuous segment or ray only over the declared interval. The displayed domain excludes or does not sample 0, although the zero-offset rule is still proportional.

Algebra 1
Linear Models from Initial Value and Rate

Linear Models from Initial Value and Rate | A1-U05-P16

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for an exact affine rule, domain, interpretation, or corrected model.
8 PDFs and a README; 50 buyer pages.

Algebra 1

Linear Models from Initial Value and Rate

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

At use count 18, 250 grams remain and 15 grams are used per count. Construct an anchored linear model and then rewrite it to identify $Q(0)$. Do not treat the value at $t = 18$ as the intercept. _____ Bank label: _____	At week 40, a fund is 1000 dollars and then changes -22 dollars per week. Construct an anchored linear model and then rewrite it to identify $Q(0)$. Do not treat the value at $t = 40$ as the intercept. _____ Bank label: _____
A vertical coordinate starts at 3 units and changes by $-\frac{7}{3}$ units per step. Let t be the number of steps. Construct $Q(t)$ in units; identify the value at $t = 0$ and preserve the sign of the supplied rate. _____ Bank label: _____	At $t = -8$ relative to calibration, a signal is 12 and rises $\frac{5}{2}$ per time unit. Construct an anchored linear model and then rewrite it to identify $Q(0)$. Do not treat the value at $t = -8$ as the intercept. _____ Bank label: _____
An inventory starts at 100 and processes at most 8 whole orders. Use the supplied initial-rate rule $Q(t) = 100 - 12t$. State the valid domain for t in orders, combining input type with the process limit. _____ Bank label: _____	For the contextual model $Q(t) = 4 - \frac{1}{3}t$ on domain $-6 \leq t \leq 0$, explain the intercept and slope in the original units and say whether $Q(0)$ is observed or extrapolated. Q is a historical offset and $t = 0$ is the end of the observation window. _____ Bank label: _____
A process has initial value 9 miles and rate 45 miles per hour. Express its model using meters and input measured in seconds; output counts multiply by $\frac{201168}{125}$ and input counts by 3600. _____ Bank label: _____	For the contextual model $Q(t) = 31 + 5t$ on domain $t \geq 7$, explain the intercept and slope in the original units and say whether $Q(0)$ is observed or extrapolated. Q is a quantity measured from a baseline date, but observations start seven periods later. _____ Bank label: _____

Algebra 1

Linear Models from Initial Value and Rate

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

A temperature deviation rises from -10 to a cutoff of 8. Use the supplied initial-rate rule $Q(t) = -10 + \frac{9}{4}t$. State the valid domain for t in hours, combining input type with the process limit. _____ _____	A signed elevation is -5 meters at time zero and falls 2 meters per kilometer traveled. Let t be the number of kilometers. Construct $Q(t)$ in meters; identify the value at $t = 0$ and preserve the sign of the supplied rate. _____ _____
A process has initial value 2 liters and rate 6 liters per package. Express its model using liters and input measured in items; output counts multiply by 1 and input counts by 3. _____ _____	A process has initial value $\frac{13}{6}$ gallons and rate $-\frac{17}{9}$ gallons per hour. Express its model using quarts and input measured in minutes; output counts multiply by 4 and input counts by 60. _____ _____
A process has initial value 12 liters and rate 5 liters per hour. Express its model using milliliters and input measured in minutes; output counts multiply by 1000 and input counts by 60. _____ _____	At $t = \frac{3}{2}$ days, a total is 9 and grows 4 units per day. Construct an anchored linear model and then rewrite it to identify $Q(0)$. Do not treat the value at $t = \frac{3}{2}$ as the intercept. _____ _____

Algebra 1

Linear Models from Initial Value and Rate

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: At $t = 4$, $A = 18$ and $B = 17$. Both initial value and rate change, so neither parameter alone explains the output gap. For the contextual model $Q(t) = -5 - 4t$ on domain $-2 \leq t \leq 6$, explain the intercept and slope in the original units and say whether $Q(0)$ is observed or extrapolated. Q is position relative to a marker and $t = 0$ is a chosen clock reference. Your response: _____	Incoming: In $Q(t) = -5 - 4t$, -5 is observed at the chosen zero; -4 is the signed output change per one input unit. Context: Q is position relative to a marker and $t = 0$ is a chosen clock reference. Models $A(t) = 18 - \frac{1}{2}t$ and $B(t) = 18 - \frac{3}{4}t$ have the same starting value. Explain how the changed rate affects later outputs and compare them at $t = 10$. Your response: _____
Incoming: In $Q(t) = 72 - 9t$, 72 is observed at the chosen zero; -9 is the signed output change per one input unit. Context: Q is percentage points remaining, not a multiplicative percent change. Compare the redesigned affine models $A(t) = -10 + 7t$ and $B(t) = 5 + 3t$. Separate the start change from the rate change before checking $t = 4$. Your response: _____	Incoming: At $t = 6$, $A = 100$ and $B = 120$. Both initial value and rate change, so neither parameter alone explains the output gap. For the contextual model $Q(t) = 500 + 20t$ on domain $0 \leq t \leq 6$, explain the intercept and slope in the original units and say whether $Q(0)$ is observed or extrapolated. Q includes a fixed setup contribution plus production over hours. Your response: _____
Incoming: At $t = 7$, $A = 44$ and $B = 65$. The models start together, and their rate difference changes the gap with t. For the contextual model $Q(t) = 90$ on domain $0 \leq t \leq 12$, explain the intercept and slope in the original units and say whether $Q(0)$ is observed or extrapolated. Q is a fixed sensor reading and t is hours. Your response: _____	Incoming: $Q(t) = 0 + \frac{7}{3}(t - 12)$, equivalently $Q(t) = -28 + \frac{7}{3}t$; therefore $Q(0) = -28$. A process has initial value 0 items and rate 300 items per hour. Express its model using items and input measured in minutes; output counts multiply by 1 and input counts by 60. Your response: _____

Algebra 1

Linear Models from Initial Value and Rate

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Compare the redesigned affine models $A(t) = 500 + 20t$ and $B(t) = 450 + 25t$. Separate the start change from the rate change before checking $t = 4$.

Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Both parameters differ in $A(t) = 8 + \frac{3}{2}t$ and $B(t) = 12 + \frac{1}{2}t$. Compare the exact rational starts and rates, then evaluate each at $t = 6$.

Models $A(t) = 10 + 3t$ and $B(t) = 16 + 3t$ share one rate. Isolate the effect of changing the initial value, then check the fixed gap at $t = 4$.

Models $A(t) = 6 + 12t$ and $B(t) = 9 + 12t$ share one rate. Isolate the effect of changing the initial value, then check the fixed gap at $t = \frac{5}{2}$.

Linear Models from Initial Value and Rate

Full Worked Solutions - excerpt

Worked example

Problem. At use count 18, 250 grams remain and 15 grams are used per count. Construct an anchored linear model and then rewrite it to identify $Q(0)$. Do not treat the value at $t = 18$ as the intercept.

Answer. $Q(t) = 250 - 15(t - 18)$, equivalently $Q(t) = 520 - 15t$; therefore $Q(0) = 520$.

Explanation and check.

Start from the reference form using $(t - 18)$ and rate -15 . Expanding gives the initial value

$$250 - (-15)(18) = 520$$

Worked example

Problem. At week 40, a fund is 1000 dollars and then changes -22 dollars per week. Construct an anchored linear model and then rewrite it to identify $Q(0)$. Do not treat the value at $t = 40$ as the intercept.

Answer. $Q(t) = 1000 - 22(t - 40)$, equivalently $Q(t) = 1880 - 22t$; therefore $Q(0) = 1880$.

Explanation and check.

Start from the reference form using $(t - 40)$ and rate -22 . Expanding gives the initial value

$$1000 - (-22)(40) = 1880$$

Algebra 1
Evaluating Linear Models in Context

Evaluating Linear Models in Context | A1-U05-P17

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for an exact prediction with a context-qualified conclusion.
8 PDFs and a README; 50 buyer pages.

Algebra 1

Evaluating Linear Models
in Context

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

A newly appended row has input 4 and output $\frac{47}{6}$. Test it against $Q(t) = -\frac{5}{2} + \frac{7}{3}t$ with absolute tolerance $\frac{1}{2}$, and say what an out-of-band result establishes. _____ Bank label: _____	A supporting table covers inputs -8 through -1, and the rule's domain is $-10 \leq t \leq 3$. Locate $t = -5$ relative to the evidence and classify this within-span prediction. _____ Bank label: _____
For the supplied rule $Q(t) = \frac{11}{3} + \frac{13}{7}t$, evaluate at $t = 14$ and compare with observed value 29. Use $\text{observed-predicted} \leq \frac{2}{3}$ as the consistency rule. _____ Bank label: _____	A supporting table covers inputs 0 through 18, and the rule's domain is $0 \leq t \leq 20$. Locate $t = 11$ relative to the evidence and classify this within-span prediction. _____ Bank label: _____
The supplied model is $Q(t) = 18 + 7t$ on t in $\{0, 1, \dots, 12\}$. At what t, measured in batches, does Q reach 60? Solve and verify that the predicted input is admissible. _____ Bank label: _____	For the forecast $Q(t) = 18 + 5t$ at $t = 12$, the intercept changes by 7 and the rate changes by -1. Combine the two effects exactly and state the net prediction change. _____ Bank label: _____
The supplied model is $Q(t) = 25 + 11t$ on t in $\{0, 1, \dots, 10\}$. At what t, measured in days, does Q reach 102? Solve and verify that the predicted input is admissible. _____ Bank label: _____	The supplied forecast is $Q(t) = \frac{9}{2} + \frac{7}{3}t$. At $t = 3$ it is being used under this condition: completed packages must be whole. Compute the output and decide whether the contextual interpretation is feasible; identify the decisive condition. _____ Bank label: _____

Algebra 1

Evaluating Linear Models
in Context

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

The supplied forecast is $Q(t) = -15 + 11t$. At $t = 12$ it is being used under this condition: domain is $2 \leq t \leq 9$ and capacity is 80. Compute the output and decide whether the contextual interpretation is feasible; identify the decisive condition. 	Check observation $Q = -1$ at $t = 9$ against $Q(t) = 12 - \frac{3}{2}t$, allowing error of at most 1. Report the signed and absolute residual before judging agreement.
The established rule is $Q(t) = 320 - 18(t - 12)$, where Q measures stored energy in kilowatt-hours and t is days. Within $0 \leq t \leq 18$, predict $Q(5)$ and interpret the reference shift $t = 12$. 	A decreasing model for reservoir depth is $Q(t) = 51 - 5t$. Its modeled domain is $0 \leq t \leq 9$, Q is measured in feet, and t in days. Evaluate the admissible forecast at $t = \frac{13}{2}$ and state what the sign means.
A decreasing model for candle height is $Q(t) = 24 - 3t$. Its modeled domain is $0 \leq t \leq 8$, Q is measured in centimeters, and t in hours. Evaluate the admissible forecast at $t = 5$ and state what the sign means. 	The supplied forecast is $Q(t) = 72 - 9t$. At $t = 8$ it is being used under this condition: inventory must be nonnegative. Compute the output and decide whether the contextual interpretation is feasible; identify the decisive condition.

Algebra 1

Evaluating Linear Models in Context

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Evidence in a table stops at the span $[0, 7]$, and the model itself is restricted to $0 \leq t \leq 12$. Assess the proposed forecast input 16 against both limits.

Audit this forecast statement: A rule gives distance in miles with t in hours. A student evaluates it correctly but reports the result as miles per hour. Identify the first unjustified step and write a repaired, qualified conclusion.

The first and last tabulated inputs are 9 and 27. For domain $0 \leq t \leq 35$, classify use of the rule exactly at $t = 27$ and distinguish an endpoint from beyond-range use.

A student states a conclusion from the visible representation without preserving all stated associations, constraints, or units. Diagnose the specific reasoning error, then complete the original task: Audit this forecast statement: A rate 2.46 is rounded to 2 before multiplying by 18, and the final forecast is reported to the nearest tenth. Identify the first unjustified step and write a repaired, qualified conclusion.

Evaluating Linear Models in Context

Full Worked Solutions - excerpt

Worked example

Problem. A newly appended row has input 4 and output $\frac{47}{6}$. Test it against $Q(t) = -\frac{5}{2} + \frac{7}{3}t$ with absolute tolerance $\frac{1}{2}$, and say what an out-of-band result establishes.

Answer. The model predicts $\frac{41}{6}$; residual observed-predicted is 1, whose absolute value is 1. That is outside the tolerance $\frac{1}{2}$, so the observation is not consistent with the model at this tolerance. This comparison alone does not establish a cause.

Explanation and check.

Prediction $\frac{41}{6}$ and observation $\frac{47}{6}$ have absolute gap 1, larger than allowed tolerance $\frac{1}{2}$.

Worked example

Problem. A supporting table covers inputs -8 through -1 , and the rule's domain is $-10 \leq t \leq 3$. Locate $t = -5$ relative to the evidence and classify this within-span prediction.

Answer. This is interpolation: -5 lies strictly between observed inputs -8 and -1 . It is inside the declared model domain, but the classification alone does not guarantee empirical accuracy; continued linear behavior is an assumption wherever direct observations are absent.

Explanation and check.

The requested input lies between -8 and -1 , so the prediction uses the model within the observed span.

Algebra 1
Transformations of Linear Functions

Transformations of Linear Functions | A1-U05-P18

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for an exact transformed rule, coordinate map, domain, or justified comparison.
8 PDFs and a README; 55 buyer pages.

Algebra 1

Transformations of Linear Functions

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Starting from $f(x) = \frac{7}{6}x - \frac{5}{2}$, shift every output by $\frac{5}{2}$. Write g , and compare its slope and y -intercept with f .

The original line contains $(-\frac{1}{3}, \frac{5}{2})$, $(\frac{8}{3}, -\frac{7}{2})$. Translate coordinates by the map x to $x + \frac{4}{3}$ and y to $y - \frac{5}{6}$. List every image point and verify that the same displacement was used throughout.

x	y
$-\frac{1}{3}$	$\frac{5}{2}$
$\frac{8}{3}$	$-\frac{7}{2}$
$\frac{8}{3}$	$-\frac{7}{2}$

Bank label: _____

Bank label: _____

Starting with $f(x) = 9x - 2$, shift input coordinates right 3, scale all resulting outputs by 0, and finally shift outputs by -5 . Compose all three stages in order.

For $f(x) = -5x + 8$, analyze the proposed change 'horizontal right 4' without plotting every point. State what happens to parallelism and cite the controlling parameter invariant.

Bank label: _____

Bank label: _____

Algebra 1

Transformations of Linear Functions

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Map the collinear points $(-\frac{9}{2}, \frac{7}{3})$, $(\frac{3}{2}, -\frac{5}{3})$ using x to $-\frac{2}{3}x + \frac{11}{4}$ and y to $\frac{5}{2}y$. Compute every exact image and use the common affine coordinate rule to verify the transformed line.

x	y
$-\frac{9}{2}$	$\frac{7}{3}$
$\frac{3}{2}$	$-\frac{5}{3}$

Complete the task, then compare the direct graph approach with an equivalent check. Explain why both support the same conclusion. Assume the named family 'hshift' only. Can $f(x) = \frac{7}{5}x + \frac{13}{6}$ be transformed into $g(x) = \frac{7}{5}x - \frac{61}{30}$? Recover the parameter if possible, or identify the incompatible feature.

Transformations of Linear Functions

Full Worked Solutions - excerpt

Worked example

Problem. Starting from $f(x) = \frac{7}{6}x - \frac{5}{2}$, shift every output by $\frac{5}{2}$. Write g , and compare its slope and y -intercept with f .

Answer. $g(x) = \frac{7}{6}x$. The slope remains $\frac{7}{6}$ and the y -intercept changes from $-\frac{5}{2}$ to 0.

Explanation and check.

An output shift adds $\frac{5}{2}$ only to the intercept; it does not change the rate of change.

Worked example

Problem. The original line contains $(-\frac{1}{3}, \frac{5}{2}), (\frac{8}{3}, -\frac{7}{2})$. Translate coordinates by the map x to $x + \frac{4}{3}$ and y to $y - \frac{5}{6}$. List every image point and verify that the same displacement was used throughout.

x	y
$-\frac{1}{3}$	$\frac{5}{2}$
$\frac{8}{3}$	$-\frac{7}{2}$

Answer. Mapped points: $(1, \frac{5}{3}), (4, -\frac{13}{3})$. The same coordinate rule is applied to each point.

Explanation and check.

Add the specified coordinate displacements to each point; the image list is $(1, \frac{5}{3}), (4, -\frac{13}{3})$.

Algebra 1
Solving Systems by Graphing

Solving Systems by Graphing | A1-U06-P01

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
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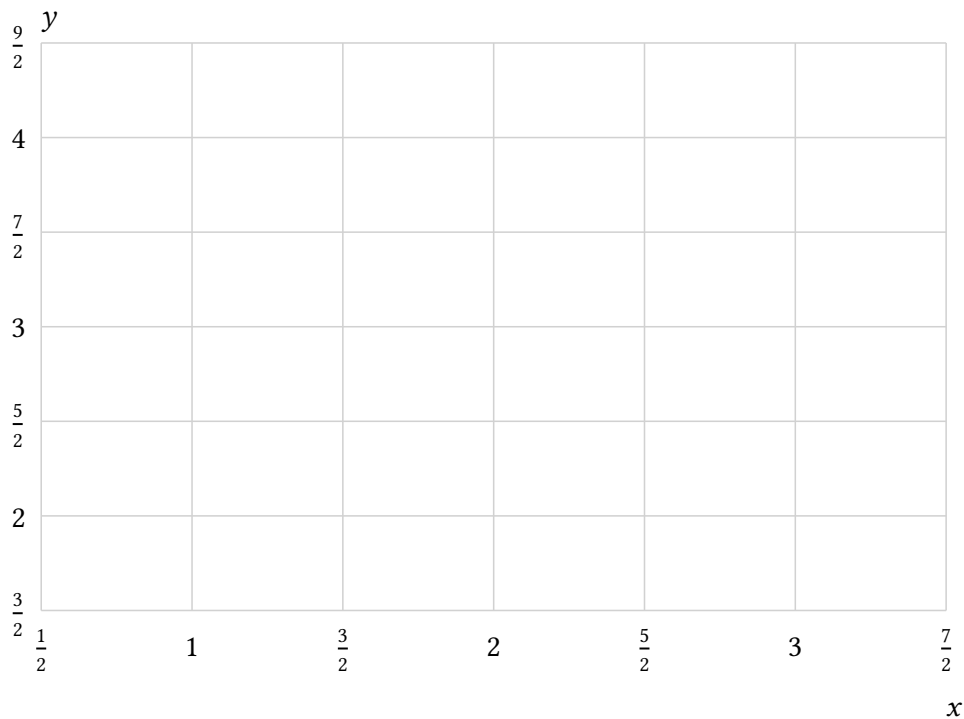
Topic focus
Across 96 tasks this topic asks for an exact or justified approximate common solution with verification.
8 PDFs and a README; 142 buyer pages.

Algebra 1

Solving Systems
by Graphing

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Graph the system $y = x + 1$ and $y = -x + 5$ on common axes. Use two exact points per line, locate the crossing, and verify the ordered pair in both equations.

Input x	Output y
1	2
3	4

Input x	Output y
1	4
3	2

Bank label: _____

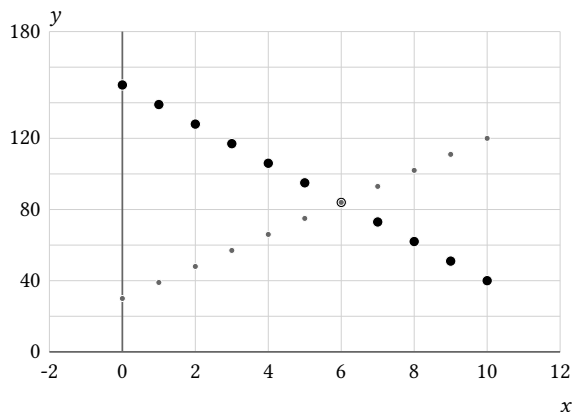
Algebra 1

Solving Systems
by Graphing

Name: _____ Date: _____ Class: _____

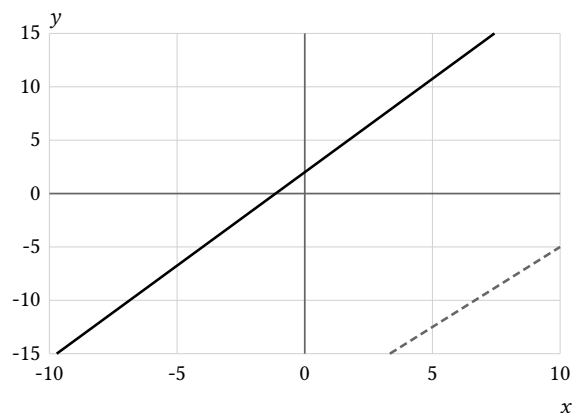
Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Two supplied contextual graphs follow $A(x) = -11x + 150$ and $B(x) = 9x + 30$ for x in $\{0, 1, \dots, 10\}$. The input unit is orders and output unit is items. Find and interpret their intersection, then enforce the stated domain.



Test candidate point $(1, 1)$ against the system $y = 3x - 2$ and $y = -2x + 4$. Report separately whether each equation passes before deciding common membership.

A graphing panel shows $y = \frac{7}{4}x + 2$ and $y = \frac{3}{2}x - 20$ only in window $[-10, 10]x[-15, 15]$. What conclusion is warranted, and what exact feature or improved window would support it?



Test candidate point $(1, 0)$ against the system $y = 2x + 3$ and $y = -3x + 1$. Report separately whether each equation passes before deciding common membership.

Algebra 1

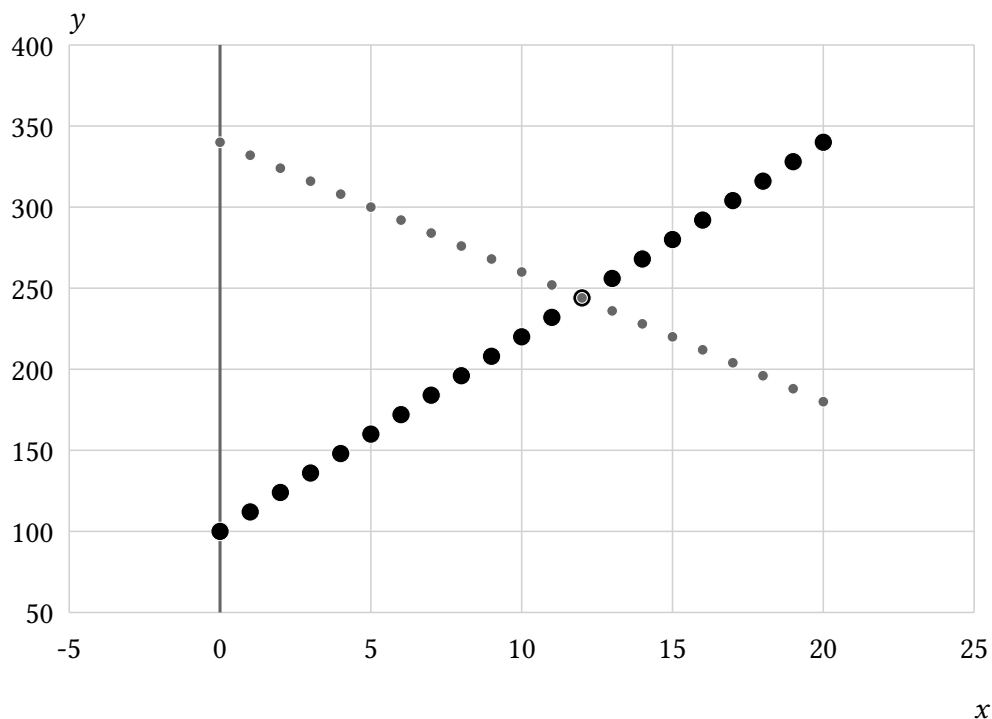
Solving Systems
by Graphing

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: For $y = -4x + 7$ and $y = -4x + 7$ in window $[-1, 2]x[-2, 8]$, the lines are coincident; the crop does not change that exact relationship.

Two supplied contextual graphs follow $A(x) = 12x + 100$ and $B(x) = -8x + 340$ for x in $\{0, 1, \dots, 20\}$. The input unit is tickets and output unit is dollars. Find and interpret their intersection, then enforce the stated domain.



Your response: _____

Algebra 1

Solving Systems by Graphing

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Audit this graphical-system solution: Fractional graph points are rounded before the lines are drawn, moving the crossing. Identify the first plotting, scale, or common-membership error and repair it.

Audit this graphical-system solution: The equation $x = -4$ is plotted as $y = -4$. Identify the first plotting, scale, or common-membership error and repair it.

Audit this graphical-system solution: The line $y = -2x + 1$ is drawn with rise 2 for run 1. Identify the first plotting, scale, or common-membership error and repair it.

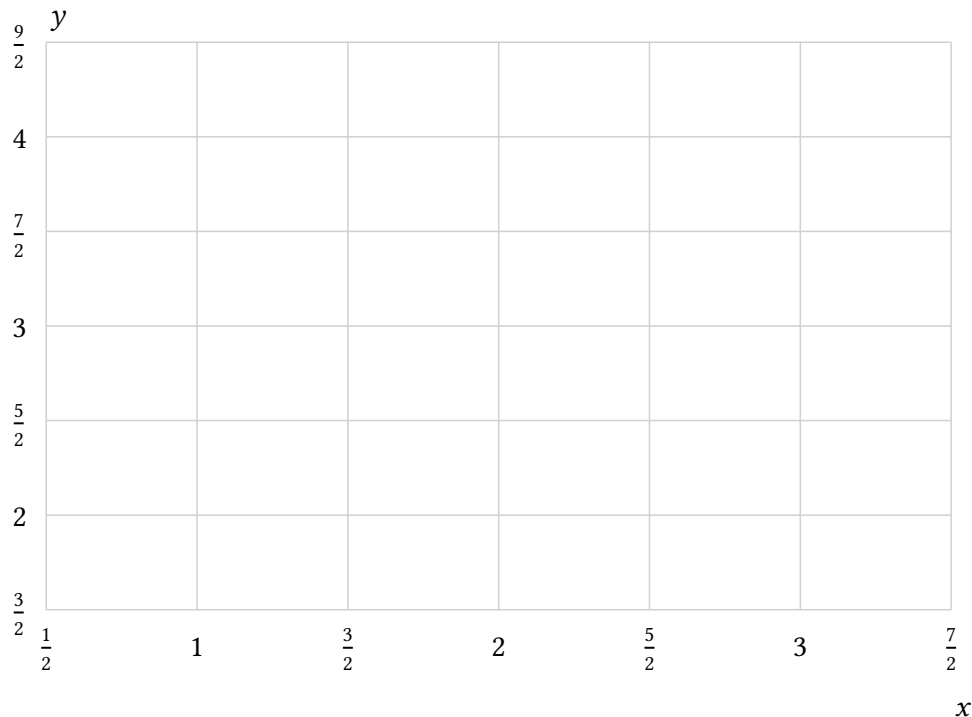
Audit this graphical-system solution: For $y = 3x - 4$, the plotted line starts at $(0, 4)$. Identify the first plotting, scale, or common-membership error and repair it.

Solving Systems by Graphing

Full Worked Solutions - excerpt

Worked example

Problem. Graph the system $y = x + 1$ and $y = -x + 5$ on common axes. Use two exact points per line, locate the crossing, and verify the ordered pair in both equations.



Input x	Output y
1	2
3	4

Input x	Output y
1	4
3	2

Answer. The graphs of $y = x + 1$ and $y = -x + 5$ intersect at $(2, 3)$, which satisfies both original equations.

Explanation and check.

Plot line 1 through $(1, 2), (3, 4)$ and line 2 through $(1, 4), (3, 2)$; their shared point is $(2, 3)$.

Worked example

Problem. Test candidate point $(2, 5)$ against the system $y = 2x + 1$ and $y = -x + 7$. Report separately whether each equation passes before deciding common membership.

Answer. For $y = 2x + 1$ and $y = -x + 7$, first equation: passes; second equation: passes. Therefore $(2, 5)$ is a common solution.

Explanation and check.

Both original equations accept $(2, 5)$, so the point lies on both graphs simultaneously.

Algebra 1
Number of Solutions in Linear Systems

Number of Solutions in Linear Systems | A1-U06-P02

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for one, none, or infinitely many solutions with exact justification.
8 PDFs and a README; 85 buyer pages.

Algebra 1**Number of Solutions
in Linear Systems****Name:** _____ **Date:** _____ **Class:** _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

An exact graph marks one crossing of two genuine lines and also labels their unequal direction vectors. Is the full system count determined?

Bank label: _____

Algebra 1

Number of Solutions in Linear Systems

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Decide whether these genuine lines cross, remain distinct, or coincide: $2x + y = 7$ and $x - 2y = -4$. Give exact coefficient evidence. 	A student must classify the system before choosing any solving method: $4x + 7y = -2$ and $12x + 21y = -6$. Give exact coefficient evidence.
A student claims $5y = 10$ and $y = -3$ must cross because their constants differ. Correct the count. 	Classify this pair of standard-form equations without finding an intersection: $4x - 7y = 2$ and $-8x + 14y = -9$. Give exact coefficient evidence.
Simplify both equations before classifying the system: $2(x + y) - y = 7$ and $x - 3(y - 1) = 4$. Show the normalized pair as evidence. 	A solution labels $2x + 3y = 7$ and $4x + 6y = 20$ as the same line because the variable coefficients double. Correct it.

Algebra 1

Number of Solutions in Linear Systems

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: No solution. Justification: The first equation becomes $8 = 5$, a contradiction. No point on the horizontal line can satisfy it. Start with $x - 2y = 3$. Construct a second genuine-line equation so the system has infinitely many solutions. Constraint: The second equation must contain both $(3, 0)$ and $(5, 1)$ and differ in appearance. Give the equation and verify the complete line relation. Your response: _____	Incoming: One valid construction is $-3x + 6y = -9$; with $x - 2y = 3$, it has infinitely many solutions. Justification: The direction cross-product is 0, and the constant checks are both 0; the equations name the same line. Therefore the construction meets the stated count and the additional constraint. Start with $x + y = 5$. Construct a second genuine-line equation so the system has one solution. Constraint: Both equations must contain $(3, 2)$, and the second direction must differ. Give the equation and verify the complete line relation. Your response: _____
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Algebra 1**Number of Solutions
in Linear Systems**

Name: _____ **Date:** _____ **Class:** _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A student treats $4x - y = 6$ and $6 = 4x - y$ as two different lines because the sides are reversed. Audit the system.

Complete the task, then compare two valid approaches from this topic (compare normalized equations, use slopes/intercepts, or analyze coefficient proportionality) and justify why they agree on the required conclusion. Start with $x = 4$. Construct a second genuine-line equation so the system has one solution. Constraint: Make the second line horizontal while the first is vertical. Give the equation and verify the complete line relation.

Complete the task, then compare two valid approaches from this topic (compare normalized equations, use slopes/intercepts, or analyze coefficient proportionality) and justify why they agree on the required conclusion. Start with $y = 4$. Construct a second genuine-line equation so the system has one solution. Constraint: The second line must be oblique, not another horizontal line. Give the equation and verify the complete line relation.

Choose and justify a method before solving (compare normalized equations, use slopes/intercepts, or analyze coefficient proportionality). Then complete the task: From a graph, slopes 0.333 and 0.334 are both rounded to 0.33, and the system is labeled no solution. Audit the conclusion.

Number of Solutions in Linear Systems

Full Worked Solutions - excerpt

Worked example

Problem. An exact graph marks one crossing of two genuine lines and also labels their unequal direction vectors. Is the full system count determined?

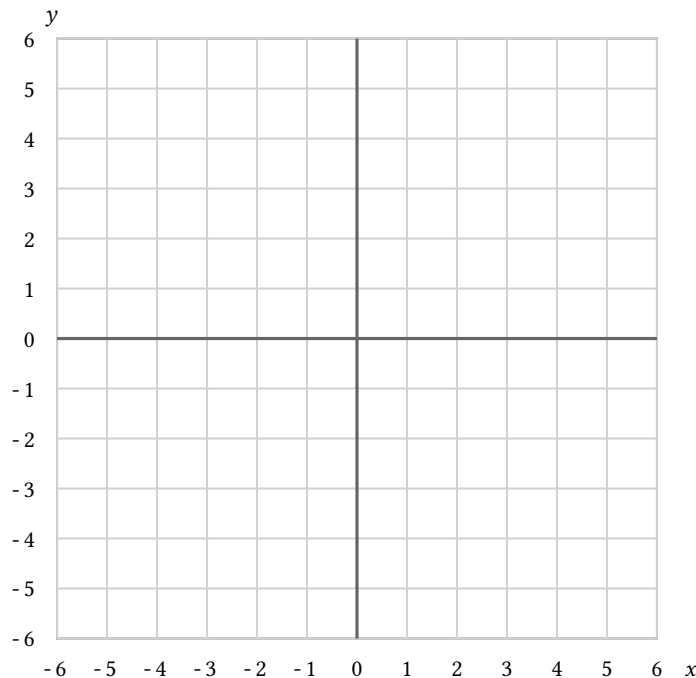
Answer. Yes. The system has one solution. Justification: The marked crossing supplies existence, and unequal directions prevent coincidence or a second meeting. Genuine lines with different directions intersect once.

Explanation and check.

The marked crossing supplies existence, and unequal directions prevent coincidence or a second meeting. Genuine lines with different directions intersect once.

Worked example

Problem. The graphing display uses the rules below: $x = 12$ and $x - y = -15$, in the window x from -6 to 6 and y from -6 to 6 . The viewing note says one trace is outside the displayed x -range. Classify the complete system; do not infer from the crop alone.



Answer. The system $x = 12$; $x - y = -15$ has one solution. Justification: The direction cross-product is -1 , not 0 , so the genuine lines are nonparallel and meet once. The location of that meeting is not needed for this classification.

Explanation and check.

The direction cross-product is -1 , not 0 , so the genuine lines are nonparallel and meet once. The location of that meeting is not needed for this classification.

Algebra 1
Solving Systems by Substitution

Solving Systems by Substitution | A1-U06-P03

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for first invalid step, correction, and ordered pair, ordered pair, complete solution set and missing coordinate and k.

8 PDFs and a README; 57 buyer pages.

Algebra 1

Solving Systems
by Substitution

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Substitution in the system $y = 2x + 4$ and $5y = 10x + 21$ collapses to $0 = 1$. Interpret the collapsed equation. State the complete solution set and justify it using the original system. _____ Bank label: _____	It is known that $y = 2$. The pair satisfies $5x + 5y = 0$ and $kx + 5y = 24$. Recover the missing coordinate and determine k. Explain how each equation is used. _____ Bank label: _____
Solve the system $y = x - 2$ and $2x - y = 7$ by substitution. Then verify the ordered pair in both original equations. _____ Bank label: _____	Neither variable is displayed alone in the system $x + 5y = 25$ and $4x + 4y = 20$. Isolate x from the first equation, use substitution to solve, and check the result in both equations. _____ Bank label: _____
Both equations give y in terms of x: $y = (x - 1) + 11$ and $y = -2x + 1$. Equate the two expressions, then find both coordinates of the solution. _____ Bank label: _____	Solve the system $x = -y - 12$ and $2x + 6y = -52$ by substitution. Then verify the ordered pair in both original equations. _____ Bank label: _____
Neither variable is displayed alone in the system $6x - y = 17$ and $-4x + 6y = -38$. Isolate x from the first equation, use substitution to solve, and check the result in both equations. _____ Bank label: _____	Both equations give y in terms of x: $y = 2x - 4$ and $y = x - 5$. Equate the two expressions, then find both coordinates of the solution. _____ Bank label: _____

Algebra 1

Solving Systems
by Substitution

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

The data table gives $x = -5$. The pair satisfies $2x + 3y = -28$ and $4x + 3y = k$. Recover the missing coordinate and determine k. Explain how each equation is used. <table border="1"> <thead> <tr> <th>given coordinate</th> <th>value</th> </tr> </thead> <tbody> <tr> <td>x</td> <td>-5</td> </tr> </tbody> </table> 	given coordinate	value	x	-5	The data table gives $x = 3$. The pair satisfies $2x + 2y = 18$ and $kx + 2y = -3$. Recover the missing coordinate and determine k. Explain how each equation is used. <table border="1"> <thead> <tr> <th>given coordinate</th> <th>value</th> </tr> </thead> <tbody> <tr> <td>x</td> <td>3</td> </tr> </tbody> </table> 	given coordinate	value	x	3
given coordinate	value								
x	-5								
given coordinate	value								
x	3								
The data table gives $x = 2$. The pair satisfies $2x + 6y = 34$ and $5x + 3y + k = 23$. Recover the missing coordinate and determine k. Explain how each equation is used. <table border="1"> <thead> <tr> <th>given coordinate</th> <th>value</th> </tr> </thead> <tbody> <tr> <td>x</td> <td>2</td> </tr> </tbody> </table> 	given coordinate	value	x	2	Substitution in the system $y = -x$ and $3y = -3x + 1$ collapses to $0 = 1$. Interpret the collapsed equation. State the complete solution set and justify it using the original system. 				
given coordinate	value								
x	2								
Substitution in the system $y = 2x + 3$ and $4y = 8x + 12$ collapses to $0 = 0$. Interpret the collapsed equation. State the complete solution set and justify it using the original system. 	For the system $y = -2x + 6$ and $4x + 3y = 10$, a student writes: "Substitute: $4x + 3 \cdot -2x + 6 = 10$." Identify the first invalid step, repair it, solve the system, and verify the ordered pair. 								

Algebra 1

Solving Systems
by Substitution

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $(-1, -7)$ Neither variable is displayed alone in the system $-x + 3y = 1$ and $2x + 7y = -15$. Isolate x from the first equation, use substitution to solve, and check the result in both equations. Your response: _____	Incoming: $(-3, -2)$ Neither variable is displayed alone in the system $3x - y = -6$ and $-3x + 4y = -3$. Isolate x from the first equation, use substitution to solve, and check the result in both equations. Your response: _____
Incoming: $(-4, -4)$ Substitution in the system $y = -2x - 2$ and $3y = -6x - 4$ collapses to $0 = 2$. Interpret the collapsed equation. State the complete solution set and justify it using the original system. Your response: _____	Incoming: No solution It is known that $y = -3$. The pair satisfies $3x + 4y = -21$ and $kx + 3y = 0$. Recover the missing coordinate and determine k. Explain how each equation is used. Your response: _____
Incoming: $(0, 3)$ Neither variable is displayed alone in the system $-x + 4y = 1$ and $-2x + 6y = 2$. Isolate x from the first equation, use substitution to solve, and check the result in both equations. Your response: _____	Incoming: $(-1, 0)$ Both equations give y in terms of x: $y = x + 2$ and $y = 2x + 4$. Equate the two expressions, then find both coordinates of the solution. Your response: _____

Algebra 1

Solving Systems by Substitution

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Substitution in the system $y = -3x - 5$ and $2y = -6x - 10$ collapses to $0 = 0$. A student concludes that every point in the coordinate plane works. State the complete solution set and justify it using the original system. Compare these two claims about the displayed collapsed equation: A says that it alone completely describes the solution set in the coordinate plane; B says that the solution set must satisfy both the collapsed statement and the retained original equation. Decide which reasoning is valid, explain the difference, and give the complete solution set. If the collapsed statement is false, explain why both descriptions produce an empty set.

For the system $y = -2x - 16$ and $2x + 3y = -28$, a student writes: "Substitute: $2x + 3 \cdot -2x - 16 = -28$." Identify the first invalid step, repair it, solve the system, and verify the ordered pair.

Solving Systems by Substitution

Full Worked Solutions - excerpt

Worked example

Problem. Solve the system $y = x - 2$ and $2x - y = 7$ by substitution. Then verify the ordered pair in both original equations.

Answer. $(5, 3)$

Explanation and check.

Use the isolated relation $y = x - 2$; substitution gives $x = 5$, so $x = 5$. Back-substitution gives the other coordinate, $(5, 3)$. Substituting that pair into both original equations verifies both equalities.

Worked example

Problem. Solve the system $x = 3y$ and $-2x + 5y = 2$ by substitution. Then verify the ordered pair in both original equations.

Answer. $(-6, -2)$

Explanation and check.

Use the isolated relation $x = 3y$; substitution gives $-y = 2$, so $y = -2$. Back-substitution gives the other coordinate, $(-6, -2)$. Substituting that pair into both original equations verifies both equalities.

Algebra 1
Solving Systems by Elimination

Solving Systems by Elimination | A1-U06-P04

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for first error, corrected row, and ordered pair, complete solution set, aligned system and ordered pair, multiplier and surviving equation or impossibility justification and ordered pair.

8 PDFs and a README; 56 buyer pages.

Algebra 1

Solving Systems
by Elimination

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Solve the system $5x + 4y = -7$ and $x - 4y = 13$ by choosing addition or subtraction so a variable cancels immediately. Verify the result in both original equations. _____ Bank label: _____	One coefficient pair in $2x - 3y = 2$ and $2x - 2y = 4$ is already aligned. Solve by elimination. Verify the result in both original equations. _____ Bank label: _____
Use the ready cancellation in $3x - y = 14$ and $-3x + 2y = -7$ to determine the ordered pair. Verify the result in both original equations. _____ Bank label: _____	Without scaling either equation, eliminate a variable and solve the system $4x + y = -25$ and $7x + y = -40$. Verify the result in both original equations. _____ Bank label: _____
For the system $5x + 3y = 0$ and $9x - 3y = 0$, explain whether addition or subtraction creates the cancellation, then solve. Verify the result in both original equations. _____ Bank label: _____	For the system $3x - 3y = 15$ and $-3x - 5y = 17$, explain whether addition or subtraction creates the cancellation, then solve. Verify the result in both original equations. _____ Bank label: _____
Choose a nonzero multiplier for one row of $x + 3y = 16$ and $7x + 9y = 28$ and solve by elimination. Check the ordered pair in both originals. _____ Bank label: _____	Use one whole-equation scaling before combining the equations in $16x + 21y = -137$ and $4x + 4y = -28$. Check the ordered pair in both originals. _____ Bank label: _____

Algebra 1

Solving Systems
by Elimination

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Rewrite each equation in aligned standard form before eliminating for $2(x + 2) - 3y = 3$ and $-3x + 2y = -1$. Verify the final ordered pair in the original displayed equations. 	A student's elimination work contains one first invalid step for $2x - 2y = -4$ and $4x - 3y = -8$: "Multiply $E1$ by 2 but leave its right side as -4." Identify the first error, give the corrected combination, solve, and verify the ordered pair.
Determine k so that $E1 + kE2$ eliminates the specified variable, and give the surviving equation for $E1$: $2x - 3y = -10$ and $E2$: $3x - 3y = -6$; eliminate x. 	Carry out the indicated elimination and interpret the constant statement without discarding the original constraint for $x - 2y = -2$ and $2x - 4y = -4$ by forming $-2E1 + E2$.
Simplify the system carefully, align like terms, and then solve by elimination for $5x - 3y = -6 + 2x$ and $2x + 4y = 32$. Verify the final ordered pair in the original displayed equations. 	The linear structure is hidden. Normalize both rows before forming an elimination combination for $0.4x + 0.3y = 1.0$ and $-0.4x - 0.6y = 0.8$. Verify the final ordered pair in the original displayed equations.

Algebra 1

Solving Systems
by Elimination

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $(0, 0)$ Scale exactly one equation in $2x - 2y = 16$ and $4x - 5y = 39$ to create cancellation, then solve. Check the ordered pair in both originals. Your response: _____	Incoming: $(7, -2)$ Scale exactly one equation in $2x - 2y = 11$ and $4x - 7y = 16$ to create cancellation, then solve. Give the answer exactly and check it. Your response: _____
Incoming: $(-2, 0)$ Choose a nonzero multiplier for one row of $x + 3y = -2$ and $5x + 9y = 2$ and solve by elimination. Check the ordered pair in both originals. Your response: _____	Incoming: $(4, 2)$ Solve $3x + y = -10$ and $9x - 2y = -10$ by elimination; only one original equation needs to be multiplied. Check the ordered pair in both originals. Your response: _____
Incoming: $(1, -7)$ Solve the system $3x + y = -5$ and $-3x + 3y = 9$ by choosing addition or subtraction so a variable cancels immediately. Verify the result in both original equations. Your response: _____	Incoming: $(-2, -4)$ Use direct elimination to solve the system $4x + 2y = -24$ and $7x + 2y = -30$. Verify the result in both original equations. Your response: _____

Algebra 1

Solving Systems by Elimination

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

For the system $5x - 3y = -28$ and $9x + 3y = -42$, explain whether addition or subtraction creates the cancellation, then solve. Verify the result in both original equations. First choose either adding the two equations or subtracting one from the other to cancel a variable immediately, without scaling. Explain your choice using the displayed coefficients, carry out the chosen operation, solve, and verify both original equations. You need not carry out the other operation.

Carry out the indicated elimination and interpret the constant statement without discarding the original constraint for $-5x + y = -1$ and $-10x + 2y = -2$ by forming $-2E1 + E2$. After carrying out the required combination, compare these two claims about the resulting constant statement: *A* says that it alone completely describes the solution set in the coordinate plane; *B* says that the solution set must satisfy both the collapsed statement and the retained original equation. Decide which reasoning is valid, explain the difference, and give the complete solution set. If the collapsed statement is false, explain why both descriptions produce an empty set.

Solving Systems by Elimination

Full Worked Solutions - excerpt

Worked example

Problem. Use direct elimination to solve the system $2x - y = 0$ and $2x = 0$. Verify the result in both original equations.

Answer. $(0, 0)$

Explanation and check.

Subtract the second equation from the first; this gives $-y = 0$. Solving that one-variable equation gives $y = 0$. Substitution into $2x - y = 0$ gives the remaining coordinate, so the solution is $(0, 0)$. Both original equations are true at that pair.

Worked example

Problem. Find efficient multipliers for both equations and solve by elimination for $2x - y = -4$ and $3x - 4y = -6$.

Answer. $(-2, 0)$

Explanation and check.

Form $3E1 - 2E2$; this gives $5y = 0$. Solving that one-variable equation gives $y = 0$. Substitution into $2x - y = -4$ gives the remaining coordinate, so the solution is $(-2, 0)$. Both original equations are true at that pair.

Algebra 1

Choosing a Method for Linear Systems

Choosing a Method for Linear Systems | A1-U06-P05

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for route verdict and complete corrected solution set, method, decisive feature, and first step, casewise route decision and validity reason, more efficient route and structural reason, linked entries and reversibility justification and exact witness and information-loss explanation.

8 PDFs and a README; 64 buyer pages.

Algebra 1

Choosing a Method for Linear Systems

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

For the original system $2x - 2y = -14$ and $-x + 2y = 11$, a student proposes to discard both originals and keep only their sum, $x = -3$. Disprove equivalence with an exact point and state whether the transformation enlarges or excludes part of the solution set. 	The original system is $E1: 3x + 2y = -10$ and $E2: 2x + 3y = -15$. A new system is formed by the reversible operation: replace $E1$ with $-3E1$ while retaining $E2$. Prove that the complete solution sets are equal in both directions; explicitly use the retained information or inverse operation.
Two valid routes are proposed for $2x - y = -9$ and $2x + y = -15$. Route A isolates x from $2x - y = -9$, introducing division by 2, and substitutes. Route B subtracts the equations immediately, canceling $2x$. The requested answer is exact. Which route is more efficient, and why? Judge the algebraic cost and exactness rather than the number of written lines alone. 	For the original system $3x - y = 8$ and $2x + 3y = -24$, a student proposes to discard both originals and keep only their sum, $5x + 2y = -16$. Disprove equivalence with an exact point and state whether the transformation enlarges or excludes part of the solution set.
Two valid routes are proposed for $3x + y = -7$ and $3x + 4y = -1$. Route A isolates x from $3x + y = -7$, introducing division by 3, and substitutes. Route B subtracts the equations immediately, canceling $3x$. The requested answer is exact. Which route is more efficient, and why? Judge the algebraic cost and exactness rather than the number of written lines alone. 	Two valid routes are proposed for $4x + 3y = 21$ and $4x + 4y = 28$. Route A isolates x from $4x + 3y = 21$, introducing division by 4, and substitutes. Route B subtracts the equations immediately, canceling $4x$. The requested answer is exact. Which route is more efficient, and why? Judge the algebraic cost and exactness rather than the number of written lines alone.

Algebra 1

Choosing a Method for Linear Systems

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: elimination: $(4x + 3y) - (4x + 4y) = (36) - (40)$ For $5x - y = -22$ and $-5x + y = 22$, choose substitution or elimination as the more economical exact route. Cite the decisive coefficient relation and state the first operation without finishing the solve. For the response cell, record the method and its first action; for an algebraic action show the equation before simplifying, and use $E1$ minus $E2$ if subtracting. Complete and justify every part of the original task; do not carry out a full solve when the original task forbids it. Your response: _____	Incoming: elimination: $(4x + y) - (4x + 3y) = (19) - (33)$ For $5x - 3y = 45$ and $-5x = -30$, choose substitution or elimination as the more economical exact route. Cite the decisive coefficient relation and state the first operation without finishing the solve. For the response cell, record the method and its first action; for an algebraic action show the equation before simplifying, and use $E1$ minus $E2$ if subtracting. Complete and justify every part of the original task; do not carry out a full solve when the original task forbids it. Your response: _____
Incoming: $k = 2$, y-coefficient 0, constant -66. Start with $E1$: $2x + 2y = -8$ and $E2$: $3x + 3y = -12$. Complete this proposed equivalent transformation: retain $E1$ and complete $kE1 + E2$ so its x-coefficient is 1; report k, the y-coefficient, and the constant. Determine every linked entry or prove incompatibility, and explain why retaining $E1$ matters. For the response cell, record all requested missing entries, or the incompatibility conclusion. Complete and justify every part of the original task; do not carry out a full solve when the original task forbids it. Your response: _____	Incoming: $k = 3$, y-coefficient 5, constant -26. Start with $E1$: $3x + 3y = 12$ and $E2$: $3x + 3y = 12$. Complete this proposed equivalent transformation: retain $E1$ and complete $kE1 + E2$ so its x-coefficient is 6; report k, the y-coefficient, and the constant. Determine every linked entry or prove incompatibility, and explain why retaining $E1$ matters. For the response cell, record all requested missing entries, or the incompatibility conclusion. Complete and justify every part of the original task; do not carry out a full solve when the original task forbids it. Your response: _____
Incoming: The missing constant is -15. For $4x - 2y = -26$ and $4x + y = -23$, choose substitution or elimination as the more economical exact route. Cite the decisive coefficient relation and state the first operation without finishing the solve. For the response cell, record the method and its first action; for an algebraic action show the equation before simplifying, and use $E1$ minus $E2$ if subtracting. Complete and justify every part of the original task; do not carry out a full solve when the original task forbids it. Your response: _____	Incoming: elimination: $(4x - 2y) - (4x + y) = (-26) - (-23)$ For $2x - 3y = 18$ and $2x - y = 6$, choose substitution or elimination as the more economical exact route. Cite the decisive coefficient relation and state the first operation without finishing the solve. For the response cell, record the method and its first action; for an algebraic action show the equation before simplifying, and use $E1$ minus $E2$ if subtracting. Complete and justify every part of the original task; do not carry out a full solve when the original task forbids it. Your response: _____

Algebra 1Choosing a Method
for Linear Systems

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Two valid routes are proposed for $2x - 2y = 6$ and $2x - y = 0$. Route A isolates x from $2x - 2y = 6$, introducing division by 2, and substitutes. Route B subtracts the equations immediately, canceling $2x$. The requested answer is exact. Which route is more efficient, and why? Judge the algebraic cost and exactness rather than the number of written lines alone.

Two valid routes are proposed for $3x + 2y = -2$ and $3x + 4y = -4$. Route A isolates x from $3x + 2y = -2$, introducing division by 3, and substitutes. Route B subtracts the equations immediately, canceling $3x$. The requested answer is exact. Which route is more efficient, and why? Judge the algebraic cost and exactness rather than the number of written lines alone.

Audit this claim for $2x - 2y = 0$ and $-x + 2y = -3$: The student changes only the constant in $E1$ by 1, continues, and reports $(-3, -3)$. Check the final set against both originals and separately judge whether every transformation is set-preserving. Repair the argument.

Two valid routes are proposed for $4x + 2y = 20$ and $4x + 5y = 32$. Route A isolates x from $4x + 2y = 20$, introducing division by 4, and substitutes. Route B subtracts the equations immediately, canceling $4x$. The requested answer is exact. Which route is more efficient, and why? Judge the algebraic cost and exactness rather than the number of written lines alone.

Choosing a Method for Linear Systems

Full Worked Solutions - excerpt

Worked example

Problem. Two valid routes are proposed for $2x - 2y = 6$ and $2x - y = 0$. Route A isolates x from $2x - 2y = 6$, introducing division by 2, and substitutes. Route B subtracts the equations immediately, canceling $2x$. The requested answer is exact. Which route is more efficient, and why? Judge the algebraic cost and exactness rather than the number of written lines alone.

Answer. Route B is more efficient because it avoids early fractions and uses the ready equal x -coefficients.

Explanation and check.

For $2x - 2y = 6$ and $2x - y = 0$, both routes preserve the system, but Route B is preferable because it avoids early fractions and uses the ready equal x -coefficients. Direct checking confirms that both valid routes lead to $(-3, -6)$.

Worked example

Problem. Two valid routes are proposed for $2x - y = -9$ and $2x + y = -15$. Route A isolates x from $2x - y = -9$, introducing division by 2, and substitutes. Route B subtracts the equations immediately, canceling $2x$. The requested answer is exact. Which route is more efficient, and why? Judge the algebraic cost and exactness rather than the number of written lines alone.

Answer. Route B is more efficient because it avoids early fractions and uses the ready equal x -coefficients.

Explanation and check.

For $2x - y = -9$ and $2x + y = -15$, both routes preserve the system, but Route B is preferable because it avoids early fractions and uses the ready equal x -coefficients. Direct checking confirms that both valid routes lead to $(-6, -3)$.

Algebra 1
Systems of Equations Word Problems

Systems of Equations Word Problems | A1-U06-P06

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for algebraic check, contextual verdict, and rounding analysis, equations, rates or insufficiency, and verification, balance equations, source amounts, and feasibility, equations, quantities or insufficiency, and admissibility, semantic error, corrected variables/equations, and verification and exact shared input/output or no crossing, with domain assessment.

8 PDFs and a README; 74 buyer pages.

Algebra 1

Systems of Equations
Word Problems

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

A record shows 12 total adult tickets and student tickets. Each adult ticket contributes 3 dollars, and each student ticket contributes 5 dollars; the combined contribution is 56 dollars. Define x and y with units, write the two equality constraints, determine the quantities if possible, and assess whether the result is admissible. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

Bank label: _____

Unknown component contributions x and y are constant across measurements. Measurement 1 has X -multiplicity 1 and Y -multiplicity 2 for total 19; Measurement 2 has multiplicities 2 and 2 for total 26. Build the weighted-sum system from the table, determine x and y if identifiable, and check every measured total. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

measurement	X multiplicity	Y multiplicity	measured total
1	1	2	19
2	2	2	26

Bank label: _____

A record shows 21 total standard tasks and bonus tasks. Each standard task contributes 6 credits, and each bonus task contributes 11 credits; the combined contribution is 191 credits. Define x and y with units, write the two equality constraints, determine the quantities if possible, and assess whether the result is admissible. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

Bank label: _____

A technician must make 14 liters of a mixture with $\frac{485}{14}\%$ active ingredient using Source A at 15% and Source B at 40%. Let x and y be liters from A and B. Use the table data to write total-volume and active-component equations, solve exactly, and decide whether the mixture is physically feasible. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

source	concentration	amount liters	active liters
A	$\frac{3}{20}$	x	$\frac{3}{20}x$
B	$\frac{2}{5}$	y	$\frac{2}{5}y$
target	$\frac{97}{280}$	14	$\frac{97}{20}$

Bank label: _____

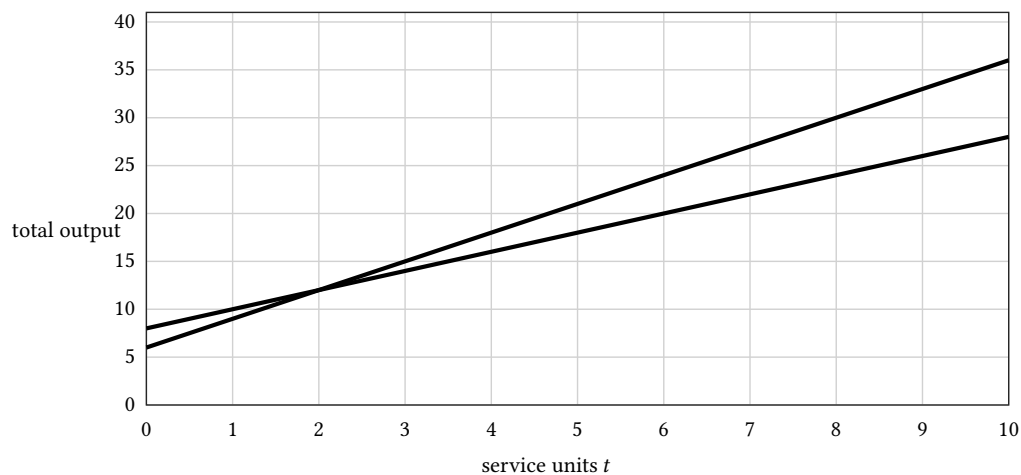
Algebra 1

Systems of Equations Word Problems

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Plan A has output $A(t) = 8 + 2t$ and Plan B has output $B(t) = 6 + 3t$, where t is a nonnegative number of service units. Build the equality model, determine any shared input and output exactly, and decide whether it is a meaningful break-even point. Use the exact graph rules and scale in the provided data.



Algebra 1

Systems of Equations
Word Problems

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $x = 14$ and $y = 16$; the pair is admissible as item counts.

Two drones leave the same marker in opposite directions at constant speeds x and y kilometers per hour. In Trial 1, drone X flies for 3 hours and drone Y for 6 hours, placing them 75 kilometers apart. In Trial 2, their flight times are 3 hours and 1 hour and their separation is 20 kilometers. Build the two rate-time equations from the table, determine both speeds, and verify both separations. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

observation	X hours	Y hours	separation km
1	3	6	75
2	3	1	20

Your response: _____

Incoming: $x = 8$ units/hour and $y = 1$ unit/hour.

A record shows 18 total small boxes and large boxes. Each small box contributes 5 kilograms, and each large box contributes 9 kilograms; the combined contribution is 138 kilograms. Define x and y with units, write the two equality constraints, determine the quantities if possible, and assess whether the result is admissible. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

Your response: _____

Incoming: $x = 4$ and $y = 12$; the pair is admissible as item counts.

Two constant production rates x and y are measured in units per hour. Observation 1 runs process X for 4 hours and process Y for 4 hours, producing 48 units total. Observation 2 uses 5 hours and 2 hours respectively and produces 48 units. Build the two rate-time equations from the table, determine both rates if the observations identify them, and verify against both totals. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

observation	X hours	Y hours	total units
1	4	4	48
2	5	2	48

Your response: _____

Incoming: $x = 9$ and $y = 5$; the result is admissible. It comes from $x + y = 14$ and $x - y = 4$.

Unknown component contributions x and y are constant across measurements. Measurement 1 has X -multiplicity 3 and Y -multiplicity 6 for total 24; Measurement 2 has multiplicities 3 and 4 for total 18. Build the weighted-sum system from the table, determine x and y if identifiable, and check every measured total. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

measurement	X multiplicity	Y multiplicity	measured total
1	3	6	24
2	3	4	18

Your response: _____

Algebra 1

Systems of Equations Word Problems

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A model uses x and y under this domain requirement: nonnegative whole-number item counts. The stored equations are $x + y = 10$ and $2x + 3y = \frac{57}{2}$, and an algebraic solver reports $(\frac{3}{2}, \frac{17}{2})$. Assess the pair in context, explain whether rounding is allowed, and verify the original equalities. Compare algebraic validity with contextual admissibility, and justify the rounding conclusion using the actual equalities and stated domain.

Context: x and y count two item types; there are 22 items total, valued at 3 and 5 credits each, with combined value 92 credits. A student proposes $3x + 5y = 22$ and $3x + 5y = 92$. Identify the first semantic mismatch before solving, state the corrected two-equation model with variable units, and verify that the repaired model represents the context.

Context: x and y count two item types; there are 6 items total, valued at 4 and 6 credits each, with combined value 34 credits. A student proposes $4x + 6y = 6$ and $4x + 6y = 34$. Identify the first semantic mismatch before solving, state the corrected two-equation model with variable units, and verify that the repaired model represents the context.

One measurement of two unknown per-unit contributions gives $2x + 4y = 54$. A second measurement must use nonnegative integer multiplicities and be compatible with the same contributions. Compare candidates A: $4x + 8y = 108$, B: $2x + 4y = 56$, and C: $5x + 4y = 63$. Select the observation that uniquely identifies x and y , and explain why the other two fail without using a determinant formula.

Systems of Equations Word Problems

Full Worked Solutions - excerpt

Worked example

Problem. For two account balances in dollars, the conditions are: x is 6 more than y , and the stated total condition is $x + y = 18$ when x and y use the units named in context. Translate the comparison with the correct reference quantity, solve the two equality constraints, and assess whether both quantities are admissible.

Answer. $x = 12$ and $y = 6$; the result is admissible. It comes from $x + y = 18$ and $x - y = 6$.

Explanation and check.

The total condition is $x + y = 18$. The relationship ' x is 6 more than y ' becomes $x - y = 6$. Solving the two independent equations gives $x = 12$ and $y = 6$. Both quantities satisfy the stated relationship and domain.

Worked example

Problem. For two collections of items, the conditions are: x is 4 times as large as y , and the stated total condition is $x + y = 10$ when x and y use the units named in context. Translate the comparison with the correct reference quantity, solve the two equality constraints, and assess whether both quantities are admissible.

Answer. $x = 8$ and $y = 2$; the result is admissible. It comes from $x + y = 10$ and $x - 4y = 0$.

Explanation and check.

The total condition is $x + y = 10$. The relationship ' x is 4 times as large as y ' becomes $x - 4y = 0$. Solving the two independent equations gives $x = 8$ and $y = 2$. Both quantities satisfy the stated relationship and domain.

Algebra 1
Graphing Linear Inequalities and Systems

Graphing Linear Inequalities and Systems | A1-U06-COMB-P07-P08

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for exact boundary, membership or shading decision, and justification and system, common feasible region, and exact justification.
8 PDFs and a README; 186 buyer pages.

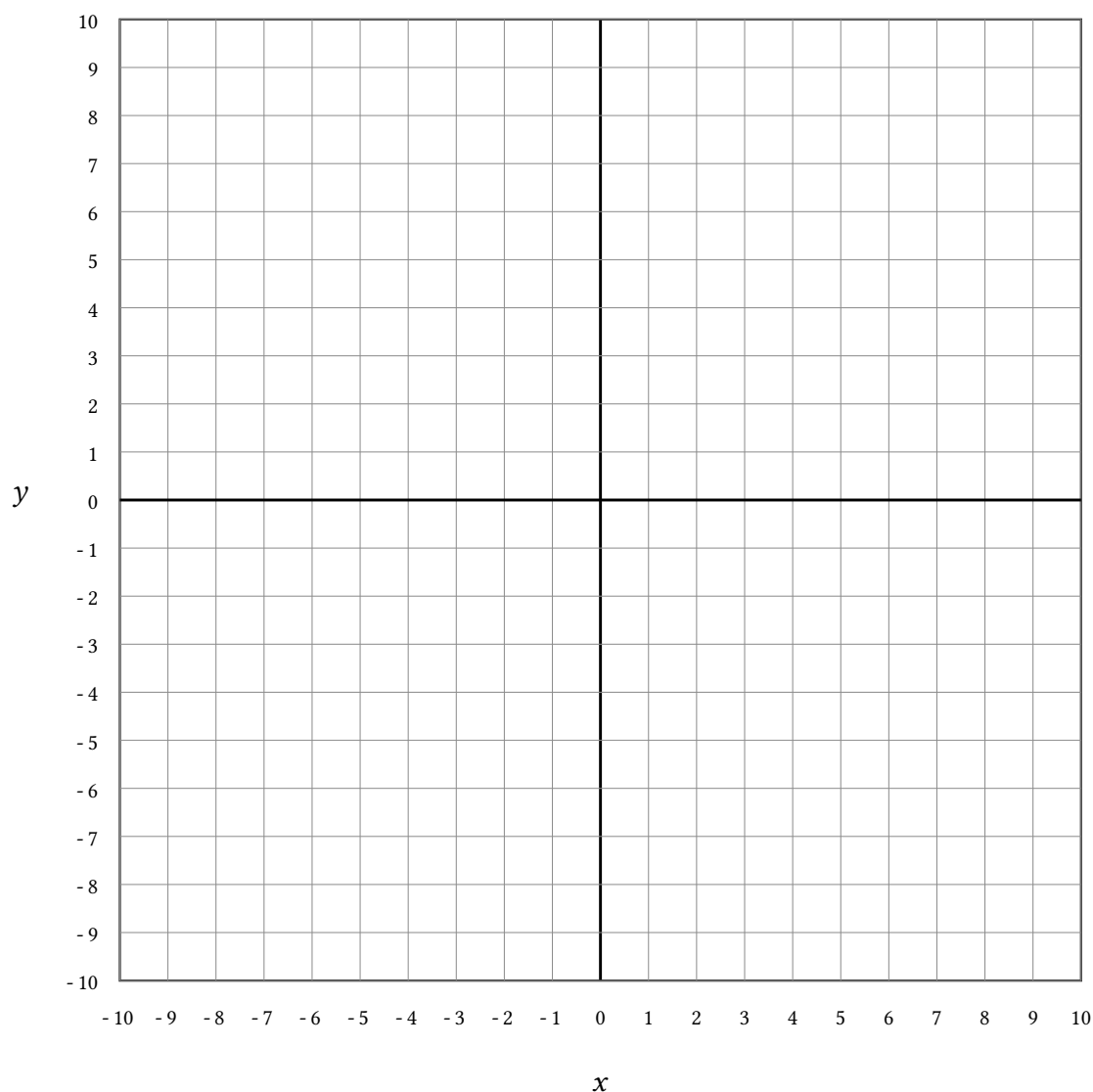
Algebra 1

Graphing Linear Inequalities and Systems

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Graph $x - 2y \leq -4$ as one half-plane. Rearrange only as helpful, explicitly track any relation reversal, then give the exact boundary, edge style, and shaded side shown by a decisive off-line test point. For the response cell, record the exact boundary, solid or dashed edge, and shaded side. Still draw or interpret the full required graph and justify every requested part.



Algebra 1

Graphing Linear Inequalities and Systems

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

For the single inequality $x + y \leq -5$, test points $P = (-2, -3)$, $Q = (-3, -4)$, and $R = (-1, -2)$. Complete the substitution table, list every included point, and distinguish boundary equality from interior membership.

Point	x	y	Exact substitutions	Membership / boundary / domain
P	-2	-3	_____	_____
Q	-3	-4	_____	_____
R	-1	-2	_____	_____

For the single inequality $2x + 3y \leq -1$, test points $P = (-2, 1)$, $Q = (-4, -2)$, and $R = (0, 4)$. Complete the substitution table, list every included point, and distinguish boundary equality from interior membership.

Point	x	y	Exact substitutions	Membership / boundary / domain
P	-2	1	_____	_____
Q	-4	-2	_____	_____
R	0	4	_____	_____

For the single inequality $3x + y \leq -4$, test points $P = (-2, 2)$, $Q = (-5, 1)$, and $R = (1, 3)$. Complete the substitution table, list every included point, and distinguish boundary equality from interior membership.

Point	x	y	Exact substitutions	Membership / boundary / domain
P	-2	2	_____	_____
Q	-5	1	_____	_____
R	1	3	_____	_____

For the single inequality $x + 3y < 6$, test points $P = (-2, \frac{8}{3})$, $Q = (-3, -\frac{1}{3})$, and $R = (-1, \frac{17}{3})$. Complete the substitution table, list every included point, and distinguish boundary equality from interior membership.

Point	x	y	Exact substitutions	Membership / boundary / domain
P	-2	$\frac{8}{3}$	_____	_____
Q	-3	$-\frac{1}{3}$	_____	_____
R	-1	$\frac{17}{3}$	_____	_____

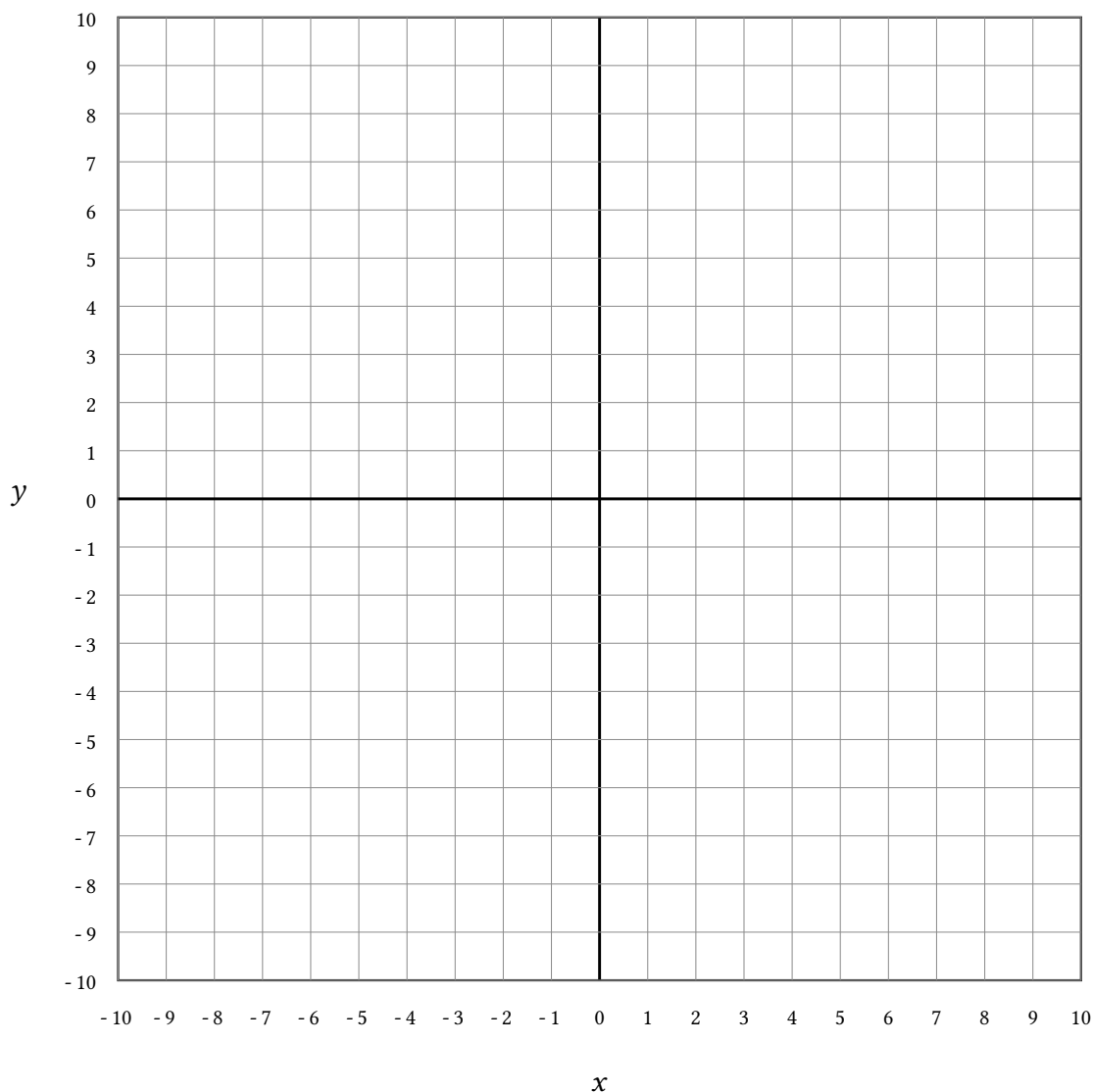
Algebra 1

Graphing Linear Inequalities and Systems

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Graph $2x - 3y \geq -11$ as one half-plane. Rearrange only as helpful, explicitly track any relation reversal, then give the exact boundary, edge style, and shaded side shown by a decisive off-line test point. For the response cell, record the exact boundary, solid or dashed edge, and shaded side. Still draw or interpret the full required graph and justify every requested part.



Algebra 1

Graphing Linear Inequalities and Systems

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

For $x + y \leq 0$, candidates A , B , and C are listed in the provided graph data. Select a decisive test point for the shading direction, or explain why none is decisive and supply one. A point on the boundary is not an acceptable side test.

Candidate	x	y
A	0	0
B	1	0
C	1	-1

For $3x + y \leq 5$, candidates A , B , and C are listed in the graph payload. Select a decisive test point for the shading direction, or explain why none is decisive and supply one. A point on the boundary is not an acceptable side test.

Candidate	x	y
A	$\frac{5}{3}$	0
B	0	0
C	0	5

Graphing Linear Inequalities and Systems

Full Worked Solutions - excerpt

Worked example

Problem. Classify the full solution set of $x \geq -1$; $x \leq 2$ as bounded, unbounded, empty, a line, or a single point. Prove the classification from the inequalities rather than from the visible graph window.

Answer. For $x \geq -1$; $x \leq 2$, the feasible region is an unbounded strip: x is bounded but y is unrestricted in both directions.

Explanation and check.

For $x \geq -1$; $x \leq 2$, read the parallel and enclosing bounds globally. Here, x is bounded but y is unrestricted in both directions. A witness is $(0, 0)$, which satisfies every constraint. This conclusion does not depend on the plotted window.

Worked example

Problem. Classify the full solution set of $x \geq -1$; $x \leq -1$ as bounded, unbounded, empty, a line, or a single point. Prove the classification from the inequalities rather than from the visible graph window.

Answer. For $x \geq -1$; $x \leq -1$, the feasible region is a line: both inclusive bounds force x to one value while y remains free.

Explanation and check.

For $x \geq -1$; $x \leq -1$, read the parallel and enclosing bounds globally. Here, both inclusive bounds force x to one value while y remains free. A witness is $(-1, 0)$, which satisfies every constraint. This conclusion does not depend on the plotted window.

Algebra 1
Product of Powers

Product of Powers | A1-U07-P01
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for exact expression or conclusion with exponent-rule justification.
8 PDFs and a README; 54 buyer pages.

Algebra 1

Product of Powers

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Treat the equation as a formal power identity in the displayed base y. Assume n must be a positive integer. Solve $y^6 y^n = y^8$ for n, or explain why no admissible value exists. Use the requested final expression or admissible exponent as the matching response; also complete the original justification. _____ Bank label: _____	The fixed numerical base (-2) has absolute value greater than 1. Assume n must be a positive integer. Solve $(-2)^7 (-2)^n = (-2)^{10}$ for n, or explain why no admissible value exists. Use the requested final expression or admissible exponent as the matching response; also complete the original justification. _____ Bank label: _____
The fixed numerical base 2 has absolute value greater than 1. Assume n must be a positive integer. Solve $2^n \cdot 2^n \cdot 2^3 = 2^{11}$ for n, or explain why no admissible value exists. Use the requested final expression or admissible exponent as the matching response; also complete the original justification. _____ Bank label: _____	The fixed numerical base 7 has absolute value greater than 1. Assume n must be a positive integer. Solve $7^n \cdot 7^n \cdot 7^n \cdot 7^4 = 7^{19}$ for n, or explain why no admissible value exists. Use the requested final expression or admissible exponent as the matching response; also complete the original justification. _____ Bank label: _____
Treat the equation as a formal power identity in the displayed base m. Assume n must be a positive integer. Solve $m^n m^n m^5 = m^{17}$ for n, or explain why no admissible value exists. Use the requested final expression or admissible exponent as the matching response; also complete the original justification. _____ Bank label: _____	The fixed numerical base 3 has absolute value greater than 1. Assume n must be a positive integer. Solve $3^n \cdot 3^n \cdot 3^3 = 3^8$ for n, or explain why no admissible value exists. Use the requested final expression or admissible exponent as the matching response; also complete the original justification. _____ Bank label: _____
Rewrite $(x + 1)^2 (x + 1)^3$ as one power. Identify the common base and justify the exponent in the result by counting repeated factors. Use the requested final expression or admissible exponent as the matching response; also complete the original justification. _____ Bank label: _____	Rewrite $(y - 2)^3 (y - 2)^3$ as one power. Identify the common base and justify the exponent in the result by counting repeated factors. Use the requested final expression or admissible exponent as the matching response; also complete the original justification. _____ Bank label: _____

Algebra 1

Product of Powers

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $w^3w^6 = w^9$. Simplify $x^5y^3x^2$ by combining only powers whose bases are identical. State which factors must remain in separate base groups. Use the requested final expression or admissible exponent as the matching response; also complete the original justification. Your response: _____	Incoming: $p^5q^4p^2 = p^7q^4$. Rewrite x^2x^4 as one power. Identify the common base and justify the exponent in the result by counting repeated factors. Use the requested final expression or admissible exponent as the matching response; also complete the original justification. Your response: _____
Incoming: $p^5p^4 = p^9$. Rewrite q^2q^5 as one power. Identify the common base and justify the exponent in the result by counting repeated factors. Use the requested final expression or admissible exponent as the matching response; also complete the original justification. Your response: _____	Incoming: $r^3r^5 = r^8$. Rewrite u^5u^5 as one power. Identify the common base and justify the exponent in the result by counting repeated factors. Use the requested final expression or admissible exponent as the matching response; also complete the original justification. Your response: _____
Incoming: $x^5y^3x^2 = x^7y^3$. Rewrite $(-2)^4(-2)^6$ as one power. Identify the common base and justify the exponent in the result by counting repeated factors. Use the requested final expression or admissible exponent as the matching response; also complete the original justification. Your response: _____	Incoming: $v^2v^6 = v^8$. Rewrite w^3w^6 as one power. Identify the common base and justify the exponent in the result by counting repeated factors. Use the requested final expression or admissible exponent as the matching response; also complete the original justification. Your response: _____

Algebra 1

Product of Powers

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A first group contains 2 copies of the base 4, and a second group contains 3 more copies of that identical base. Without evaluating the base, explain why multiplying the groups gives 4^5 . Compare two proposed explanations: concatenate the two factor lists and add their lengths, or multiply the two list lengths. Which gives a valid general justification? Explain using the original groups; do not evaluate the base.

Audit the claim $x^3x^5 = x^8$. Decide whether it is valid under the product rule. If it is invalid, identify the first structural error and give a repair or a numerical counterexample. A learner justifies this by saying: "Any two powers can be combined by adding their exponents, even when their bases differ." Evaluate the equality and this justification separately. Identify and repair the missing condition in the justification.

A first group contains 3 copies of the base x , and a second group contains 4 more copies of that identical base. Without evaluating the base, explain why multiplying the groups gives x^7 . Compare two proposed explanations: concatenate the two factor lists and add their lengths, or multiply the two list lengths. Which gives a valid general justification? Explain using the original groups; do not evaluate the base.

Audit the claim $y^3y^4 = y^{12}$. Decide whether it is valid under the product rule. If it is invalid, identify the first structural error and give a repair or a numerical counterexample.

Product of Powers

Full Worked Solutions - excerpt

Worked example

Problem. Audit the claim $a^2b^5 = a^7$. Decide whether it is valid under the product rule. If it is invalid, identify the first structural error and give a repair or a numerical counterexample.

Answer. The claim is invalid: the bases a and b are not identical; the product stays a^2b^5 .

Explanation and check.

First check the operation and the exact bases before touching exponents. The bases a and b are not identical; the product stays a^2b^5 . At $a = 2$ and $b = 3$, the claimed sides are 972 and 128.

Worked example

Problem. Audit the claim $t^2 + t^3 = t^5$. Decide whether it is valid under the product rule. If it is invalid, identify the first structural error and give a repair or a numerical counterexample.

Answer. The claim is invalid: the product rule does not apply across addition.

Explanation and check.

First check the operation and the exact bases before touching exponents. The product rule does not apply across addition. At $t = 2$, the sides are 12 and 32.

Algebra 1
Quotient of Powers

Quotient of Powers | A1-U07-P02
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for simplified expression, retained restriction, and exact justification.
8 PDFs and a README; 63 buyer pages.

Algebra 1

Quotient of Powers

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Assume $x \neq 0$. Simplify $\frac{x^2}{x^1}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____	Assume $y \neq 0$. Simplify $\frac{y^3}{y^2}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____
Assume $t \neq 0$. Simplify $\frac{t^4}{t^3}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____	Assume $a \neq 0$. Simplify $\frac{a^5}{a^4}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____
Assume $x \neq 2$. Simplify $\frac{(x-2)^7}{(x-2)^5}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____	Assume $y \neq -3$. Simplify $\frac{(y+3)^8}{(y+3)^6}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____
Assume $t \neq 2$. Simplify $\frac{(2t-4)^5}{(2t-4)^1}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____	Assume $p \neq -2$. Simplify $\frac{(3p+6)^4}{(3p+6)^2}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____

Algebra 1

Quotient of Powers

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

The factor diagram has numerator labels $N1:x$, $N2:x$, $N3:x$ and denominator labels $D1:x$, $D2:x$. Use the diagram to match every denominator factor with one numerator factor. State the remaining factor count and the nonzero-base condition.

Numerator

N1 x	N2 x	N3 x
-----------	-----------	-----------

Denominator

D1 x	D2 x
-----------	-----------

The factor diagram has numerator labels $N1:(x-2)$, $N2:(x-2)$, $N3:(x-2)$, $N4:(x-2)$, $N5:(x-2)$ and denominator labels $D1:(x-2)$, $D2:(x-2)$, $D3:(x-2)$. Use the diagram to match every denominator factor with one numerator factor. State the remaining factor count and the nonzero-base condition.

Numerator

N1 $(x-2)$	N2 $(x-2)$	N3 $(x-2)$	N4 $(x-2)$
N5 $(x-2)$			

Denominator

D1 $(x-2)$	D2 $(x-2)$	D3 $(x-2)$
---------------	---------------	---------------

The factor diagram has numerator labels $N1:2$, $N2:2$, $N3:2$, $N4:2$, $N5:2$, $N6:2$, $N7:2$ and denominator labels $D1:2$, $D2:2$, $D3:2$, $D4:2$. Use the diagram to match every denominator factor with one numerator factor. State the remaining factor count and the nonzero-base condition.

Numerator

N1 2	N2 2	N3 2	N4 2	N5 2	N6 2
N7 2					

Denominator

D1 2	D2 2	D3 2	D4 2
---------	---------	---------	---------

The factor diagram has numerator labels $N1:(y+3)$, $N2:(y+3)$, $N3:(y+3)$, $N4:(y+3)$, $N5:(y+3)$, $N6:(y+3)$ and denominator labels $D1:(y+3)$, $D2:(y+3)$. Use the diagram to match every denominator factor with one numerator factor. State the remaining factor count and the nonzero-base condition.

Numerator

N1 $(y+3)$	N2 $(y+3)$	N3 $(y+3)$	N4 $(y+3)$
N5 $(y+3)$	N6 $(y+3)$		

Denominator

D1 $(y+3)$	D2 $(y+3)$
---------------	---------------

Algebra 1

Quotient of Powers

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $\frac{a^8(3p+6)^9}{a^5(3p+6)^5} = a^3(3p+6)^4$; original denominator conditions: $a \neq 0$ and $p \neq -2$. Assume $p \neq -2$. Simplify $\frac{(3p+6)^{12}}{(3p+6)^6}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. Your response: _____	Incoming: $\frac{(r+1)^8}{(r+1)^4} = (r+1)^4$; original condition: $r \neq -1$. Simplify $\frac{(x-2)^5 \cdot 5^2(y+3)^6}{(x-2)^4(y+3)^3}$. Cancel and subtract exponents separately for each exact base, preserve any unmatched numerator factor, and list every restriction inherited from the original denominator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. Your response: _____
Incoming: $\frac{t^6a^5}{t^3a^2} = t^3a^3$; original denominator conditions: $t \neq 0$ and $a \neq 0$. Assume $r \neq -1$. Simplify $\frac{(r+1)^8}{(r+1)^4}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. Your response: _____	Incoming: $\frac{m^9(r+1)^9}{m^4(r+1)^5} = m^5(r+1)^4$; original denominator conditions: $m \neq 0$ and $r \neq -1$. Simplify $\frac{(y+3)^6a^6n^6}{(y+3)^1n^2}$. Cancel and subtract exponents separately for each exact base, preserve any unmatched numerator factor, and list every restriction inherited from the original denominator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. Your response: _____
Incoming: $\frac{(3p+6)^{12}}{(3p+6)^6} = (3p+6)^6$; original condition: $p \neq -2$. Simplify $\frac{m^2(r+1)^9}{m^4(r+1)^5}$. Cancel and subtract exponents separately for each exact base, preserve any unmatched numerator factor, and list every restriction inherited from the original denominator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. Your response: _____	Incoming: $\frac{a^7}{a^2} = a^5$; original condition: $a \neq 0$. Simplify $\frac{2^8 \cdot 3^7}{2^4 \cdot 3^4}$. Cancel and subtract exponents separately for each exact base, preserve any unmatched numerator factor, and list every restriction inherited from the original denominator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. Your response: _____

Algebra 1

Quotient of Powers

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Simplify $\frac{x^2t^2y^3}{x^1y^2}$. Preserve any unmatched numerator factor and list every restriction inherited from the original denominator. Choose between matching numerator and denominator factors by identical whole base, or matching factors merely because their exponents agree. Justify which strategy applies to this quotient, then use it to complete the original simplification and domain requirements.

Simplify $\frac{t^3a^3}{t^2a^2}$. Preserve any unmatched numerator factor and list every restriction inherited from the original denominator. Choose between matching numerator and denominator factors by identical whole base, or matching factors merely because their exponents agree. Justify which strategy applies to this quotient, then use it to complete the original simplification and domain requirements.

Simplify $\frac{(x-2)^4(y+3)^3}{(x-2)^3(y+3)^2}$. Preserve any unmatched numerator factor and list every restriction inherited from the original denominator. Choose between matching numerator and denominator factors by identical whole base, or matching factors merely because their exponents agree. Justify which strategy applies to this quotient, then use it to complete the original simplification and domain requirements.

Simplify $\frac{(2t-4)^5a^5m^4}{(2t-4)^4m^3}$. Preserve any unmatched numerator factor and list every restriction inherited from the original denominator. Choose between matching numerator and denominator factors by identical whole base, or matching factors merely because their exponents agree. Justify which strategy applies to this quotient, then use it to complete the original simplification and domain requirements.

Quotient of Powers

Full Worked Solutions - excerpt

Worked example

Problem. Audit the worked simplification: $\frac{3^8}{3^3} = 3^{11}$. Identify the first quotient-rule or domain error, repair it, and use the supplied structure or a counterexample to justify the verdict.

Answer. The work is invalid: a quotient subtracts exponent counts: the repair is 3^5 .

Explanation and check.

Check exact base equality, then subtract denominator exponent from numerator exponent, and finally retain every original denominator exclusion. A quotient subtracts exponent counts: the repair is 3^5 . The numerator has only five uncanceled copies.

Worked example

Problem. Audit the worked simplification: $\frac{(x-1)^7}{(x-1)^3} = (x-1)^4$ for every real x . Identify the first quotient-rule or domain error, repair it, and use the supplied structure or a counterexample to justify the verdict.

Answer. The work is invalid: the power is correct, but the domain must keep $x \neq 1$.

Explanation and check.

Check exact base equality, then subtract denominator exponent from numerator exponent, and finally retain every original denominator exclusion. The power is correct, but the domain must keep $x \neq 1$. At $x = 1$, the original denominator is zero.

Algebra 1
Zero Exponents

Zero Exponents | A1-U07-P04
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for exact value, condition, or boundary-aware conclusion with justification.
8 PDFs and a README; 50 buyer pages.

Algebra 1

Zero Exponents

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Evaluate $(4 - 11)^0$. First compute the expression that forms the base; then decide whether the zero power is defined. Use the complete requested value, domain, or coefficient conditions as the matching response and retain the original explanation and restrictions. _____ Bank label: _____	Evaluate $((3)(6) - 18)^0$ under the real-number zero-exponent convention used in this course. Explain the boundary case. Use the complete requested value, domain, or coefficient conditions as the matching response and retain the original explanation and restrictions. _____ Bank label: _____
Evaluate $-(-5)^0$. State which operations are outside the exponent's scope. Use the complete requested value, domain, or coefficient conditions as the matching response and retain the original explanation and restrictions. _____ Bank label: _____	Evaluate $3^0 + 11^0$. Replace only each defined zero-powered group by 1 and retain every operation outside that group. Use the complete requested value, domain, or coefficient conditions as the matching response and retain the original explanation and restrictions. _____ Bank label: _____
Evaluate $6^0 - (-4)^0$. Replace only each defined zero-powered group by 1 and retain every operation outside that group. Use the complete requested value, domain, or coefficient conditions as the matching response and retain the original explanation and restrictions. _____ Bank label: _____	Evaluate $\frac{8}{5^0}$. Replace only each defined zero-powered group by 1 and retain every operation outside that group. Use the complete requested value, domain, or coefficient conditions as the matching response and retain the original explanation and restrictions. _____ Bank label: _____
Evaluate $(2 \cdot 5)^0 + 3$. Replace only each defined zero-powered group by 1 and retain every operation outside that group. Use the complete requested value, domain, or coefficient conditions as the matching response and retain the original explanation and restrictions. _____ Bank label: _____	Find the exact real domain of $((2x + 3)(x - 4))^0$. Account for every way the complete base can be zero or undefined. Use the complete requested value, domain, or coefficient conditions as the matching response and retain the original explanation and restrictions. _____ Bank label: _____

Algebra 1

Zero Exponents

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Evaluate $((-3)^2 + 1)^0$. First compute the expression that forms the base; then decide whether the zero power is defined. _____ _____	Evaluate $((\frac{14}{7}) - 5)^0$. First compute the expression that forms the base; then decide whether the zero power is defined. _____ _____
Evaluate $2^0 \cdot 9^0$. Replace only each defined zero-powered group by 1 and retain every operation outside that group. _____ _____	Evaluate $4(6^0 + 10^0)$. Replace only each defined zero-powered group by 1 and retain every operation outside that group. _____ _____
Evaluate $2(3 + 4)^0$. Replace only each defined zero-powered group by 1 and retain every operation outside that group. _____ _____	Evaluate $3 - 2(-7)^0$. Replace only each defined zero-powered group by 1 and retain every operation outside that group. _____ _____

Algebra 1

Zero Exponents

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: undefined For which real x is $(x - 3)^0$ defined? Give the restriction before simplifying the power. Use the complete requested value, domain, or coefficient conditions as the matching response and retain the original explanation and restrictions. Your response: _____	Incoming: $-\frac{1}{2}$ Determine whether $0(4 - 4)^0$ is defined. Do not let an outside factor or operation hide a zero base. Use the complete requested value, domain, or coefficient conditions as the matching response and retain the original explanation and restrictions. Your response: _____
Incoming: -1 Evaluate $4 \cdot 3^0$. State which operations are outside the exponent's scope. Use the complete requested value, domain, or coefficient conditions as the matching response and retain the original explanation and restrictions. Your response: _____	Incoming: 5 Evaluate $\frac{3^0}{7}$. Replace only each defined zero-powered group by 1 and retain every operation outside that group. Use the complete requested value, domain, or coefficient conditions as the matching response and retain the original explanation and restrictions. Your response: _____
START Evaluate $((2^3) - 3)^0$. First compute the expression that forms the base; then decide whether the zero power is defined. Use the complete requested value, domain, or coefficient conditions as the matching response and retain the original explanation and restrictions. Your response: _____	Incoming: all real x except $x = 7$ Find the exact real domain of $((x - 2)(x + 5))^0$. Account for every way the complete base can be zero or undefined. Use the complete requested value, domain, or coefficient conditions as the matching response and retain the original explanation and restrictions. Your response: _____

Algebra 1

Zero Exponents

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Evaluate 2^0 . Identify the entire base before applying the zero-exponent rule. Choose a justified first step: apply the nonzero-base rule directly if its condition is already established, or first evaluate/check the entire base to establish whether the rule applies. Explain your choice for this expression, then give its value or explain why it is undefined.

Evaluate $(-2)^0$. Identify the entire base before applying the zero-exponent rule. Choose a justified first step: apply the nonzero-base rule directly if its condition is already established, or first evaluate/check the entire base to establish whether the rule applies. Explain your choice for this expression, then give its value or explain why it is undefined.

Evaluate $(\frac{1}{2})^0$. Identify the entire base before applying the zero-exponent rule. Choose a justified first step: apply the nonzero-base rule directly if its condition is already established, or first evaluate/check the entire base to establish whether the rule applies. Explain your choice for this expression, then give its value or explain why it is undefined.

Evaluate $(-\frac{3}{4})^0$. Identify the entire base before applying the zero-exponent rule. Choose a justified first step: apply the nonzero-base rule directly if its condition is already established, or first evaluate/check the entire base to establish whether the rule applies. Explain your choice for this expression, then give its value or explain why it is undefined.

Zero Exponents

Full Worked Solutions - excerpt

Worked example

Problem. Determine whether $5 + 0(9 - 9)^0$ is defined. Do not let an outside factor or operation hide a zero base.

Answer. undefined

Explanation and check.

The powered base is zero, so the product term is undefined before the outside zero can act; hence the whole sum is undefined.

Worked example

Problem. Determine whether $-2((3 \cdot 3 - 9)^0) + 7$ is defined. Do not let an outside factor or operation hide a zero base.

Answer. undefined

Explanation and check.

The grouped base $3 \cdot 3 - 9$ equals zero. External multiplication and addition cannot make that zero power defined.

Algebra 1
Negative Exponents

Negative Exponents | A1-U07-P05
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
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08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for exact positive-exponent form, integer exponent, ordering, or domain-aware correction.
8 PDFs and a README; 52 buyer pages.

Algebra 1

Negative Exponents

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Rewrite $(-3)^{-2}$ using a positive exponent, then give its exact value. Invert the complete base rather than changing its sign. Use the requested exact positive-exponent expression/value as the matching response, complete the original explanation, and retain every stated nonzero assumption. _____ Bank label: _____	Rewrite x^{-2} using only positive exponents and state the original real-domain condition. Use the requested exact positive-exponent expression/value as the matching response, complete the original explanation, and retain every stated nonzero assumption. _____ Bank label: _____
Rewrite y^{-5} using only positive exponents and state the original real-domain condition. Use the requested exact positive-exponent expression/value as the matching response, complete the original explanation, and retain every stated nonzero assumption. _____ Bank label: _____	Rewrite $(-m)^{-3}$ using only positive exponents and state the original real-domain condition. Use the requested exact positive-exponent expression/value as the matching response, complete the original explanation, and retain every stated nonzero assumption. _____ Bank label: _____
Rewrite $(2a)^{-2}$ using only positive exponents and state the original real-domain condition. Use the requested exact positive-exponent expression/value as the matching response, complete the original explanation, and retain every stated nonzero assumption. _____ Bank label: _____	Rewrite $(-3b)^{-3}$ using only positive exponents and state the original real-domain condition. Use the requested exact positive-exponent expression/value as the matching response, complete the original explanation, and retain every stated nonzero assumption. _____ Bank label: _____
Rewrite $(uv)^{-2}$ using only positive exponents and state the original real-domain condition. Use the requested exact positive-exponent expression/value as the matching response, complete the original explanation, and retain every stated nonzero assumption. _____ Bank label: _____	Rewrite $(-rs)^{-3}$ using only positive exponents and state the original real-domain condition. Use the requested exact positive-exponent expression/value as the matching response, complete the original explanation, and retain every stated nonzero assumption. _____ Bank label: _____

Algebra 1

Negative Exponents

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $\frac{1}{4^3} = \frac{1}{16}$ Rewrite 5^{-3} using a positive exponent, then give its exact value. Invert the complete base rather than changing its sign. Use the requested exact positive-exponent expression/value as the matching response, complete the original explanation, and retain every stated nonzero assumption. Your response: _____	START Rewrite 2^{-1} using a positive exponent, then give its exact value. Invert the complete base rather than changing its sign. Use the requested exact positive-exponent expression/value as the matching response, complete the original explanation, and retain every stated nonzero assumption. Your response: _____
Incoming: $(\frac{7}{4})^2 = \frac{49}{16}$ Rewrite $(\frac{5}{2})^{-2}$ with a positive exponent and evaluate exactly. Preserve the sign as part of the reciprocal base. Use the requested exact positive-exponent expression/value as the matching response, complete the original explanation, and retain every stated nonzero assumption. Your response: _____	Incoming: $\frac{1}{10^1} = \frac{1}{10}$ Rewrite 10^{-3} using a positive exponent, then give its exact value. Invert the complete base rather than changing its sign. Use the requested exact positive-exponent expression/value as the matching response, complete the original explanation, and retain every stated nonzero assumption. Your response: _____
Incoming: $\frac{1}{6^2} = \frac{1}{36}$ Rewrite 10^{-1} using a positive exponent, then give its exact value. Invert the complete base rather than changing its sign. Use the requested exact positive-exponent expression/value as the matching response, complete the original explanation, and retain every stated nonzero assumption. Your response: _____	Incoming: $(\frac{4}{3})^2 = \frac{16}{9}$ Rewrite $(\frac{3}{5})^{-3}$ with a positive exponent and evaluate exactly. Preserve the sign as part of the reciprocal base. Use the requested exact positive-exponent expression/value as the matching response, complete the original explanation, and retain every stated nonzero assumption. Your response: _____

Algebra 1

Negative Exponents

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Assume x and y are nonzero. Rewrite $x^{-2}y^3$ using only positive exponents. Explain which factor crosses the fraction bar. Choose a route: replace each negative-powered factor by its reciprocal before combining, or first combine signed exponents of identical bases and then rewrite the result with positive exponents. Explain why your chosen route fits this expression, use it, and retain all original nonzero assumptions.

Assume x and y are nonzero. Rewrite $\frac{x^2}{y^{-3}}$ using only positive exponents. Explain which factor crosses the fraction bar. Choose a route: replace each negative-powered factor by its reciprocal before combining, or first combine signed exponents of identical bases and then rewrite the result with positive exponents. Explain why your chosen route fits this expression, use it, and retain all original nonzero assumptions.

Assume x and y are nonzero. Rewrite $\frac{x^{-2}}{y^3}$ using only positive exponents. Explain which factor crosses the fraction bar. Choose a route: replace each negative-powered factor by its reciprocal before combining, or first combine signed exponents of identical bases and then rewrite the result with positive exponents. Explain why your chosen route fits this expression, use it, and retain all original nonzero assumptions.

Assume x and y are nonzero. Rewrite $\frac{x^{-2}}{y^{-3}}$ using only positive exponents. Explain which factor crosses the fraction bar. Choose a route: replace each negative-powered factor by its reciprocal before combining, or first combine signed exponents of identical bases and then rewrite the result with positive exponents. Explain why your chosen route fits this expression, use it, and retain all original nonzero assumptions.

Negative Exponents

Full Worked Solutions - excerpt

Worked example

Problem. Compare 3^{-4} and 3^{-2} using $<$, $=$, or $>$ without relying on decimal approximations. Explain the reciprocal order or negative-base parity that decides the result.

Answer. $3^{-4} < 3^{-2}$

Explanation and check.

Because $3^4 > 3^2 > 0$, their reciprocals satisfy $3^{-4} < 3^{-2}$.

Worked example

Problem. A student rewrites $(2x)^{-2}$ as $\frac{1}{2x^2}$. Identify the first structural error, then give the corrected expression and every original-domain restriction.

Answer. $(2x)^{-2} = \frac{1}{4x^2}$, with $x \neq 0$.

Explanation and check.

The exponent applies to the entire product, so both 2 and x must be squared after inversion.

Algebra 1
Operations with Scientific Notation

Operations with Scientific Notation | A1-U07-P07

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
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Topic focus

Across 96 tasks this topic asks for exact normalized scientific notation with any required units or explicit final rounding, decision with exact calculation and justification, missing normalized quotient with a substitution check, exact quotient and order-of-magnitude confirmation, sign justification and normalized quotient and exact normalized quotient and power-of-ten scale check.

8 PDFs and a README; 52 buyer pages.

Algebra 1

Operations with Scientific Notation

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Multiply $-1.2 \cdot 10^3$ by $-8.3 \cdot 10^2$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____	Multiply $-7.7 \cdot 10^8$ by $-1.3 \cdot 10^0$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____
Multiply $2.01 \cdot 10^{-4}$ by $3.02 \cdot 10^{-5}$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____	Multiply $3.125 \cdot 10^3$ by $3.2 \cdot 10^2$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____
Multiply $-2.005 \cdot 10^8$ by $4.9 \cdot 10^0$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____	Multiply $9.999 \cdot 10^{12}$ by $9.999 \cdot 10^{-12}$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____
Multiply $9.05 \cdot 10^{-6}$ by $-1.12 \cdot 10^9$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____	Multiply $-3.333 \cdot 10^7$ by $3.003 \cdot 10^{-7}$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____

Algebra 1

Operations with
Scientific Notation

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Divide $9 \cdot 10^{-2}$ by $3 \cdot 10^{-5}$. Keep any nonterminating coefficient as an exact fraction, subtract the denominator exponent, and normalize. _____ _____	Divide $4.8 \cdot 10^4$ by $-1.2 \cdot 10^0$. Keep any nonterminating coefficient as an exact fraction, subtract the denominator exponent, and normalize. _____ _____
For $\frac{-6.3 \cdot 10^7}{-3.5 \cdot 10^{-3}}$, determine the sign before doing any magnitude arithmetic. Then calculate the exact quotient. _____ _____	Evaluate $\frac{-9.05 \cdot 10^{10}}{2.5 \cdot 10^{-7}}$. Track the sign independently from the exponent subtraction so neither is lost. _____ _____
The direct coefficient in $\frac{1.02 \cdot 10^{-8}}{-5.1 \cdot 10^6}$ is -0.2. Carry the negative sign through the normalization step and state the final result. _____ _____	In $\frac{2.02 \cdot 10^{-2}}{4.04 \cdot 10^3}$, the denominator coefficient is twice the numerator coefficient. Use that relation to get the coefficient quotient, then handle the powers. _____ _____

Algebra 1

Operations with Scientific Notation

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A proposed quotient for $\frac{9.1 \cdot 10^{-2}}{1.3 \cdot 10^3}$ is $7 \cdot 10^{-5}$. Verify it by multiplication and report the exact result.

Compare converting 0.0042 to scientific notation first with multiplying the decimals first. Choose a valid exact route for $0.0042(3.5 \cdot 10^6)$, explain why it works, and normalize the result.

A device reports $(-3.5 \cdot 10^6)$. To divide this by $-7 \cdot 10^2$, should you interpret $E6$ as times 10^6 or as times 6? Choose, justify the sign and exponent operations, and compute exactly.

For $\frac{[1250000(1.6 \cdot 10^{-5})]}{4 \cdot 10^2}$, choose between grouping the numerator product before dividing and multiplying all three quantities. Explain which respects the expression and compute exactly.

Operations with Scientific Notation

Full Worked Solutions - excerpt

Worked example

Problem. Multiply $2 \cdot 10^2$ by $3 \cdot 10^4$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient.

Answer. $6 \cdot 10^6$

Explanation and check.

Multiply coefficients to get 6 and add exponents to get 6. Thus the direct product is $6 \cdot 10^6$; normalizing it gives $6 \cdot 10^6$.

Worked example

Problem. Multiply $1.5 \cdot 10^3$ by $4 \cdot 10^2$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient.

Answer. $6 \cdot 10^5$

Explanation and check.

Multiply coefficients to get 6 and add exponents to get 5. Thus the direct product is $6 \cdot 10^5$; normalizing it gives $6 \cdot 10^5$.

Algebra 1
Comparing Scientific Notation

Comparing Scientific Notation | A1-U07-P08

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
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Topic focus

Across 96 tasks this topic asks for assigned power, selected decade label, selected power and threshold comparison, selected power, area interval and boundary-crossing conclusion and inclusive total interval and decade conclusion.

8 PDFs and a README; 55 buyer pages.

Algebra 1

Comparing Scientific Notation

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Find the multiplicative factor that compares 2.7×10^{-4} to 9×10^{-3}; that is, evaluate the first quantity divided by the second. Interpret a result below 1. Use the complete originally requested response for the match, including both factors, the complete inequality, or both policy results when asked. Preserve the specified units, estimate convention, tie rule and precision; give the original justification. _____ Bank label: _____	Sample A has 1.2×10^7 particles and sample B has 8×10^5 particles. A student says A has about 100 times as many because the exponents differ by 2. Compute the actual factor and explain why 100 is misleading. Use the complete originally requested response for the match, including both factors, the complete inequality, or both policy results when asked. Preserve the specified units, estimate convention, tie rule and precision; give the original justification. _____ Bank label: _____
Estimate $\frac{7.8 \times 10^9}{2.1 \times 10^6}$ to one significant digit. Is 1,000 or 4,000 the better description of the scale factor? Use the complete originally requested response for the match, including both factors, the complete inequality, or both policy results when asked. Preserve the specified units, estimate convention, tie rule and precision; give the original justification. _____ Bank label: _____	An oak is 2.4×10^1 m tall and a seedling is 6×10^{-1} m tall. How many times as tall is the oak as the seedling? Then state the seedling's height as a multiplicative fraction of the oak's. Use the complete originally requested response for the match, including both factors, the complete inequality, or both policy results when asked. Preserve the specified units, estimate convention, tie rule and precision; give the original justification. _____ Bank label: _____
A table shows a quantity changing from 2.4×10^{-6} moles to 9.6×10^{-4} moles. By what multiplicative factor did it increase? Use the complete originally requested response for the match, including both factors, the complete inequality, or both policy results when asked. Preserve the specified units, estimate convention, tie rule and precision; give the original justification. _____ Bank label: _____	The value 0.000001 is an exact power-of-ten boundary. Express it as a power of ten, then give the next larger adjacent power. Do not claim it is strictly between them. Use the complete originally requested response for the match, including both factors, the complete inequality, or both policy results when asked. Preserve the specified units, estimate convention, tie rule and precision; give the original justification. _____ Bank label: _____
A component is 38 mm long. Using $1,000 \text{ mm} = 1 \text{ m}$, convert the length to meters and bracket it between adjacent powers of ten measured in meters. Use the complete originally requested response for the match, including both factors, the complete inequality, or both policy results when asked. Preserve the specified units, estimate convention, tie rule and precision; give the original justification. _____ Bank label: _____	For $M = 2.6 \times 10^7$, $N = 4.1 \times 10^{-2}$, and $P = 10^3$, give the adjacent power-of-ten bounds for each. For the exact boundary P, state equality rather than using two strict inequalities. Use the complete originally requested response for the match, including both factors, the complete inequality, or both policy results when asked. Preserve the specified units, estimate convention, tie rule and precision; give the original justification. _____ Bank label: _____

Algebra 1

Comparing Scientific Notation

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

A student orders three concentrations as $Y < X < Z$, where $X = 7.9 \times 10^{-6}$, $Y = 1.2 \times 10^{-5}$, and $Z = 6.4 \times 10^{-7}$. Correct the order and explain the student's likely exponent mistake. _____ _____	Panel A has area $3.2m^2$ and panel B has area $3.1 \times 10^4 cm^2$. Given $1m^2 = 10^4 cm^2$, which panel has greater area? Write the comparison in square centimeters. _____ _____
Event A lasts 0.0042s, B lasts 3,900 microseconds, and C lasts 4.5ms. With $1s = 1,000ms$ and $1ms = 1,000$ microseconds, order the events from shortest duration to longest. _____ _____	File A is 0.84 MB and file B is 8.6×10^5 bytes. Using $1 MB = 10^6$ bytes, determine which file is larger and the size difference in bytes. _____ _____
A stone has mass 0.0062 kg, a bead has mass 5,900mg, and a clip has mass 6.05 g. Convert to grams and order them from greatest mass to least. _____ _____	Order 2.03×10^{-2}, 9.7×10^{-4}, 1.99×10^{-2}, and 3.1×10^{-3} from least to greatest. Explain how the exponents organize the comparison. _____ _____

Algebra 1

Comparing Scientific Notation

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: 1.5 Reading A is 8.4×10^{-5} and reading B is 1.2×10^{-7}. Is A 70, 700, or 7,000 times B? Use the coefficient ratio as well as the exponent gap. Use the complete originally requested response for the match, including both factors, the complete inequality, or both policy results when asked. Preserve the specified units, estimate convention, tie rule and precision; give the original justification. Your response: _____	Incoming: 15 Locate 6.7×10^4 between two adjacent powers of ten. Write a complete inequality. Use the complete originally requested response for the match, including both factors, the complete inequality, or both policy results when asked. Preserve the specified units, estimate convention, tie rule and precision; give the original justification. Your response: _____
Incoming: $10^4 < 6.7 \times 10^4 < 10^5$ Without rounding the value, place 0.00082 between adjacent powers of ten and explain how its decimal position determines the bounds. Use the complete originally requested response for the match, including both factors, the complete inequality, or both policy results when asked. Preserve the specified units, estimate convention, tie rule and precision; give the original justification. Your response: _____	Incoming: 7.2cm^3, so $10^0\text{cm}^3 < 7.2\text{cm}^3 < 10^1\text{cm}^3$ The arithmetic midpoint between 10^4 and 10^5 is 5.5×10^4. If a midpoint tie is assigned to the upper power, what is the nearest-power estimate of 5.5×10^4? Use the complete originally requested response for the match, including both factors, the complete inequality, or both policy results when asked. Preserve the specified units, estimate convention, tie rule and precision; give the original justification. Your response: _____
START About how many times as large is 6.4×10^8 as 1.6×10^6? Separate the coefficient ratio from the power-of-ten ratio. Use the complete originally requested response for the match, including both factors, the complete inequality, or both policy results when asked. Preserve the specified units, estimate convention, tie rule and precision; give the original justification. Your response: _____	Incoming: 4 Mass A is 1.35×10^{-3} g and mass B is 4.5×10^{-5} g. Which statement is defensible: A is 3 times, 30 times, or 300 times B? Justify using both coefficients and exponents. Use the complete originally requested response for the match, including both factors, the complete inequality, or both policy results when asked. Preserve the specified units, estimate convention, tie rule and precision; give the original justification. Your response: _____

Algebra 1

Comparing Scientific Notation

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A positive factor A is between 2×10^3 and 3×10^3 , inclusive, while B is between 4×10^2 and 5×10^2 , inclusive. Bound AB using endpoints. Do the bounds force AB to stay in one decade? Choose the endpoint method appropriate to the displayed operation: pair lower with lower and upper with upper for a product of positive factors, or pair a lower numerator with an upper denominator and vice versa for a positive quotient. Explain which method applies here, then use it to answer the original bound and decade questions.

Let $6 \times 10^7 \leq N \leq 8 \times 10^7$ and $2 \leq D \leq 4$, with both positive. Find the tight endpoint bounds for $\frac{N}{D}$. Is its decade determined by these data? Choose the endpoint method appropriate to the displayed operation: pair lower with lower and upper with upper for a product of positive factors, or pair a lower numerator with an upper denominator and vice versa for a positive quotient. Explain which method applies here, then use it to answer the original bound and decade questions.

A report compares 3.2 km with 480 m and says, "The longer distance is about 0.0067 times the shorter distance." Using $1 \text{ km} = 1,000 \text{ m}$, identify the scale error and give a defensible factor.

A data rate stays between 3×10^4 and 4×10^4 bytes per second for a duration between 2×10^2 and 2.5×10^2 seconds. Bound the total bytes using positive endpoints. Does every possible total lie strictly in the 10^6 decade? Choose the endpoint method appropriate to the displayed operation: pair lower with lower and upper with upper for a product of positive factors, or pair a lower numerator with an upper denominator and vice versa for a positive quotient. Explain which method applies here, then use it to answer the original bound and decade questions.

Comparing Scientific Notation

Full Worked Solutions - excerpt

Worked example

Problem. Which is larger, 8.7×10^6 or 1.02×10^7 ? Rewrite one value so the coefficient comparison is direct.

Answer. 1.02×10^7 is larger.

Explanation and check.

Rewrite 1.02×10^7 as 10.2×10^6 . Since $10.2 > 8.7$, the second quantity is larger.

Worked example

Problem. Estimate $\frac{6.2 \times 10^{-7}}{1.7 \times 10^{-9}}$ to one significant digit. Show why the answer is closer to 400 than to 100.

Answer. About 4×10^2 , or 400

Explanation and check.

The power ratio is 10^2 and $\frac{6.2}{1.7}$ is about 3.65. The product is about 3.65×10^2 , which rounds to 4×10^2 .

Algebra 1
Identifying Geometric Sequences

Identifying Geometric Sequences | A1-U07-P09

96 problems · Four activity formats

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Topic focus
Across 96 tasks this topic asks for compatible ratio set, set of compatible ratios, ratio in exact form, common ratio, geometric decision and ratio and three indexed terms.
8 PDFs and a README; 59 buyer pages.

Algebra 1

Identifying Geometric Sequences

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

For $n = 1, 2, 3, 4$, a sequence has terms 2, 6, 18, 54. Is the displayed sequence geometric? If so, give the common ratio. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification.

Index n	Given term
1	2
2	6
3	18
4	54

Bank label: _____

Determine whether 80, 40, 20, 10 has a constant multiplicative step. State that step as a common ratio. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification.

Bank label: _____

Does the finite sequence $7, -7, 7, -7, 7$ have one common ratio? Explain the alternating signs. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification.

Bank label: _____

At indices 3 through 6, the terms are $-4, 8, -16, 32$. Decide whether these consecutive terms are geometric and identify r . Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification.

Index n	Given term
3	-4
4	8
5	-16
6	32

Bank label: _____

Algebra 1

Identifying Geometric Sequences

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

A table gives $a_0 = -5$, $a_1 = -15$, $a_2 = -45$, and $a_3 = -135$. Test every transition for a common ratio.

Index n	Given term
0	-5
1	-15
2	-45
3	-135

The first four terms in a table are $-81, -27, -9, -3$. Are they geometric, and why do the terms remain negative?

Index n	Given term
1	-81
2	-27
3	-9
4	-3

A table lists 3, 12, 48, 193 at consecutive indices. Test the geometric claim and identify the first transition that fails.

Index n	Given term
1	3
2	12
3	48
4	193

A table starts at $n = 4$ with $a_4 = 9$, $a_5 = 27$, $a_6 = 81$, and $a_7 = 243$. Does the nonunit starting index affect the common-ratio test?

Index n	Given term
4	9
5	27
6	81
7	243

Observed terms at $n = 1$ through 4 are 4, 12, 36, 108. State the common ratio supported by these data, then explain what the finite table does not prove about later terms.

At four consecutive indices the terms are 2, -4 , 8, -15.5 . Test the proposed geometric pattern, locate the failure, and state the term that would preserve the earlier ratio.

Index n	Given term
5	2
6	-4
7	8
8	-15.5

Algebra 1

Identifying Geometric Sequences

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

START The entries $\frac{5}{2}$, $\frac{5}{4}$, $\frac{5}{8}$, and $\frac{5}{16}$ are consecutive terms. Verify or reject the claim that they form a geometric sequence. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification. Your response: _____	Incoming: The common ratio is $-\frac{2}{3}$. Assume 4, 12 begin a geometric sequence. Find the next term. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification. Your response: _____						
Incoming: Yes; $r = 2$. A table row reads 243, 81, 27, 9 at consecutive indices. Determine its common ratio. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification. Your response: _____	Incoming: 48, -6 A geometric sequence has $a_2 = 1.2$ and $a_3 = 6$. Determine a_4 from the ratio in the table. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="text-align: left;">Index n</th> <th style="text-align: left;">Given term</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>1.2</td> </tr> <tr> <td>3</td> <td>6</td> </tr> </tbody> </table> Your response: _____	Index n	Given term	2	1.2	3	6
Index n	Given term						
2	1.2						
3	6						
Incoming: The sequence is geometric with $r = -\frac{1}{2}$. A geometric sequence has $a_1 = 3$ and $a_2 = 6$. Find a_3 and a_4. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="text-align: left;">Index n</th> <th style="text-align: left;">Given term</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>3</td> </tr> <tr> <td>2</td> <td>6</td> </tr> </tbody> </table> Your response: _____	Index n	Given term	1	3	2	6	Incoming: $r = \frac{1}{5}$ Use exact fraction arithmetic to test $\frac{3}{2}$, -1, $\frac{2}{3}$, $-\frac{4}{9}$ for one common ratio. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification. Your response: _____
Index n	Given term						
1	3						
2	6						

Algebra 1**Identifying Geometric Sequences****Name:** _____ **Date:** _____ **Class:** _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

The geometric sequence 5, 15, _____, 135 has one missing term. Recover it and verify both neighboring transitions. Choose a recovery method justified by the given positions: use a quotient of known adjacent nonzero terms, or use the multiplicative relation across an index gap. Explain which information supports your choice, apply it, and check every possible ratio or missing term against the original sign and geometric conditions.

A real geometric sequence has consecutive terms 64, x , 16. Find every possible x and the corresponding common ratio. Choose a recovery method justified by the given positions: use a quotient of known adjacent nonzero terms, or use the multiplicative relation across an index gap. Explain which information supports your choice, apply it, and check every possible ratio or missing term against the original sign and geometric conditions.

Identifying Geometric Sequences

Full Worked Solutions - excerpt

Worked example

Problem. Starting with $a_9 = 125$, apply $r = \frac{1}{5}$ to complete a_{10} and a_{11} .

Answer. $a_{10} = 25$ and $a_{11} = 5$.

Explanation and check.

Successive division by 5 produces 25 and 5.

Worked example

Problem. Given $a_3 = 1$ and $r = -4$, supply the next two entries.

Answer. $a_4 = -4$ and $a_5 = 16$.

Explanation and check.

Multiply by -4 twice: 1 becomes -4 , then 16.

Algebra 1
Explicit Geometric Sequence Rules

Explicit Geometric Sequence Rules | A1-U07-P10

96 problems · Four activity formats

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Topic focus
This topic is a focused set of 96 practice tasks on Explicit Geometric Sequence Rules.
8 PDFs and a README; 54 buyer pages.

Algebra 1

Explicit Geometric Sequence Rules

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Term 0 of a geometric sequence is 7. Every step doubles the preceding term. Give an explicit formula valid for whole-number indices. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____	The fifth term is 9 and the common ratio is 1. Give an anchor-form rule for all positive indices. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____
A two-sided integer-indexed geometric sequence satisfies $a_3 = -11$ and $r = 1$. State an anchor rule and its simplest equivalent form. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____	A finite geometric sequence is indexed from 1 through 14, has $a_{10} = 1024$, and uses $r = \frac{1}{2}$. Give a single explicit expression on precisely that domain. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____
The value at $n = 5$ is -32 in a geometric sequence with ratio -2. State a formula and explicitly retain the whole-number index domain. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____	<i>Abi</i>-infinite geometric sequence is indexed by all integers, has $a_{-2} = 5$, and uses $r = 3$. Build the explicit rule from that negative-index anchor. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____
State a_n for integer $n \geq 6$ if $a_8 = \frac{1}{16}$ and the sequence advances by a factor of -2. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____	For indices 1 through 9, build an anchor rule from $a_5 = \frac{3}{32}$ and $r = \frac{1}{2}$, then give an equivalent expression anchored at index 1. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____

Algebra 1

Explicit Geometric Sequence Rules

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Let m be a real number. A geometric sequence begins its stated domain at $n = 2$ with $a_2 = m$ and ratio 5. Give a formula that retains m as a parameter. 	Let q be a nonzero real number. An integer-indexed geometric sequence has $a_0 = 8$ and ratio q. Give its explicit rule for every integer index.
For real parameter c, write the positive-index geometric sequence satisfying $a_4 = c$ and $r = -3$. 	A positive-index geometric sequence has first term 8 and common ratio 0. Give an explicit rule that is valid at $n = 1$ without relying on 0^0.
At time index 0 a discrete state is -3; every later state is obtained by multiplying the current state by 0. State its explicit value for all nonnegative indices, handling the initial index explicitly. 	A sequence begins with $a_1 = 5$ and has common ratio 0; the observed $a_4 = 0$ is consistent with that rule. Write a complete explicit description rather than substituting into $5(0)^{n-1}$ at $n = 1$.

Algebra 1

Explicit Geometric Sequence Rules

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $a_n = -81\left(-\frac{1}{3}\right)^{n-6}, n \geq 1$. For nonnegative integer n, describe the geometric sequence anchored by $a_0 = \frac{5}{2}$ with common ratio 6. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. Your response: _____	Incoming: $A_n = 50(4)^{n-3}, n \geq 1$. Indices 2 through 8 form a finite geometric list. Its index-3 entry is -7 and its ratio is -4. Give a rule only for those listed indices. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. Your response: _____
Incoming: $R_n = 15(2)^{n-7}, n \geq 1$. After discount round 2, a modeled price is 72 dollars. Every additional round retains $\frac{4}{5}$ of the preceding price, and rounds begin at 0. Write the round-n sequence. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. Your response: _____	Incoming: $a_n = 48\left(-\frac{1}{2}\right)^{n-4}, n \geq 1$. On the index domain $n \geq 4$, a geometric sequence has $a_7 = 2$ and $r = 3$. Write a rule whose exponent visibly counts from index 7. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. Your response: _____
Incoming: $a_n = 160\left(\frac{3}{4}\right)^{n-3}, n \geq 0$. Form the nth-term expression for a geometric sequence with $a_6 = -81$ and $r = -\frac{1}{3}$. Its index set is 1, 2, 3, Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. Your response: _____	Incoming: $a_n = 6(5)^{n-4}, n \geq 1$. A sequence indexed by $n = 0, 1, 2, \dots$ has $a_2 = 12$ and common ratio -2. Express a_n using the supplied anchor. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. Your response: _____

Algebra 1

Explicit Geometric Sequence Rules

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A geometric table begins with $(n, a_n) = (1, 3)$ and $(2, 6)$. Recover its explicit nth-term rule. Choose an explicit-rule construction method: anchor the formula at a supplied indexed term, or first recover the term at the stated starting index and anchor there. Explain which is more direct for these givens, use that method, and verify all supplied indexed terms and any sign restrictions. Retain every admissible rule if the data do not select one.

Index n	Given value
1	3
2	6

The entries at indices 0 and 1 are 5 and 15 in a geometric sequence. Find r and express a_n for every nonnegative integer n . Choose an explicit-rule construction method: anchor the formula at a supplied indexed term, or first recover the term at the stated starting index and anchor there. Explain which is more direct for these givens, use that method, and verify all supplied indexed terms and any sign restrictions. Retain every admissible rule if the data do not select one.

Explicit Geometric Sequence Rules

Full Worked Solutions - excerpt

Worked example

Problem. Decide whether $a_n = 2(-1)^{n-1}$ and $b_n = -2(-1)^n$ produce the same alternating values at matching positive indices.

Answer. Yes, they are identical on $n \geq 1$.

Explanation and check.

Multiplying $(-1)^n$ by -1 is the same as lowering the exponent by one: $-2(-1)^n = 2(-1)^{n-1}$.

Worked example

Problem. Construct the positive-index rule satisfying $a_3 = -4$, $a_5 = -16$, and $r > 0$.

Answer. $a_n = -4(2)^{n-3}, n \geq 1$.

Explanation and check.

The two-step relation yields $r^2 = 4$, with real candidates ± 2 . The stated positive ratio selects 2 .

Algebra 1
Recursive Geometric Sequence Rules

Recursive Geometric Sequence Rules | A1-U07-P11

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Topic focus
This topic is a focused set of 96 practice tasks on Recursive Geometric Sequence Rules.
8 PDFs and a README; 61 buyer pages.

Algebra 1

Recursive Geometric Sequence Rules

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

A discrete state is -2 at time 0 and is quadrupled at every tick. Give its initial condition and one-step recurrence. Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Bank label: _____

State a recurrence for a sequence whose first declared term is $a_5 = 9$ and whose common ratio is 2. Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given indexed term	Value
a_5	9

Bank label: _____

Convert the table values $\frac{1}{3}, \frac{2}{3}, \frac{4}{3}$ at consecutive positive indices into a recursive definition. Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given index	Given value
1	$\frac{1}{3}$
2	$\frac{2}{3}$
3	$\frac{4}{3}$

Bank label: _____

Write a complete recurrence for the positive-index terms 64, -16 , 4, preserving the exact signed factor. Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given index	Given value
1	64
2	-16
3	4

Bank label: _____

Algebra 1

Recursive Geometric Sequence Rules

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Let c be real. Define recursively the positive-index geometric sequence with first value c and multiplier 4.

Given indexed term	Value
a_1	c

For real parameter q , write the zero-indexed recurrence having $a_0 = 7$ and common multiplier q .

Given indexed term	Value
a_0	7

Only $a_1 = 2$ and $a_3 = 18$ are known. Write every real geometric recurrence compatible with those observations, including each initial condition and update range.

Given indexed term	Value
a_1	2
a_3	18

The table shows 0 at indices 1, 2, and 3. Give two different complete geometric recurrences that extend this table and explain why the displayed values do not identify one multiplier.

Given index	Given value
1	0
2	0
3	0

A nonzero sequence value at index 5 is x . Moving one index left multiplies a value by 3. Write the forward recurrence and choose a valid initial condition at index 5 for the domain $n \geq 5$.

Given indexed term	Value
a_5	x

Starting at $a_{-2} = 3$ and multiplying the immediately prior term by -2 , fill a_{-1} , a_0 , a_1 , and a_2 .

Given indexed term	Value
a_{-2}	3

Algebra 1

Recursive Geometric Sequence Rules

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $a_2 = 7$ and $a_3 = 7$.

For $a_0 = 8$ and $a_n = 0a_{n-1}$, find a_1 and a_2 . Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given indexed term	Value
a_0	8

Your response: _____

Incoming: $a_2 = 27$, $a_3 = 9$, and $a_4 = 3$.

A recurrence is anchored by $a_4 = \frac{1}{5}$ and multiplies by 5. Find a_5 through a_7 . Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given indexed term	Value
a_4	$\frac{1}{5}$

Your response: _____

Incoming: $a_2 = 6$ and $a_3 = -12$.

Given $a_3 = 4$ and $a_n = 5a_{n-1}$, evaluate a_4 and a_5 . Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given indexed term	Value
a_3	4

Your response: _____

Incoming: $a_1 = -10$, $a_2 = -20$, and $a_3 = -40$.

A table has 64 at index 4 and uses the multiplier $-\frac{1}{2}$. Determine the entries at indices 5, 6, and 7. Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given indexed term	Value
a_4	64

Your response: _____

Incoming: $a_3 = 10$, $a_4 = 20$, $a_5 = 40$, and $a_6 = 80$.

A geometric update starts from $a_5 = -2$ and multiplies by 4. Determine a_6 , a_7 , and a_8 . Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given indexed term	Value
a_5	-2

Your response: _____

Incoming: $a_3 = 2$, $a_4 = -\frac{2}{3}$, and $a_5 = \frac{2}{9}$.

Use the index-7 initial condition 10 and multiplier 3 to determine the next two indexed terms. Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given indexed term	Value
a_7	10

Your response: _____

Algebra 1

Recursive Geometric Sequence Rules

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

The first three terms are 2, 6, 18 at indices 1, 2, 3. Write a recursive definition that includes its starting value and valid update range. Choose how to establish the update multiplier from these givens: infer it from an available adjacent nonzero pair, or translate/use the supplied per-step multiplier or description. Explain which evidence supports your route, then give the complete recursive specification in the originally requested index form and range.

Given index	Given value
1	2
2	6
3	18

A table starts at $n = 0$ with values 5, 10, 20. State its geometric recurrence using the zero-index convention. Choose how to establish the update multiplier from these givens: infer it from an available adjacent nonzero pair, or translate/use the supplied per-step multiplier or description. Explain which evidence supports your route, then give the complete recursive specification in the originally requested index form and range.

Given index	Given value
0	5
1	10
2	20

Recursive Geometric Sequence Rules

Full Worked Solutions - excerpt

Worked example

Problem. The recurrence $a_1 = 4, a_n = a_{n-1} + 3$ is attached to the geometric table 4, 12, 36. Repair the update operation.

Answer. $a_1 = 4$; $a_n = 3a_{n-1}$ for $n \geq 2$.

Explanation and check.

The values triple rather than increase by 3, so the recurrence must multiply the preceding term by 3.

Worked example

Problem. Audit $a_0 = 7, a_n = 2a_{n-1}$ for $n \geq 0$. Repair the range so the initial condition is not also forced to reference an undefined a_{-1} .

Answer. $a_0 = 7$; $a_n = 2a_{n-1}$ for $n \geq 1$.

Explanation and check.

Index 0 is supplied directly, so the first recurrence output is index 1.

Algebra 1

Exponential Function Rules and Evaluation

Exponential Function Rules and Evaluation | A1-U07-P12

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Exponential Function Rules and Evaluation.
8 PDFs and a README; 57 buyer pages.

Algebra 1

Exponential Function Rules
and Evaluation

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

What output does $f(x) = 4(5)^x$ assign to the origin input $x = 0$? Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. _____ Bank label: _____	Find $q(2)$ for $q(x) = (\frac{3}{4})4^x$, applying the coefficient after the power. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. _____ Bank label: _____
Evaluate $z(2)$ for $z(x) = 25(\frac{1}{5})^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. _____ Bank label: _____	Find $F(-1)$ for $F(x) = 7(\frac{1}{7})^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. _____ Bank label: _____
Evaluate $G(-3)$ under $G(x) = -16(\frac{1}{2})^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. _____ Bank label: _____	Compute $J(-1)$ for $J(x) = 10(\frac{1}{10})^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. _____ Bank label: _____
Evaluate $K(-4)$ exactly if $K(x) = -3(2)^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. _____ Bank label: _____	Evaluate $M(-2)$ for $M(x) = -2(3)^x$, and explain why combining -2 and 3 into a base -6 changes the rule. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. _____ Bank label: _____

Algebra 1

Exponential Function Rules and Evaluation

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Under the convention $f(x) = ab^x$ with $a \neq 0$, $b > 0$, and $b \neq 1$, classify $f(x) = 3(2)^x$. 	Is $g(x) = x^3$ an exponential function of x under the stated constant-base convention? Explain the structural reason.
Classify $h(x) = 5x + 2$ as exponential or nonexponential and give one decisive feature. 	Does $p(x) = 7(\frac{1}{2})^x$ qualify as a nonconstant exponential function on the real numbers?
Classify $q(x) = -4(3)^x$. Does the negative coefficient prevent exponential structure? 	A model is $F(t) = 12(3)^t$, where t is years after 2018 and F is measured in colonies. Interpret 12 and 3.

Algebra 1

Exponential Function Rules
and Evaluation

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $D(0) = -9$.

Find $h(\frac{1}{2})$ for $h(x) = 18(\frac{1}{36})^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions.

Your response: _____

Incoming: $A(3) = -32$.

Evaluate $C(-2)$ for $C(x) = 3(\frac{1}{3})^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions.

Your response: _____

Incoming: $j(3) = 56$; equal input step 3; output ratio 8.

The displayed table for $k(x) = 3(4)^x$ begins at $x = 1$. Supply the missing middle value. For the match, record all missing values in table order together with the equal input step and its output ratio, and complete the original verification.

Rule: $k(x) = 3(4)^x$

x	k(x)
1	12
2	_____
3	192

Your response: _____

START

Evaluate $f(2)$ for $f(x) = 3(2)^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions.

Your response: _____

Algebra 1

Exponential Function Rules and Evaluation

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Complete the missing entry in the table for $f(x) = 3(2)^x$, then verify the equal-step ratios. Choose how to fill the missing entries: substitute the missing inputs directly into the given rule, or use a known table output with the multiplier for the actual input step. Explain why your chosen route applies, use it, and complete the original ratio verification.

Rule: $f(x) = 3(2)^x$

x	f(x)
0	3
1	_____
2	12

For $g(x) = 20(\frac{1}{2})^x$, fill the $x = 1$ row and use it to check the listed value at $x = 3$. Choose how to fill the missing entries: substitute the missing inputs directly into the given rule, or use a known table output with the multiplier for the actual input step. Explain why your chosen route applies, use it, and complete the original ratio verification.

Rule: $g(x) = 20(\frac{1}{2})^x$

x	g(x)
0	20
1	_____
3	$\frac{5}{2}$

Exponential Function Rules and Evaluation

Full Worked Solutions - excerpt

Worked example

Problem. Compare $A(x) = 6(2)^x$ and $B(x) = 3(2)^{x+1}$ for an arbitrary real x .

Answer. $A(x) = B(x)$ for every real x .

Explanation and check.

$B(x) = 3(2)(2^x) = 6(2^x)$, which is exactly $A(x)$.

Worked example

Problem. Without separately evaluating both powers, compare $f(3)$ and $f(4)$ for $f(x) = 3(2)^x$.

Answer. $f(4) > f(3)$, and $f(4) = 2f(3)$.

Explanation and check.

The inputs differ by one, so the later output contains one additional factor of the base 2.

Algebra 1
Graphing Exponential Functions

Graphing Exponential Functions | A1-U07-P14

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Graphing Exponential Functions.
8 PDFs and a README; 152 buyer pages.

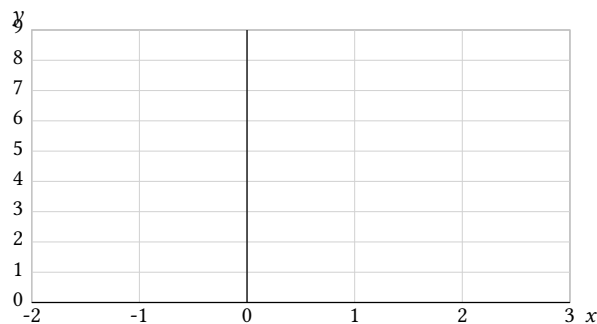
Algebra 1

Graphing Exponential Functions

Name: _____ Date: _____ Class: _____

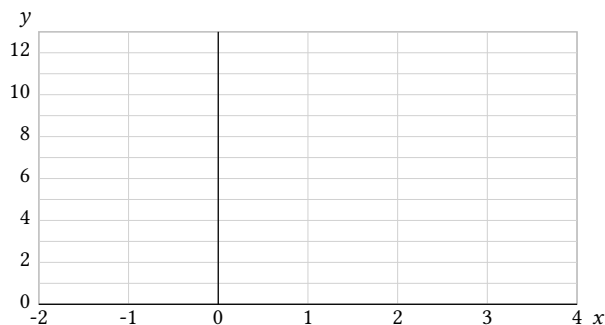
Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

On the stated grid, graph $f(x) = 2^x$. Label three exact points, the y -intercept, and the horizontal asymptote, then indicate the direction of growth. For matching, use the complete constructed graph with the original required anchors, boundary points, asymptote, scale and labels. The graphing work remains required; a formula-only response does not replace it.



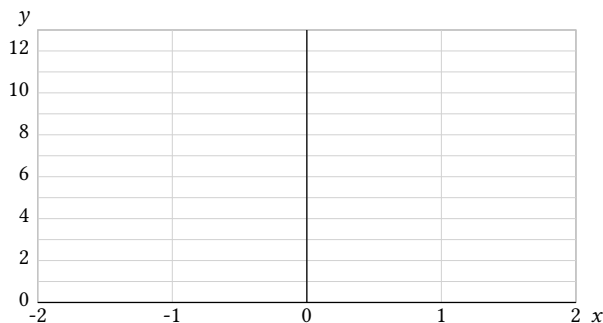
Bank label: _____

Construct the graph of $g(x) = 3(\frac{1}{2})^x$ in the given window. Supply three consecutive-input points and identify the line the curve approaches. For matching, use the complete constructed graph with the original required anchors, boundary points, asymptote, scale and labels. The graphing work remains required; a formula-only response does not replace it.



Bank label: _____

Plot $h(x) = 4(3)^x$ using the required inputs $-1, 0$, and 1 . State the intercept and asymptote that complete the sketch. For matching, use the complete constructed graph with the original required anchors, boundary points, asymptote, scale and labels. The graphing work remains required; a formula-only response does not replace it.



Bank label: _____

Graph $p(x) = -2(2)^x$ on the unit grid. Label its y -intercept, two neighboring points, and describe its rightward behavior. For matching, use the complete constructed graph with the original required anchors, boundary points, asymptote, scale and labels. The graphing work remains required; a formula-only response does not replace it.



Bank label: _____

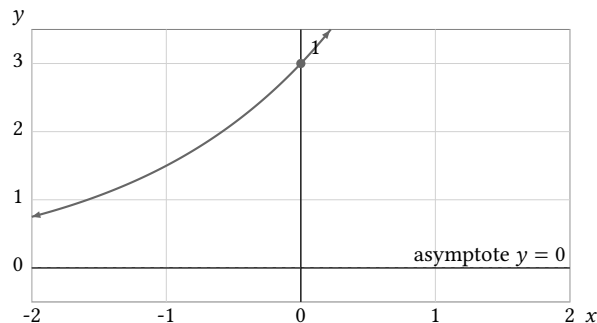
Algebra 1

Graphing Exponential Functions

Name: _____ Date: _____ Class: _____

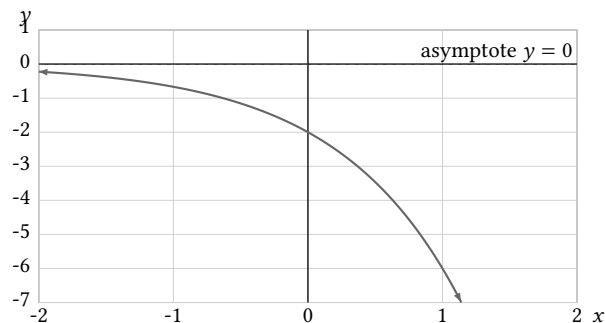
Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

A displayed continuous exponential curve is labeled $y = 3(2)^x$, passes through $(0, 3)$, and approaches $y = 0$ from above. State its domain, range, and y -intercept.

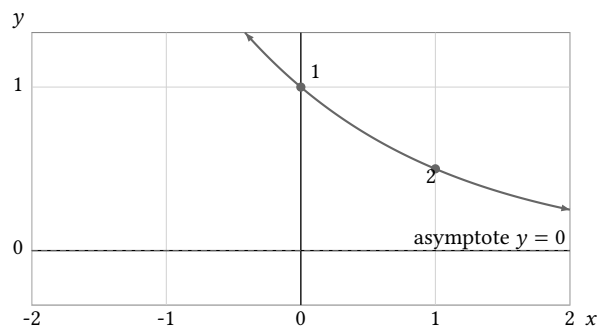


Marker	Exact coordinate	Boundary status
1	$(0, 3)$	included

The graph is the full curve $y = -2(3)^x$ with horizontal asymptote $y = 0$. Give its domain, range, and y -intercept.

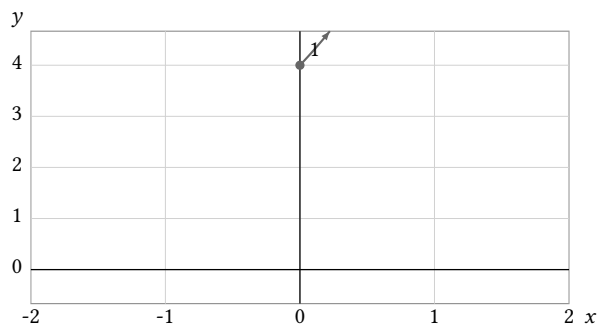


A continuous curve passes through $(0, 1)$ and $(1, \frac{1}{2})$, is labeled $y = (\frac{1}{2})^x$, and approaches $y = 0$. Name the y -intercept and tell whether it increases or decreases.



Marker	Exact coordinate	Boundary status
1	$(0, 1)$	included
2	$(1, \frac{1}{2})$	included

The displayed branch $y = 4(2)^x$ begins with a closed point at $(0, 4)$ and continues right. State the restricted domain and range.



Marker	Exact coordinate	Boundary status
1	$(0, 4)$	included

Algebra 1

Graphing Exponential Functions

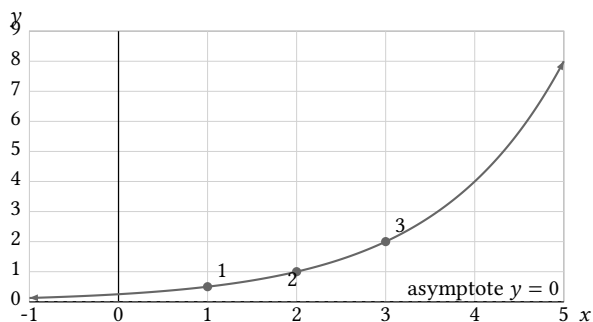
Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: The anchors become $(1, \frac{1}{2})$, $(2, 1)$, and $(3, 2)$; the graph is shifted 2 units right and retains asymptote $y = 0$.

Using the reference points for $y = 3^x$, graph $y = 3^{x+1}$. Where do the three points move? For matching, use the complete constructed graph with the original required anchors, boundary points, asymptote, scale and labels. The graphing work remains required; a formula-only response does not replace it. Graph for the incoming match

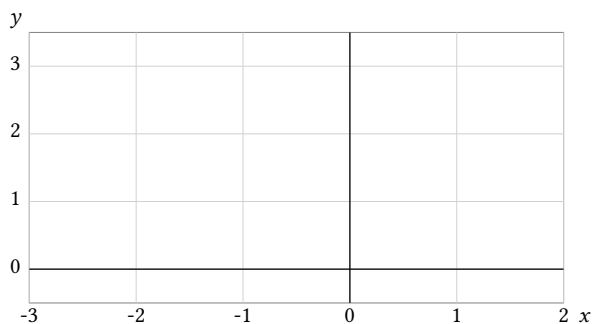
Window $x: [-1, 5]$, $y: [0, 9]$. Tick intervals: $x1, y1$.



Marker	Exact coordinate	Boundary status
1	$(1, \frac{1}{2})$	included
2	$(2, 1)$	included
3	$(3, 2)$	included

Graphing grid

Window $x: [-3, 2]$, $y: [-\frac{1}{2}, \frac{7}{2}]$. Tick intervals: $x1, y1$.



First value / input	Second value / output
-1	$\frac{1}{3}$
0	1
1	3

Your response: _____

Algebra 1

Graphing Exponential Functions

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Which window shows all required anchors of $y = 3(2)^x$ at $x = 0, 1, 2$, and 3 ? Justify using the largest output.

A

Axis	Window interval
x	$[-1, 4]$
y	$[0, 30]$

B

Axis	Window interval
x	$[-1, 4]$
y	$[0, 10]$

Select a window that displays both the initial value and decay through $x = 6$ for $y = 64(\frac{1}{2})^x$.

A

Axis	Window interval
x	$[0, 6]$
y	$[0, 70]$

B

Axis	Window interval
x	$[0, 6]$
y	$[0, 5]$

Graphing Exponential Functions

Full Worked Solutions - excerpt

Worked example

Problem. The graphs $f(x) = 2^x$ and $g(x) = 3^x$ share $(0, 1)$. Which is higher for positive x , and which is higher for negative x ?

Answer. For $x > 0$, g is higher; for $x < 0$, f is higher. They are equal at $x = 0$.

Explanation and check.

The larger base grows faster to the right but has smaller reciprocal powers to the left.

Worked example

Problem. For the reflected growth graphs u and v , which curve lies lower? Describe the relationship between their outputs. Compare $U(x) = -2(2)^x$ and $V(x) = -6(2)^x$ with asymptote $y = 0$.

Answer. v lies lower for every real x , and $v(x) = 3u(x)$. Both decrease and approach $y = 0$ from below on the left.

Explanation and check.

Multiplying a negative output by 3 makes it more negative, so the larger coefficient magnitude places the curve lower.

Algebra 1
Exponential Growth Models

Exponential Growth Models | A1-U07-P15
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Exponential Growth Models.
8 PDFs and a README; 62 buyer pages.

Algebra 1

Exponential Growth Models

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Find the multiplier for each statement and explain why the phrases are not equivalent. Given statements: A: next value is 18% of current B: next value is 18% more than current 	A trial's output increases by 140% after each launch. Determine the factor and interpret it as a percent of the preceding output. Given rate: 140% increase per launch
Give the quarterly factor for 2.5% growth as both a decimal and a fraction. Given rate: 2.5% per quarter 	A quantity grows by 200% each interval. Is its factor 2 or 3? Justify. Given rate: 200% increase per interval
Find the multiplier, and state the implied percent increase. Given statement: the next count is 120% of the current count 	Find the final amount after the two successive growth intervals. Initial: 100 Rates: 10%, 20%

Algebra 1

Exponential Growth Models

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

START A quantity increases by 5% each interval. What multiplier represents one interval of growth? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Given rate: 5% per interval Your response: _____	Incoming: 1.05 Membership grows 12% per month. Give the monthly growth factor. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Given rate: 12% per month Your response: _____
Incoming: 100 Determine the cycle-0 quantity. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Cycles: 2 Later: 675 Given rate: 50% per cycle Your response: _____	Incoming: $A(t) = 500(1.20)^{t-3}$. Under the continuous interval model, find $F(\frac{1}{2})$. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Model: $F(t) = 180(1.44)^t$ for real $t \geq 0$ Time: $\frac{1}{2}$ interval Your response: _____
Incoming: 1.0004 What multiplier implements the stated update after one round? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Given statement: add 30% of the current amount after each round Your response: _____	Incoming: 1.75 A measurement increases 0.1% each hour. What hourly multiplier should be used? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Given rate: 0.1% per hour Your response: _____

Algebra 1**Exponential Growth Models****Name:** _____ **Date:** _____ **Class:** _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Find the modeled amount after two periods. Choose a calculation route: substitute the elapsed update count directly into the model, or track successive interval multiplications when the stated time and domain permit complete updates.

Explain why the selected route fits these givens, use it, and preserve the original time origin and rounding instruction.

Model: $A(n) = 100(1.10)^n$

Time: 2

What is the modeled quantity after three complete cycles? Choose a calculation route: substitute the elapsed update count directly into the model, or track successive interval multiplications when the stated time and domain permit complete updates. Explain why the selected route fits these givens, use it, and preserve the original time origin and rounding instruction.

Cycles: 3

Initial: 80

Given rate: 50% per cycle

Exponential Growth Models

Full Worked Solutions - excerpt

Worked example

Problem. Find the multiplier for each statement and explain why the phrases are not equivalent.

Given statements: A : next value is 18% of current B : next value is 18% more than current

Answer. A uses 0.18; B uses 1.18.

Explanation and check.

Percent of names the entire next amount, while percent more names an addition to the retained original.

Worked example

Problem. A quantity grows by 200% each interval. Is its factor 2 or 3? Justify.

Given rate: 200% increase per interval

Answer. The factor is 3.

Explanation and check.

The increase is two copies of the current amount; adding the retained copy makes three copies total.

Algebra 1
Exponential Decay Models

Exponential Decay Models | A1-U07-P16

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Exponential Decay Models.
8 PDFs and a README; 59 buyer pages.

Algebra 1

Exponential Decay Models

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

After one 20% loss, 80 remains. What amount was present immediately before the loss? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. _____ Bank label: _____	A quantity is 45 just after it is halved. Find its value just before that event. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. _____ Bank label: _____
What input amount gives 306 after multiplication by the retention factor 0.85? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. _____ Bank label: _____	If 72 is 60% of the amount that existed before a loss, what was that earlier amount? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. _____ Bank label: _____
A modeled amount is 240 after one 4% decrease. Find the amount one interval earlier. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. _____ Bank label: _____	Find the amount two decay steps before 128 when each step retains 80%. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. _____ Bank label: _____
After three successive halvings, a quantity is 18. What was it before any halving? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. _____ Bank label: _____	An amount is 81 after four steps that each retain 75%. Find its value before the four steps. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. _____ Bank label: _____

Algebra 1

Exponential Decay Models

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

For this fictional mathematical model, write $V(y)$. The initial amount is 15000 and loses 12% per year. Let y be the elapsed years. 	Construct $I(w)$ for w weeks after the reference count. The amount is 1200 at week 0 and loses 8% per week.
Model the amount after n completed filter passes and state the domain. The initial amount is 250 and loses 12% per pass. Let n be a nonnegative integer. 	Write the model in hours without turning the rate into an hourly rate. The initial amount is 40 and loses 5% every 2 hours. Let t be elapsed hours.
Construct the model in years. The initial amount is 900 and loses 3% per half-year. Let y be elapsed years. 	Construct the decay rule in elapsed days. The initial amount is 240 and loses 9% every 3 days. Let d be elapsed days.

Algebra 1

Exponential Decay Models

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: 12.5% per step. A constant retention factor acts twice. Determine the exact fraction lost on each action. The amount changes from 144 to 100 after two steps. Your response: _____	Incoming: 36% per step. What percent is lost during each of the four equal periods? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. <table border="1"> <thead> <tr> <th>period</th> <th>0</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>quantity</td> <td>256</td> <td>16</td> </tr> </tbody> </table> Your response: _____	period	0	4	quantity	256	16
period	0	4					
quantity	256	16					
Incoming: 13%. Solve for q, then state the percent loss for the update. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Use $250q = 232.5$, where q is the retention factor. Your response: _____	Incoming: 40% per period. Determine the constant loss percentage for each of the two equal time intervals. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. <table border="1"> <thead> <tr> <th>time</th> <th>0</th> <th>2</th> </tr> </thead> <tbody> <tr> <td>value</td> <td>400</td> <td>225</td> </tr> </tbody> </table> Your response: _____	time	0	2	value	400	225
time	0	2					
value	400	225					
Incoming: 25% per interval. Solve for the admissible q and express the corresponding percent loss. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Use $1000q^3 = 729$ with $0 < q < 1$. Your response: _____	Incoming: $\frac{1}{3}$ is lost per period. For the positive decay factor q, state the percent lost per step. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Use $250q^2 = 40$. Your response: _____						

Algebra 1

Exponential Decay Models

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Choose the correct factor and state the loss represented by each rejected choice.

The amount loses 0.08% per hour. Choose among 0.92, 0.992, and 0.9992.

Audit the claimed pair and correctly interpret factor 0.23.

A student pairs a 23% loss with a factor of 0.23.

Determine Q_0 and verify it by a forward substitution.

Use $Q(n) = Q_0(0.9)^n$ with the observation $Q(2) = 243$.

Exponential Decay Models

Full Worked Solutions - excerpt

Worked example

Problem. Solve $X(0)(0.8)^3 = 64$ for $X(0)$.

Answer. $X(0) = 125$.

Explanation and check.

Because $(0.8)^3 = 0.512$, $X(0) = \frac{64}{0.512} = 125$.

Worked example

Problem. A sequence has constant ratio 0.9 and $A_7 = 196.83$. Find A_4 .

Answer. $A_4 = 270$.

Explanation and check.

There are three forward factors from index 4 to 7, so $A_4 = \frac{196.83}{(0.9)^3} = 270$.

Algebra 1
Linear vs Exponential Models

Linear vs Exponential Models | A1-U07-P17

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Linear vs Exponential Models.
8 PDFs and a README; 70 buyer pages.

Algebra 1

Linear vs Exponential Models

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Use the equal-step behavior to classify this table, including its one-unit factor. Use the complete requested model pair and predictions, or the classification with its decisive numerical change/factor, as the matching response. Retain all original assumptions, units and evidence qualifications.

Precision of given values: exact

x	y
-2	1
-1	3
0	9

Bank label: _____

Classify the relationship and quantify its unit change. Use the complete requested model pair and predictions, or the classification with its decisive numerical change/factor, as the matching response. Retain all original assumptions, units and evidence qualifications.

Precision of given values: exact

x	y
-1	6
0	4
1	2

Bank label: _____

Determine the relationship class and distinguish its ratios from its differences. Use the complete requested model pair and predictions, or the classification with its decisive numerical change/factor, as the matching response. Retain all original assumptions, units and evidence qualifications.

Precision of given values: exact

n	A
0	100
1	90
2	81
3	72.9

Bank label: _____

Classify the table and report the rate per one x -unit. Use the complete requested model pair and predictions, or the classification with its decisive numerical change/factor, as the matching response. Retain all original assumptions, units and evidence qualifications.

Precision of given values: exact

x	y
0	2
3	14
6	26

Bank label: _____

Algebra 1

Linear vs Exponential Models

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Account for the unequal x-gaps and classify the relationship. Precision of given values: exact <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 50%;">x</th> <th style="width: 50%;">y</th> </tr> </thead> <tbody> <tr><td>0</td><td>2</td></tr> <tr><td>1</td><td>4</td></tr> <tr><td>3</td><td>16</td></tr> </tbody> </table>	x	y	0	2	1	4	3	16	Use change per x-unit, not raw y-differences, to classify the table. Precision of given values: exact <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 50%;">x</th> <th style="width: 50%;">y</th> </tr> </thead> <tbody> <tr><td>0</td><td>4</td></tr> <tr><td>2</td><td>10</td></tr> <tr><td>5</td><td>19</td></tr> </tbody> </table>	x	y	0	4	2	10	5	19		
x	y																		
0	2																		
1	4																		
3	16																		
x	y																		
0	4																		
2	10																		
5	19																		
A student notices the first ratio is 2. Decide whether the whole table supports an exponential model. Precision of given values: exact <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 50%;">x</th> <th style="width: 50%;">y</th> </tr> </thead> <tbody> <tr><td>0</td><td>10</td></tr> <tr><td>1</td><td>20</td></tr> <tr><td>3</td><td>50</td></tr> </tbody> </table>	x	y	0	10	1	20	3	50	State why these rows alone do not select uniquely between the two model classes. Precision of given values: exact <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 50%;">x</th> <th style="width: 50%;">y</th> </tr> </thead> <tbody> <tr><td>0</td><td>2.5</td></tr> <tr><td>2</td><td>2.5</td></tr> <tr><td>5</td><td>2.5</td></tr> <tr><td>9</td><td>2.5</td></tr> </tbody> </table>	x	y	0	2.5	2	2.5	5	2.5	9	2.5
x	y																		
0	10																		
1	20																		
3	50																		
x	y																		
0	2.5																		
2	2.5																		
5	2.5																		
9	2.5																		
Do not decide from the first pair alone. Classify using all intervals. Precision of given values: exact <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 50%;">x</th> <th style="width: 50%;">y</th> </tr> </thead> <tbody> <tr><td>0</td><td>50</td></tr> <tr><td>1</td><td>45</td></tr> <tr><td>2</td><td>39</td></tr> <tr><td>3</td><td>32</td></tr> </tbody> </table>	x	y	0	50	1	45	2	39	3	32	Can the table alone establish a global linear or exponential mechanism? Explain. Model assumption: none <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 50%;">x</th> <th style="width: 50%;">y</th> </tr> </thead> <tbody> <tr><td>0</td><td>5</td></tr> <tr><td>1</td><td>10</td></tr> </tbody> </table>	x	y	0	5	1	10		
x	y																		
0	50																		
1	45																		
2	39																		
3	32																		
x	y																		
0	5																		
1	10																		

Algebra 1

Linear vs Exponential Models

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: Exponential decay with unit factor $\frac{1}{9}$.

Rewrite with one exponential base, then classify the change. Rule:

$$e(x) = 6 \frac{2^x}{3^x}$$

Your response: _____

Incoming: $L(x) = 100 + 10.5x$ gives 110.5; $E(x) = 100(1.1)^x$ gives 110, a difference of 0.5.

Build the models and evaluate both one unit after $x = 0$. Use the complete requested model pair and predictions, or the classification with its decisive numerical change/factor, as the matching response. Retain all original assumptions, units and evidence qualifications.

Target x : 1

Input	Given output
0	8
3	64

Your response: _____

Incoming: The linear rule $L(x) = 5x$ predicts 15; the exponential rule $E(x) = 2.5(2)^x$ predicts 20.

Build decreasing linear and exponential candidates through the rows and compare the missing middle value. Use the complete requested model pair and predictions, or the classification with its decisive numerical change/factor, as the matching response. Retain all original assumptions, units and evidence qualifications.

Target x : 1

x	y
0	16
2	4

Your response: _____

Incoming: $L(x) = 6x + 10$ gives 10; $E(x) = 8(2)^x$ gives 8 at $x = 0$.

Build linear and exponential candidates and fill the missing middle value. Use the complete requested model pair and predictions, or the classification with its decisive numerical change/factor, as the matching response. Retain all original assumptions, units and evidence qualifications.

Target x : -1

x	y
-2	9
0	1

Your response: _____

Algebra 1

Linear vs Exponential Models

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Classify the relationship as linear, exponential, neither, or ambiguous, and give the decisive equal-step pattern. Choose a first diagnostic test: compare output differences for equal input steps, or compare output ratios where division is defined. Explain why that test is useful for these exact rows, use it, and complete the original classification. If the first test is inconclusive, state what further check or model assumption is needed.

Precision of given values: exact

x	y
0	3
1	7
2	11

Determine the model class supported by all consecutive entries. Choose a first diagnostic test: compare output differences for equal input steps, or compare output ratios where division is defined. Explain why that test is useful for these exact rows, use it, and complete the original classification. If the first test is inconclusive, state what further check or model assumption is needed.

Precision of given values: exact

x	y
0	2
1	6
2	18
3	54

Linear vs Exponential Models

Full Worked Solutions - excerpt

Worked example

Problem. Rewrite q in coefficient-times-power form, then classify it. Rule: $q(x) = 2^{x+1}$

Answer. $q(x) = 2(2)^x$ is exponential with unit ratio 2.

Explanation and check.

The exponent rule $2^{x+1} = 2^x$ times 2 exposes the constant multiplicative factor.

Worked example

Problem. Simplify the formula and use a change calculation to classify it. Rule: $m(x) = 9\frac{x}{3} + 5$

Answer. $m(x) = 3x + 5$ is linear, and $m(x + 1) - m(x) = 3$.

Explanation and check.

Dividing the x -term by 3 gives a constant coefficient of 3.

Algebra 1
Classifying Polynomials

Classifying Polynomials | A1-U08-P01
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Classifying Polynomials.
8 PDFs and a README; 64 buyer pages.

Algebra 1

Classifying Polynomials

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Is the displayed expression a polynomial in x? Support the decision with its exponent structure. Work with the variable x. Consider $7x^4 - 3x^2 + x - 9$. _____ _____	Classify the expression as a polynomial or a nonexample in t, and identify the decisive term. Work with the variable t. Consider $5t^3 - 2t^{-1}$. _____ _____
Does this formula define a polynomial in z on the real numbers? Explain the role of the denominator. Work with the variable z. Consider $z^2 + \frac{6}{z}$. _____ _____	A classmate rejects this expression because $\sqrt{2}$ is irrational. Decide whether the classmate is correct. Work with the variable x. Consider $\sqrt{2}x^3 - 4x + 1$. _____ _____
When q is the stated variable, is -13 a polynomial? State the exponent interpretation that applies. _____ _____	Determine whether fractional coefficients prevent this from being a polynomial in m. Work with the variable m. Consider $(\frac{3}{5})m^5 - (\frac{7}{2})m^2 + 8$. _____ _____

Algebra 1

Classifying Polynomials

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: It is the nonzero constant 3, so its degree is 0 and leading coefficient is 3.

Cancel the top-degree pair and combine the next degree before stating the leading information. Use all originally requested signed terms/classification or degree/leading-coefficient information as the matching response, including the simplified polynomial when requested. Retain the original explanation.

Work with the variable d .

Consider $4d^9 + 2d^4 - 6d - 4d^9 + 3d^4$.

Your response: _____

Incoming: The leading coefficient is -2 and the degree is 8.

State the degree and leading coefficient, and identify the tempting but irrelevant large coefficient. Use all originally requested signed terms/classification or degree/leading-coefficient information as the matching response, including the simplified polynomial when requested. Retain the original explanation.

Work with the variable x .

Consider $x^{10} - 1000x^9 + 2$.

Your response: _____

Incoming: The polynomial is $(\frac{1}{3})t^9 - 2t^4 + 1000$; degree 9, leading coefficient $\frac{1}{3}$.

Give the degree and leading coefficient, then write the complete coefficient vector down through the constant term. Use all originally requested signed terms/classification or degree/leading-coefficient information as the matching response, including the simplified polynomial when requested. Retain the original explanation.

Work with the variable w .

Consider $-4w^7 + 3w^4 - w + 6$.

Your response: _____

Incoming: Degree 7, leading coefficient -4 ; vector $[-4, 0, 0, 3, 0, 0, -1, 6]$.

Use the nonzero-coefficient specification to write the leading term and determine the degree and leading coefficient.

Work with the variable n .

All other coefficients: 0

Power	Given coefficient
12	-2
5	700
0	-1

Your response: _____

Algebra 1

Classifying Polynomials

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Combine like powers before determining the degree and leading coefficient. Choose a simplification method before naming the degree: collect coefficients in a descending-power list/table, or combine visible like-power groups directly. Explain your choice for this expression, use it, and then determine the requested degree and leading coefficient from the surviving terms.

Work with the variable x .

Consider $5x^4 - 3x^2 + 7x - 5x^4$.

Which term becomes leading after simplification, and what degree follows? Choose a simplification method before naming the degree: collect coefficients in a descending-power list/table, or combine visible like-power groups directly. Explain your choice for this expression, use it, and then determine the requested degree and leading coefficient from the surviving terms.

Work with the variable y .

Consider $2y^6 + y^3 - 4 - 2y^6 + 7y$.

Classifying Polynomials

Full Worked Solutions - excerpt

Worked example

Problem. When q is the stated variable, is -13 a polynomial? State the exponent interpretation that applies.

Answer. Yes. It is the constant polynomial $-13q^0$.

Explanation and check.

A nonzero constant is a polynomial of degree 0 because it can be viewed as a coefficient times q^0 .

Worked example

Problem. Is the displayed expression a polynomial in x ? Support the decision with its exponent structure.

Work with the variable x .

Consider $7x^4 - 3x^2 + x - 9$.

Answer. Yes. Every exponent of x is a nonnegative integer.

Explanation and check.

The powers are 4, 2, 1, and 0, so the expression meets the polynomial exponent condition.

Algebra 1
Adding and Subtracting Polynomials

Adding and Subtracting Polynomials | A1-U08-P02

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
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Topic focus
This topic is a focused set of 96 practice tasks on Adding and Subtracting Polynomials.
8 PDFs and a README; 78 buyer pages.

Algebra 1

Adding and Subtracting Polynomials

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Verify the three upper-degree cancellations and give the lower-degree sum. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	w
Addends	$w^{11} + 2w^7 - w, -4w^{11} + w^4 + 3,$ $3w^{11} - 2w^7 - w^4 + 5w$

Bank label: _____

Use sixths to test both high-degree columns, then finish the lower-degree sum. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	y
Addends	$(\frac{5}{6})y^8 - (\frac{2}{3})y^5 + y,$ $-(\frac{1}{3})y^8 + (\frac{7}{6})y^5 - 2,$ $-(\frac{1}{2})y^8 - (\frac{1}{2})y^5 - 3y + 5$

Bank label: _____

Create signed totals from power 9 down to power 0 and simplify the four-polynomial sum. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	x
Addends	$3x^9 - 2x^6 + x^2, -5x^9 + x^7 + 4x^6,$ $2x^9 - x^7 - 2x^6 + 3x, -x^2 + 8$

Bank label: _____

Interpret the three coefficient maps, combine matching powers, and write the polynomial they sum to. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	z
Addends	(Power 7 4; Power 3 -2; Power 0 1), (Power 7 -1; Power 5 6; Power 3 5), (Power 7 -3; Power 5 -6; Power 1 2; Power 0 -4)

Bank label: _____

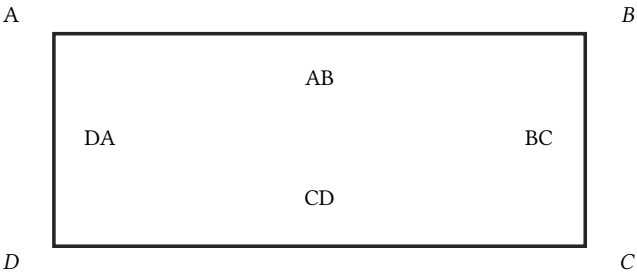
Algebra 1

Adding and Subtracting Polynomials

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

The diagram lists every side of rectangle ABCD. Combine the four labels to express its perimeter.



Boundary order only; not drawn to scale. Exact labels are in the table.

Shape	rectangle ABCD	
Boundary order	AB, BC, CD, DA	
Segment labels	AB	$3x + 2$
	BC	$x + 5$
	CD	$3x + 2$
	DA	$x + 5$
Included segments	AB, BC, CD, DA	
Units	meters	

Algebra 1

Adding and Subtracting Polynomials

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $-d + 6$. Simplify the high powers and state the final standard form. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Variable</td> <td>u</td> </tr> <tr> <td>Addends</td> <td>$u^6 - 2u^3 + u, 4u^3 - 5, -u^6 - 2u^3 + 3u + 1$</td> </tr> </table> Your response: _____	Variable	u	Addends	$u^6 - 2u^3 + u, 4u^3 - 5, -u^6 - 2u^3 + 3u + 1$	Incoming: $5m^2 + 2m + 5$. Add without inserting unnecessary zero terms in the final standard form. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Variable</td> <td>p</td> </tr> <tr> <td>Addends</td> <td>$p^{10} + p, -4p^7 + 2, 3p^7 - 5p + 6$</td> </tr> </table> Your response: _____	Variable	p	Addends	$p^{10} + p, -4p^7 + 2, 3p^7 - 5p + 6$
Variable	u								
Addends	$u^6 - 2u^3 + u, 4u^3 - 5, -u^6 - 2u^3 + 3u + 1$								
Variable	p								
Addends	$p^{10} + p, -4p^7 + 2, 3p^7 - 5p + 6$								
Incoming: $3v^6 - 2v^2 + 7$. Align the missing columns and write the total in standard form. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Variable</td> <td>x</td> </tr> <tr> <td>Addends</td> <td>$x^3 - 4x + 9, -2x^2 + 7x - 1, 5x^2 - 3$</td> </tr> </table> Your response: _____	Variable	x	Addends	$x^3 - 4x + 9, -2x^2 + 7x - 1, 5x^2 - 3$	Incoming: $2s - 7$. Add the decimal coefficient pairs and express whole-number totals simply. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Variable</td> <td>t</td> </tr> <tr> <td>Addends</td> <td>$0.75t^4 - 0.5t + 2, 0.25t^4 + 1.5t - 6$</td> </tr> </table> Your response: _____	Variable	t	Addends	$0.75t^4 - 0.5t + 2, 0.25t^4 + 1.5t - 6$
Variable	x								
Addends	$x^3 - 4x + 9, -2x^2 + 7x - 1, 5x^2 - 3$								
Variable	t								
Addends	$0.75t^4 - 0.5t + 2, 0.25t^4 + 1.5t - 6$								
START Combine the rational cubic coefficients and simplify every other column. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Variable</td> <td>z</td> </tr> <tr> <td>Addends</td> <td>$(\frac{1}{2})z^3 - 2z, (\frac{3}{4})z^3 + 5z - 1$</td> </tr> </table> Your response: _____	Variable	z	Addends	$(\frac{1}{2})z^3 - 2z, (\frac{3}{4})z^3 + 5z - 1$	Incoming: $(\frac{1}{2})r^5 - r^2 + 5$. Simplify the seventh-, fifth-, first-, and zero-power columns in turn. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Variable</td> <td>s</td> </tr> <tr> <td>Addends</td> <td>$s^7 - 3s + 2, -2s^7 + s^5 + s, s^7 - s^5 + 4s - 9$</td> </tr> </table> Your response: _____	Variable	s	Addends	$s^7 - 3s + 2, -2s^7 + s^5 + s, s^7 - s^5 + 4s - 9$
Variable	z								
Addends	$(\frac{1}{2})z^3 - 2z, (\frac{3}{4})z^3 + 5z - 1$								
Variable	s								
Addends	$s^7 - 3s + 2, -2s^7 + s^5 + s, s^7 - s^5 + 4s - 9$								

Algebra 1

Adding and Subtracting Polynomials

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Add the two polynomials by matching equal powers. Choose an organization method: align equal powers in coefficient columns, or collect matching signed terms horizontally. Explain why your choice fits these polynomials, use it, and keep every missing-power position and sign correct.

Variable	x
Addends	$3x^2 + 2x - 5, 4x^2 - x + 7$

Find the standard-form sum of the displayed binomials. Choose an organization method: align equal powers in coefficient columns, or collect matching signed terms horizontally. Explain why your choice fits these polynomials, use it, and keep every missing-power position and sign correct.

Variable	y
Addends	$5y^3 - 2, -2y^3 + 6$

Adding and Subtracting Polynomials

Full Worked Solutions - excerpt

Worked example

Problem. Verify the three upper-degree cancellations and give the lower-degree sum. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	w
Addends	$w^{11} + 2w^7 - w, -4w^{11} + w^4 + 3, 3w^{11} - 2w^7 - w^4 + 5w$

Answer. $4w + 3$.

Explanation and check.

Powers 11, 7, and 4 all total zero; $-w + 5w = 4w$ and the constant is 3.

Worked example

Problem. Add each represented degree and report the sparse remainder. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	d
Addends	$5d^8 - d^5 + 2d^2, -2d^8 + 4d^5 - d, -3d^8 - 3d^5 - 2d^2 + 6$

Answer. $-d + 6$.

Explanation and check.

Powers 8, 5, and 2 each total zero; the unmatched lower terms are $-d$ and 6.

Algebra 1
Multiplying Monomials

Multiplying Monomials | A1-U08-P03
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Multiplying Monomials.
8 PDFs and a README; 79 buyer pages.

Algebra 1

Multiplying Monomials

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Resolve the zero exponent and the two coefficient signs before combining powers. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification. <table border="1"> <tr> <td>Factors</td> <td>$-6m^2n^0p^3, -5mn^4p$</td> </tr> </table> _____ Bank label: _____	Factors	$-6m^2n^0p^3, -5mn^4p$	Determine the sign and simplify the three exponent sums. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification. <table border="1"> <tr> <td>Factors</td> <td>$9q^2r^5s, -(\frac{1}{3})q^3rs^2$</td> </tr> </table> _____ Bank label: _____	Factors	$9q^2r^5s, -(\frac{1}{3})q^3rs^2$
Factors	$-6m^2n^0p^3, -5mn^4p$				
Factors	$9q^2r^5s, -(\frac{1}{3})q^3rs^2$				
Use the decimal coefficient exactly and merge the shared variable factors. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification. <table border="1"> <tr> <td>Factors</td> <td>$-12x^4y, -0.25x^2y^2$</td> </tr> </table> _____ Bank label: _____	Factors	$-12x^4y, -0.25x^2y^2$	Reduce the signed rational coefficient and simplify both powers. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification. <table border="1"> <tr> <td>Factors</td> <td>$(\frac{5}{8})a^3b^4, -(\frac{16}{15})ab^2$</td> </tr> </table> _____ Bank label: _____	Factors	$(\frac{5}{8})a^3b^4, -(\frac{16}{15})ab^2$
Factors	$-12x^4y, -0.25x^2y^2$				
Factors	$(\frac{5}{8})a^3b^4, -(\frac{16}{15})ab^2$				
Keep the coefficient in decimal form and combine the variables. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification. <table border="1"> <tr> <td>Factors</td> <td>$0.6c^2d^3, -1.5c^5d$</td> </tr> </table> _____ Bank label: _____	Factors	$0.6c^2d^3, -1.5c^5d$	Combine the repeated bases and retain the new w factor. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification. <table border="1"> <tr> <td>Factors</td> <td>$7uv^6, -2u^3v^2w^4$</td> </tr> </table> _____ Bank label: _____	Factors	$7uv^6, -2u^3v^2w^4$
Factors	$0.6c^2d^3, -1.5c^5d$				
Factors	$7uv^6, -2u^3v^2w^4$				
Reduce the coefficient before reporting the three-variable product. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification. <table border="1"> <tr> <td>Factors</td> <td>$-10g^2h^3k, (\frac{3}{5})gh^2k^4$</td> </tr> </table> _____ Bank label: _____	Factors	$-10g^2h^3k, (\frac{3}{5})gh^2k^4$	Show the rational reduction and high-power consolidation in the product. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification. <table border="1"> <tr> <td>Factors</td> <td>$-(\frac{3}{8})x^7y^2, -(\frac{16}{9})x^3y^5$</td> </tr> </table> _____ Bank label: _____	Factors	$-(\frac{3}{8})x^7y^2, -(\frac{16}{9})x^3y^5$
Factors	$-10g^2h^3k, (\frac{3}{5})gh^2k^4$				
Factors	$-(\frac{3}{8})x^7y^2, -(\frac{16}{9})x^3y^5$				

Algebra 1

Multiplying Monomials

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Decide whether exponent work is needed before giving the product. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Factors</td> <td>$0z^7w^2, -3zw$</td> </tr> </table> 	Factors	$0z^7w^2, -3zw$	Find the product and state why adding the displayed exponents does not give its degree. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Factors</td> <td>$0m^6n, -17m^2n^8$</td> </tr> </table> 	Factors	$0m^6n, -17m^2n^8$								
Factors	$0z^7w^2, -3zw$												
Factors	$0m^6n, -17m^2n^8$												
Compute the exact monomial product and its total degree. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Factors</td> <td>$(\frac{7}{12})s^4t^3, -(\frac{18}{35})s^2t^5u$</td> </tr> </table> 	Factors	$(\frac{7}{12})s^4t^3, -(\frac{18}{35})s^2t^5u$	First simplify the monomial product; then evaluate it at $x = -1$ and $y = 2$. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Factors</td> <td colspan="2">$-3x^4y, 2x^2y^3$</td> </tr> <tr> <td>Evaluation</td> <td colspan="2"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">x</td> <td>-1</td> </tr> <tr> <td>y</td> <td>2</td> </tr> </table> </td> </tr> </table> 	Factors	$-3x^4y, 2x^2y^3$		Evaluation	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">x</td> <td>-1</td> </tr> <tr> <td>y</td> <td>2</td> </tr> </table>		x	-1	y	2
Factors	$(\frac{7}{12})s^4t^3, -(\frac{18}{35})s^2t^5u$												
Factors	$-3x^4y, 2x^2y^3$												
Evaluation	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">x</td> <td>-1</td> </tr> <tr> <td>y</td> <td>2</td> </tr> </table>		x	-1	y	2							
x	-1												
y	2												
After applying the given parameter value, decide which part of the four-factor product controls the result. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Factors</td> <td colspan="2">$-5z^2w, cz^3, 7w^5, -z$</td> </tr> <tr> <td>Parameter value</td> <td colspan="2"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">c</td> <td>0</td> </tr> </table> </td> </tr> </table> 	Factors	$-5z^2w, cz^3, 7w^5, -z$		Parameter value	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">c</td> <td>0</td> </tr> </table>		c	0	Simplify the five factors and report the total degree of the resulting monomial. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Factors</td> <td colspan="2">$2x^2y, -3xy^2, (\frac{1}{2})z^3, -4xz, y$</td> </tr> </table> 	Factors	$2x^2y, -3xy^2, (\frac{1}{2})z^3, -4xz, y$		
Factors	$-5z^2w, cz^3, 7w^5, -z$												
Parameter value	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">c</td> <td>0</td> </tr> </table>		c	0									
c	0												
Factors	$2x^2y, -3xy^2, (\frac{1}{2})z^3, -4xz, y$												

Algebra 1

Multiplying Monomials

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $-14r^4s^4$. Interpret the unit coefficient and zero power, then simplify the product. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification. <table border="1"> <tr> <td>Factors</td> <td>$-x^5y^2, 6x^0y^3$</td> </tr> </table> Your response: _____	Factors	$-x^5y^2, 6x^0y^3$	Incoming: $6c^7d^3$. Cancel within the numerical product, then combine the literal factors. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification. <table border="1"> <tr> <td>Factors</td> <td>$14k^2l, (\frac{3}{7})kl^4$</td> </tr> </table> Your response: _____	Factors	$14k^2l, (\frac{3}{7})kl^4$
Factors	$-x^5y^2, 6x^0y^3$				
Factors	$14k^2l, (\frac{3}{7})kl^4$				
Incoming: $-15a^3b^5c^4$. Determine the positive product created by the two signed factors. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification. <table border="1"> <tr> <td>Factors</td> <td>$-4mn^3p^2, -2m^4np$</td> </tr> </table> Your response: _____	Factors	$-4mn^3p^2, -2m^4np$	Incoming: $2p^3q^6$. Give the exact product without a decimal coefficient. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification. <table border="1"> <tr> <td>Factors</td> <td>$-(\frac{2}{3})r^3s^2, 9rs$</td> </tr> </table> Your response: _____	Factors	$-(\frac{2}{3})r^3s^2, 9rs$
Factors	$-4mn^3p^2, -2m^4np$				
Factors	$-(\frac{2}{3})r^3s^2, 9rs$				
START Multiply the two monomials and write one simplified term. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification. <table border="1"> <tr> <td>Factors</td> <td>$3x, 4y$</td> </tr> </table> Your response: _____	Factors	$3x, 4y$	Incoming: $10cd^2$. Multiply and combine each repeated variable base. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification. <table border="1"> <tr> <td>Factors</td> <td>$4x^2y, 3xy^3$</td> </tr> </table> Your response: _____	Factors	$4x^2y, 3xy^3$
Factors	$3x, 4y$				
Factors	$4x^2y, 3xy^3$				

Algebra 1

Multiplying Monomials

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Multiply the three factors and collect matching variables. Choose an organization route: multiply the signed coefficients and collect each variable group separately, or multiply the monomial factors successively. Explain why the route is useful for these factors, use it, and preserve every exponent and sign.

Factors	$2x, 3y, 4xy$
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Use the number of negative factors to determine the sign, then simplify. Choose an organization route: multiply the signed coefficients and collect each variable group separately, or multiply the monomial factors successively. Explain why the route is useful for these factors, use it, and preserve every exponent and sign.

Factors	$-a^2, 5ab, -2b^3$
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Group coefficient, m , and n factors before multiplying. Choose an organization route: multiply the signed coefficients and collect each variable group separately, or multiply the monomial factors successively. Explain why the route is useful for these factors, use it, and preserve every exponent and sign.

Factors	$3m^2n, -2mn^3, 5m$
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Simplify and explain why the final sign is negative. Choose an organization route: multiply the signed coefficients and collect each variable group separately, or multiply the monomial factors successively. Explain why the route is useful for these factors, use it, and preserve every exponent and sign.

Factors	$-4p, -q^2, -3pq$
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Multiplying Monomials

Full Worked Solutions - excerpt

Worked example

Problem. Decide whether exponent work is needed before giving the product.

Factors	$0z^7w^2, -3zw$
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Answer. The product is zero.

Explanation and check.

A coefficient of zero makes the first factor zero. The zero-product property settles the result before any exponents are combined.

Worked example

Problem. Write the signed product as a single monomial.

Factors	$7pq, -q$
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Answer. $-7pq^2$.

Explanation and check.

The coefficient becomes -7 . The two q factors combine to q^2 , while p appears once.

Algebra 1
Monomial Times Polynomial

Monomial Times Polynomial | A1-U08-P04

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8 PDFs and a README; 68 buyer pages.

Algebra 1

Monomial Times Polynomial

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Form three exact products while keeping c and d exponent sums separate. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements. <table border="1"> <tr> <td>Expression</td> <td>$7c^2d(-2c^3 + 3cd - d^2)$</td> </tr> </table> _____ Bank label: _____	Expression	$7c^2d(-2c^3 + 3cd - d^2)$	Apply the same r^2s^3 factor to every inside term. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements. <table border="1"> <tr> <td>Expression</td> <td>$3r^2s^3(2rs - 5s^2 + 4)$</td> </tr> </table> _____ Bank label: _____	Expression	$3r^2s^3(2rs - 5s^2 + 4)$
Expression	$7c^2d(-2c^3 + 3cd - d^2)$				
Expression	$3r^2s^3(2rs - 5s^2 + 4)$				
Expand, taking special care with the negative middle term. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements. <table border="1"> <tr> <td>Expression</td> <td>$-2x^2y(3xy^2 - 4x^2 + y^3)$</td> </tr> </table> _____ Bank label: _____	Expression	$-2x^2y(3xy^2 - 4x^2 + y^3)$	Multiply the outside monomial by the two variable terms and the constant. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements. <table border="1"> <tr> <td>Expression</td> <td>$4ab^3(-a^2b + 2ab^2 - 3)$</td> </tr> </table> _____ Bank label: _____	Expression	$4ab^3(-a^2b + 2ab^2 - 3)$
Expression	$-2x^2y(3xy^2 - 4x^2 + y^3)$				
Expression	$4ab^3(-a^2b + 2ab^2 - 3)$				
Distribute $-8r^2s$ and simplify both fractional coefficient products. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements. <table border="1"> <tr> <td>Expression</td> <td>$-8r^2s((\frac{1}{4})r^3s^2 - (\frac{1}{2})rs + 3)$</td> </tr> </table> _____ Bank label: _____	Expression	$-8r^2s((\frac{1}{4})r^3s^2 - (\frac{1}{2})rs + 3)$	Multiply each decimal coefficient and preserve the c-d exponent pattern. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements. <table border="1"> <tr> <td>Expression</td> <td>$2.5cd^2(4c^2 - 1.2cd + 0.8d^2)$</td> </tr> </table> _____ Bank label: _____	Expression	$2.5cd^2(4c^2 - 1.2cd + 0.8d^2)$
Expression	$-8r^2s((\frac{1}{4})r^3s^2 - (\frac{1}{2})rs + 3)$				
Expression	$2.5cd^2(4c^2 - 1.2cd + 0.8d^2)$				
Track four sign interactions produced by the negative outside factor. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements. <table border="1"> <tr> <td>Expression</td> <td>$-7mn^2(-2m^3 + 3mn - 5n^2 + 1)$</td> </tr> </table> _____ Bank label: _____	Expression	$-7mn^2(-2m^3 + 3mn - 5n^2 + 1)$	Produce one exact product for each of the four sparse terms. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements. <table border="1"> <tr> <td>Expression</td> <td>$2p^2q^3(3p^4 - 2p^2q + q^2 - 6)$</td> </tr> </table> _____ Bank label: _____	Expression	$2p^2q^3(3p^4 - 2p^2q + q^2 - 6)$
Expression	$-7mn^2(-2m^3 + 3mn - 5n^2 + 1)$				
Expression	$2p^2q^3(3p^4 - 2p^2q + q^2 - 6)$				

Algebra 1

Monomial Times Polynomial

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

A one-row product table has row factor $3x$. Fill the missing cell under the column term $-x$. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <td style="padding: 2px 10px;">$\times$</td> <td style="padding: 2px 10px;">$2x^2$</td> <td style="padding: 2px 10px;">$-x$</td> <td style="padding: 2px 10px;">4</td> </tr> <tr> <td style="padding: 2px 10px;">$3x$</td> <td style="padding: 2px 10px;">$6x^3$</td> <td style="padding: 2px 10px;">_____</td> <td style="padding: 2px 10px;">$12x$</td> </tr> </table>	$\times$	$2x^2$	$-x$	4	$3x$	$6x^3$	_____	$12x$	The diagram sends the common factor $-2a^2$ to each of three column terms. What belongs in the branch ending at b? <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <td style="padding: 2px 10px;">$\times$</td> <td style="padding: 2px 10px;">$3a$</td> <td style="padding: 2px 10px;">-4</td> <td style="padding: 2px 10px;">b</td> </tr> <tr> <td style="padding: 2px 10px;">$-2a^2$</td> <td style="padding: 2px 10px;">$-6a^3$</td> <td style="padding: 2px 10px;">$8a^2$</td> <td style="padding: 2px 10px;">_____</td> </tr> </table>	$\times$	$3a$	-4	b	$-2a^2$	$-6a^3$	$8a^2$	_____
$\times$	$2x^2$	$-x$	4														
$3x$	$6x^3$	_____	$12x$														
$\times$	$3a$	-4	b														
$-2a^2$	$-6a^3$	$8a^2$	_____														
Use the labeled row factor and the middle product cell to recover the missing column term. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <td style="padding: 2px 10px;">$\times$</td> <td style="padding: 2px 10px;">$2m^2$</td> <td style="padding: 2px 10px;">?</td> <td style="padding: 2px 10px;">4</td> </tr> <tr> <td style="padding: 2px 10px;">$5m$</td> <td style="padding: 2px 10px;">$10m^3$</td> <td style="padding: 2px 10px;">$-15m^2$</td> <td style="padding: 2px 10px;">$20m$</td> </tr> </table>	$\times$	$2m^2$	?	4	$5m$	$10m^3$	$-15m^2$	$20m$	Exactly one cell in the row does not equal its row factor times column term. Identify and repair it. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <td style="padding: 2px 10px;">$\times$</td> <td style="padding: 2px 10px;">$2p$</td> <td style="padding: 2px 10px;">-3</td> <td style="padding: 2px 10px;">q</td> </tr> <tr> <td style="padding: 2px 10px;">$4p^2$</td> <td style="padding: 2px 10px;">$8p^3$</td> <td style="padding: 2px 10px;">$-12p$</td> <td style="padding: 2px 10px;">$4p^2q$</td> </tr> </table>	$\times$	$2p$	-3	q	$4p^2$	$8p^3$	$-12p$	$4p^2q$
$\times$	$2m^2$	?	4														
$5m$	$10m^3$	$-15m^2$	$20m$														
$\times$	$2p$	-3	q														
$4p^2$	$8p^3$	$-12p$	$4p^2q$														

Algebra 1

Monomial Times Polynomial

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $-6t^5 - 2.4t^3 + 12t$. Reduce the denominator 5 against each coefficient and combine powers. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements. <table border="1"> <tr> <td>Expression</td> <td>$(\frac{3}{5})p^2q(10p^3 - 5pq^2 + 15q)$</td> </tr> </table> Your response: _____	Expression	$(\frac{3}{5})p^2q(10p^3 - 5pq^2 + 15q)$	Incoming: $-5x^6 + 2x^4 - x^3 + 9x^2$. Scale the three coefficients by 1.5 and combine matching bases. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements. <table border="1"> <tr> <td>Expression</td> <td>$1.5pq^2(2p^3 - 4pq + 6q^2)$</td> </tr> </table> Your response: _____	Expression	$1.5pq^2(2p^3 - 4pq + 6q^2)$
Expression	$(\frac{3}{5})p^2q(10p^3 - 5pq^2 + 15q)$				
Expression	$1.5pq^2(2p^3 - 4pq + 6q^2)$				
Incoming: $6m^7 - 12m^5 + 3m^3 - 18m^2$. State the expanded result and explain what happens to the four distinct terms. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements. <table border="1"> <tr> <td>Expression</td> <td>$0(7x^6 - 3x^2y + 5y^4 - 11)$</td> </tr> </table> Your response: _____	Expression	$0(7x^6 - 3x^2y + 5y^4 - 11)$	Incoming: $-1.5y^2 + y$. Expand the three groups separately and then total each degree column. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements. <table border="1"> <tr> <td>Expression</td> <td>$2t(t^2 - t + 3) + 3t(-t^2 + 2t - 1) - t(t^2 + 4)$</td> </tr> </table> Your response: _____	Expression	$2t(t^2 - t + 3) + 3t(-t^2 + 2t - 1) - t(t^2 + 4)$
Expression	$0(7x^6 - 3x^2y + 5y^4 - 11)$				
Expression	$2t(t^2 - t + 3) + 3t(-t^2 + 2t - 1) - t(t^2 + 4)$				
Incoming: $3y^5 - 2y^3 + 4y^2$. Multiply the decimal factor across the sparse polynomial. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements. <table border="1"> <tr> <td>Expression</td> <td>$-1.2t(5t^4 + 2t^2 - 10)$</td> </tr> </table> Your response: _____	Expression	$-1.2t(5t^4 + 2t^2 - 10)$	Incoming: $-2t^3 + 4t^2 - t$. After distributing, determine the single term left by cancellation. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements. <table border="1"> <tr> <td>Expression</td> <td>$4c(c^2 - d) + 2c(-2c^2 + 3d)$</td> </tr> </table> Your response: _____	Expression	$4c(c^2 - d) + 2c(-2c^2 + 3d)$
Expression	$-1.2t(5t^4 + 2t^2 - 10)$				
Expression	$4c(c^2 - d) + 2c(-2c^2 + 3d)$				

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Monomial Times Polynomial

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Distribute the monomial to both terms. Choose a distribution organization: use a one-row partial-product table, or connect the outside monomial to each signed term directly in order. Explain your choice, use it, and retain every original sign and requested term order.

Expression	$2x(x + 3)$
------------	-------------

Apply the outside factor to the variable term and the constant. Choose a distribution organization: use a one-row partial-product table, or connect the outside monomial to each signed term directly in order. Explain your choice, use it, and retain every original sign and requested term order.

Expression	$3a(a - 4)$
------------	-------------

Track the negative multiplier across the entire binomial. Choose a distribution organization: use a one-row partial-product table, or connect the outside monomial to each signed term directly in order. Explain your choice, use it, and retain every original sign and requested term order.

Expression	$-2m(m + 5)$
------------	--------------

Find both partial products and give the expanded polynomial. Choose a distribution organization: use a one-row partial-product table, or connect the outside monomial to each signed term directly in order. Explain your choice, use it, and retain every original sign and requested term order.

Expression	$4p(2p + 1)$
------------	--------------

Monomial Times Polynomial

Full Worked Solutions - excerpt

Worked example

Problem. Expand the product and verify whether every resulting term has the same total degree.

Expression	$5a^2b(-2a^3b^2 + 3ab^4 - 4b^5)$
------------	----------------------------------

Answer. $-10a^5b^3 + 15a^3b^5 - 20a^2b^6$; every term has total degree 8.

Explanation and check.

Distribution gives the three monomials shown. Their exponent sums are $5 + 3$, $3 + 5$, and $2 + 6$, each equal to 8.

Worked example

Problem. State the expanded result and explain what happens to the four distinct terms. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$0(7x^6 - 3x^2y + 5y^4 - 11)$
------------	-------------------------------

Answer. 0.

Explanation and check.

Every partial product has factor 0, so all four terms become 0 and their sum is the zero polynomial.

Algebra 1
Multiplying Binomials and Larger Polynomials

Multiplying Binomials and Larger Polynomials | A1-U08-P05

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Multiplying Binomials and Larger Polynomials.
8 PDFs and a README; 56 buyer pages.

Algebra 1

Multiplying Binomials and Larger Polynomials

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Multiply all four term pairs and keep unlike x-y monomials separate. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(2x - 1)(x^2 + 3y)$ _____ Bank label: _____	Expand the four products and do not merge terms with different total degrees. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(3a + 2b^2)(a - b)$ _____ Bank label: _____
Generate every row-column pairing and order the resulting monomials by total degree. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(m^2 - 3n)(2m + n^2)$ _____ Bank label: _____	Expand the product, tracking the negative quadratic term through both columns. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(-2p^2 + q)(p + 4q^2)$ _____ Bank label: _____
Multiply all four term pairs and retain both rs and rs^2 as distinct terms. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(5r - 2s^2)(-r + 3s)$ _____ Bank label: _____	Create the complete four-product expansion for the two high-degree binomials. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(x^3 + 2y)(2x^2 - 3y^2)$ _____ Bank label: _____
Expand the product and explain which two partial products create the quadratic coefficient. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(-3x^2 + 2x)(4x - 5)$ _____ Bank label: _____	Expand and order the four monomials by total degree, breaking ties by the exponent of a. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(2a^3 - 3b)(-a^2 + 4b^2)$ _____ Bank label: _____

Algebra 1

Multiplying Binomials and Larger Polynomials

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Expand the product and report how the two mn contributions determine the final mixed coefficient. Expression: $(3m + 2n)(2m - 3n)$ _____ _____	Expand the product first, then evaluate the resulting polynomial at $r = -2$. Expression: $(2r^2 - 3)(r + 4)$ Evaluation: $r = -2$ _____ _____																		
Write the four-term expansion, then use it to find the value at $x = 1$ and $y = -1$. Expression: $(x^2 - 2y)(3x + 4y^2)$ Evaluation: $x = 1; y = -1$ _____ _____	Fill the lower-right product cell, then add all four cells to form the final polynomial. <table border="1"> <tbody> <tr> <td>$\times$</td> <td>x</td> <td>3</td> </tr> <tr> <td>x</td> <td>x^2</td> <td>$3x$</td> </tr> <tr> <td>2</td> <td>$2x$</td> <td>_____</td> </tr> </tbody> </table> _____ _____	$\times$	x	3	x	x^2	$3x$	2	$2x$	_____									
$\times$	x	3																	
x	x^2	$3x$																	
2	$2x$	_____																	
Complete the branch from row term $2a$ to column term 4, then combine the grid. <table border="1"> <tbody> <tr> <td>$\times$</td> <td>a</td> <td>4</td> </tr> <tr> <td>$2a$</td> <td>$2a^2$</td> <td>_____</td> </tr> <tr> <td>-1</td> <td>$-a$</td> <td>-4</td> </tr> </tbody> </table> _____ _____	$\times$	a	4	$2a$	$2a^2$	_____	-1	$-a$	-4	Use both cells in the first row to recover its term label, then write the collected product. <table border="1"> <tbody> <tr> <td>$\times$</td> <td>m</td> <td>2</td> </tr> <tr> <td>_____</td> <td>m^2</td> <td>$2m$</td> </tr> <tr> <td>-3</td> <td>$-3m$</td> <td>-6</td> </tr> </tbody> </table> _____ _____	$\times$	m	2	_____	m^2	$2m$	-3	$-3m$	-6
$\times$	a	4																	
$2a$	$2a^2$	_____																	
-1	$-a$	-4																	
$\times$	m	2																	
_____	m^2	$2m$																	
-3	$-3m$	-6																	

Algebra 1

Multiplying Binomials and Larger Polynomials

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $3x^2 + 5xy - 2y^2$. Expand and group terms by a^2, ab, and b^2. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(2a-b)(a+4b)$ Your response: _____	Incoming: $2r^3 - 7r^2 - 15r$. Multiply all x-y term pairs and combine the xy products. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(x+2y)(3x-y)$ Your response: _____
Incoming: $8m^2-10m-3$. Track the negative leading coefficient through both terms of the second factor. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(-2r+3)(r+7)$ Your response: _____	Incoming: $3m^3+5m^2-2m$. Create the four products and combine the two quadratic terms. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(2r^2+3r)(r-5)$ Your response: _____
Incoming: $3a^3 + a^2b - 6ab - 2b^2$. Keep the linear coefficient exact while combining the two cross products. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $((\frac{1}{2})x+3)(4x-5)$ Your response: _____	Incoming: $2x^2 + 13x + 15$. Multiply all term pairs and collect the linear contributions. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(4m+1)(2m-3)$ Your response: _____

Algebra 1

Multiplying Binomials and Larger Polynomials

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Expand exactly and verify that the quadratic contributions cancel despite unequal coefficients.

Expression: $(3a - 4)(2a^2 + (\frac{8}{3})a - 5)$

Expand the product, then verify from the standard form that $x = 1$ makes its value zero.

Expression: $(x + 1)(2x^2 - 5x + 3)$ Check Value: $x = 1$

Choose a so the expanded product has no x^2 term, then give the complete resulting polynomial.

Expression: $(2x + a)(3x^2 - 4x + 5)$

Choose an initial pair, record its quadratic product, and then expand by the remaining factor. Explain why your chosen initial pair is useful for keeping the intermediate terms organized, then retain the original requirement to record that intermediate product and multiply by the remaining factor.

Expression: $(x + 1)(x + 2)(x + 3)$

Multiplying Binomials and Larger Polynomials

Full Worked Solutions - excerpt

Worked example

Problem. Form the linear-pair quadratic, multiply by the sparse third factor, and order by descending x exponent.

Expression: $(x - y)(x + 2y)(x^2 + y^2)$

Answer. $x^4 + x^3y - x^2y^2 + xy^3 - 2y^4$.

Explanation and check.

The linear pair is $x^2 + xy - 2y^2$. Multiplication by $x^2 + y^2$ yields the five-term result after the x^2y^2 contributions combine.

Worked example

Problem. Multiply two bivariate factors, then distribute the third and collect degree-three exponent pairs.

Expression: $(x + y)(x + 2y)(2x - y)$

Answer. $2x^3 + 5x^2y + xy^2 - 2y^3$.

Explanation and check.

The first pair is $x^2 + 3xy + 2y^2$. Multiplying by $2x - y$ and collecting gives the homogeneous cubic.

Algebra 1
Special Binomial Products

Special Binomial Products | A1-U08-P06

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Special Binomial Products.
8 PDFs and a README; 50 buyer pages.

Algebra 1

Special Binomial Products

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Determine the square when both degree-three monomial terms are negative. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(-2a^2b - 3bc^2)^2$ _____ Bank label: _____	Square each bivariate monomial and calculate their cross term. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(m^2n + 2mn^2)^2$ _____ Bank label: _____
Square the two full monomial terms and combine their exponents correctly. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(2p^2q - 5pq^2)^2$ _____ Bank label: _____	Expand the square of the bilinear monomial and constant. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(4mn + 5)^2$ _____ Bank label: _____
Turn the given square into a collected polynomial. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(7a^2b - 2)^2$ _____ Bank label: _____	Expand without factoring away the requested square structure. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(5uv^2 + 2u^2)^2$ _____ Bank label: _____
Expand the square before distributing the negative outer multiplier. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $-2(2y + 3)^2$ _____ Bank label: _____	Treat $y - 2$ as the second whole term, apply the square identity, and then remove the remaining parentheses. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(x + (y - 2))^2$ _____ Bank label: _____

Algebra 1

Special Binomial Products

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Expand the square and verify that every resulting term has the same total degree. Expression: $(x^2 + 2xy)^2$ _____ _____	Give the exact product of the fractional conjugates. Expression: $((\frac{1}{2})x + 4)((\frac{1}{2})x - 4)$ _____ _____
Simplify the product with rational leading coefficient. Expression: $((\frac{2}{3})y - 3)((\frac{2}{3})y + 3)$ _____ _____	Treat ab as the common monomial and calculate the product. Expression: $(ab + 5)(ab - 5)$ _____ _____
Find the two monomials that survive this three-variable product. Expression: $(2xy - 3z)(2xy + 3z)$ _____ _____	Apply the identity to the two full bivariate monomials. Expression: $(m^2n + 2mn^2)(m^2n - 2mn^2)$ _____ _____

Algebra 1

Special Binomial Products

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $9y^4 - 6y^2z^3 + z^6$. Find the exact difference of monomial squares in this product. Expression: $(a^2b^3 + bc)(a^2b^3 - bc)$ Your response: _____	START Expand the square and include its doubled cross term. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(x + 3)^2$ Your response: _____
Incoming: $x^2 + 6x + 9$. Write this squared difference as a trinomial. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(y - 5)^2$ Your response: _____	Incoming: $25a^2 + 10ab + b^2$. Convert the square into a homogeneous quadratic in m and n. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(2m - 7n)^2$ Your response: _____
Incoming: $m^2 + 8mn + 16n^2$. Find the exact coefficients in the bivariate trinomial. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $((\frac{1}{4})x - 2y)^2$ Your response: _____	Incoming: $36a^2 + 4ab + (\frac{1}{9})b^2$. Expand and order the result by descending degree in x. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(2 - x^2)^2$ Your response: _____

Algebra 1**Special Binomial Products****Name:** _____ **Date:** _____ **Class:** _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Which listed method matches the expression's factor structure?

Expression: $(z + 8)^2$

binomial square

conjugate product

general distribution

Select the special-product pattern shown by these factors.

Expression: $(w + 10)(w - 10)$

binomial square

conjugate product

general distribution

Decide whether a special identity applies or ordinary distribution is required.

Expression: $(a + 2)(a + 5)$

binomial square

conjugate product

general distribution

Explain whether the opposite-looking constants justify a conjugate shortcut.

Expression: $(x + 5)(x - 4)$

Special Binomial Products

Full Worked Solutions - excerpt

Worked example

Problem. Find the exact difference of monomial squares in this product.

Expression: $(a^2b^3 + bc)(a^2b^3 - bc)$

Answer. $a^4b^6 - b^2c^2$.

Explanation and check.

Squaring the common term gives a^4b^6 and squaring the opposite term gives b^2c^2 .

Worked example

Problem. Explain whether the opposite-looking constants justify a conjugate shortcut.

Expression: $(x + 5)(x - 4)$

Answer. No; use general distribution.

Explanation and check.

Conjugates require exactly $+V$ and $-V$. Here $+5$ and -4 have different magnitudes, so their cross terms do not cancel.

Algebra 1
Greatest Common Factor of Polynomials

Greatest Common Factor of Polynomials | A1-U08-P07

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
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Topic focus
This topic is a focused set of 96 practice tasks on Greatest Common Factor of Polynomials.
8 PDFs and a README; 63 buyer pages.

Algebra 1

Greatest Common Factor of Polynomials

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Ignore signs for divisibility, then combine the numerical gcd with the exponent minima. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $-54p^5q^3$, $72p^3q^5$, $-90p^4q^4$, $126p^6q^2$ Convention: positive GCF _____ Bank label: _____	Find the greatest common monomial across all four high-degree terms. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $64x^6y^2$, $96x^4y^5$, $160x^5y^3$, $224x^7y^4$ _____ Bank label: _____
Determine the GCF and map each variable minimum to its controlling term. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $81a^5b^4c^2$, $108a^3b^6c$, $135a^4b^5c^3$ _____ Bank label: _____	Use variable presence as well as exponents to find the GCF. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $10m^3n^2$, $14m^2p^3$, $22m^4np$ _____ Bank label: _____
Find the coordinatewise exponent minima rather than following list order. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $44x^3y^5$, $66x^5y^2$, $110x^4y^3$, $154x^2y^4$ _____ Bank label: _____	Compute the greatest common monomial in r, s, and t. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $50r^6s^3t^2$, $75r^4s^5t$, $125r^5s^4t^3$ _____ Bank label: _____
Find the GCF, then mentally check that all three quotients are monomials with no further common factor. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $72a^4b^2c^3$, $120a^3b^5c^2$, $168a^6b^3c$ _____ Bank label: _____	Factor out the greatest common factor. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Polynomial: $6x + 12$ _____ Bank label: _____

Algebra 1

Greatest Common Factor of Polynomials

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Find the GCF and identify the term that prevents y from appearing in it. Terms: $26x^2y$, $39xy^2$, $65x^3$ 	Determine the GCF and explain the effect of the missing z. Terms: $42m^3n^2z$, $70m^2n^4$, $98m^5n^3z^2$
Factor completely with respect to the GCF and identify the constant quotient. Polynomial: $28a^2b + 42ab^2 + 70ab$ 	Extract the positive GCF from four signed terms and test the residual's common factor. Polynomial: $-72x^5y^3 + 96x^3y^5 - 120x^4y^2 + 168x^6y^4$
Factor the polynomial and explain why c cannot enter the GCF. Polynomial: $30a^3b^2c + 42a^2b^4 + 66a^4b^3c^2$ 	Extract the greatest variable factor even though the coefficients share no larger integer. Polynomial: $35m^4n^3 - 22m^2n^5 + 13m^3n^2$

Algebra 1

Greatest Common Factor of Polynomials

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $15u^3v^2$. Determine the greatest monomial when separate terms set the c and d minima. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $34c^2d^3, 51c^4d, 85c^3d^2$ Your response: _____	Incoming: $27m^2n^2(2m^2n - 3n^3 + 5m)$. Factor out the GCF and confirm the residual terms have no universal variable. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Polynomial: $34p^3q^2 + 51p^2q^4 - 85p^4q$ Your response: _____
Incoming: x. State the GCF, treating the absent y as exponent zero. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $12x^2y, 18x^3, 30x$ Your response: _____	Incoming: a^2b^2. Extract the greatest monomial and preserve the displayed term order. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Polynomial: $33a^5 + 55a^3 - 77a^4$ Your response: _____
START Determine the GCF when different terms control the a and b minima. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $20a^2b, 30ab^2$ Your response: _____	Incoming: $12p^2$. Identify which term controls each variable exponent and give the GCF. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $25a^3b^2, 35a^2b^3, 45a^4b$ Your response: _____

Algebra 1

Greatest Common Factor of Polynomials

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Find the greatest common monomial factor of the two terms. Choose a coefficient method: compare common divisors directly, or use prime factorizations. Explain why the chosen method fits these coefficients, then combine that result with the smallest shared exponent of each variable to give the greatest common monomial.

Terms: $6x$, 9

Determine the largest monomial dividing both entries. Choose a coefficient method: compare common divisors directly, or use prime factorizations. Explain why the chosen method fits these coefficients, then combine that result with the smallest shared exponent of each variable to give the greatest common monomial.

Terms: $8y$, 12

Give the numerical and variable parts of the GCF together. Choose a coefficient method: compare common divisors directly, or use prime factorizations. Explain why the chosen method fits these coefficients, then combine that result with the smallest shared exponent of each variable to give the greatest common monomial.

Terms: $10a$, $15a$

Find the GCF, using the smaller exponent on m . Choose a coefficient method: compare common divisors directly, or use prime factorizations. Explain why the chosen method fits these coefficients, then combine that result with the smallest shared exponent of each variable to give the greatest common monomial.

Terms: $14m^2$, $21m$

Greatest Common Factor of Polynomials

Full Worked Solutions - excerpt

Worked example

Problem. Explain why the work is not finished and give the GCF form.

Student work to audit: $12x^2 + 18x = 3x(4x + 6)$

Answer. The residual still shares 2; the complete form is $6x(2x + 3)$.

Explanation and check.

The proposed equality is valid, but moving the residual factor 2 outside changes $3x$ to the greatest factor $6x$.

Worked example

Problem. Identify the invalid outside exponent and factor the polynomial correctly.

Student work to audit: $20a^3b + 30a^2b^2 = 10a^3b(2 + 3b)$

Answer. Use the smaller a exponent; the correct form is $10a^2b(2a + 3b)$.

Explanation and check.

The second term contains only a^2 , so a^3 cannot divide it. Subtracting exponent 2 gives quotients $2a$ and $3b$.

Algebra 1
Factoring Trinomials

Factoring Trinomials | A1-U08-P08
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
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08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Factoring Trinomials.
8 PDFs and a README; 64 buyer pages.

Algebra 1

Factoring Trinomials

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Factor into binomials whose leading coefficients are both greater than one. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response.

Expression	$6x^2 + 17x + 5$
Coefficient domain	integers

Bank label: _____

Factor the trinomial whose middle coefficient is negative one. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response.

Expression	$6x^2 - x - 15$
Coefficient domain	integers

Bank label: _____

Test the possible constant placements and report the one that matches the middle term. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response.

Expression	$6x^2 + 5x - 4$
Coefficient domain	integers

Bank label: _____

Among the possible leading-coefficient splits, find one that also matches the linear term. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response.

Expression	$12x^2 + 11x + 2$
Coefficient domain	integers

Bank label: _____

Algebra 1

Factoring Trinomials

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

State the signed pair you use and the resulting factorization. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Expression</td> <td>$x^2 + 4x - 45$</td> </tr> <tr> <td>Coefficient domain</td> <td>integers</td> </tr> </table> _____ _____	Expression	$x^2 + 4x - 45$	Coefficient domain	integers	Factor over the integers if possible; otherwise state that no such factorization exists. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Expression</td> <td>$x^2 + 6x + 11$</td> </tr> <tr> <td>Coefficient domain</td> <td>integers</td> </tr> </table> _____ _____	Expression	$x^2 + 6x + 11$	Coefficient domain	integers		
Expression	$x^2 + 4x - 45$										
Coefficient domain	integers										
Expression	$x^2 + 6x + 11$										
Coefficient domain	integers										
Decide whether the trinomial has integer binomial factors and support the decision with a pair check. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Expression</td> <td>$x^2 - 5x + 8$</td> </tr> <tr> <td>Coefficient domain</td> <td>integers</td> </tr> </table> _____ _____	Expression	$x^2 - 5x + 8$	Coefficient domain	integers	Test the integer-pair condition and report the resulting factored form or its absence. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Expression</td> <td>$x^2 + 7x + 13$</td> </tr> <tr> <td>Coefficient domain</td> <td>integers</td> </tr> </table> _____ _____	Expression	$x^2 + 7x + 13$	Coefficient domain	integers		
Expression	$x^2 - 5x + 8$										
Coefficient domain	integers										
Expression	$x^2 + 7x + 13$										
Coefficient domain	integers										
Check whether the negative prime constant permits the required integer factorization. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Expression</td> <td>$x^2 - 2x - 17$</td> </tr> <tr> <td>Coefficient domain</td> <td>integers</td> </tr> </table> _____ _____	Expression	$x^2 - 2x - 17$	Coefficient domain	integers	Select the one listed pair that meets the linear-coefficient condition and write the factors. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Expression</td> <td>$x^2 - 19x + 84$</td> </tr> <tr> <td>Coefficient domain</td> <td>integers</td> </tr> <tr> <td>Candidate pairs</td> <td>-1, -84, -2, -42, -3, -28, -4, -21, -6, -14, -7, -12</td> </tr> </table> _____ _____	Expression	$x^2 - 19x + 84$	Coefficient domain	integers	Candidate pairs	-1, -84, -2, -42, -3, -28, -4, -21, -6, -14, -7, -12
Expression	$x^2 - 2x - 17$										
Coefficient domain	integers										
Expression	$x^2 - 19x + 84$										
Coefficient domain	integers										
Candidate pairs	-1, -84, -2, -42, -3, -28, -4, -21, -6, -14, -7, -12										

Algebra 1

Factoring Trinomials

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

START Factor the displayed monic trinomial over the integers. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Expression</td> <td style="width: 50%; text-align: center;">$x^2 + 5x + 6$</td> </tr> <tr> <td>Coefficient domain</td> <td>integers</td> </tr> </table> Your response: _____	Expression	$x^2 + 5x + 6$	Coefficient domain	integers	Incoming: $(x - 2)(x - 7)$. Factor, paying attention to the signs forced by the constant term. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Expression</td> <td style="width: 50%; text-align: center;">$x^2 + 2x - 15$</td> </tr> <tr> <td>Coefficient domain</td> <td>integers</td> </tr> </table> Your response: _____	Expression	$x^2 + 2x - 15$	Coefficient domain	integers
Expression	$x^2 + 5x + 6$								
Coefficient domain	integers								
Expression	$x^2 + 2x - 15$								
Coefficient domain	integers								
Incoming: $(x + 4)(x + 9)$. Factor the expression with a positive constant and a negative linear coefficient. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Expression</td> <td style="width: 50%; text-align: center;">$x^2 - 13x + 36$</td> </tr> <tr> <td>Coefficient domain</td> <td>integers</td> </tr> </table> Your response: _____	Expression	$x^2 - 13x + 36$	Coefficient domain	integers	Incoming: $(x - 9)(x + 4)$. Identify which pair for the constant also matches the x-coefficient, then factor. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Expression</td> <td style="width: 50%; text-align: center;">$x^2 + 15x + 44$</td> </tr> <tr> <td>Coefficient domain</td> <td>integers</td> </tr> </table> Your response: _____	Expression	$x^2 + 15x + 44$	Coefficient domain	integers
Expression	$x^2 - 13x + 36$								
Coefficient domain	integers								
Expression	$x^2 + 15x + 44$								
Coefficient domain	integers								
Incoming: $(x - 4)(x - 11)$. Match an integer pair to the two required conditions and give the product form. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Expression</td> <td style="width: 50%; text-align: center;">$x^2 + 6x - 55$</td> </tr> <tr> <td>Coefficient domain</td> <td>integers</td> </tr> </table> Your response: _____	Expression	$x^2 + 6x - 55$	Coefficient domain	integers	Incoming: $(x + 5)(x - 3)$. Find an integer factorization and check its middle term. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Expression</td> <td style="width: 50%; text-align: center;">$x^2 - 4x - 21$</td> </tr> <tr> <td>Coefficient domain</td> <td>integers</td> </tr> </table> Your response: _____	Expression	$x^2 - 4x - 21$	Coefficient domain	integers
Expression	$x^2 + 6x - 55$								
Coefficient domain	integers								
Expression	$x^2 - 4x - 21$								
Coefficient domain	integers								

Algebra 1

Factoring Trinomials

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Factor the primitive trinomial over the integers. Choose a method before factoring: split the middle term using a product-sum pair, or test integer binomial factors directly. Explain which structure makes your choice efficient, then carry out the original factorization and verify all coefficients.

Expression	$2x^2 + 7x + 3$
Coefficient domain	integers

Write the displayed expression as two integer binomial factors. Choose a method before factoring: split the middle term using a product-sum pair, or test integer binomial factors directly. Explain which structure makes your choice efficient, then carry out the original factorization and verify all coefficients.

Expression	$3x^2 + 14x + 8$
Coefficient domain	integers

Find factors whose mixed-sign cross terms give the required middle coefficient. Choose a method before factoring: split the middle term using a product-sum pair, or test integer binomial factors directly. Explain which structure makes your choice efficient, then carry out the original factorization and verify all coefficients.

Expression	$2x^2 + 7x - 15$
Coefficient domain	integers

Match the cross terms and give the complete integer factorization. Choose a method before factoring: split the middle term using a product-sum pair, or test integer binomial factors directly. Explain which structure makes your choice efficient, then carry out the original factorization and verify all coefficients.

Expression	$2x^2 - 5x - 12$
Coefficient domain	integers

Factoring Trinomials

Full Worked Solutions - excerpt

Worked example

Problem. Test the integer-pair condition and report the resulting factored form or its absence.

Expression	$x^2 + 7x + 13$
Coefficient domain	integers

Answer. No integer factorization is available.

Explanation and check.

Since 13 is prime, only 1 and 13 can be positive factor constants, and their sum 14 does not match 7.

Worked example

Problem. Factor over the integers if possible; otherwise state that no such factorization exists.

Expression	$x^2 + 6x + 11$
Coefficient domain	integers

Answer. No factorization into monic integer binomials exists.

Explanation and check.

The positive pairs for 11 are 1, 11, with sum 12; changing both signs gives -12 . Neither sum is 6.

Algebra 1
Difference of Squares

Difference of Squares | A1-U08-P09
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
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Topic focus
This topic is a focused set of 96 practice tasks on Difference of Squares.
8 PDFs and a README; 49 buyer pages.

Algebra 1

Difference of Squares

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Factor the two high-power terms without changing their variable bases. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $225x^8 - y^{10}$. Use integer coefficients. _____ Bank label: _____	Extract each even-power root and write the factorization. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $49a^4 - 36b^6$. Use integer coefficients. _____ Bank label: _____
Write the conjugate pair after finding both multivariable roots. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $169c^2d^4 - 64e^6$. Use integer coefficients. _____ Bank label: _____	Factor despite the different degrees carried by the two variables. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $196x^{10} - 225y^2$. Use integer coefficients. _____ Bank label: _____
Take the integer roots of both composite square coefficients and factor. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $289p^4 - 324q^8$. Use integer coefficients. _____ Bank label: _____	Use the consecutive coefficient roots to produce the factors. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $400a^2b^6 - 441c^4$. Use integer coefficients. _____ Bank label: _____
Write conjugates using the correct power of each variable. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $x^6 - 100y^4$. Use integer coefficients. _____ Bank label: _____	Factor after taking the square root of each even-exponent monomial. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $36x^8 - 49y^6$. Use integer coefficients. _____ Bank label: _____

Algebra 1

Difference of Squares

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Decide whether the difference-of-squares identity applies, and name the two square bases. Use the expression $x^2 - 25$. Use integer coefficients. _____ _____	Identify whether the expression is eligible for conjugate factoring and give its term roots. Use the expression $9x^2 - 16$. Use integer coefficients. _____ _____
Check both terms and state whether this is a difference of squares. Use the expression $y^2 - 49$. Use integer coefficients. _____ _____	State the square-base pair if the identity applies. Use the expression $4a^2 - 81$. Use integer coefficients. _____ _____
Determine whether the real difference-of-squares identity can be used as written. Use the expression $x^2 + 36$. Use real coefficients. _____ _____	Recover c from the stated conjugate factors. Use the expression $x^2 - c$. The stated factors are $(x - 7)(x + 7)$. Use integer coefficients. _____ _____

Algebra 1

Difference of Squares

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $(25m^4 - n)(25m^4 + n)$. Factor with the unit square as the first base. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $1 - 81x^2$. Use integer coefficients. Your response: _____	Incoming: $(3y - 1)(3y + 1)$. Factor the two-variable square difference. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $25a^2 - b^2$. Use integer coefficients. Your response: _____
Incoming: $(9a - 10b)(9a + 10b)$. Apply the difference-of-squares identity exactly once. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $16x^4 - 25$. Use integer coefficients. Apply the difference-of-squares identity exactly once. Your response: _____	Incoming: $(x - 11)(x + 11)$. Preserve the term order when forming the conjugate factors. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $100 - 9x^2$. Use integer coefficients. Your response: _____
Incoming: $(3\frac{m}{4} - 5n)(3\frac{m}{4} + 5n)$. Factor the monomial square minus one. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $100u^6v^2 - 1$. Use integer coefficients. Your response: _____	Incoming: $(2x - 5)(2x + 5)$. Supply the integer conjugate factors. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $9y^2 - 1$. Use integer coefficients. Your response: _____

Algebra 1**Difference of Squares****Name:** _____ **Date:** _____ **Class:** _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Treat the shifted expression as one square base, then simplify both resulting factors. Choose whether to preserve the displayed composite expressions as square bases or expand and collect first. Justify which route exposes the two squares more efficiently for this expression, then give the original requested factorization. Use the expression $(x + 3)^2 - 25$. Use integer coefficients.

Factor the shifted square difference and combine constants inside each factor. Choose whether to preserve the displayed composite expressions as square bases or expand and collect first. Justify which route exposes the two squares more efficiently for this expression, then give the original requested factorization. Use the expression $(x - 4)^2 - 9$. Use integer coefficients.

Form conjugates of the complete group and reduce their constants. Choose whether to preserve the displayed composite expressions as square bases or expand and collect first. Justify which route exposes the two squares more efficiently for this expression, then give the original requested factorization. Use the expression $(2x + 1)^2 - 16$. Use integer coefficients.

Factor using the scaled shifted group as a single base. Choose whether to preserve the displayed composite expressions as square bases or expand and collect first. Justify which route exposes the two squares more efficiently for this expression, then give the original requested factorization. Use the expression $(3x - 2)^2 - 36$. Use integer coefficients.

Difference of Squares

Full Worked Solutions - excerpt

Worked example

Problem. State the square-base pair if the identity applies. Use the expression $4a^2 - 81$. Use integer coefficients.

Answer. The pair is $2a$ and 9 ; the identity applies.

Explanation and check.

Squaring $2a$ gives $4a^2$ and squaring 9 gives 81 , with the needed difference sign.

Worked example

Problem. Use the specified factor to recover the missing square term T and the conjugate partner. Use the expression $(x + 4)^2 - T$. One required factor is $x - 3$. Use integer coefficients.

Answer. $T = 49$ and the partner is $x + 11$.

Explanation and check.

The difference factor $(x + 4) - B = x - 3$ forces $B = 7$. Thus $T = B^2 = 49$, and the sum factor is $x + 4 + 7 = x + 11$.

Algebra 1
Factoring Polynomials Completely

Factoring Polynomials Completely | A1-U08-P10

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
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08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Factoring Polynomials Completely.
8 PDFs and a README; 51 buyer pages.

Algebra 1

Factoring Polynomials Completely

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Remove the multivariable GCF and resolve the nonmonic binary quadratic that remains. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $12a^4b + 42a^3b^2 - 24a^2b^3$ _____ Bank label: _____	Select a signed multivariable GCF and continue until the residual splits into binomials. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $-12p^4q + 12p^3q^2 + 45p^2q^3$ _____ Bank label: _____
Write the expression as its maximal monomial GCF times primitive binomials. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $54r^4s - 9r^3s^2 - 18r^2s^3$ _____ Bank label: _____	Resolve the common monomial and the remaining homogeneous trinomial. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $12u^3v - 30u^2v^2 - 72uv^3$ _____ Bank label: _____
Pull out the signed z-containing GCF and completely factor the x expression. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $-108x^2z^2 - 99xz^2 - 18z^2$ _____ Bank label: _____	Factor the homogeneous remainder into two linear forms after removing its common monomial. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $4a^3b^2 - 4a^2b^3 - 48ab^4$ _____ Bank label: _____

Algebra 1

Factoring Polynomials Completely

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Select the GCF sign that makes the square-difference pattern immediate. Expression: $-45m^4 + 5m^2$ _____ _____	After removing the greatest shared monomial, identify both scaled square bases. Expression: $32p^3q - 98pq^3$ _____ _____
Extract all common powers, then express the remainder as conjugate binary forms. Expression: $75x^5y^2 - 12x^3y^4$ _____ _____	Preserve the odd shared power of b in the GCF and factor the residual identity. Expression: $98a^4b^3 - 18a^2b^5$ _____ _____
Use the maximal numerical content before applying the special product. Expression: $108m^3n^4 - 48mn^6$ _____ _____	Normalize the negative leading term through the GCF and finish with conjugates. Expression: $-200p^5q + 72p^3q^3$ _____ _____

Algebra 1

Factoring Polynomials Completely

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $15x^3(x+7)^2$ Treat y as part of the GCF and factor the x-quadratic that remains. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $70x^2y - 49xy - 84y$ Your response: _____	Incoming: $8p^2(p-2)(p-7)$ Factor until every nonconstant factor is linear over the integers. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $9y^3 + 18y^2 - 135y$ Your response: _____
Incoming: $4x(x+3)^2$ Give the complete factorization and identify the multiplicity of its binomial factor. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $7a^4 - 70a^3 + 175a^2$ Your response: _____	Incoming: $3x(2x+1)(x+3)$ State the two decisive factoring steps and the final product. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $12x^3 - 40x^2 + 12x$ Your response: _____
START Factor completely, showing the common-factor decision before the quadratic step. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $2x^3 + 10x^2 + 12x$ Your response: _____	Incoming: $18c^2(c+4)(c+9)$ Extract the full GCF and split the resulting nonmonic trinomial. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $6x^3 + 21x^2 + 9x$ Your response: _____

Algebra 1**Factoring Polynomials Completely****Name:** _____ **Date:** _____ **Class:** _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Choose the productive first method, justify it from the visible structure, and finish factoring.

Expression: $6x^3 + 30x^2 + 36x$

Available methods: GCF trinomial grouping

Select the method sequence that reaches an integer endpoint rather than stopping after one split.

Expression: $x^4 - 81$

Available methods: GCF difference of squares trinomial

Which method should be tried first, and what complete product does it produce? Explain using the term arrangement.

Expression: $2a^2 + 8a + 3a + 12$

Given structural clue: four terms with matching local quotients

Explain why a GCF should precede the special-product test, then factor completely.

Expression: $12a^4 - 108a^2$

Suggested approach to consider: compare the original terms as squares

Factoring Polynomials Completely

Full Worked Solutions - excerpt

Worked example

Problem. Select the GCF sign that makes the square-difference pattern immediate.

Expression: $-45m^4 + 5m^2$

Answer. $-5m^2(3m - 1)(3m + 1)$

Explanation and check.

Extract $-5m^2$ to leave $9m^2 - 1$, then use bases $3m$ and 1 .

Worked example

Problem. Preserve the odd shared power of b in the GCF and factor the residual identity.

Expression: $98a^4b^3 - 18a^2b^5$

Answer. $2a^2b^3(7a - 3b)(7a + 3b)$

Explanation and check.

The GCF $2a^2b^3$ leaves $49a^2 - 9b^2$, a square difference.

Algebra 1
Polynomial Identities and Area Models

Polynomial Identities and Area Models | A1-U08-P11

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
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Topic focus
This topic is a focused set of 96 practice tasks on Polynomial Identities and Area Models.
8 PDFs and a README; 153 buyer pages.

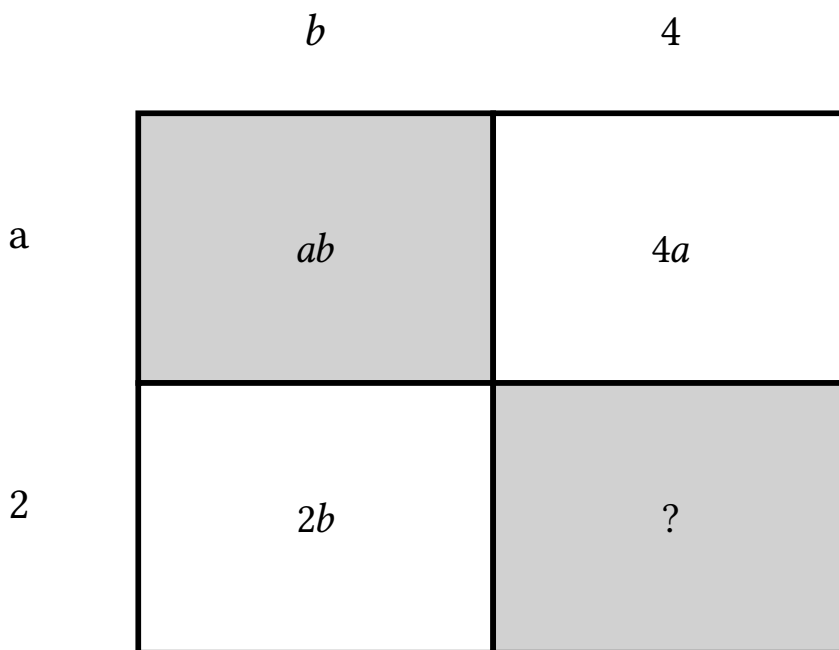
Algebra 1

Polynomial Identities and Area Models

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Three subareas of the 2-by-2 partition are labeled and the lower-right label is missing. Find that area and use the complete partition to write the area identity. Match the complete requested identity or exact value, and supply the original area or structural justification. Retain all original dimensions and conditions.



Bank label: _____

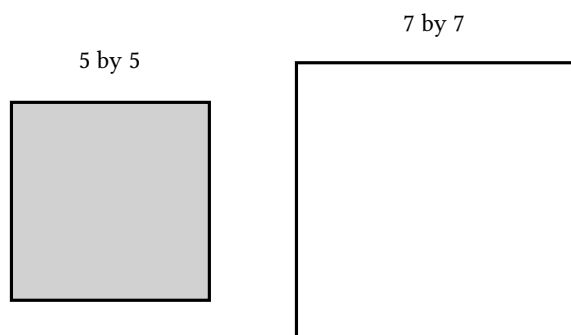
Algebra 1

Polynomial Identities and Area Models

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Decide whether the proposed cutout is a valid area proof, and separately evaluate whether the algebraic difference-of-squares equality is true.



Determine whether any real value of c makes the equality an identity. Check the independent coefficient requirements.

Determine whether any c makes $(x + 2)(x + c) = x^2 + 7x + 8$ hold for all real x .

Describe a labeled rectangle construction whose nonoverlapping regions prove the supplied identity. Include the outer dimensions and the cut location.

Use $a(b + c) = ab + ac$ with $a > 0$, $b > 0$, and $c > 0$. Use 2 pieces.

Prove the divisibility claim using the neighboring factors in the supplied identity.

Let n be an odd integer. Use $n^2 - 1 = (n - 1)(n + 1)$ to show that $n^2 - 1$ is divisible by 8.

Algebra 1

Polynomial Identities and Area Models

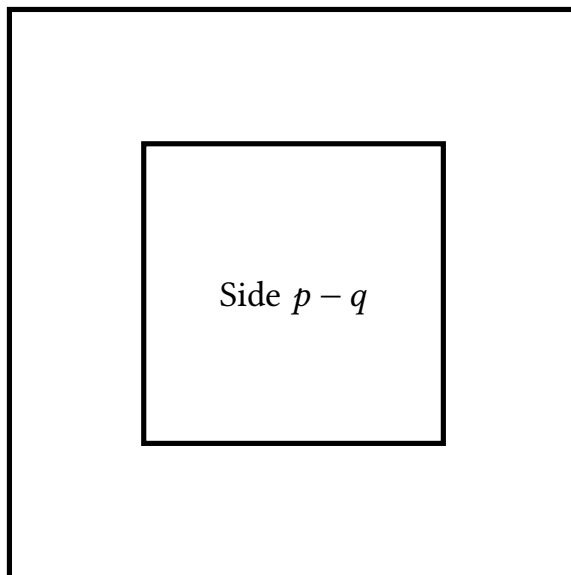
Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $(z + \frac{1}{3})^2 = z^2 + (\frac{2}{3})z + \frac{1}{9}$

Express the frame as a rectangle product. Match the complete requested identity or exact value, and supply the original area or structural justification. Retain all original dimensions and conditions.

Side $p + q$



Your response: _____

Algebra 1

Polynomial Identities and Area Models

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Determine whether the equality is an identity. Give algebraic evidence that applies to every real input. Choose an algebraic verification route: simplify the difference of the two sides, or transform one side using distributive structure or a known identity. Explain which route suits the displayed expressions, then fulfill every original parameter, counterexample, and all-input requirement.

Compare $3(x + 2)^2 - 3x^2$ with $12x + 12$ for all real x .

The two sides agree at $x = 0$. Decide whether that observation proves the claim, and supply decisive evidence. Choose an algebraic verification route: simplify the difference of the two sides, or transform one side using distributive structure or a known identity. Explain which route suits the displayed expressions, then fulfill every original parameter, counterexample, and all-input requirement.

Compare $(x + 2)(x + 5)$ with $x^2 + 6x + 10$ for all real x . The expressions match at $x = 0$.

Find the value of k that makes the equality an identity, then verify the result for all x . Choose an algebraic verification route: simplify the difference of the two sides, or transform one side using distributive structure or a known identity. Explain which route suits the displayed expressions, then fulfill every original parameter, counterexample, and all-input requirement.

Compare $(x + 3)^2 - x^2$ with $kx + 9$ for all real x , where k is a parameter.

Prove or refute the claim without checking a list of sample inputs. A common structural factor may be useful. Choose an algebraic verification route: simplify the difference of the two sides, or transform one side using distributive structure or a known identity. Explain which route suits the displayed expressions, then fulfill every original parameter, counterexample, and all-input requirement.

Compare $2x(x - 4) + (x - 4)^2$ with $(x - 4)(3x - 4)$ for all real x .

Polynomial Identities and Area Models

Full Worked Solutions - excerpt

Worked example

Problem. Identify the incorrect coefficient.

Compare $4(x + 2)^2$ with $4x^2 + 8x + 16$.

Answer. not an identity; the middle coefficient should be 16

Explanation and check.

Four times $x^2 + 4x + 4$ is $4x^2 + 16x + 16$.

Worked example

Problem. Give structural evidence about the claim.

Compare $(x - 3)(x + 3)$ with $x^2 + 9$ for all real x .

Answer. not an identity; the product is $x^2 - 9$

Explanation and check.

Cross terms cancel, while the constants multiply to -9 , not 9 .

Algebra 1
Quadratic Function Classification and Range

Quadratic Function Classification and Range | A1-U09-P01

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for decision and justification preserving the original requested quantities.
8 PDFs and a README; 122 buyer pages.

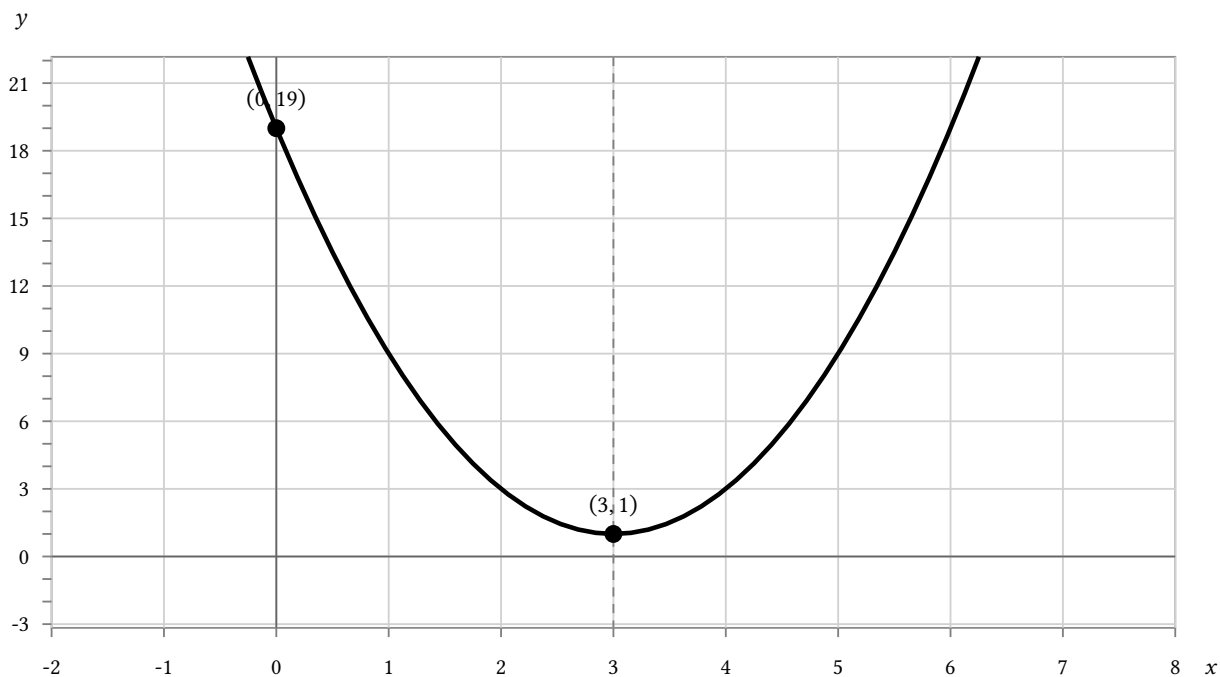
Algebra 1

Quadratic Function Classification and Range

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Explain the intercept status using the extremum, and give end behavior. For the answer bank, record the minimum point as (x, y) . Complete and justify every part of the original task in your work.



Bank label: _____

Algebra 1

Quadratic Function Classification and Range

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Use finite differences to decide whether the table is compatible with a quadratic model.

Model assumption: values come from a polynomial of degree at most 2

Input	Output
-2	7
-1	2
0	1
1	4
2	11

Predict the opening and extremum type without locating the vertex.

Rule: $g(x) = 5x^2 - 7x + 1$ Leading coefficient: 5

Compute the second differences and interpret their sign.

Model assumption: polynomial degree at most 2

Input	Output
-1	2
0	5
1	4
2	-1
3	-10

State the opening, extremum type, and end behavior. Rule:

$q(x) = -x^2 + 12x + 8$ Leading coefficient: -1

Algebra 1

Quadratic Function Classification and Range

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Explain why ordinary consecutive second differences are not valid evidence here and what must be addressed.

Declared family: unspecified

Input	Output
0	1
1	4
3	16
6	49

Choose between classifying by the largest displayed exponent and combining like terms first. Use the chosen method to determine the actual degree and justify it. Rule: $s(x) = x(x^2 + 2x - 1) - x^3 + 4$

Quadratic Function Classification and Range

Full Worked Solutions - excerpt

Worked example

Problem. Classify h and identify its leading coefficient. Rule: $h(x) = x(x + 1) + (x - 2)^2$

Answer. quadratic with leading coefficient 2

Explanation and check.

The rule becomes $x^2 + x + x^2 - 4x + 4 = 2x^2 - 3x + 4$.

Worked example

Problem. Classify h by its actual degree after simplification. Rule: $h(x) = 3(x^2 + 2x) - 3x^2 + 4$ Domain: all real x

Answer. linear, not quadratic

Explanation and check.

The x^2 terms cancel, leaving $h(x) = 6x + 4$, which has degree 1.

Algebra 1
Quadratic Vertex, Axis, and Intercepts

Quadratic Vertex, Axis, and Intercepts | A1-U09-P02

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Quadratic Vertex, Axis, and Intercepts.
8 PDFs and a README; 61 buyer pages.

Algebra 1

Quadratic Vertex, Axis, and Intercepts

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Find the axis input first, then evaluate the function there. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $v(x) = 2x^2 - 6x + 1$ _____ Bank label: _____	Derive the fractional maximum point and axis. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $E(x) = -4x^2 + 7x + 2$ _____ Bank label: _____
Compute the vertex and verify its height by substitution. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $H(x) = 9x^2 + 6x - 8$ _____ Bank label: _____	Locate the low point and its axis for the fractional leading coefficient. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $K(x) = (\frac{1}{3})x^2 - 4x + 5$ _____ Bank label: _____
Read the vertex, axis, and extremum type directly from the formula. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $f(x) = 2(x - 3)^2 + 1$ _____ Bank label: _____	State the lowest point and symmetry line. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $p(x) = (x - 1)^2 - 8$ _____ Bank label: _____
Name the turning point, axis, and extremum type. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $q(x) = -3(x + 2)^2 - 5$ _____ Bank label: _____	Extract the vertex and axis from the displayed form. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $r(x) = 0.5(x - 7)^2$ _____ Bank label: _____

Algebra 1

Quadratic Vertex, Axis, and Intercepts

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Find every x-intercept and the y-intercept as ordered pairs. The rule is $f(x) = (x - 2)(x + 5)$ The domain is all real x _____ _____	List the coordinates where the graph meets each axis. The rule is $g(x) = -2(x + 1)(x - 4)$ _____ _____
Find the intercept coordinates, noting any point shared by both axes. The rule is $p(x) = x(x - 7)$ _____ _____	Identify the x-axis contact point and the y-intercept. The rule is $q(x) = 3(x + 2)^2$ _____ _____
Determine all real intercepts. The rule is $r(x) = (x - 3)^2 + 4$ _____ _____	Find the single real x-axis contact and the vertical-axis crossing. The rule is $s(x) = -(x + 4)^2$ _____ _____

Algebra 1

Quadratic Vertex, Axis, and Intercepts

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $(5, \frac{11}{2})$ Derive the vertex in lowest-term fractions. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $C(x) = 7x^2 - 3x + 2$ Your response: _____	Incoming: $(\frac{5}{12}, -\frac{71}{24})$ Find the vertex while keeping compound fractions exact. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $E(x) = (\frac{2}{5})x^2 + 3x - 1$ Your response: _____
Incoming: $(\frac{7}{15}, \frac{41}{90})$ Find the maximum point in the t-coordinate system. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $H(t) = -(\frac{2}{3})t^2 + 4t + 1$ Your response: _____	START Use the standard-form coefficients to compute the vertex. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $q(x) = 3x^2 - 12x + 10$ Your response: _____
Incoming: axis: $y = -\frac{7}{2}$; vertex: $(-\frac{7}{2}, -11)$ Interpret the negated input inside the square and identify the vertex. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $V(x) = -4(0 - x)^2 + 3$ Your response: _____	Incoming: $(-\frac{1}{5}, \frac{21}{5})$ Compute the maximum point from standard form. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $s(x) = -2x^2 + 20x - 41$ Your response: _____

Algebra 1

Quadratic Vertex, Axis, and Intercepts

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Calculate the axis of symmetry and vertex. Choose between using the coefficient axis formula and rewriting as a completed square. Explain which is more convenient for these coefficients, then provide all originally requested features exactly and verify the vertex height.

The rule is $f(x) = x^2 - 6x + 5$

Find the vertex and write its vertical axis. Choose between using the coefficient axis formula and rewriting as a completed square. Explain which is more convenient for these coefficients, then provide all originally requested features exactly and verify the vertex height.

The rule is $g(x) = 2x^2 + 8x - 1$

Determine the vertex, axis, and whether the vertex is a maximum or minimum. Choose between using the coefficient axis formula and rewriting as a completed square. Explain which is more convenient for these coefficients, then provide all originally requested features exactly and verify the vertex height.

The rule is $p(x) = -x^2 + 4x + 7$

State the axis equation and the exact vertex. Choose between using the coefficient axis formula and rewriting as a completed square. Explain which is more convenient for these coefficients, then provide all originally requested features exactly and verify the vertex height.

The rule is $r(x) = x^2 + 10x + 21$

Quadratic Vertex, Axis, and Intercepts

Full Worked Solutions - excerpt

Worked example

Problem. Find the intercept coordinates; keep the scale factor in the y -intercept calculation.

The rule is $C(x) = (\frac{1}{2})(x + 6)(x - 2)$

Answer. x -intercepts: $(-6, 0), (2, 0)$; y -intercept: $(0, -6)$

Explanation and check.

The roots come from the factors. At $x = 0$, one half of $6(-2)$ is -6 .

Worked example

Problem. Identify the x -axis contact point and the y -intercept.

The rule is $q(x) = 3(x + 2)^2$

Answer. multiplicity: 2; x -intercepts: $(-2, 0)$; y -intercept: $(0, 12)$

Explanation and check.

The squared factor is zero only at $x = -2$ and has multiplicity 2. At $x = 0$ the output is 12.

Algebra 1
Quadratic Function Transformations

Quadratic Function Transformations | A1-U09-P03

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
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08	Terms of Use & License	included

Topic focus

This topic is a focused set of 96 practice tasks on Quadratic Function Transformations.

8 PDFs and a README; 66 buyer pages.

Algebra 1

Quadratic Function Transformations

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Write the final equation and identify the peak location. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale.

Parent	$f(x) = x^2$
Operations	shift left 2, reflect across x -axis, shift up 6

Bank label: _____

Write the final vertex form. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale.

Parent	$f(x) = x^2$
Operations	shift right 4, double outputs, shift up 5

Bank label: _____

Write the rule for the specified order. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale.

Parent	$f(x) = x^2$
Operations	multiply outputs by $-\frac{1}{3}$, shift down 3

Bank label: _____

Write the exact final equation. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale.

Parent	$f(x) = x^2$
Operations	shift left $\frac{1}{2}$, shift down $\frac{3}{2}$, multiply current outputs by 4

Bank label: _____

Algebra 1

Quadratic Function Transformations

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Predict the target vertex and axis. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Reference</td> <td style="width: 70%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Rule</td> <td style="width: 70%;">$f(x) = x^2$</td> </tr> <tr> <td>Vertex</td> <td>0, 0</td> </tr> </table> </td> </tr> <tr> <td>Target relation</td> <td>$g(x) = f(x - 3) + 2$</td> </tr> </table> 	Reference	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Rule</td> <td style="width: 70%;">$f(x) = x^2$</td> </tr> <tr> <td>Vertex</td> <td>0, 0</td> </tr> </table>	Rule	$f(x) = x^2$	Vertex	0, 0	Target relation	$g(x) = f(x - 3) + 2$	Map the reference vertex and classify the target extremum. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Reference vertex</td> <td style="width: 70%;">2, -1</td> </tr> <tr> <td>Reference opening</td> <td>up</td> </tr> <tr> <td>Transformation</td> <td> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">h</td> <td style="width: 70%;">0</td> </tr> <tr> <td>a</td> <td>3</td> </tr> <tr> <td>k</td> <td>4</td> </tr> </table> </td> </tr> </table> 	Reference vertex	2, -1	Reference opening	up	Transformation	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">h</td> <td style="width: 70%;">0</td> </tr> <tr> <td>a</td> <td>3</td> </tr> <tr> <td>k</td> <td>4</td> </tr> </table>	h	0	a	3	k	4
Reference	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Rule</td> <td style="width: 70%;">$f(x) = x^2$</td> </tr> <tr> <td>Vertex</td> <td>0, 0</td> </tr> </table>	Rule	$f(x) = x^2$	Vertex	0, 0																
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h	0																				
a	3																				
k	4																				
Predict the target x-intercepts. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Reference roots</td> <td style="width: 70%;">-2, 2</td> </tr> <tr> <td>Target relation</td> <td>$g(x) = f(x - 3)$</td> </tr> </table> 	Reference roots	-2, 2	Target relation	$g(x) = f(x - 3)$	Predict the new x-intercepts. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Reference</td> <td style="width: 70%;">$f(x) = x^2$</td> </tr> <tr> <td>Target relation</td> <td>$g(x) = f(x) - 4$</td> </tr> </table> 	Reference	$f(x) = x^2$	Target relation	$g(x) = f(x) - 4$												
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Target relation	$g(x) = f(x - 3)$																				
Reference	$f(x) = x^2$																				
Target relation	$g(x) = f(x) - 4$																				
Predict the target vertex and extremum type. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Reference vertex</td> <td style="width: 70%;">-1, -3</td> </tr> <tr> <td>Reference extremum</td> <td>minimum</td> </tr> <tr> <td>Target relation</td> <td>$g(x) = -f(x) + 2$</td> </tr> </table> 	Reference vertex	-1, -3	Reference extremum	minimum	Target relation	$g(x) = -f(x) + 2$	Predict the target vertex and x-intercepts using the supplied old level. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Reference vertex</td> <td style="width: 70%;">0, -5</td> </tr> <tr> <td>Reference level points</td> <td> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">y</td> <td style="width: 70%;">-2</td> </tr> <tr> <td>Points</td> <td>-3, -2, 3, -2</td> </tr> </table> </td> </tr> <tr> <td>Target relation</td> <td>$g(x) = f(x) + 2$</td> </tr> </table> 	Reference vertex	0, -5	Reference level points	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">y</td> <td style="width: 70%;">-2</td> </tr> <tr> <td>Points</td> <td>-3, -2, 3, -2</td> </tr> </table>	y	-2	Points	-3, -2, 3, -2	Target relation	$g(x) = f(x) + 2$				
Reference vertex	-1, -3																				
Reference extremum	minimum																				
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y	-2																				
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Target relation	$g(x) = f(x) + 2$																				

Algebra 1

Quadratic Function Transformations

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $g(x) = 2x^2 + 6$ Write the final rule and preserve the operation order. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Parent</td> <td>$f(x) = x^2$</td> </tr> <tr> <td>Operations</td> <td>multiply outputs by 2, shift the resulting graph up 3</td> </tr> </table> Your response: _____	Parent	$f(x) = x^2$	Operations	multiply outputs by 2, shift the resulting graph up 3	Incoming: $g(x) = 5x^2 - 2$ Write and simplify the final rule. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Parent</td> <td>$f(x) = x^2$</td> </tr> <tr> <td>Operations</td> <td>shift up 3, multiply all current outputs by 2</td> </tr> </table> Your response: _____	Parent	$f(x) = x^2$	Operations	shift up 3, multiply all current outputs by 2				
Parent	$f(x) = x^2$												
Operations	multiply outputs by 2, shift the resulting graph up 3												
Parent	$f(x) = x^2$												
Operations	shift up 3, multiply all current outputs by 2												
Incoming: a: 2; h: 2; k: 1 Recover the complete parameter triple. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Target vertex</td> <td>2, -3</td> </tr> <tr> <td>Target point</td> <td>4, 5</td> </tr> <tr> <td>Model</td> <td>$g(x) = a(x-h)^2 + k$</td> </tr> </table> Your response: _____	Target vertex	2, -3	Target point	4, 5	Model	$g(x) = a(x-h)^2 + k$	Incoming: a: $\frac{1}{2}$; h: 1; k: -1 Find a and write the target rule. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Target vertex</td> <td>-1, -8</td> </tr> <tr> <td>Target root</td> <td>1</td> </tr> <tr> <td>Model</td> <td>$a(x + 1)^2 - 8$</td> </tr> </table> Your response: _____	Target vertex	-1, -8	Target root	1	Model	$a(x + 1)^2 - 8$
Target vertex	2, -3												
Target point	4, 5												
Model	$g(x) = a(x-h)^2 + k$												
Target vertex	-1, -8												
Target root	1												
Model	$a(x + 1)^2 - 8$												
Incoming: $g(x) = 3(x - 2)^2 + 1$ Compose the ordered changes into one formula. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Parent</td> <td>$f(x) = x^2$</td> </tr> <tr> <td>Operations</td> <td>shift left 1, shift down 2, multiply current outputs by -2, shift up 3</td> </tr> </table> Your response: _____	Parent	$f(x) = x^2$	Operations	shift left 1, shift down 2, multiply current outputs by -2, shift up 3	Incoming: $g(x) = -2(x + 1)^2 + 7$ Write the exact final rule. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Parent</td> <td>$f(x) = x^2$</td> </tr> <tr> <td>Operations</td> <td>reflect outputs, shift up 5, multiply all current outputs by $\frac{1}{2}$</td> </tr> </table> Your response: _____	Parent	$f(x) = x^2$	Operations	reflect outputs, shift up 5, multiply all current outputs by $\frac{1}{2}$				
Parent	$f(x) = x^2$												
Operations	shift left 1, shift down 2, multiply current outputs by -2, shift up 3												
Parent	$f(x) = x^2$												
Operations	reflect outputs, shift up 5, multiply all current outputs by $\frac{1}{2}$												

Algebra 1

Quadratic Function Transformations

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Write the transformed quadratic rule. Choose how to organize the work: apply the listed operations to the rule one at a time, or track the horizontal center, vertical scale, and vertical offset through that same sequence. Explain your choice and obtain the original requested rule without changing operation order.

Parent	$f(x) = x^2$
Operations	shift right 3, shift up 2

Write an equation for the final graph. Choose how to organize the work: apply the listed operations to the rule one at a time, or track the horizontal center, vertical scale, and vertical offset through that same sequence. Explain your choice and obtain the original requested rule without changing operation order.

Parent	$f(x) = x^2$
Operations	reflect across the x -axis, shift left 4

Translate the ordered operations into a target formula. Choose how to organize the work: apply the listed operations to the rule one at a time, or track the horizontal center, vertical scale, and vertical offset through that same sequence. Explain your choice and obtain the original requested rule without changing operation order.

Parent	$f(x) = x^2$
Operations	compress vertically by factor $\frac{1}{2}$, shift down 5

Write the target quadratic. Choose how to organize the work: apply the listed operations to the rule one at a time, or track the horizontal center, vertical scale, and vertical offset through that same sequence. Explain your choice and obtain the original requested rule without changing operation order.

Parent	$f(x) = x^2$
Operations	shift left 2, shift up 7

Quadratic Function Transformations

Full Worked Solutions - excerpt

Worked example

Problem. Predict the target vertex and x -axis contact.

Reference vertex	$-1, -4$
Target relation	$g(x) = f(x - 3) + 4$

Answer. axis: $x = 2$; multiplicity: 2; vertex: 2, 0; x intercepts: 2 and 0

Explanation and check.

The vertex shifts right 3 and up 4 to the x -axis, so it becomes a double-root tangent point.

Worked example

Problem. Decide whether the target has any real x -intercepts.

Reference range	$[2, \text{infinity})$
Target relation	$g(x) = f(x - 1) + 3$

Answer. no real x -intercepts

Explanation and check.

A target zero would require the old output -3 , but -3 is outside the reference range $[2, \text{infinity})$.

Algebra 1
Converting Quadratics to Vertex Form

Converting Quadratics to Vertex Form | A1-U09-P04

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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Topic focus
This topic is a focused set of 96 practice tasks on Converting Quadratics to Vertex Form.
8 PDFs and a README; 56 buyer pages.

Algebra 1

Converting Quadratics to Vertex Form

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Complete the inner square and scale its compensation. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$3x^2 + 18x + 20$</td> </tr> </table> _____ Bank label: _____	Standard	$3x^2 + 18x + 20$	Convert the downward-opening quadratic. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$-3x^2 + 24x + 1$</td> </tr> </table> _____ Bank label: _____	Standard	$-3x^2 + 24x + 1$
Standard	$3x^2 + 18x + 20$				
Standard	$-3x^2 + 24x + 1$				
Express the scaled perfect square in vertex form. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$4x^2 - 24x + 36$</td> </tr> </table> _____ Bank label: _____	Standard	$4x^2 - 24x + 36$	Rewrite without a trailing zero constant. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$-4x^2 - 16x - 16$</td> </tr> </table> _____ Bank label: _____	Standard	$-4x^2 - 16x - 16$
Standard	$4x^2 - 24x + 36$				
Standard	$-4x^2 - 16x - 16$				
Convert and retain the remainder after the scaled square. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$6x^2 - 12x + 8$</td> </tr> </table> _____ Bank label: _____	Standard	$6x^2 - 12x + 8$	Rewrite to reveal the left-shifted vertex. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$-6x^2 - 36x - 50$</td> </tr> </table> _____ Bank label: _____	Standard	$-6x^2 - 36x - 50$
Standard	$6x^2 - 12x + 8$				
Standard	$-6x^2 - 36x - 50$				
Convert and compute the scaled correction. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$7x^2 + 28x + 19$</td> </tr> </table> _____ Bank label: _____	Standard	$7x^2 + 28x + 19$	Write the exact vertex form. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$-7x^2 + 28x - 11$</td> </tr> </table> _____ Bank label: _____	Standard	$-7x^2 + 28x - 11$
Standard	$7x^2 + 28x + 19$				
Standard	$-7x^2 + 28x - 11$				

Algebra 1

Converting Quadratics to Vertex Form

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Fill both equal blanks.

Trace

$$x^2 + 4x + 9 = (x^2 + 4x + \underline{\hspace{1cm}} - \underline{\hspace{1cm}}) + 9 = (x + 2)^2 + 5$$

What number belongs in both blanks?

Trace

$$x^2 - 6x + 1 = (x^2 - 6x + \underline{\hspace{1cm}}) - \underline{\hspace{1cm}} + 1 = (x - 3)^2 - 8$$

Algebra 1

Converting Quadratics to Vertex Form

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $(x + \frac{7}{2})^2 - \frac{69}{4}$ Complete the square for $x^2 + x$. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$x^2 + x$</td> </tr> </table> Your response: _____	Standard	$x^2 + x$	Incoming: $(x + 12)^2 - 1$ Extract the completed square from the trinomial. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$x^2 - 24x + 160$</td> </tr> </table> Your response: _____	Standard	$x^2 - 24x + 160$
Standard	$x^2 + x$				
Standard	$x^2 - 24x + 160$				
Incoming: $(x - \frac{9}{2})^2 - \frac{81}{4}$ Rewrite using a single rational vertical offset. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$x^2 + 7x - 5$</td> </tr> </table> Your response: _____	Standard	$x^2 + 7x - 5$	Incoming: $(x + \frac{11}{2})^2 - \frac{41}{4}$ Convert and include an exact form that expands back to 50 as the constant. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$x^2 + 15x + 50$</td> </tr> </table> Your response: _____	Standard	$x^2 + 15x + 50$
Standard	$x^2 + 7x - 5$				
Standard	$x^2 + 15x + 50$				
Incoming: $(x - 11)^2 + 1$ Write vertex form and show the one-unit deficit. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$x^2 + 24x + 143$</td> </tr> </table> Your response: _____	Standard	$x^2 + 24x + 143$	Incoming: $(x + \frac{1}{2})^2 - \frac{1}{4}$ Rewrite and keep all constants as fractions. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$x^2 - x + 6$</td> </tr> </table> Your response: _____	Standard	$x^2 - x + 6$
Standard	$x^2 + 24x + 143$				
Standard	$x^2 - x + 6$				

Algebra 1

Converting Quadratics to Vertex Form

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Rewrite the quadratic in vertex form. Choose how to organize the conversion: insert and compensate a square-completing term, or compare coefficients with a squared-binomial form. Explain which route suits the coefficients, then give the original requested vertex form and verify it.

Standard	$x^2 + 6x + 5$
----------	----------------

Complete the square and state the equivalent vertex form. Choose how to organize the conversion: insert and compensate a square-completing term, or compare coefficients with a squared-binomial form. Explain which route suits the coefficients, then give the original requested vertex form and verify it.

Standard	$x^2 - 8x + 19$
----------	-----------------

Put $x^2 + 10x$ into vertex form without changing its values. Choose how to organize the conversion: insert and compensate a square-completing term, or compare coefficients with a squared-binomial form. Explain which route suits the coefficients, then give the original requested vertex form and verify it.

Standard	$x^2 + 10x$
----------	-------------

Find the vertex form and identify the final constant. Choose how to organize the conversion: insert and compensate a square-completing term, or compare coefficients with a squared-binomial form. Explain which route suits the coefficients, then give the original requested vertex form and verify it.

Standard	$x^2 - 4x - 12$
----------	-----------------

Converting Quadratics to Vertex Form

Full Worked Solutions - excerpt

Worked example

Problem. Complete the final equality.

Trace	$x^2 + 8x + 3 = (x + 4)^2 - 16 + 3 = (x + 4)^2 + \underline{\hspace{2cm}}$
-------	--

Answer. -13

Explanation and check.

Combine -16 and 3 .

Worked example

Problem. Use the last equality to recover the original constant c .

Trace	$4x^2 - 16x + c = 4[(x - 2)^2 - 4] + c = 4(x - 2)^2 + 9$
-------	--

Answer. 25

Explanation and check.

The final constant is $c - 16$, so $c - 16 = 9$.

Algebra 1
Quadratic Zeros and Factored Form

Quadratic Zeros and Factored Form | A1-U09-P05

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
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Topic focus
This topic is a focused set of 96 practice tasks on Quadratic Zeros and Factored Form.
8 PDFs and a README; 109 buyer pages.

Algebra 1

Quadratic Zeros and Factored Form

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

State the zero and its multiplicity. Match the complete original zero set, factored function, contact description, or parameter solution set. Preserve multiplicity and any required orientation or verification. <table border="1"> <tr> <td>Function</td> <td>$g(x) = (x - 4)^2$</td> </tr> </table> Bank label: _____	Function	$g(x) = (x - 4)^2$	Express the rule as repeated factors and state the zero data. Match the complete original zero set, factored function, contact description, or parameter solution set. Preserve multiplicity and any required orientation or verification. <table border="1"> <tr> <td>Function</td> <td>$f(x) = 5x^2$</td> </tr> </table> Bank label: _____	Function	$f(x) = 5x^2$
Function	$g(x) = (x - 4)^2$				
Function	$f(x) = 5x^2$				
Give the zero and multiplicity. Match the complete original zero set, factored function, contact description, or parameter solution set. Preserve multiplicity and any required orientation or verification. <table border="1"> <tr> <td>Function</td> <td>$f(x) = (4x + 1)^2$</td> </tr> </table> Bank label: _____	Function	$f(x) = (4x + 1)^2$	State all zero information, including multiplicity. Match the complete original zero set, factored function, contact description, or parameter solution set. Preserve multiplicity and any required orientation or verification. <table border="1"> <tr> <td>Function</td> <td>$f(x) = -9(2x - 5)(2x - 5)$</td> </tr> </table> Bank label: _____	Function	$f(x) = -9(2x - 5)(2x - 5)$
Function	$f(x) = (4x + 1)^2$				
Function	$f(x) = -9(2x - 5)(2x - 5)$				

Algebra 1

Quadratic Zeros and Factored Form

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Identify the zeros and explain the role of 7. <table border="1"> <tr> <td>Function</td> <td>$f(x) = 7(x - 1)(x - 6)$</td> </tr> </table> 	Function	$f(x) = 7(x - 1)(x - 6)$	Give the x-intercepts from the factored rule. <table border="1"> <tr> <td>Function</td> <td>$f(x) = -2(x + 1)(x - 8)$</td> </tr> </table> 	Function	$f(x) = -2(x + 1)(x - 8)$
Function	$f(x) = 7(x - 1)(x - 6)$				
Function	$f(x) = -2(x + 1)(x - 8)$				
Determine the x-intercepts. <table border="1"> <tr> <td>Function</td> <td>$f(x) = (5 - x)(3x + 6)$</td> </tr> </table> 	Function	$f(x) = (5 - x)(3x + 6)$	State where outputs are positive, negative, and zero. <table border="1"> <tr> <td>Function</td> <td>$f(x) = (x + 2)(x - 5)$</td> </tr> </table> 	Function	$f(x) = (x + 2)(x - 5)$
Function	$f(x) = (5 - x)(3x + 6)$				
Function	$f(x) = (x + 2)(x - 5)$				
Give the sign pattern across the two zeros. <table border="1"> <tr> <td>Function</td> <td>$f(x) = -3(x - 1)(x - 4)$</td> </tr> </table> 	Function	$f(x) = -3(x - 1)(x - 4)$	Describe the sign on both sides of the double root. <table border="1"> <tr> <td>Function</td> <td>$f(x) = 2(x + 3)^2$</td> </tr> </table> 	Function	$f(x) = 2(x + 3)^2$
Function	$f(x) = -3(x - 1)(x - 4)$				
Function	$f(x) = 2(x + 3)^2$				

Algebra 1

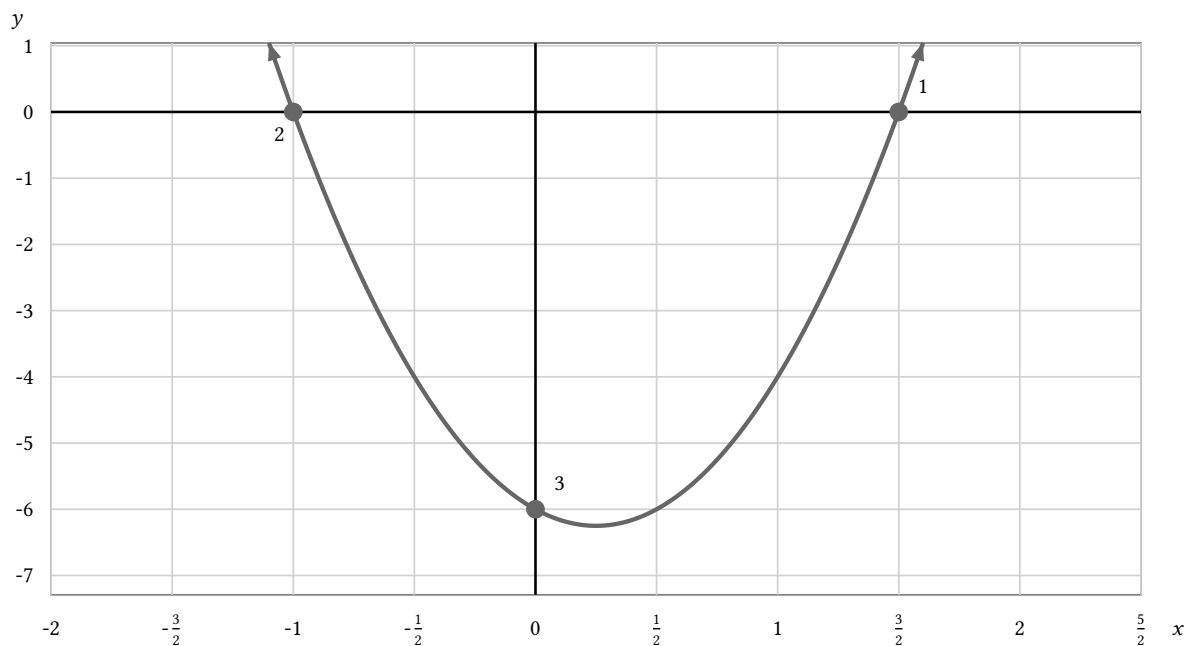
Quadratic Zeros and Factored Form

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $f(x) = 6(x - \frac{1}{3})(x - 2)$

Give a factored rule using integer-coefficient linear factors. Match the complete original zero set, factored function, contact description, or parameter solution set. Preserve multiplicity and any required orientation or verification.



Marker	Exact coordinate	Boundary status
1	$(\frac{3}{2}, 0)$	included
2	$(-1, 0)$	included
3	$(0, -6)$	included

Graph	X intercepts	$\frac{3}{2}, 0, -1, 0$
	Exact point	$0, -6$
Scales	x	$\frac{1}{2}$
	y	1

Your response: _____

Algebra 1

Quadratic Zeros and Factored Form

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Construct the quadratic in factored form. Choose between using the root factors with one unknown scale or solving for standard-form coefficients from the same data. Explain which setup is more economical, then give the originally requested factored rule and verify the point and roots.

Zeros	$-2, 3$
Point	$0, -6$

Use the two zero rows and the remaining row to find the rule. Choose between using the root factors with one unknown scale or solving for standard-form coefficients from the same data. Explain which setup is more economical, then give the originally requested factored rule and verify the point and roots.

Input	Output
1	0
5	0
0	10

Quadratic Zeros and Factored Form

Full Worked Solutions - excerpt

Worked example

Problem. Normalize the factors and give the complete sign chart.

Function	$f(x) = (4x + 8)(3x - 9)$
----------	---------------------------

Answer. negative: $(-2, 3)$; positive: $(-\infty, -2)$ union $(3, \infty)$; zero: $-2, 3$

Explanation and check.

The factors are $4(x + 2)$ and $3(x - 3)$; their scalar product is positive.

Worked example

Problem. State the sign without treating 4 as two interval boundaries.

Function	$f(x) = (2x - 8)(5x - 20)$
----------	----------------------------

Answer. negative: none; positive: $(-\infty, 4)$ union $(4, \infty)$; zero: 4

Explanation and check.

Both factors are positive multiples of $x - 4$, so their product is a positive square multiple.

Algebra 1
Comparing Forms of Quadratic Functions

Comparing Forms of Quadratic Functions | A1-U09-P06
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
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Topic focus
This topic is a focused set of 96 practice tasks on Comparing Forms of Quadratic Functions.
8 PDFs and a README; 59 buyer pages.

Algebra 1

Comparing Forms of Quadratic Functions

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Select the equivalent factored form. Match the complete expression, feature values, or parameter values requested below; show the requested verification. The standard form is $x^2 - 5x + 6$. Compare the proposed factored forms $(x - 2)(x - 3)$; $(x + 2)(x + 3)$.

Bank label: _____

Choose the equivalent vertex form. Match the complete expression, feature values, or parameter values requested below; show the requested verification. The standard form is $x^2 + 6x + 5$. Compare the proposed vertex forms $(x + 3)^2 - 4$; $(x - 3)^2 - 4$.

Bank label: _____

Verify whether the three representations agree.

Label	Supplied expression or information
standard	$-2x^2 + 8x - 6$
vertex	$-2(x - 2)^2 + 2$
factored	$-2(x - 1)(x - 3)$

Bank label: _____

Which candidate matches the standard form? Match the complete expression, feature values, or parameter values requested below; show the requested verification. The standard form is $3x^2 - 15x + 18$.

Label	Supplied expression or information
A	$(x - 2)(x - 3)$
B	$3(x - 2)(x - 3)$

Bank label: _____

Algebra 1

Comparing Forms of Quadratic Functions

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Choose the representation and state the roots. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Label</th> <th>Supplied expression or information</th> </tr> </thead> <tbody> <tr> <td>standard</td> <td>$6x^2 + x - 2$</td> </tr> <tr> <td>factored</td> <td>$(3x + 2)(2x - 1)$</td> </tr> </tbody> </table> 	Label	Supplied expression or information	standard	$6x^2 + x - 2$	factored	$(3x + 2)(2x - 1)$	Which form should be read, and what is the vertex? <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Label</th> <th>Supplied expression or information</th> </tr> </thead> <tbody> <tr> <td>standard</td> <td>$3x^2 + 12x + 8$</td> </tr> <tr> <td>vertex</td> <td>$3(x + 2)^2 - 4$</td> </tr> </tbody> </table> 	Label	Supplied expression or information	standard	$3x^2 + 12x + 8$	vertex	$3(x + 2)^2 - 4$		
Label	Supplied expression or information														
standard	$6x^2 + x - 2$														
factored	$(3x + 2)(2x - 1)$														
Label	Supplied expression or information														
standard	$3x^2 + 12x + 8$														
vertex	$3(x + 2)^2 - 4$														
Choose the representation that preserves the units and answer the question. The context is height $h(t)$ in feet. Determine initial height at $t = 0$. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Label</th> <th>Supplied expression or information</th> </tr> </thead> <tbody> <tr> <td>standard</td> <td>$-16t^2 + 48t + 6$</td> </tr> <tr> <td>vertex</td> <td>$-16(t - \frac{3}{2})^2 + 42$</td> </tr> </tbody> </table> 	Label	Supplied expression or information	standard	$-16t^2 + 48t + 6$	vertex	$-16(t - \frac{3}{2})^2 + 42$	Which form decides the claim immediately? Determine whether $x = 5$ is a zero. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Label</th> <th>Supplied expression or information</th> </tr> </thead> <tbody> <tr> <td>standard</td> <td>$2x^2 - 6x - 20$</td> </tr> <tr> <td>factored</td> <td>$2(x - 5)(x + 2)$</td> </tr> </tbody> </table> 	Label	Supplied expression or information	standard	$2x^2 - 6x - 20$	factored	$2(x - 5)(x + 2)$		
Label	Supplied expression or information														
standard	$-16t^2 + 48t + 6$														
vertex	$-16(t - \frac{3}{2})^2 + 42$														
Label	Supplied expression or information														
standard	$2x^2 - 6x - 20$														
factored	$2(x - 5)(x + 2)$														
Select the single form that shows both requested features. Determine opening direction and extreme output. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Label</th> <th>Supplied expression or information</th> </tr> </thead> <tbody> <tr> <td>standard</td> <td>$-2x^2 + 20x - 41$</td> </tr> <tr> <td>vertex</td> <td>$-2(x - 5)^2 + 9$</td> </tr> </tbody> </table> 	Label	Supplied expression or information	standard	$-2x^2 + 20x - 41$	vertex	$-2(x - 5)^2 + 9$	Which available form best answers the feature question? Determine minimum value. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Label</th> <th>Supplied expression or information</th> </tr> </thead> <tbody> <tr> <td>standard</td> <td>$x^2 + 4x + 8$</td> </tr> <tr> <td>vertex</td> <td>$(x + 2)^2 + 4$</td> </tr> <tr> <td>real factored</td> <td>does not exist</td> </tr> </tbody> </table> 	Label	Supplied expression or information	standard	$x^2 + 4x + 8$	vertex	$(x + 2)^2 + 4$	real factored	does not exist
Label	Supplied expression or information														
standard	$-2x^2 + 20x - 41$														
vertex	$-2(x - 5)^2 + 9$														
Label	Supplied expression or information														
standard	$x^2 + 4x + 8$														
vertex	$(x + 2)^2 + 4$														
real factored	does not exist														

Algebra 1

Comparing Forms of Quadratic Functions

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: b: -16; c: 9 Find a and k. Match the complete expression, feature values, or parameter values requested below; show the requested verification. <table border="1"> <thead> <tr> <th>Label</th> <th>Supplied expression or information</th> </tr> </thead> <tbody> <tr> <td>standard</td> <td>$ax^2 + 18x + 20$</td> </tr> <tr> <td>vertex</td> <td>$a(x + 3)^2 + k$</td> </tr> </tbody> </table> Your response: _____	Label	Supplied expression or information	standard	$ax^2 + 18x + 20$	vertex	$a(x + 3)^2 + k$	Incoming: factored form: $(x-m)(x-2)$; zeros: $m, 2$ Give the minimum and minimizers in terms of r. Use $f(x) = 2(x-r)(x+r)$. Restrict x to $[0, \infty)$. Let r be real. Determine minimum on domain. Your response: _____
Label	Supplied expression or information						
standard	$ax^2 + 18x + 20$						
vertex	$a(x + 3)^2 + k$						
Incoming: p: 3; q: -12 Choose and perform the useful conversion. Use $h(x) = x^2 - 7x + 12$. Determine zeros. Your response: _____	Incoming: factored form: $(x-3)(x-4)$; zeros: 3, 4 State the range and explain why no conversion is needed. Use $f(x) = -4(x+1)^2 + 9$. Determine range. Your response: _____						
Incoming: factored form: $-2(x-3)(x+2)$; positive: $(-2, 3)$ Find the range with a minimal vertex calculation. Use $f(x) = 5(x+2)(x-4)$. Determine range. Your response: _____	Incoming: factored form: $(3x+2)(2x-1)$; zeros: $-\frac{2}{3}, \frac{1}{2}$ Factor and answer the sign question. Use $f(x) = -2x^2 + 2x + 12$. Determine positive-output interval. Your response: _____						

Algebra 1

Comparing Forms of Quadratic Functions

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Which supplied form reveals the requested feature most directly? Justify the form choice from the requested feature and the supplied expressions, then complete the original feature reading. Preserve the supplied alternatives and any restrictions. Determine y -intercept.

Label	Supplied expression or information
standard	$2x^2 - 5x + 7$
vertex	$2(x - \frac{5}{4})^2 + \frac{31}{8}$
factored	not supplied

Choose the form that answers the question immediately. Justify the form choice from the requested feature and the supplied expressions, then complete the original feature reading. Preserve the supplied alternatives and any restrictions. Determine minimum value.

Label	Supplied expression or information
standard	$x^2 - 6x + 11$
vertex	$(x - 3)^2 + 2$

Comparing Forms of Quadratic Functions

Full Worked Solutions - excerpt

Worked example

Problem. Convert directly from vertex to factored form. Use $f(x) = 3(x + 1)^2 - 27$. Determine zeros.

Answer. factored form: $3(x - 2)(x + 4)$; zeros: $-4, 2$

Explanation and check.

Factor $3[(x + 1)^2 - 9] = 3[(x + 1) - 3][(x + 1) + 3]$.

Worked example

Problem. Find a purposeful factorization and state the roots. Use $f(x) = x^2 - (m + 2)x + 2m$. Determine zeros in terms of m .

Answer. factored form: $(x - m)(x - 2)$; zeros: $m, 2$

Explanation and check.

The required sum is $m + 2$ and product $2m$, so the factors separate as $x - m$ and $x - 2$.

Algebra 1
Solving Quadratics by Factoring

Solving Quadratics by Factoring | A1-U09-P07

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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Algebra 1

Solving Quadratics
by Factoring

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Solve the product equation and list both roots. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $(x - 2)(x + 5) = 0$ _____ Bank label: _____	Find the complete solution set without dividing by x. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $x(x - 7) = 0$ _____ Bank label: _____
Solve each linear factor equation. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $(2x - 3)(x + 1) = 0$ _____ Bank label: _____	Explain whether the outside -3 changes the roots. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $-3(x + 2)(x - 6) = 0$ _____ Bank label: _____
Solve by separating the two factor equations. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $(x - 9)(x + 9) = 0$ _____ Bank label: _____	Keep every root of the product. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $4x(3x + 2) = 0$ _____ Bank label: _____
Solve the nonmonic factor equations exactly. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $(3x + 4)(2x - 5) = 0$ _____ Bank label: _____	Account for the reversed second factor. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $7(x - 3)(5 - x) = 0$ _____ Bank label: _____

Algebra 1

Solving Quadratics by Factoring

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Give the distinct real solution and its multiplicity. Equation: $(x + 4)^2 = 0$ _____ _____	State the distinct root and multiplicity. Equation: $(5x + 1)^2 = 0$ _____ _____
How many distinct solutions are there? Equation: $-(x - 1)(x - 1) = 0$ _____ _____	Find the root represented twice. Equation: $(7 - 2x)^2 = 0$ _____ _____
Recognize duplicate roots from opposite factors. Equation: $(4x + 5)(-4x - 5) = 0$ _____ _____	State the repeated solution exactly. Equation: $(\frac{x}{3} - 5)^2 = 0$ _____ _____

Algebra 1

Solving Quadratics
by Factoring

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: factorization: $(-\frac{x}{7})(5 - 3x)$; solutions: $0, \frac{5}{3}$ Factor the nonmonic trinomial and solve exactly. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $2x^2 + 7x + 3 = 0$ Your response: _____	Incoming: factorization: $(3x + 1)(x - 2)$; solutions: $-\frac{1}{3}, 2$ Use nonmonic linear factors to solve. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $6x^2 + x - 2 = 0$ Your response: _____
Incoming: cross terms: $-15x + 8x = -7x$; factorization: $(3x + 4)(2x - 5) = 0$; solutions: $-\frac{4}{3}, \frac{5}{2}$ Factor with product -120 and solve. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $20x^2 + 7x - 6 = 0$ Your response: _____	Incoming: factorization: $2(2x - 1)(2x + 1)$; solutions: $-\frac{1}{2}, \frac{1}{2}$ Factor by coordinating the cross terms. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $10x^2 - 17x + 3 = 0$ Your response: _____
Incoming: factorization: $(x + 8)(x + 3)$; solutions: $-8, -3$ Use two factors with leading term $2x$. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $4x^2 + 4x - 15 = 0$ Your response: _____	Incoming: factorization: $5(x - 3)(x + 3)$; solutions: $-3, 3$ Factor completely before solving. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $3x^2 + 12x + 9 = 0$ Your response: _____

Algebra 1

Solving Quadratics by Factoring

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Factor the trinomial and solve. Choose a factoring setup: test integer binomial factor pairs directly, or split the middle term using a product-sum pair. Explain which is efficient for this equation, then finish the original factor-and-solve task with every zero-product branch.

Equation: $x^2 + 5x + 6 = 0$

Use a factor pair with product -12 . Choose a factoring setup: test integer binomial factor pairs directly, or split the middle term using a product-sum pair. Explain which is efficient for this equation, then finish the original factor-and-solve task with every zero-product branch.

Equation: $x^2 - x - 12 = 0$

Recognize the difference of squares and solve. Choose a factoring setup: test integer binomial factor pairs directly, or split the middle term using a product-sum pair. Explain which is efficient for this equation, then finish the original factor-and-solve task with every zero-product branch.

Equation: $x^2 - 9 = 0$

Factor and report distinct roots. Choose a factoring setup: test integer binomial factor pairs directly, or split the middle term using a product-sum pair. Explain which is efficient for this equation, then finish the original factor-and-solve task with every zero-product branch.

Equation: $x^2 + 8x + 16 = 0$

Solving Quadratics by Factoring

Full Worked Solutions - excerpt

Worked example

Problem. A student factors correctly as $(2x + 1)(x + 3)$ but solves only $2x + 1 = 0$. Complete the reasoning.

Answer. factorization: $(2x + 1)(x + 3) = 0$; first error: the factor $x + 3$ was never set to zero; solutions: $-3, -\frac{1}{2}$

Explanation and check.

Zero-product reasoning is a union of both factor equations, so -3 must be added to $-\frac{1}{2}$.

Worked example

Problem. A student claims $(x + 4)(x + 3) = 0$. Find the first mismatch and repair the solution.

Equation: $x^2 + x - 12 = 0$ Student Factorization: $(x + 4)(x + 3) = 0$

Answer. correct factorization: $(x + 4)(x - 3) = 0$; first error: the claimed factors expand to $x^2 + 7x + 12$; solutions: $-4, 3$

Explanation and check.

The constant must be -12 and the linear coefficient $+1$; constants 4 and -3 meet both conditions.

Algebra 1
Solving Quadratics by Square Roots

Solving Quadratics by Square Roots | A1-U09-P08

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
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Topic focus
This topic is a focused set of 96 practice tasks on Solving Quadratics by Square Roots.
8 PDFs and a README; 51 buyer pages.

Algebra 1

Solving Quadratics by
Square Roots

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Solve over the real numbers and show both branches. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = 16$ over the real numbers. _____ Bank label: _____	How many distinct real solutions are there? Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = 0$ over the real numbers. _____ Bank label: _____
Classify the real solution set before attempting a square root. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = -9$ over the real numbers. _____ Bank label: _____	Distinguish the principal square root from the equation solutions. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = 1$ over the real numbers. _____ Bank label: _____
List the complete real solution set. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = 49$ over the real numbers. _____ Bank label: _____	Use square-root branches to solve. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = 25$ over the real numbers. _____ Bank label: _____
Find and verify both roots. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = 100$ over the real numbers. _____ Bank label: _____	State both real roots rather than only the radical value. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = 4$ over the real numbers. _____ Bank label: _____

Algebra 1

Solving Quadratics by
Square Roots

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Determine the number of real roots. Solve $x^2 = -36$ over the real numbers. _____ _____	Classify the equation in the real domain. Solve $x^2 = -\frac{4}{9}$ over the real numbers. _____ _____
Decide whether any real branch exists. Solve $x^2 = -0.49$ over the real numbers. _____ _____	Use sign evidence to classify real solvability. Solve $x^2 = -\frac{121}{9}$ over the real numbers. _____ _____
Determine the real solution count. Solve $x^2 = -0.0001$ over the real numbers. _____ _____	Separate perfect-square magnitude from the sign classification. Solve $x^2 = -\frac{289}{64}$ over the real numbers. _____ _____

Algebra 1

Solving Quadratics by
Square Roots

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $x = -2$ or $x = 4$ Separate the outer operations from the final translation. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $3(x + 4)^2 + 2 = 29$ over the real numbers. Your response: _____	Incoming: $x = -1$ or $x = 7$ Interpret the plus sign inside the square correctly. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $(x + 5)^2 = 9$ over the real numbers. Your response: _____
Incoming: $x = -8$ or $x = -2$ Determine whether the branch notation creates distinct roots. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $(x - 4)^2 = 0$ over the real numbers. Your response: _____	Incoming: $x = -\frac{17}{10}$ or $x = \frac{17}{10}$ Control the subtraction and the negative decimal divisor. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $-0.8x^2 + 1.25 = -2.982$ over the real numbers. Your response: _____
Incoming: $x = -\frac{20}{9}$ or $x = \frac{20}{9}$ Find the common-denominator isolation and all real roots. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $(\frac{7}{3})x^2 + \frac{5}{6} = \frac{599}{84}$ over the real numbers. Your response: _____	Incoming: $x = -\frac{19}{10}$ or $x = \frac{19}{10}$ Invert the fractional scale, then take square roots. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $(\frac{81}{4})x^2 + 6 = 106$ over the real numbers. Your response: _____

Algebra 1

Solving Quadratics by Square Roots

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Isolate x squared before taking both square-root branches. Choose whether to remove the additive term before dividing by the square coefficient, or divide the whole equation by that nonzero coefficient first. Justify the cleaner arithmetic, then isolate the square and finish both branches as originally requested.

Solve $8x^2 + 3 = 53$ over the real numbers.

Preserve equality through both inverse operations and solve. Choose whether to remove the additive term before dividing by the square coefficient, or divide the whole equation by that nonzero coefficient first. Justify the cleaner arithmetic, then isolate the square and finish both branches as originally requested.

Solve $18x^2 - 7 = 91$ over the real numbers.

Determine whether the two sign branches remain distinct. Choose whether to remove the additive term before dividing by the square coefficient, or divide the whole equation by that nonzero coefficient first. Justify the cleaner arithmetic, then isolate the square and finish both branches as originally requested.

Solve $4x^2 + 13 = 13$ over the real numbers.

Track the negative coefficient while isolating the square. Choose whether to remove the additive term before dividing by the square coefficient, or divide the whole equation by that nonzero coefficient first. Justify the cleaner arithmetic, then isolate the square and finish both branches as originally requested.

Solve $-25x^2 + 8 = -56$ over the real numbers.

Solving Quadratics by Square Roots

Full Worked Solutions - excerpt

Worked example

Problem. Isolate the middle squared term, then branch.

Solve $7 - 2(x - 4)^2 = 5$ over the real numbers.

Answer. branches: $x - 4 = \pm 1$; center: 4; radius squared: 1; real solution count: 2; solutions: 3, 5

Explanation and check.

Subtract 7 and divide by -2 to find $(x - 4)^2 = 1$. Therefore x is 3 or 5.

Worked example

Problem. Determine the number of real roots.

Solve $x^2 = -36$ over the real numbers.

Answer. isolated square value: -36 ; real solution count: 0; No real solutions

Explanation and check.

Because x squared is at least zero for every real x , there are no real roots.

Algebra 1
Solving Quadratics by Completing the Square

Solving Quadratics by Completing the Square | A1-U09-P09

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
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Topic focus
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8 PDFs and a README; 62 buyer pages.

Algebra 1

Solving Quadratics by
Completing the Square

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Complete the square and solve the symmetric integer branches. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 + 16x + 60 = 0$. _____ Bank label: _____	Find the center and both roots using equality-preserving additions. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 - 14x + 40 = 0$. _____ Bank label: _____
Preserve the exact nonsquare distance from the completed center. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 + 18x + 70 = 0$. _____ Bank label: _____	Complete the square with a negative linear term. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 - 2x - 10 = 0$. _____ Bank label: _____
Build the square and simplify the exact solution statement. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 + 12x + 29 = 0$. _____ Bank label: _____	Use the fractional half-coefficient and give exact roots. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 + 3x - 1 = 0$. _____ Bank label: _____
Complete the square without rounding the half-integer center. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 - 5x + 2 = 0$. _____ Bank label: _____	Track the quarter fractions created by the odd coefficient. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 + 7x + 3 = 0$. _____ Bank label: _____

Algebra 1

Solving Quadratics by
Completing the Square

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Supply the omitted line and finish the partial solution. Work over the real numbers with $x^2 + 6x = 7$. $x^2 + 6x = 7$ _____ $(x + 3)^2 = 16$ _____ _____	Fill the equality-preserving completion step. Work over the real numbers with $x^2 - 8x = -7$. $x^2 - 8x = -7$ _____ $(x - 4)^2 = 9$ _____ _____
Supply the normalization line that must precede square completion. Work over the real numbers with $2x^2 + 12x = 10$. $2x^2 + 12x = 10$ _____ $x^2 + 6x + 9 = 5 + 9$ _____ _____	Repair the trace by supplying the omitted signed branch. Work over the real numbers with $x^2 + 4x - 5 = 0$. $(x + 2)^2 = 9$ $x + 2 = 3$ $x = 1$ _____ _____
Determine the fractional amount missing from both sides. Work over the real numbers with $x^2 + 5x = 2$. $x^2 + 5x = 2$ $x^2 + 5x + \underline{\hspace{2cm}} = 2 + \underline{\hspace{2cm}}$ _____ _____	Replace the trinomial with its equivalent squared-binomial form. Work over the real numbers with $x^2 - 6x + 9 = 14$. $x^2 - 6x + 9 = 14$ _____ $x - 3 = \pm\sqrt{14}$ _____ _____

Algebra 1

Solving Quadratics by
Completing the Square

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: amount added to each side: $\frac{25}{16}$; completed square equation: $(x - \frac{5}{4})^2 = \frac{31}{16}$; real solution count: 2; solutions: $\frac{5-\sqrt{31}}{4}, \frac{5+\sqrt{31}}{4}$; square root radicand: $\frac{31}{16}$ Recognize the repeated root created by a rational completion amount. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 + (\frac{7}{5})x + \frac{49}{100} = 0$. Your response: _____	Incoming: amount added to each side: $\frac{9}{16}$; completed square equation: $(x + \frac{3}{4})^2 = \frac{33}{16}$; real solution count: 2; solutions: $\frac{-3-\sqrt{33}}{4}, \frac{-3+\sqrt{33}}{4}$; square root radicand: $\frac{33}{16}$ Normalize the leading coefficient before completing the square. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $2x^2 + 8x + 1 = 0$. Your response: _____
Incoming: amount added after normalizing: 1; completed square equation: $(x - 1)^2 = \frac{8}{5}$; leading coefficient divisor: 5; normalized equation: $x^2 - 2x - \frac{3}{5} = 0$; real solution count: 2; solutions: $1 - 2 \cdot \frac{\sqrt{10}}{5}, 1 + 2 \cdot \frac{\sqrt{10}}{5}$; square root radicand: $\frac{8}{5}$ Use normalization to expose the repeated root. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $2x^2 - 4x + 2 = 0$. Your response: _____	Incoming: amount added after normalizing: $\frac{25}{4}$; completed square equation: $(x - \frac{5}{2})^2 = \frac{13}{12}$; leading coefficient divisor: 6; normalized equation: $x^2 - 5x + \frac{31}{6} = 0$; real solution count: 2; solutions: $\frac{5}{2} - \frac{\sqrt{39}}{6}, \frac{5}{2} + \frac{\sqrt{39}}{6}$; square root radicand: $\frac{13}{12}$ Normalize the odd linear coefficient and solve exactly. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $4x^2 + 20x + 11 = 0$. Your response: _____
Incoming: amount added after normalizing: $\frac{9}{4}$; completed square equation: $(x + \frac{3}{2})^2 = \frac{1}{4}$; leading coefficient divisor: 10; normalized equation: $x^2 + 3x + 2 = 0$; real solution count: 2; solutions: $-2, -1$; square root radicand: $\frac{1}{4}$ Normalize and simplify the small exact radius. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $12x^2 - 24x + 11 = 0$. Your response: _____	START Rearrange the constants and use the completed-square sign to classify roots. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 - 5x + 9 = 2$. Your response: _____

Algebra 1

Solving Quadratics by Completing the Square

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Complete the square and keep both exact radical branches. Choose between adding the completing quantity to both sides and inserting a compensating pair on the left before isolating the square. Justify the clearer equality-preserving route, then solve by the requested square completion.

Work over the real numbers with $x^2 + 6x + 1 = 0$.

Use half the linear coefficient to build the square. Choose between adding the completing quantity to both sides and inserting a compensating pair on the left before isolating the square. Justify the clearer equality-preserving route, then solve by the requested square completion.

Work over the real numbers with $x^2 - 4x - 3 = 0$.

Show the equal addition that creates a perfect-square trinomial. Choose between adding the completing quantity to both sides and inserting a compensating pair on the left before isolating the square. Justify the clearer equality-preserving route, then solve by the requested square completion.

Work over the real numbers with $x^2 + 8x + 5 = 0$.

Complete the square and simplify the resulting radical. Choose between adding the completing quantity to both sides and inserting a compensating pair on the left before isolating the square. Justify the clearer equality-preserving route, then solve by the requested square completion.

Work over the real numbers with $x^2 - 10x + 7 = 0$.

Solving Quadratics by Completing the Square

Full Worked Solutions - excerpt

Worked example

Problem. Use normalization to expose the repeated root. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals.

Work over the real numbers with $2x^2 - 4x + 2 = 0$.

Answer. amount added after normalizing: 1; completed square equation: $(x - 1)^2 = 0$; leading coefficient divisor: 2; normalized equation: $x^2 - 2x + 1 = 0$; real solution count: 1; solutions: 1; square root radicand: 0

Explanation and check.

Dividing by 2 already displays the perfect square $x^2 - 2x + 1$. Its only root is $x = 1$.

Worked example

Problem. Show how negative normalization reveals a zero radius. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals.

Work over the real numbers with $-5x^2 + 20x - 20 = 0$.

Answer. amount added after normalizing: 4; completed square equation: $(x - 2)^2 = 0$; leading coefficient divisor: -5; normalized equation: $x^2 - 4x + 4 = 0$; real solution count: 1; solutions: 2; square root radicand: 0

Explanation and check.

Every term divided by -5 gives the perfect square $x^2 - 4x + 4$. Hence $x = 2$ is repeated.

Algebra 1
Quadratic Formula

Quadratic Formula | A1-U09-P10
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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Topic focus
This topic is a focused set of 96 practice tasks on Quadratic Formula.
8 PDFs and a README; 58 buyer pages.

Algebra 1

Quadratic Formula

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Consider $4x^2 + 9 = 12x$ over the real numbers. Rewrite with zero on one side and identify the coefficient used for $-b$. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. _____ Bank label: _____	Consider $x(x - 3) = 10$ over the real numbers. Expand the product and normalize before filling the formula slots. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. _____ Bank label: _____
Consider $2x(x + 4) = 3$ over the real numbers. Distribute the outside factors and determine the signed constant after normalization. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. _____ Bank label: _____	Consider $(x - 2)(x + 5) = 7$ over the real numbers. Expand, combine the product constant with the right-side value, and then identify coefficients. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. _____ Bank label: _____
Consider $3(x^2 - 2) = x + 1$ over the real numbers. Remove grouping and collect both right-side terms before entering a, b, and c. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. _____ Bank label: _____	Consider $(x + 1)^2 = 8$ over the real numbers. Convert the square to standard zero form for a formula substitution. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. _____ Bank label: _____
Consider $5x^2 = 2(x + 3)$ over the real numbers. Distribute the right side and move its two terms with the correct signs. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. _____ Bank label: _____	Consider $0.5x^2 - 1.5x = 2$ over the real numbers. Keep the fractional coefficients rather than clearing them, and normalize c correctly. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. _____ Bank label: _____

Algebra 1

Quadratic Formula

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Consider $6x - 5 = 2x^2$ over the real numbers. Place the quadratic term first without losing the signs of the other terms. _____ _____	Consider $4 - x(x + 2) = 0$ over the real numbers. Use an equivalent positive-leading normalization and state the coefficient triple it creates. _____ _____												
Consider $-(x - 4)^2 = 3x - 20$ over the real numbers. Expand the leading negative square, collect, and choose a positive-leading zero form. _____ _____	Consider $x^2 + x - 1 = 0$ over the real numbers. Round the final approximations to 2 decimal places. Report the exact pair first and then fill a hundredths-and-residual table. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="padding: 5px;">branch</th> <th style="padding: 5px;">exact root</th> <th style="padding: 5px;">rounded to 2 places</th> <th style="padding: 5px;">absolute residual</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Smaller root</td> <td style="padding: 5px;">_____</td> <td style="padding: 5px;">_____</td> <td style="padding: 5px;">_____</td> </tr> <tr> <td style="padding: 5px;">Larger root</td> <td style="padding: 5px;">_____</td> <td style="padding: 5px;">_____</td> <td style="padding: 5px;">_____</td> </tr> </tbody> </table> _____ _____	branch	exact root	rounded to 2 places	absolute residual	Smaller root	_____	_____	_____	Larger root	_____	_____	_____
branch	exact root	rounded to 2 places	absolute residual										
Smaller root	_____	_____	_____										
Larger root	_____	_____	_____										
Consider $2x^2 - x - 2 = 0$ over the real numbers. Round the final approximations to 2 decimal places. Approximate each branch to the nearest hundredth and substitute the rounded results. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="padding: 5px;">branch</th> <th style="padding: 5px;">exact root</th> <th style="padding: 5px;">rounded to 2 places</th> <th style="padding: 5px;">absolute residual</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Smaller root</td> <td style="padding: 5px;">_____</td> <td style="padding: 5px;">_____</td> <td style="padding: 5px;">_____</td> </tr> <tr> <td style="padding: 5px;">Larger root</td> <td style="padding: 5px;">_____</td> <td style="padding: 5px;">_____</td> <td style="padding: 5px;">_____</td> </tr> </tbody> </table> _____ _____	branch	exact root	rounded to 2 places	absolute residual	Smaller root	_____	_____	_____	Larger root	_____	_____	_____	Consider $3x^2 - 2x - 2 = 0$ over the real numbers. Round the final approximations to 2 decimal places. Simplify the exact radical before giving hundredth approximations. _____ _____
branch	exact root	rounded to 2 places	absolute residual										
Smaller root	_____	_____	_____										
Larger root	_____	_____	_____										

Algebra 1

Quadratic Formula

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

START Consider $8x^2 + 2x - 3 = 0$ over the real numbers. Evaluate the radical 10 and reduce the two sixteenth-denominator branches. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. Your response: _____	Incoming: $\{1, \frac{7}{2}\}$ Consider $3x^2 - 5x = 2x^2 + 6$ over the real numbers. Collect the quadratic terms first and apply the formula to the net leading coefficient. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. Your response: _____
Incoming: $\{1\}$ Consider $16x^2 + 24x + 9 = 0$ over the real numbers. Evaluate the formula at a zero discriminant with an even denominator reduction. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. Your response: _____	Incoming: $\{-1, \frac{7}{2}\}$ Consider $(3x - 2)^2 = 25$ over the real numbers. Expand the affine square and solve the resulting quadratic by the complete formula. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. Your response: _____
Incoming: $\{-2 - \sqrt{3}, -2 + \sqrt{3}\}$ Consider $2x^2 - 3x - 1 = 0$ over the real numbers. State the exact formula roots when the positive discriminant has no square factor. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. Your response: _____	Incoming: $\{-2, 3\}$ Consider $3x^2 - 12 = 0$ over the real numbers. Use $a = 3$ and $b = 0$ directly rather than simplifying the equation first. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. Your response: _____

Algebra 1

Quadratic Formula

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Consider $2x^2 + 3x - 5 = 0$ over the real numbers. Read a , b , and c with their signs, then write the full quadratic-formula substitution. Choose how to organize the arithmetic: calculate the discriminant first and then insert it, or write the complete signed formula substitution before simplifying any component. Justify your choice for these coefficients, then show the coefficients and the full formula substitution.

Consider $4x^2 - 9 = 0$ over the real numbers. Insert the absent term explicitly before setting up the formula. Choose how to organize the arithmetic: calculate the discriminant first and then insert it, or write the complete signed formula substitution before simplifying any component. Justify your choice for these coefficients, then show the coefficients and the full formula substitution.

Consider $-x^2 + 6x + 7 = 0$ over the real numbers. Keep the displayed leading sign and form the denominator $2a$. Choose how to organize the arithmetic: calculate the discriminant first and then insert it, or write the complete signed formula substitution before simplifying any component. Justify your choice for these coefficients, then show the coefficients and the full formula substitution.

Consider $3x^2 - 8x + 2 = 0$ over the real numbers. Record the coefficient triple and the unsimplified radical expression. Choose how to organize the arithmetic: calculate the discriminant first and then insert it, or write the complete signed formula substitution before simplifying any component. Justify your choice for these coefficients, then show the coefficients and the full formula substitution.

Quadratic Formula

Full Worked Solutions - excerpt

Worked example

Problem. Consider $6x - 5 = 2x^2$ over the real numbers. Place the quadratic term first without losing the signs of the other terms.

Answer. coefficients: $a: 2; b: -6; c: 5$; discriminant: -4 ; formula substitution: $x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(2)(5)}}{2(2)}$; normalized equation: $2x^2 - 6x + 5 = 0$; solutions:

Explanation and check.

Subtracting the left side from both sides gives $2x^2 - 6x + 5 = 0$, so $a = 2, b = -6, c = 5$.

Worked example

Problem. Consider $(x + 1)^2 = 8$ over the real numbers. Convert the square to standard zero form for a formula substitution. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set.

Answer. $\{-1 + 2 \cdot \sqrt{2}, -2 \cdot \sqrt{2} - 1\}$

Explanation and check.

The signed coefficients are $a = 1, b = 2, c = -7$. In standard form, $x^2 + 2x - 7 = 0$. The discriminant is 32. Substitution in the quadratic formula gives $x = \frac{-(2) \pm \sqrt{(2)^2 - 4(1)(-7)}}{2(1)}$. Expanding gives $x^2 + 2x + 1 = 8$; moving 8 left gives $c = -7$ while $b = 2$.

Algebra 1
Discriminant and Real Roots

Discriminant and Real Roots | A1-U09-P11

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Discriminant and Real Roots.
8 PDFs and a README; 89 buyer pages.

Algebra 1

Discriminant and Real Roots

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Consider $x^2 - 5x + 6 = 0$. The coefficients are real. Compute only the discriminant and state the number of distinct real roots. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. _____ Bank label: _____	Consider $x^2 + 4x + 4 = 0$. The coefficients are real. Classify the real roots from b squared minus $4ac$, without finding the root. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. _____ Bank label: _____
Consider $x^2 + 2x + 5 = 0$. The coefficients are real. Use the sign of the formula radicand to classify this equation. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. _____ Bank label: _____	Consider $2x^2 - 3x - 2 = 0$. The coefficients are real. Determine the distinct real-root count from the discriminant alone. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. _____ Bank label: _____
Consider $2x^2 + x + 2 = 0$. The coefficients are real. Calculate the discriminant sign and interpret it over the reals. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. _____ Bank label: _____	Consider $x^2 - 9 = 0$. The coefficients are real. Insert the absent linear coefficient and classify by discriminant sign. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. _____ Bank label: _____
Consider $x^2 + 9 = 0$. The coefficients are real. Make $b = 0$ explicit before determining the real-root count. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. _____ Bank label: _____	Consider $-2x^2 - 3x - 5 = 0$. The coefficients are real. Track all three signs and classify the roots without multiplying by -1. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. _____ Bank label: _____

Algebra 1

Discriminant and Real Roots

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Consider $0x^2 + 5x - 1 = 0$. The coefficients are real. Explain why the quadratic discriminant classification is unavailable here. 	Consider $-x^2 + 4x - 4 = 0$. The coefficients are real. Retain the negative leading coefficient and evaluate the discriminant.
Consider $4x^2 - 12x + 9 = 0$. The coefficients are real. Check whether the two discriminant terms cancel for this scaled equation. 	Consider $(\frac{1}{3})x^2 + (\frac{2}{3})x + \frac{1}{3} = 0$. The coefficients are real. Compute the rational discriminant exactly and classify distinct roots.
Consider $7x^2 = 0$. The coefficients are real. Account for both missing terms and count distinct real roots. 	Consider $3(x - 2)^2 = 6x - 15$. The coefficients are real. Expand the square, collect the external linear expression, and classify the resulting contact.

Algebra 1

Discriminant and Real Roots

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $D = 41$; two distinct irrational roots.

Consider $4x^2 + 3x - 1 = x^2 - 2x + 1$. The coefficients are rational. Collect both polynomials and classify the two exact roots arithmetically. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots.

Your response: _____

Algebra 1

Discriminant and Real Roots

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Consider $x^2 + 4x + k = 0$. Let k be real. Partition all real k by the number of distinct real roots. Choose a classification route: analyze the discriminant inequality, or normalize to a square and analyze its right-hand side. Explain which gives simpler parameter conditions here; first separate any value that makes the equation nonquadratic.

Consider $2x^2 + 3x + k = 0$. Let k be real. Find the exact constant threshold for zero, one, and two real roots. Choose a classification route: analyze the discriminant inequality, or normalize to a square and analyze its right-hand side. Explain which gives simpler parameter conditions here; first separate any value that makes the equation nonquadratic.

Consider $3x^2 - 6x + k = 0$. Let k be real. Use the discriminant to classify every real k without solving any quadratic. Choose a classification route: analyze the discriminant inequality, or normalize to a square and analyze its right-hand side. Explain which gives simpler parameter conditions here; first separate any value that makes the equation nonquadratic.

Consider $-x^2 + 2x + k = 0$. Let k be real. Track the inequality direction for a parameter with negative leading coefficient. Choose a classification route: analyze the discriminant inequality, or normalize to a square and analyze its right-hand side. Explain which gives simpler parameter conditions here; first separate any value that makes the equation nonquadratic.

Discriminant and Real Roots

Full Worked Solutions - excerpt

Worked example

Problem. Consider $-3x^2 + x + 1 = 0$. The coefficients are rational. Use the positive nonsquare discriminant to classify exact root type. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots.

Answer. $D = 13$; two distinct irrational roots.

Explanation and check.

The discriminant calculation is $(1)^2 - 4(-3)(1) = 13$. Its square root is $\sqrt{13}$. The coefficients are rational, but $\sqrt{13}$ is not, so both real roots are irrational. The discriminant is 13; its square root is $\sqrt{13}$, so the equation has two distinct irrational roots.

Worked example

Problem. Consider $2x^2 - 8 = 0$. The coefficients are rational. Insert $b = 0$ and determine whether the symmetric roots are rational. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots.

Answer. $D = 64$; two distinct rational roots.

Explanation and check.

The discriminant calculation is $(0)^2 - 4(2)(-8) = 64$. Its square root is 8. The discriminant 64 has rational radical 8. The discriminant is 64; its square root is 8, so the equation has two distinct rational roots.

Algebra 1
Quadratic Word Problems

Quadratic Word Problems | A1-U09-P12

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Quadratic Word Problems.
8 PDFs and a README; 126 buyer pages.

Algebra 1

Quadratic Word Problems

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

A rectangular herb plot has 46 meters of edging. Let w be its width. Build the area function, state its square-meter unit, and give the open domain that keeps both dimensions positive. Match the complete original model with its requested units, meaningful domain and interpretation or verification. The coefficient polynomial alone is not the complete contextual response.

Context	A rectangular herb plot uses all 46 meters of edging on four sides.
Variable definition	w is the width in meters
Length unit	meters
Area unit	square meters

Bank label: _____

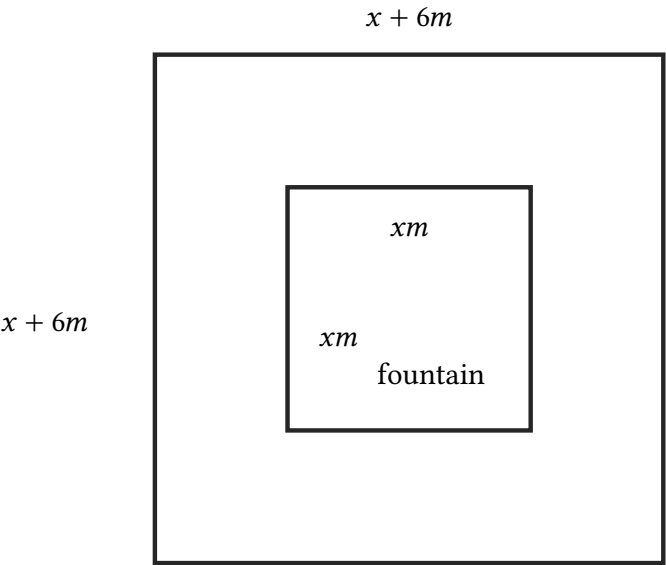
Algebra 1

Quadratic Word Problems

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

A centered square fountain has side x , and the surrounding square plaza has side $x + 6$ meters. Build the walkable ring-area model by distinguishing the two dependent squares.



Context	A square plaza of side $x + 6$ meters surrounds a centered square fountain of side x meters.
Variable definition	x is the fountain side length in meters
Length unit	meters
Area unit	square meters

Algebra 1

Quadratic Word Problems

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: feasible domain: $0 \leq x \leq 20$; x is an integer; model: $R(x) = (12 + x)(180 - 9x)$; output unit: dollars

A concert forecast pairs each 2-dollar discount with 16 additional ticket sales, starting from 30 dollars and 240 sales. Model revenue by discount count d and prevent a negative ticket price. Match the complete original model with its requested units, meaningful domain and interpretation or verification. The coefficient polynomial alone is not the complete contextual response.

Context	A fictional concert sells 240 tickets at 30 dollars; every 2-dollar discount adds 16 predicted sales.
Variable definition	d is the number of 2-dollar discounts
Factor relations	price= $30 - 2d$ dollars, tickets= $240 + 16d$
Output unit	dollars

Your response: _____

Incoming: feasible domain: $0 \leq d \leq 15$; d is an integer; model: $R(d) = (30 - 2d)(240 + 16d)$; output unit: dollars

A table is organized by blocks of five extra tour visitors. Starting from 20 visitors at 28 dollars each, every added block lowers everyone's rate by 1 dollar. Write total income in b and preserve the block-count domain. Match the complete original model with its requested units, meaningful domain and interpretation or verification. The coefficient polynomial alone is not the complete contextual response.

additional blocks	visitors	rate (dollars/visitor)	income (dollars)
0	20	28	560
4	40	24	960
12	80	16	1280

Context	A fictional museum tour charges 28 dollars per visitor for 20 visitors and lowers the per-person rate by 1 dollar for each additional block of 5 visitors.
Variable definition	b is the number of additional 5-visitor blocks
Factor relations	visitors= $20 + 5b$, rate= $28 - b$ dollars per visitor
Output unit	dollars

Your response: _____

Algebra 1

Quadratic Word Problems

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

The exact table has $R(0) = 2$, $R(1) = 6$, and $R(2) = 14$. Given $R(x) = ax^2 + bx + 2$, recover a and b and verify the row at $x = 2$. Choose a calibration setup: use the known initial value to reduce the coefficient unknowns first, or write the full observation equations and eliminate systematically. Explain which setup is more economical for these data, then complete the original model and verification requirements.

input	output (response units)	Context	A sensor response follows $R(x) = ax^2 + bx + 2$.
0	2	Variable definition	x is the input setting
1	6	Known initial value	$R(0) = 2$
2	14	Measurement unit	response units

For $Q(x) = ax^2 + bx + 5$, the table gives $Q(-1) = 4$ and $Q(1) = 8$. Add and subtract the equations to recover the even and odd contributions. Choose a calibration setup: use the known initial value to reduce the coefficient unknowns first, or write the full observation equations and eliminate systematically. Explain which setup is more economical for these data, then complete the original model and verification requirements.

input	output (calibration units)	Context	A calibration curve is $Q(x) = ax^2 + bx + 5$.
-1	4	Variable definition	x is signed control offset
0	5	Known initial value	$Q(0) = 5$
1	8	Measurement unit	calibration units

Quadratic Word Problems

Full Worked Solutions - excerpt

Worked example

Problem. A model multiplies 2 meters by x centimeters and labels $2x$ as square meters. Repair the unit conversion and area rule.

Context	A panel is 2 meters wide and x centimeters tall.
Supplied rule	area equals width times height
Proposed argument	$A(x) = 2x$ square meters.

Answer. correction: convert x centimeters to $\frac{x}{100}$ meters, so $A(x) = \frac{x}{50}$ square meters; defect: the factors use incompatible length units; evidence: x centimeters $= \frac{x}{100}$ meters, $2(\frac{x}{100}) = \frac{x}{50}$

Explanation and check.

Convert the height before multiplying: x centimeters is $\frac{x}{100}$ meters. The area is $2(\frac{x}{100}) = \frac{x}{50}$ square meters.

Worked example

Problem. A student treats $A(15) = -45$ as a possible rectangular area for $A = x(12 - x)$. Identify the first contextual failure and repair the domain.

Context	A rectangle has width x meters and length $12-x$ meters.
Supplied rule	$A(x) = x(12 - x)$
Proposed argument	Use $x = 15$ because the algebra returns $A(15) = -45$.

Answer. correction: restrict the geometry to $0 < x < 12$; negative area is not a physical rectangle; defect: $x = 15$ makes the dependent length -3 meters; evidence: $12 - 15 = -3$ meters, valid dimensions must be positive

Explanation and check.

At $x = 15$ the other side is -3 meters, so no rectangle exists. The correct model domain is $0 < x < 12$; the negative algebraic output is outside that domain.

Algebra 1
Linear-Quadratic Systems

Linear-Quadratic Systems | A1-U09-P13

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for feasible equal-output events with units, complete set of real ordered pairs, diagnosis and complete corrected ordered-pair set and complete parameter partition by 0, 1, or 2 intersections.
8 PDFs and a README; 79 buyer pages.

Algebra 1

Linear-Quadratic Systems

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

$f(x) = -2x^2 - 3x + 10$ and $g(x) = -3x + 2$. Determine the complete real solution set of this line-quadratic system, then check each coordinate in both rules. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check.

Quadratic rule	$f(x) = -2x^2 - 3x + 10$
Line rule	$g(x) = -3x + 2$
Required check	each ordered pair must satisfy both displayed rules

Bank label: _____

$f(x) = x^2 + 4x - 7$ and $g(x) = 2x + 1$. Locate all real intersections algebraically and verify that every reported point lies on both relations. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check.

Quadratic rule	$f(x) = x^2 + 4x - 7$
Line rule	$g(x) = 2x + 1$
Required check	each ordered pair must satisfy both displayed rules

Bank label: _____

$f(x) = x^2 - 9x + 3$ and $g(x) = -4x + 3$. Solve for the common inputs and recover the matching output for each one. Give points, not roots alone. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check.

Quadratic rule	$f(x) = x^2 - 9x + 3$
Line rule	$g(x) = -4x + 3$
Required check	each ordered pair must satisfy both displayed rules

Bank label: _____

$f(x) = -x^2 + 13$ and $g(x) = 4$. First decide whether there are zero, one, or two real intersections; then report all ordered pairs. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check.

Quadratic rule	$f(x) = -x^2 + 13$
Line rule	$g(x) = 4$
Required check	each ordered pair must satisfy both displayed rules

Bank label: _____

Algebra 1

Linear-Quadratic Systems

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

$f(x) = 3x^2 + \frac{7}{2}x + \frac{19}{4}$ and $g(x) = \frac{1}{2}x + 2$. Locate all real intersections algebraically and verify that every reported point lies on both relations. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Quadratic rule</td> <td>$f(x) = 3x^2 + \frac{7}{2}x + \frac{19}{4}$</td> </tr> <tr> <td>Line rule</td> <td>$g(x) = \frac{1}{2}x + 2$</td> </tr> <tr> <td>Required check</td> <td>each ordered pair must satisfy both displayed rules</td> </tr> </table> 	Quadratic rule	$f(x) = 3x^2 + \frac{7}{2}x + \frac{19}{4}$	Line rule	$g(x) = \frac{1}{2}x + 2$	Required check	each ordered pair must satisfy both displayed rules	$f(x) = -x^2 + 9x - 15$ and $g(x) = 3x - 4$. Find every ordered pair shared by the line and the parabola. Show the equation obtained by equating their outputs. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Quadratic rule</td> <td>$f(x) = -x^2 + 9x - 15$</td> </tr> <tr> <td>Line rule</td> <td>$g(x) = 3x - 4$</td> </tr> <tr> <td>Required check</td> <td>each ordered pair must satisfy both displayed rules</td> </tr> </table> 	Quadratic rule	$f(x) = -x^2 + 9x - 15$	Line rule	$g(x) = 3x - 4$	Required check	each ordered pair must satisfy both displayed rules
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Line rule	$g(x) = \frac{1}{2}x + 2$												
Required check	each ordered pair must satisfy both displayed rules												
Quadratic rule	$f(x) = -x^2 + 9x - 15$												
Line rule	$g(x) = 3x - 4$												
Required check	each ordered pair must satisfy both displayed rules												
$f(x) = \frac{3}{2}x^2 - \frac{1}{3}x - \frac{1}{4}$ and $g(x) = \frac{5}{3}x - \frac{7}{4}$. Use the most revealing exact method for the difference equation and state the full intersection set. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Quadratic rule</td> <td>$f(x) = \frac{3}{2}x^2 - \frac{1}{3}x - \frac{1}{4}$</td> </tr> <tr> <td>Line rule</td> <td>$g(x) = \frac{5}{3}x - \frac{7}{4}$</td> </tr> <tr> <td>Required check</td> <td>each ordered pair must satisfy both displayed rules</td> </tr> </table> 	Quadratic rule	$f(x) = \frac{3}{2}x^2 - \frac{1}{3}x - \frac{1}{4}$	Line rule	$g(x) = \frac{5}{3}x - \frac{7}{4}$	Required check	each ordered pair must satisfy both displayed rules	Where does $x = 0$ meet $y = -x^2 + 2x + 5$? Treat the line as a fixed input rather than trying to write it as $y = mx + b$. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Quadratic rule</td> <td>$y = -x^2 + 2x + 5$</td> </tr> <tr> <td>Line relation</td> <td>$x = 0$</td> </tr> </table> 	Quadratic rule	$y = -x^2 + 2x + 5$	Line relation	$x = 0$		
Quadratic rule	$f(x) = \frac{3}{2}x^2 - \frac{1}{3}x - \frac{1}{4}$												
Line rule	$g(x) = \frac{5}{3}x - \frac{7}{4}$												
Required check	each ordered pair must satisfy both displayed rules												
Quadratic rule	$y = -x^2 + 2x + 5$												
Line relation	$x = 0$												

Algebra 1

Linear-Quadratic Systems

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: points: $(x: -3; y: \frac{19}{2})$; real intersection count: 1 Find all points where $y = x^2$ reaches the horizontal line $y = 9$. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Quadratic rule</td> <td>$y = x^2$</td> </tr> <tr> <td>Line relation</td> <td>$y = 9$</td> </tr> </table> Your response: _____	Quadratic rule	$y = x^2$	Line relation	$y = 9$	Incoming: points: $(x: -2; y: 5)$; real intersection count: 1 The line $x = \frac{1}{2}$ cannot be isolated as a y-function. Substitute its exact input into $y = 2x^2 - 3x + 1$ and report the point. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Quadratic rule</td> <td>$y = 2x^2 - 3x + 1$</td> </tr> <tr> <td>Line relation</td> <td>$x = \frac{1}{2}$</td> </tr> </table> Your response: _____	Quadratic rule	$y = 2x^2 - 3x + 1$	Line relation	$x = \frac{1}{2}$
Quadratic rule	$y = x^2$								
Line relation	$y = 9$								
Quadratic rule	$y = 2x^2 - 3x + 1$								
Line relation	$x = \frac{1}{2}$								
Incoming: points: $(x: -\frac{3}{2}; y: -\frac{17}{4})$; real intersection count: 1 Evaluate the system $y = -2x^2 + 7x - 5$ with $x = -1$. Pay attention to the signs produced by the negative fixed input. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Quadratic rule</td> <td>$y = -2x^2 + 7x - 5$</td> </tr> <tr> <td>Line relation</td> <td>$x = -1$</td> </tr> </table> Your response: _____	Quadratic rule	$y = -2x^2 + 7x - 5$	Line relation	$x = -1$	Incoming: points: $(x: -\frac{1}{2}; y: \frac{3}{2})$, $(x: \frac{1}{2}; y: \frac{3}{2})$; real intersection count: 2 Solve the fixed-output system formed by $y = -2x^2 + 4$ and $y = \frac{7}{2}$, giving ordered pairs exactly. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Quadratic rule</td> <td>$y = -2x^2 + 4$</td> </tr> <tr> <td>Line relation</td> <td>$y = \frac{7}{2}$</td> </tr> </table> Your response: _____	Quadratic rule	$y = -2x^2 + 4$	Line relation	$y = \frac{7}{2}$
Quadratic rule	$y = -2x^2 + 7x - 5$								
Line relation	$x = -1$								
Quadratic rule	$y = -2x^2 + 4$								
Line relation	$y = \frac{7}{2}$								
Incoming: points: $(x: \frac{1}{2}; y: 3)$, $(x: 2; y: 6)$; real intersection count: 2 Reduce or isolate the line $4x + 2y = 6$, then coordinate its outputs with $y = 2x^2 + 2x - 3$. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Quadratic rule</td> <td>$y = 2x^2 + 2x - 3$</td> </tr> <tr> <td>Line relation</td> <td>$4x + 2y = 6$</td> </tr> </table> Your response: _____	Quadratic rule	$y = 2x^2 + 2x - 3$	Line relation	$4x + 2y = 6$	Incoming: points: ; real intersection count: 0 Report the ordered pair common to $y = -2x^2 - x + 4$ and the non-isolated line relation $x = 1$. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Quadratic rule</td> <td>$y = -2x^2 - x + 4$</td> </tr> <tr> <td>Line relation</td> <td>$x = 1$</td> </tr> </table> Your response: _____	Quadratic rule	$y = -2x^2 - x + 4$	Line relation	$x = 1$
Quadratic rule	$y = 2x^2 + 2x - 3$								
Line relation	$4x + 2y = 6$								
Quadratic rule	$y = -2x^2 - x + 4$								
Line relation	$x = 1$								

Algebra 1

Linear-Quadratic Systems

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

$f(x) = x^2 + 2x - 4$ and $g(x) = x + 2$. Find every ordered pair shared by the line and the parabola. Show the equation obtained by equating their outputs. After equating the outputs as requested, choose factoring or the quadratic formula for the resulting equation. Justify the choice from its coefficients, then recover every shared ordered pair and verify both original rules.

Quadratic rule	$f(x) = x^2 + 2x - 4$
Line rule	$g(x) = x + 2$
Required check	each ordered pair must satisfy both displayed rules

$f(x) = -x^2 + 3x + 5$ and $g(x) = 2x - 1$. Solve for the common inputs and recover the matching output for each one. Give points, not roots alone. After equating the outputs as requested, choose factoring or the quadratic formula for the resulting equation. Justify the choice from its coefficients, then recover every shared ordered pair and verify both original rules.

Quadratic rule	$f(x) = -x^2 + 3x + 5$
Line rule	$g(x) = 2x - 1$
Required check	each ordered pair must satisfy both displayed rules

Linear-Quadratic Systems

Full Worked Solutions - excerpt

Worked example

Problem. Does the horizontal line $y = 3$ meet $y = x^2 - 2x + 5$ over the reals? Justify the complete intersection set.

Quadratic rule	$y = x^2 - 2x + 5$
Line relation	$y = 3$

Answer. points: ; real intersection count: 0

Explanation and check.

The horizontal condition makes $x^2 - 2x + 5 = 3$. Solving gives the listed input value(s); each has output 3.

Worked example

Problem. Where does $x = 0$ meet $y = -x^2 + 2x + 5$? Treat the line as a fixed input rather than trying to write it as $y = mx + b$.

Quadratic rule	$y = -x^2 + 2x + 5$
Line relation	$x = 0$

Answer. points: (x: 0; y: 5); real intersection count: 1

Explanation and check.

A vertical line fixes $x = 0$. Direct evaluation of the quadratic gives $y = 5$, so the unique shared point is $(0, 5)$.

Algebra 1
Solving Quadratics Using Graphs

Solving Quadratics Using Graphs | A1-U09-P14

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for correct difference-function graph and its zeros, justified root bracket or exact endpoint root, diagnosis and corrected graphical root statement, root conclusion and decisive exact evidence, complete set of distinct real roots and better window choice with justified precision.

8 PDFs and a README; 361 buyer pages.

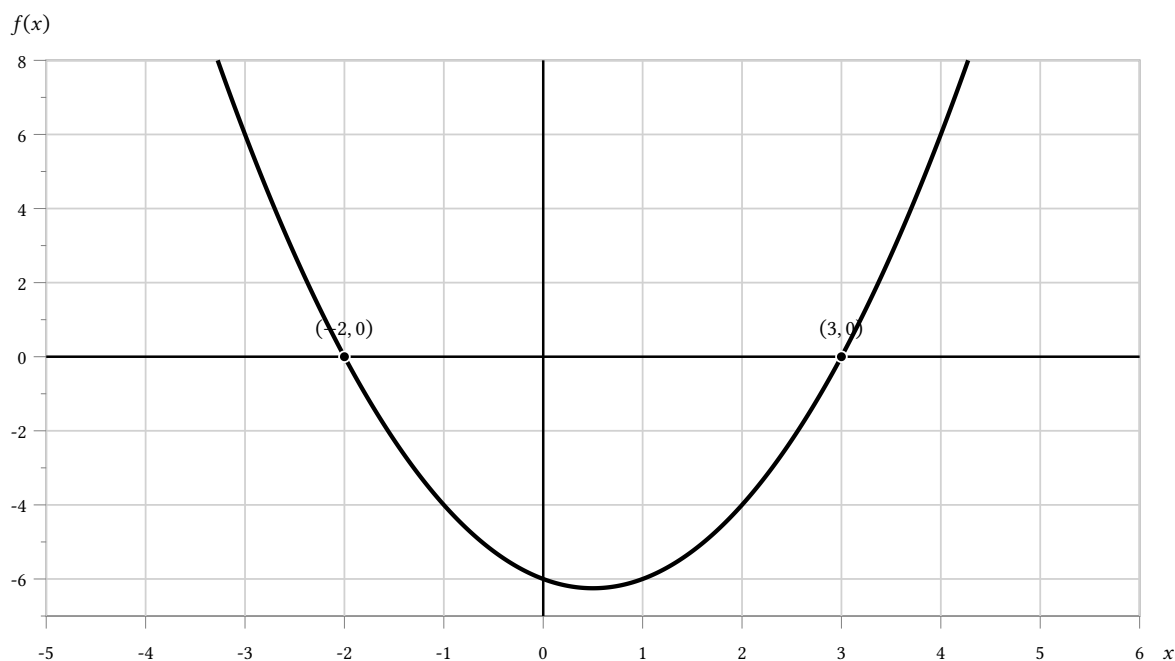
Algebra 1

Solving Quadratics
Using Graphs

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

The exact unit-grid graph of $f(x) = x^2 - x - 6$ marks both x -intercepts. State the roots. Match the complete original graphical response, including the chosen zero-function graph or level and any excluded inputs where requested. Read the preserved graph at its stated precision.



Graph data	Value
Rule	$f(x) = x^2 - x - 6$
Window	$x \in [-5, 6]; y \in [-7, 8]$
Minor tick intervals	$x: 1; y: 1$
Coordinate labels	exact
Axes / units	$x/$ units; $f(x)/$ units
Axes	Shared coordinate axes
Supplied visible labels	$(-2, 0); (3, 0)$

Bank label: _____

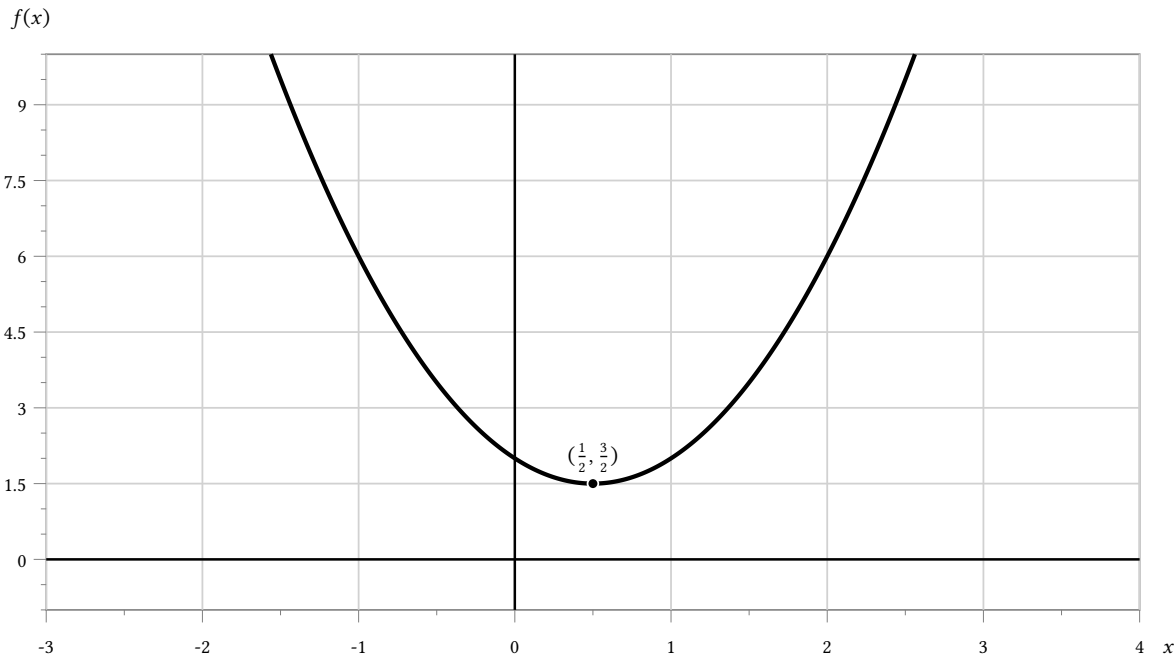
Algebra 1

Solving Quadratics
Using Graphs

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

The vertex of $f(x) = 2x^2 - 2x + 2$ is exactly labeled above $y = 0$. Use the opening to determine the root set.



Graph data	Value
Rule	$f(x) = 2x^2 - 2x + 2$
Window	$x \in [-3, 4]; y \in [-1, 10]$
Minor tick intervals	$x: \frac{1}{2}; y: \frac{1}{2}$
Coordinate labels	exact
Axes / units	x / units; $f(x)$ / units
Axes	Shared coordinate axes
Opening	up
Certified Extremum Relative To Axis	above
Supplied visible labels	$(\frac{1}{2}, \frac{3}{2})$

Algebra 1

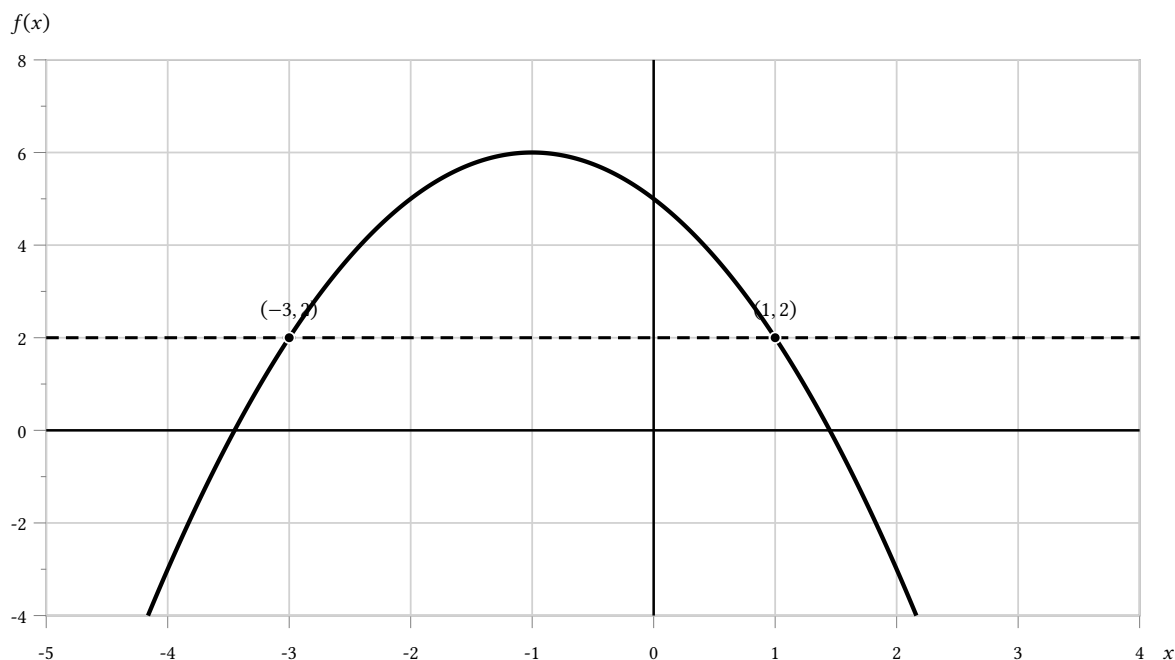
Solving Quadratics
Using Graphs

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: excluded or clipped inputs: ; inputs: $-1, 5$; level: 10

For $f(x) = -x^2 - 2x + 5$, solve $f(x) = 2$ graphically on $-5 \leq x \leq 4$. The requested level lies below the maximum. Match the complete original graphical response, including the chosen zero-function graph or level and any excluded inputs where requested. Read the preserved graph at its stated precision.



Graph data	Value
Rule	$f(x) = -x^2 - 2x + 5$
Window	$x \in [-5, 4]; y \in [-4, 8]$
Minor tick intervals	$x: 1; y: 1$
Coordinate labels	exact
Axes / units	x / units; $f(x)$ / units
Axes	Shared coordinate axes
Requested line	$y = 2$
Supplied visible labels	$(-3, 2); (1, 2)$

Your response: _____

Algebra 1

Solving Quadratics
Using Graphs

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Near-axis data for $f(x) = x^2 - 4x + 4$ have the same sign at $x = 1$ and $x = 3$. Decide whether a tangent root is possible and cite decisive evidence. Compare what the endpoint sign test establishes with what the original exact resolving evidence establishes. Explain why equal endpoint signs alone cannot rule out a tangent root or two crossings, then answer the original root question.

Display precision: exact. Exact values and rounded displays have distinct roles.

x	f(x)
1	1
3	1

Near-axis data for $f(x) = -2x^2 - 4x - 2$ have the same sign at $x = -2$ and $x = 0$. Do not conclude no root from the missing sign change. Compare what the endpoint sign test establishes with what the original exact resolving evidence establishes. Explain why equal endpoint signs alone cannot rule out a tangent root or two crossings, then answer the original root question.

Display precision: exact. Exact values and rounded displays have distinct roles.

x	f(x)
-2	-2
0	-2

Solving Quadratics Using Graphs

Full Worked Solutions - excerpt

Worked example

Problem. Near-axis data for $f(x) = x^2 - 4x + 4$ have the same sign at $x = 1$ and $x = 3$. Decide whether a tangent root is possible and cite decisive evidence. Compare what the endpoint sign test establishes with what the original exact resolving evidence establishes. Explain why equal endpoint signs alone cannot rule out a tangent root or two crossings, then answer the original root question.

Display precision: exact. Exact values and rounded displays have distinct roles.

x	$f(x)$
1	1
3	1

Answer. decisive evidence: exact vertex: $x: 2$; $y: 0$; opening: up; has real root: True; roots: 2

Explanation and check.

Same-sign samples do not exclude a root. Exact vertex data show $f(2) = 0$, so $x = 2$ is a repeated root with no sign change. A sign change certifies a crossing on a continuous interval. Equal signs alone are inconclusive; use the original exact vertex, rule, or resolving evidence without inventing precision.

Worked example

Problem. Near-axis data for $f(x) = -2x^2 - 4x - 2$ have the same sign at $x = -2$ and $x = 0$. Do not conclude no root from the missing sign change. Compare what the endpoint sign test establishes with what the original exact resolving evidence establishes. Explain why equal endpoint signs alone cannot rule out a tangent root or two crossings, then answer the original root question.

Display precision: exact. Exact values and rounded displays have distinct roles.

x	$f(x)$
-2	-2
0	-2

Answer. decisive evidence: exact vertex: $x: -1$; $y: 0$; opening: down; has real root: True; roots: -1

Explanation and check.

Same-sign samples do not exclude a root. Exact vertex data show $f(-1) = 0$, so $x = -1$ is a repeated root with no sign change. A sign change certifies a crossing on a continuous interval. Equal signs alone are inconclusive; use the original exact vertex, rule, or resolving evidence without inventing precision.

Algebra 1
Linear, Quadratic, and Exponential Functions

Linear, Quadratic, and Exponential Functions | A1-U09-P15

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for correct transformed comparison, exact finite changes, rates, and justified comparison, finite evidence, assumption audit, and justified eventual conclusion, matching family rule and interval-aware evidence, quadratic curve and why sign alone fails and quadratic and exponential identifications.
8 PDFs and a README; 114 buyer pages.

Algebra 1

Linear, Quadratic, and Exponential Functions

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

The input gaps in the exact table are unequal. The possible rules are $y = 2x + 1$, $y = x^2 + 1$, and $y = (2)^x$. Which rule generated the table, and what interval-aware evidence rules out using raw output changes alone? Normalize every change by its input gap. Match the complete original model comparison, all requested predictions or changes/rates and ties. For unequal steps, include the full normalized interval-rate evidence with the selected rule and family.

x	y
0	1
1	3
3	7
6	13

Input steps	1, 2, 3
Candidate rules	$y = 2x + 1$, $y = x^2 + 1$, $y = (2)^x$

Bank label: _____

The input gaps in the exact table are unequal. The possible rules are $y = 3x - 1$, $y = x^2$, and $y = (2)^x$. Which rule generated the table, and what interval-aware evidence rules out using raw output changes alone? Changing raw differences do not by themselves prove exponential behavior. Match the complete original model comparison, all requested predictions or changes/rates and ties. For unequal steps, include the full normalized interval-rate evidence with the selected rule and family.

x	y
0	0
1	1
3	9
4	16

Input steps	1, 2, 1
Candidate rules	$y = 3x - 1$, $y = x^2$, $y = (2)^x$

Bank label: _____

The input gaps in the exact table are unequal. The possible rules are $y = 4x - 1$, $y = x^2 + x + 1$, and $y = (2)^x$. Which rule generated the table, and what interval-aware evidence rules out using raw output changes alone? A gap of two should compound the per-unit factor twice. Match the complete original model comparison, all requested predictions or changes/rates and ties. For unequal steps, include the full normalized interval-rate evidence with the selected rule and family.

x	y
0	1
1	2
3	8
4	16

Input steps	1, 2, 1
Candidate rules	$y = 4x - 1$, $y = x^2 + x + 1$, $y = (2)^x$

Bank label: _____

The input gaps in the exact table are unequal. The possible rules are $y = -3x + 8$, $y = -x^2 + 2x + 8$, and $y = 8(\frac{1}{2})^x$. Which rule generated the table, and what interval-aware evidence rules out using raw output changes alone? Keep the signs in the interval rates. Match the complete original model comparison, all requested predictions or changes/rates and ties. For unequal steps, include the full normalized interval-rate evidence with the selected rule and family.

x	y
0	8
2	2
3	-1
6	-10

Input steps	2, 1, 3
Candidate rules	$y = -3x + 8$, $y = -x^2 + 2x + 8$, $y = 8(\frac{1}{2})^x$

Bank label: _____

Algebra 1

Linear, Quadratic, and Exponential Functions

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Classify the exact table generated on $x = 0, 1, 2, 3$ among linear, quadratic, exponential, or neither. Use first differences.

x	y
0	1
1	4
2	7
3	10

Equal input step	1
------------------	---

Classify the exact table generated on $x = 0, 1, 2, 3$ among linear, quadratic, exponential, or neither. A quadratic candidate must be considered.

x	y
0	0
1	1
2	4
3	9

Equal input step	1
------------------	---

Classify the exact table generated on $x = 0, 1, 2, 3$ among linear, quadratic, exponential, or neither. Compare ratios as well as differences.

x	y
0	2
1	4
2	8
3	16

Equal input step	1
------------------	---

Classify the exact table generated on $x = 0, 1, 2, 3, 4$ among linear, quadratic, exponential, or neither. Translation does not remove curvature.

x	y
0	3
1	4
2	9
3	18
4	31

Equal input step	1
------------------	---

Algebra 1

Linear, Quadratic, and Exponential Functions

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

START

On $x = 1$ to $x = 3$, which of the listed linear, quadratic, and exponential rules has the greatest net change? Report all three exact changes and justify the quadratic comparison. Evaluate endpoints exactly. Match the complete original model comparison, all requested predictions or changes/rates and ties. For unequal steps, include the full normalized interval-rate evidence with the selected rule and family.

Interval	1, 3	
Rules	Linear	$y = 4x$
	Quadratic	$y = 2x^2$
	Exponential	$y = 2(2)^x$

Your response: _____

Incoming: average rates: exponential: $\frac{211}{80}$; linear: 6; quadratic: 6; changes: exponential: $\frac{211}{16}$; linear: 30; quadratic: 30; descending change groups: linear and quadratic, exponential

Compute each model's average rate of change on $[-1, 5]$. Order the rates and explain why this finite comparison does not by itself settle eventual growth. Do not look only at the leading coefficient. Match the complete original model comparison, all requested predictions or changes/rates and ties. For unequal steps, include the full normalized interval-rate evidence with the selected rule and family.

Interval	$-1, 5$	
Rules	Linear	$y = 4x - 2$
	Quadratic	$y = 2x^2 - 7x + 1$
	Exponential	$y = (2)^x$

Your response: _____

Incoming: average rates: exponential: 6; linear: 5; quadratic: 6; changes: exponential: 12; linear: 10; quadratic: 12; descending change groups: quadratic and exponential, linear

Compare the signed changes of the three models from $x = -3$ through $x = 4$. Which increase, which decrease, and what does the quadratic change reveal? Show endpoint substitutions before ordering. Match the complete original model comparison, all requested predictions or changes/rates and ties. For unequal steps, include the full normalized interval-rate evidence with the selected rule and family.

Interval	$-3, 4$	
Rules	Linear	$y = -\frac{3}{2}x + 5$
	Quadratic	$y = -2x^2 + x + 5$
	Exponential	$y = -(2)^x$

Your response: _____

Incoming: average rates: exponential: $\frac{15}{4}$; linear: 4; quadratic: 4; changes: exponential: 15; linear: 16; quadratic: 16; descending change groups: linear and quadratic, exponential

Over the finite interval from $x = 0$ to $x = 3$, rank the changes in the three exact models from greatest to least. Then identify the changing-rate evidence specific to the quadratic model. Negative output levels do not determine the change order. Match the complete original model comparison, all requested predictions or changes/rates and ties. For unequal steps, include the full normalized interval-rate evidence with the selected rule and family.

Interval	0, 3	
Rules	Linear	$y = 2x - 20$
	Quadratic	$y = x^2 - 30$
	Exponential	$y = -16(\frac{1}{2})^x$

Your response: _____

Algebra 1

Linear, Quadratic, and Exponential Functions

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Use the exact table and the stated long-term growth theorem to compare the quadratic and exponential models. What is supported eventually, and what is supported only at the sampled inputs? Do not turn four rows into a proof for every larger input. Compare the finite sampled evidence with the conclusion justified by the original long-term theorem conditions. State which claim each supports and retain the original comparison domain.

x	quadratic	exponential
0	5	1
2	13	4
4	37	16
8	133	256

Quadratic rule	$y = 2x^2 + 5$
Exponential rule	$y = (2)^x$
Comparison domain	all nonnegative real x

Audit whether eventual exponential dominance applies to these two rules on $x \geq 0$. Check every sign and base assumption before using the theorem. Both leading factors and the exponential base satisfy the theorem. Compare the finite sampled evidence with the conclusion justified by the original long-term theorem conditions. State which claim each supports and retain the original comparison domain.

x	quadratic	exponential
0	2	3
3	20	$\frac{81}{8}$
6	56	$\frac{2187}{64}$
12	182	$\frac{1594323}{4096}$

Quadratic rule	$y = x^2 + 3x + 2$
Exponential rule	$y = 3(\frac{3}{2})^x$
Comparison domain	$x \geq 0$

Linear, Quadratic, and Exponential Functions

Full Worked Solutions - excerpt

Worked example

Problem. A student calls the table 1, 4, 9, 16 exponential because the increments grow. Diagnose and repair the argument.

Given evidence	equal-step outputs 1, 4, 9, 16
Student claim	The model is exponential because its increments grow.

Answer. correction: the data support a quadratic pattern; decisive check: first differences 3, 5, 7 have constant second difference 2; error: growing increments are not the same as constant ratios

Explanation and check.

The first differences are 3, 5, 7 and their differences are 2. Ratios are not constant, so quadratic—not exponential—is supported.

Worked example

Problem. Repair the claim that $E(x) = 20(\frac{1}{2})^x$ must eventually exceed $Q(x) = x^2$ merely because E is exponential.

Given evidence	$E(x) = 20(\frac{1}{2})^x$ and $Q(x) = x^2$
Student claim	Every exponential eventually exceeds every quadratic.

Answer. correction: this exponential tends toward zero and does not eventually dominate Q ; decisive check: verify positive coefficient and base greater than one before applying the theorem; error: the exponential base is below one

Explanation and check.

The dominance theorem requires a growing positive exponential with base above 1. Here E decays, while Q grows.

Algebra 1
Choosing a Quadratic Solving Method

Choosing a Quadratic Solving Method | A1-U09-P16

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
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08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for equivalence verdict, solution effect, witness, and corrected step, validity verdict, completeness verdict, corrected set, and certificate, recommended method, structural reason, and first step, chosen independent tool, independence reason, outcome, and limitation, validity, shared solution set, efficiency reason, and preferred route and constructed equation, method-sensitive justification, root set, and independent verification.

8 PDFs and a README; 70 buyer pages.

Algebra 1

Choosing a Quadratic Solving Method

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

For $(x - 4)(x + 3) = 0$, choose the most efficient solution method for the requirement “find all exact real roots.” State the structural reason and a valid first step. Both factors must be checked. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step. _____ Bank label: _____	For $(x + 2)^2 = 25$, choose the most efficient solution method for the requirement “give exact real roots.” State the structural reason and a valid first step. The plus-minus symbol preserves both branches. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step. _____ Bank label: _____
Decide whether factoring, the square-root method, completing the square, the quadratic formula, or graphing is best for $x^2 + 7x + 12 = 0$ under this answer requirement: solve exactly with minimal arithmetic. The factorization is visible without formula arithmetic. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step. _____ Bank label: _____	Select a solution route for $x^2 - 2x - 7 = 0$ that respects this precision demand: estimate roots to the nearest tenth from a displayed curve. Explain why a different representation would be less suitable. An exact radical is not the requested answer form. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step. _____ Bank label: _____

Algebra 1

Choosing a Quadratic Solving Method

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Audit these two correct approaches to $9x^2 - 12x + 4 = 0$ under the requirement “identify the distinct root and verify multiplicity two.” A: factor $(3x - 2)^2 = 0$. B: compute discriminant 0 and use $x = \frac{12}{18} = \frac{2}{3}$. Which better preserves the requested answer form, and why? The zero discriminant independently confirms the double root. _____ _____	Audit these two correct approaches to $x^2 - 6x + 12 = 0$ under the requirement “prove there are no real roots.” A: complete $(x - 3)^2 = -3$. B: compute discriminant $36 - 48 = -12$. Which better preserves the requested answer form, and why? The negative discriminant is an equally valid certificate. _____ _____
Two valid routes solve $(\frac{1}{3})x^2 - (\frac{4}{3})x + 1 = 0$. Route A: multiply by 3 and factor $x^2 - 4x + 3$. Route B: apply the formula to fractional coefficients. Compare their efficiency without treating the longer route as incorrect. Route B is valid but less convenient. _____ _____	For $2x^2 + x - 4 = 0$, compare the algebraic route “use $x = \frac{-1 \pm \sqrt{33}}{4}$, then approximate.” with the representation-based route “graph and read approximate intercepts near -1.69 and 1.19.” State what each can certify and which fits exact roots and a decimal reasonableness check. Approximate graph values do not replace exact answers. _____ _____
Audit these two correct approaches to $x^2 - 8x + 10 = 0$ under the requirement “exact roots and their midpoint.” A: complete $(x - 4)^2 = 6$, giving $4 \pm \sqrt{6}$. B: use $\frac{8 \pm \sqrt{24}}{2}$ and simplify. Which better preserves the requested answer form, and why? Formula results are equivalent after simplification. _____ _____	Two valid routes solve $4x^2 - 4x - 15 = 0$. Route A: split $-4x$ as $6x - 10x$ and factor by grouping. Route B: recognize directly $(2x - 5)(2x + 3) = 0$. Compare their efficiency without treating the longer route as incorrect. Both factorizations encode the same zero-product branches. _____ _____

Algebra 1

Choosing a Quadratic Solving Method

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: constraint audit: the midpoint is 3 and each root is distance 4 from it.; equation: $(x - 3)^2 = 16$; favored method: the square-root method; roots: $\{-1, 7\}$; verification: expansion gives $x^2 - 6x - 7 = 0 = (x + 1)(x - 7)$. Construct a quadratic equation satisfying these independent requirements: use midpoint -2 and irrational offsets $\sqrt{5}$. The visible form must genuinely favor completing the square, and the roots must be $-2 \pm \sqrt{5}$. Give the equation and verify it by a different route. The equation starts in standard form so completion is a meaningful choice. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step. Your response: _____	Incoming: constraint audit: dividing by x would violate the completeness requirement.; equation: $x(2x + 3) = 0$; favored method: factoring; roots: $\{-\frac{3}{2}, 0\}$; verification: expansion gives $2x^2 + 3x = 0$, and direct substitution confirms both values. Construct a quadratic equation satisfying these independent requirements: use symmetric rational roots $\pm\frac{5}{2}$ and a leading coefficient 4. The visible form must genuinely favor factoring as a difference of squares, and the roots must be $-\frac{5}{2}$ and $\frac{5}{2}$. Give the equation and verify it by a different route. The leading coefficient requirement is satisfied independently. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step. Your response: _____
Incoming: constraint audit: the root sum is zero, consistent with the missing linear term.; equation: $4x^2 - 25 = 0$; favored method: factoring as a difference of squares; roots: $\{-\frac{5}{2}, \frac{5}{2}\}$; verification: isolating $x^2 = \frac{25}{4}$ and taking both square roots confirms the pair. Construct a quadratic equation satisfying these independent requirements: use axis $x = \frac{3}{2}$ and offsets $\frac{\sqrt{7}}{2}$ while keeping integer standard coefficients. The visible form must genuinely favor completing the square, and the roots must be $\frac{3 \pm \sqrt{7}}{2}$. Give the equation and verify it by a different route. The method requirement determines the chosen linear coefficient. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step. Your response: _____	Incoming: certificate: $(x + 2)(x - 3) = 0$ gives exactly -2 and 3.; complete: no; correct solution set: $\{-2, 3\}$; listed values valid: no For $6x^2 + x - 2 = 0$, a proposed real solution set is $\{-\frac{2}{3}, \frac{1}{2}\}$. Decide separately whether every listed value is valid and whether the set is complete. Exact fractions are retained. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step. Your response: _____

Algebra 1

Choosing a Quadratic Solving Method

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Two valid routes solve $x^2 - 5x + 6 = 0$. Route A: factor to $(x - 2)(x - 3) = 0$, giving $x = 2$ or 3 . Route B: use the quadratic formula to obtain $\frac{5 \pm 1}{2}$, giving $x = 2$ or 3 . Compare their efficiency without treating the longer route as incorrect. Formula use is not an error. Compare the two original routes for validity and efficiency under the stated answer requirement. Do not label a longer correct route as an error; justify any preference from the visible equation structure.

Both traces for $(x - 4)^2 = 9$ claim the same solution set. Route A: take $x - 4 = \pm 3$, so $x = 1$ or 7 . Route B: expand to $x^2 - 8x + 7 = 0$ and apply the formula, obtaining $x = 1$ or 7 . Compare how each route preserves all branches and identify the more direct one. Both routes retain plus and minus. Compare the two original routes for validity and efficiency under the stated answer requirement. Do not label a longer correct route as an error; justify any preference from the visible equation structure.

Two valid routes solve $x^2 + 4x - 5 = 0$. Route A: complete $(x + 2)^2 = 9$, then get $x = 1$ or -5 . Route B: use $\frac{-4 \pm 6}{2}$, then get $x = 1$ or -5 . Compare their efficiency without treating the longer route as incorrect. The formula is still exact. Compare the two original routes for validity and efficiency under the stated answer requirement. Do not label a longer correct route as an error; justify any preference from the visible equation structure.

For $x^2 - 2 = 0$, compare the algebraic route “solve exactly as $x = \pm\sqrt{2}$ and round to ± 1.41 .” with the representation-based route “read graph intercepts near -1.41 and 1.41 from a sufficiently scaled graph.” State what each can certify and which fits roots to the nearest hundredth. The graph is valid at the requested precision if its scale supports hundredths. Compare the two original routes for validity and efficiency under the stated answer requirement. Do not label a longer correct route as an error; justify any preference from the visible equation structure.

Choosing a Quadratic Solving Method

Full Worked Solutions - excerpt

Worked example

Problem. What should be the strategic first step for $9x^2 - 16 = 0$ if the goal is find exact roots? Name the method that this step prepares. This avoids unnecessary formula substitution. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step.

Answer. decisive structure: the left side is a difference of squares; first step: factor as $(3x - 4)(3x + 4) = 0$; method: factoring

Explanation and check.

The decisive feature is the left side is a difference of squares. Therefore use factoring. A valid strategic first step is factor as $(3x - 4)(3x + 4) = 0$. This avoids unnecessary formula substitution.

Worked example

Problem. Two valid routes solve $(\frac{1}{3})x^2 - (\frac{4}{3})x + 1 = 0$. Route A: multiply by 3 and factor $x^2 - 4x + 3$. Route B: apply the formula to fractional coefficients. Compare their efficiency without treating the longer route as incorrect. Route B is valid but less convenient.

Answer. both valid: True; common solution set: $\{1, 3\}$; preferred route: Route A; reason: nonzero scaling preserves roots and removes fraction arithmetic.

Explanation and check.

Both routes are reversible and give $\{1, 3\}$. Route A is more efficient here because nonzero scaling preserves roots and removes fraction arithmetic. The other route remains mathematically valid. Route B is valid but less convenient.

Algebra 1
Mean, Median, and Mode

Mean, Median, and Mode | A1-U10-P01

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for count, middle position(s), middle value(s), median, and unit, weighted total, count, exact mean, and unit, chosen measure, data-based evidence, and purpose-based justification, construction or impossibility proof with sum, rank, and frequency verification, identified misconception, corrected computation, and corrected claim and before/after totals, counts, mean, median, modes, and change classification.

8 PDFs and a README; 71 buyer pages.

Algebra 1

Mean, Median,
and Mode

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Use the exact frequency table of points to calculate the mean. Count repeated observations rather than averaging only the distinct values. All frequencies are one. Use the complete requested calculation as the matching response: total/count/mean, ordered middle positions and median, or target total and missing value as applicable. Keep the original units and feasibility checks.

value	frequency
2	1
5	1
8	1

Bank label: _____

Find the mean of the points data represented by the table, and show the weighted total and total count that justify it. The four observations total 24. Use the complete requested calculation as the matching response: total/count/mean, ordered middle positions and median, or target total and missing value as applicable. Keep the original units and feasibility checks.

value	frequency
4	1
6	2
8	1

Bank label: _____

Use the exact frequency table of books to calculate the mean. Count repeated observations rather than averaging only the distinct values. There are three observations, not two. Use the complete requested calculation as the matching response: total/count/mean, ordered middle positions and median, or target total and missing value as applicable. Keep the original units and feasibility checks.

value	frequency
3	2
7	1

Bank label: _____

Compute the exact mean from this value-frequency table and report it in degrees. Include every value-times-frequency contribution. Opposite contributions cancel. Use the complete requested calculation as the matching response: total/count/mean, ordered middle positions and median, or target total and missing value as applicable. Keep the original units and feasibility checks.

value	frequency
-2	1
0	1
2	1

Bank label: _____

Algebra 1

Mean, Median,
and Mode

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Determine the median of the exact account units frequency table. First order values and use the total count to locate the middle position or positions. The middle values straddle zero.

value	frequency
-7	1
-1	2
3	2
8	1

Determine the median of the exact dollars frequency table. First order values and use the total count to locate the middle position or positions. The most frequent value alone does not determine an even-sample median.

value	frequency
100	4
2	5
3	1

Determine the median of the exact seconds frequency table. First order values and use the total count to locate the middle position or positions. Keep hundredths exact while ordering.

value	frequency
$\frac{101}{100}$	2
$\frac{99}{100}$	1
$\frac{21}{20}$	2
1	1

Determine the median of the exact points frequency table. First order values and use the total count to locate the middle position or positions. For fourteen observations, positions 7 and 8 must be traced through sorted cumulative counts.

value	frequency
7	6
1	3
4	1
10	4

Algebra 1

Mean, Median,
and Mode

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: count: 7; median: 3; middle positions: 4; middle values: 3; unit: points

Determine the median of the exact hours frequency table. First order values and use the total count to locate the middle position or positions. The fourth and fifth positions fall in the same value row. Use the complete requested calculation as the matching response: total/count/mean, ordered middle positions and median, or target total and missing value as applicable. Keep the original units and feasibility checks.

value	frequency
1	3
8	2
4	3

Your response: _____

Incoming: count: 3; median: 0; middle positions: 2; middle values: 0; unit: degrees

Determine the median of the exact meters frequency table. First order values and use the total count to locate the middle position or positions. Exact decimal order is 1.5, 2.5, 3.5. Use the complete requested calculation as the matching response: total/count/mean, ordered middle positions and median, or target total and missing value as applicable. Keep the original units and feasibility checks.

value	frequency
$\frac{5}{2}$	1
$\frac{3}{2}$	1
$\frac{7}{2}$	1

Your response: _____

Incoming: count: 15; mean: $\frac{23}{15}$; unit: errors; weighted total: 23

Compute the exact mean from this value-frequency table and report it in elevation units. Include every value-times-frequency contribution. Deviation arithmetic around -100 must restore the negative baseline. Use the complete requested calculation as the matching response: total/count/mean, ordered middle positions and median, or target total and missing value as applicable. Keep the original units and feasibility checks.

value	frequency
-102	2
-100	5
-93	1

Your response: _____

Incoming: count: 13; mean: $\frac{13008}{13}$; unit: grams; weighted total: 13008

Use the exact frequency table of meters to calculate the mean. Count repeated observations rather than averaging only the distinct values. Exact cancellation is easier in fourths. Use the complete requested calculation as the matching response: total/count/mean, ordered middle positions and median, or target total and missing value as applicable. Keep the original units and feasibility checks.

value	frequency
$-\frac{7}{4}$	4
$\frac{1}{2}$	3
$\frac{9}{4}$	2

Your response: _____

Algebra 1

Mean, Median, and Mode

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Mode convention: no mode when all distinct or all observed frequencies tie The ordered-data summary begins from 2, 3, 4, 5, 6 points. Apply this edit: add 20. Recompute the mean, median, and mode set, then state exactly which summaries change. The new extreme affects the total and even-sample middle positions. Compare the complete before-and-after center summaries under the original edit. Explain which mean, median and mode statements change and which remain true, using totals, ordered ranks and frequencies separately.

The ordered-data summary begins from 2, 4, 4, 6, 10 minutes. Apply this edit: remove one occurrence of 10. Recompute the mean, median, and mode set, then state exactly which summaries change. Remove only the single largest observation. Compare the complete before-and-after center summaries under the original edit. Explain which mean, median and mode statements change and which remain true, using totals, ordered ranks and frequencies separately.

Mode convention: no mode when all distinct or all observed frequencies tie The ordered-data summary begins from 1, 2, 3, 4, 5 points. Apply this edit: replace one 1 with 5. Recompute the mean, median, and mode set, then state exactly which summaries change. The replacement changes frequency and total while the middle position stays central. Compare the complete before-and-after center summaries under the original edit. Explain which mean, median and mode statements change and which remain true, using totals, ordered ranks and frequencies separately.

Mode convention: no mode when all distinct or all observed frequencies tie The ordered-data summary begins from 2, 4, 6, 8, 10, 12 points. Apply this edit: add 0. Recompute the mean, median, and mode set, then state exactly which summaries change. The sample changes from even to odd. Compare the complete before-and-after center summaries under the original edit. Explain which mean, median and mode statements change and which remain true, using totals, ordered ranks and frequencies separately.

Mean, Median, and Mode

Full Worked Solutions - excerpt

Worked example

Problem. Order the values before selecting a middle position. Data: 9, 1, 8, 2, 3. A student claims: The median is the displayed middle entry, 8. Diagnose the exact mistake and replace the claim with a correct central-summary statement.

Answer. correction: the median is 3.; diagnosis: the middle entry was selected before sorting

Explanation and check.

The ordered data are 1, 2, 3, 8, 9, whose third value is 3. Therefore the median is 3.

Worked example

Problem. Inspect every value tied at the greatest frequency. Data: 2, 2, 5, 5, 8. A student claims: The mode is 2. Diagnose the exact mistake and replace the claim with a correct central-summary statement.

Answer. correction: the mode set is $\{2, 5\}$.; diagnosis: a second value tied for greatest frequency was omitted

Explanation and check.

Both 2 and 5 occur twice, while 8 occurs once. Therefore the mode set is $\{2, 5\}$.

Algebra 1
Range, Quartiles, and IQR

Range, Quartiles, and IQR | A1-U10-P02

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for before/after ordered data, range, quartiles, IQR, and change classification, observed minimum, observed maximum, range, and unit, admissible ordered dataset with range and quartile verification, or impossibility proof, ordered data, halves, Q1, Q3, IQR, unit, and stated convention, cumulative intervals, observed endpoints, range, Q1, Q3, IQR, and unit and error diagnosis, corrected rank or endpoint calculation, and corrected spread statement.

8 PDFs and a README; 69 buyer pages.

Algebra 1

Range, Quartiles,
and IQR

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

The display order is not numerical order. The exact value-frequency table records points. Identify the smallest and largest observed values and calculate the range with its unit. Use maximum minus minimum, not last minus first. Match the complete originally requested extrema/quartile/spread response with units and any transformation order statement. Keep the declared median-of-halves convention.

Value	Frequency
8	1
3	1
11	1

Bank label: _____

The support crosses zero. The exact value-frequency table records degrees. Identify the smallest and largest observed values and calculate the range with its unit. Subtracting a negative endpoint increases the difference. Match the complete originally requested extrema/quartile/spread response with units and any transformation order statement. Keep the declared median-of-halves convention.

Value	Frequency
-4	1
2	1
7	1

Bank label: _____

The minimum occurs more than once. The exact value-frequency table records hours. Identify the smallest and largest observed values and calculate the range with its unit. Multiplicity does not change the endpoint distance. Match the complete originally requested extrema/quartile/spread response with units and any transformation order statement. Keep the declared median-of-halves convention.

Value	Frequency
2	3
5	1
9	1

Bank label: _____

The maximum has the greatest frequency. The exact value-frequency table records tokens. Identify the smallest and largest observed values and calculate the range with its unit. Range depends on its value, not how often it occurs. Match the complete originally requested extrema/quartile/spread response with units and any transformation order statement. Keep the declared median-of-halves convention.

Value	Frequency
1	1
6	2
10	4

Bank label: _____

Algebra 1

Range, Quartiles,
and IQR

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Both endpoints repeat with different multiplicities. Order these exact observations measured in ratings: 1, 1, 3, 5, 7, 9, 9, 9. Using the median-of-halves convention that excludes the overall median when n is odd, find $Q1$, $Q3$, and IQR. Use half positions rather than endpoint counts alone. 	A single extreme appears at each end. Order these exact observations measured in units: -100, 2, 3, 4, 5, 6, 7, 100. Using the median-of-halves convention that excludes the overall median when n is odd, find $Q1$, $Q3$, and IQR. The quartiles come from interior half positions.
Every observed value occurs as a pair. Order these exact observations measured in scores: 1, 1, 3, 3, 5, 5, 7, 7, 9, 9. Using the median-of-halves convention that excludes the overall median when n is odd, find $Q1$, $Q3$, and IQR. The half boundary cuts between the two copies of 5. 	Each half has its own plateau. Order these exact observations measured in minutes: 2, 2, 2, 4, 6, 8, 8, 8. Using the median-of-halves convention that excludes the overall median when n is odd, find $Q1$, $Q3$, and IQR. The central split lies between 4 and 6.
Two distant extremes bookend a tight center. Order these exact observations measured in units: -1000, 1, 2, 3, 4, 5, 6, 7, 1000. Using the median-of-halves convention that excludes the overall median when n is odd, find $Q1$, $Q3$, and IQR. Trace half positions rather than averaging endpoints. 	Several frequency blocks meet quartile boundaries. Order these exact observations measured in ratings: 1, 1, 1, 2, 2, 4, 4, 4, 4, 9, 9, 12. Using the median-of-halves convention that excludes the overall median when n is odd, find $Q1$, $Q3$, and IQR. Count ordered positions inside each repeated block.

Algebra 1

Range, Quartiles,
and IQR

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: maximum: $\frac{5}{2}$; minimum: $\frac{1}{2}$; range: 2; unit: meters The five values are deliberately unsorted. Order these exact observations measured in points: 9, 1, 5, 3, 7. Using the median-of-halves convention that excludes the overall median when n is odd, find $Q1$, $Q3$, and IQR. Remove the third value before finding the two half-medians. Match the complete originally requested extrema/quartile/spread response with units and any transformation order statement. Keep the declared median-of-halves convention. Your response: _____	Incoming: convention: exclude overall median for odd sample size; iqr: 11; q1: -4; q3: 7; unit: change units Every observation is below zero. Order these exact observations measured in degrees: -12, -10, -8, -6, -4, -2. Using the median-of-halves convention that excludes the overall median when n is odd, find $Q1$, $Q3$, and IQR. $Q3$ can be negative while IQR remains nonnegative. Match the complete originally requested extrema/quartile/spread response with units and any transformation order statement. Keep the declared median-of-halves convention. Your response: _____
Incoming: convention: exclude overall median for odd sample size; iqr: 6; q1: 4; q3: 10; unit: minutes Seven observations leave three values in each half after exclusion. Order these exact observations measured in pages: 14, 2, 8, 4, 12, 6, 10. Using the median-of-halves convention that excludes the overall median when n is odd, find $Q1$, $Q3$, and IQR. The overall median belongs to neither half. Match the complete originally requested extrema/quartile/spread response with units and any transformation order statement. Keep the declared median-of-halves convention. Your response: _____	Incoming: convention: exclude overall median for odd sample size; iqr: 4; q1: $\frac{5}{2}$; q3: $\frac{13}{2}$; unit: ratings After removing the fifth ordered value, each half has four values. Order these exact observations measured in seconds: 18, 2, 14, 6, 10, 4, 16, 8, 12. Using the median-of-halves convention that excludes the overall median when n is odd, find $Q1$, $Q3$, and IQR. Average the two middle values within each half. Match the complete originally requested extrema/quartile/spread response with units and any transformation order statement. Keep the declared median-of-halves convention. Your response: _____
Incoming: convention: exclude overall median for odd sample size; iqr: 7; q1: $\frac{5}{2}$; q3: $\frac{19}{2}$; unit: minutes Eleven values leave five in each half. Order these exact observations measured in pages: 0, 1, 2, 3, 4, 5, 7, 9, 12, 16, 21. Using the median-of-halves convention that excludes the overall median when n is odd, find $Q1$, $Q3$, and IQR. $Q1$ and $Q3$ are the third positions of their halves. Match the complete originally requested extrema/quartile/spread response with units and any transformation order statement. Keep the declared median-of-halves convention. Your response: _____	Incoming: convention: exclude overall median for odd sample size; iqr: 11; q1: 1; q3: 12; unit: hours Three copies of the median value occupy central positions. Order these exact observations measured in points: 1, 2, 4, 6, 6, 6, 8, 10, 12. Using the median-of-halves convention that excludes the overall median when n is odd, find $Q1$, $Q3$, and IQR. Exclude the fifth position only; the other copies stay in their halves. Match the complete originally requested extrema/quartile/spread response with units and any transformation order statement. Keep the declared median-of-halves convention. Your response: _____

Algebra 1

Range, Quartiles,
and IQR

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Nine observations are compressed into five rows. Use the exact frequency table of points and the convention that excludes the overall median when n is odd. Locate quartile ranks by cumulative frequency, then report the range, $Q1$, $Q3$, and IQR. Exclude ordered position 5 before splitting. Choose between expanding the frequency table into ordered observations and locating the needed ranks with cumulative frequencies. Justify the efficient choice for these counts, then show the original required rank evidence and apply the stated quartile convention.

Value	Frequency
1	2
3	2
5	1
7	2
9	2

Ten observations occupy three frequency blocks. Use the exact frequency table of minutes and the convention that excludes the overall median when n is odd. Locate quartile ranks by cumulative frequency, then report the range, $Q1$, $Q3$, and IQR. Split positions 1 – 5 and 6 – 10. Choose between expanding the frequency table into ordered observations and locating the needed ranks with cumulative frequencies. Justify the efficient choice for these counts, then show the original required rank evidence and apply the stated quartile convention.

Value	Frequency
2	3
6	4
10	3

Range, Quartiles, and IQR

Full Worked Solutions - excerpt

Worked example

Problem. Check the required subtraction direction. Given observations 2, 5, 9, a student states: The range is $2 - 9 = -7$. Under the declared quartile convention, identify the precise error and replace the spread calculation with a correct one.

Answer. correction: the range is 7, a nonnegative distance.; diagnosis: minimum was subtracted in the wrong direction

Explanation and check.

The minimum is 2 and maximum is 9, so $\text{range} = 9 - 2 = 7$. Diagnosis: minimum was subtracted in the wrong direction. Therefore the range is 7, a nonnegative distance.

Worked example

Problem. Distinguish an upper quartile from the distance between quartiles. Given ordered data 0, 2, 4, 6, 8, 10, with $Q1 = 2$ and $Q3 = 8$, a student states: The IQR is 8 because $Q3$ is 8. Under the declared quartile convention, identify the precise error and replace the spread calculation with a correct one.

Answer. correction: $Q3$ is 8 but IQR is 6.; diagnosis: $Q3$ was named as the IQR without subtracting $Q1$

Explanation and check.

$\text{IQR} = Q3 - Q1 = 8 - 2 = 6$. Diagnosis: $Q3$ was named as the IQR without subtracting $Q1$. Therefore $Q3$ is 8 but IQR is 6.

Algebra 1
Dot Plots

Dot Plots | A1-U10-P03
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for uniform labeled axis, occupied coordinates, exact stack heights, empty ticks, and total dot count, mapped or edited individual coordinates, normalized new stacks, total dots, and unit, qualifying coordinates, contributing stack heights, exact event count, and total count, feature claim, exact coordinate/stack evidence, and interpretation limit, decoded frequencies, ordered observations, total count, and treatment of empty ticks and specific display defect, source-to-dot audit, corrected stacks or axis, and key.
8 PDFs and a README; 207 buyer pages.

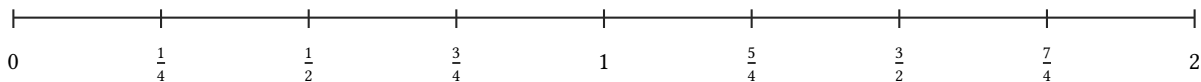
Algebra 1

Dot Plots

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Quarter-unit data leave several exact empty ticks. Plot one dot for each kilogram observation on a uniform number line from 0 to 2 with tick spacing $\frac{1}{4}$: $\frac{1}{4}$, $\frac{1}{2}$, $\frac{1}{2}$, $\frac{5}{4}$, $\frac{7}{4}$. Give the exact stack height at every occupied coordinate and retain empty ticks. Do not round quarters to tenths. Match the complete originally requested plot, qualifying-stack/count response, or reconstructed data with its dot key and units. A constructed dot plot must remain a plotted response, not just a count.



Raw observations	$\frac{1}{4}, \frac{1}{2}, \frac{1}{2}, \frac{5}{4}, \frac{7}{4}$	
Axis	Start	0
	End	2
	Tick step	$\frac{1}{4}$
	Ticks	$0, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}, 1, \frac{5}{4}, \frac{3}{2}, \frac{7}{4}, 2$
	Uniform	Yes
Key	one dot represents one observation	
Unit	kilogram	

Bank label: _____

Algebra 1

Dot Plots

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Consecutive supports have four different stack roles. An exact dot plot on a uniform goal axis from 0 to 3 with step 1 has stacks 0:1 displayed dot, 1:2 displayed dots, 2:4 displayed dots, 3:2 displayed dots; one displayed dot represents 1 observation. Reconstruct the ordered data and a value-frequency table, explicitly accounting for empty ticks. List values in coordinate order.



Axis	Start	0
	End	3
	Tick step	1
	Ticks	0, 1, 2, 3
	Uniform	Yes
Stacks	(Coordinate 0; Displayed dots 1), (Coordinate 1; Displayed dots 2), (Coordinate 2; Displayed dots 4), (Coordinate 3; Displayed dots 2)	
Key	one displayed dot represents 1 observation	
Unit	goal	

Algebra 1

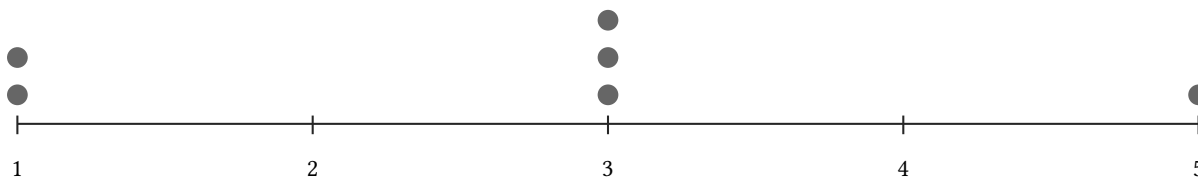
Dot Plots

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: condition: at most $-\frac{3}{2}$; count: 3; qualifying stacks: (coordinate: $-\frac{5}{2}$; dots: 2), (coordinate: $-\frac{3}{2}$; dots: 1); total: 8; unit: degree

The excluded value has no dot. The exact dot plot uses book coordinates on a uniform axis with step 1; its occupied stacks are 1:2, 3:3, 5:1. How many observations are not equal to 4? State which stacks count and handle endpoint inclusion exactly. Every observed dot remains in the event. Match the complete originally requested plot, qualifying-stack/count response, or reconstructed data with its dot key and units. A constructed dot plot must remain a plotted response, not just a count.



Axis		
	Start	1
	End	5
	Tick step	1
	Ticks	1, 2, 3, 4, 5
	Uniform	Yes
Stacks	(Coordinate 1; Dots 2), (Coordinate 3; Dots 3), (Coordinate 5; Dots 1)	
Key	one dot represents one observation	
Unit	book	
Condition	not equal to 4	

Your response: _____

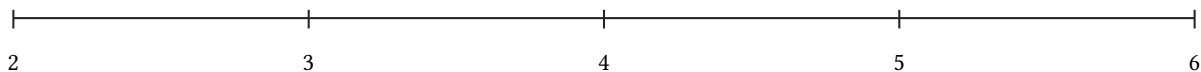
Algebra 1

Dot Plots

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Three distinct observations need three separate marks. Plot one dot for each score observation on a uniform number line from 2 to 6 with tick spacing 1: 2, 4, 6. Give the exact stack height at every occupied coordinate and retain empty ticks. Ticks 3 and 5 remain empty. Choose a construction strategy: tally each coordinate frequency before drawing, or place dots in source order and then audit the stacks. Justify the efficient choice for these repetitions, then construct the exact original plot and verify the total.



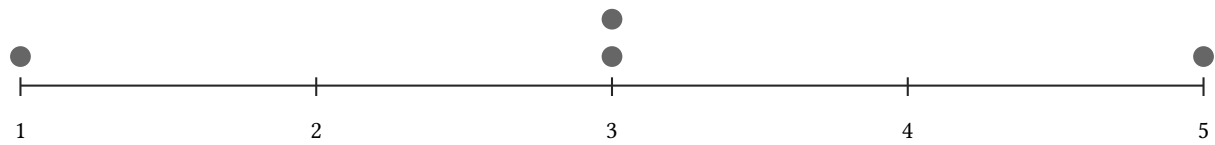
Raw observations	2, 4, 6	
Axis		
	Start	2
	End	6
	Tick step	1
	Ticks	2, 3, 4, 5, 6
	Uniform	Yes
Key	one dot represents one observation	
Unit	score	

Dot Plots

Full Worked Solutions - excerpt

Worked example

Problem. Compare the repeated source value with its stack height. Source evidence: raw ratings 1, 3, 3, 3, 5 Proposed dot display: stacks 1 : 1, 3 : 2, 5 : 1 Diagnose the exact one-to-one, coordinate, key, or axis error and state a corrected display.



Source evidence	raw ratings 1, 3, 3, 3, 5
Proposed display	stacks 1:1, 3:2, 5:1
Declared key	one dot represents one observation
Unit	rating

Answer. correction: use stacks 1 : 1, 3 : 3, 5 : 1 for five total dots.; diagnosis: one repeated observation at coordinate 3 is missing; key: one dot represents one observation; unit: rating

Explanation and check.

Audit: The source contains three copies of 3 but the proposal shows only two. Diagnosis: one repeated observation at coordinate 3 is missing. Correction: use stacks 1 : 1, 3 : 3, 5 : 1 for five total dots.

Algebra 1

Histograms

Histograms | A1-U10-P04

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for value-to-bin assignments, all bin frequencies, total count, endpoint convention, and unit, feasibility with implied counts, maximum minus minimum frequency, complete possible-count set, diagnosis and repaired intervals and combined exact count.

8 PDFs and a README; 175 buyer pages.

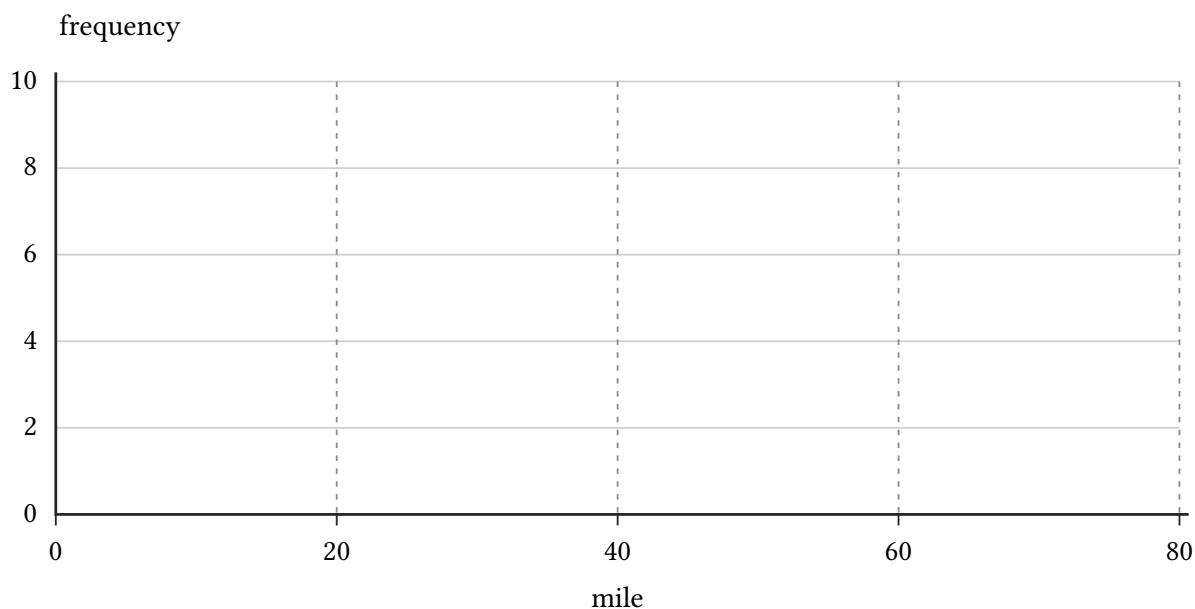
Algebra 1

Histograms

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

A coarse scale uses twenty-unit intervals. Construct a frequency histogram for the exact mile observations 3, 18, 20, 39, 41, 55, 60, 79, 80 using equal-width bin edges 0, 20, 40, 60, 80. Every bin is left-closed/right-open, except the final bin includes its right endpoint. Tally each value once, report every bar height, and retain empty bins. Horizontal width does not change the fact that height is frequency. Match the complete originally requested histogram, count, fraction or density-frequency response. Preserve bar boundaries, the frequency/density distinction, exact endpoint rules and units.



Position	Supplied value
1	3
2	18
3	20
4	39
5	41
6	55
7	60
8	79
9	80

Bank label: _____

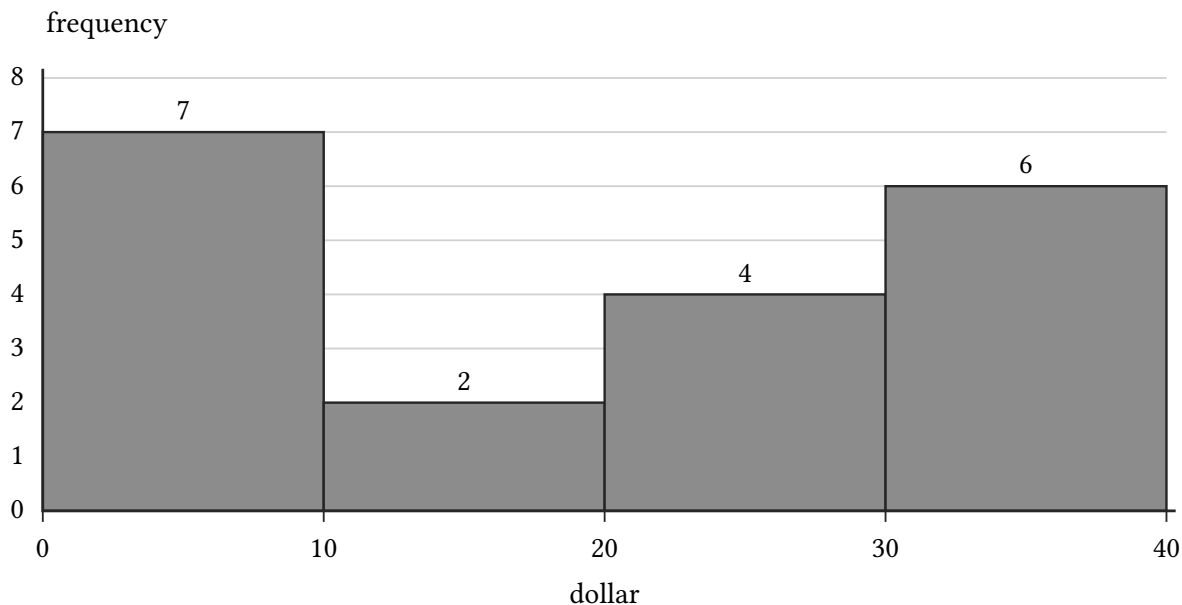
Algebra 1

Histograms

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

The requested set is a union rather than one continuous interval. A frequency histogram has bin edges 0, 10, 20, 30, 40 and bar heights 7, 2, 4, 6 in left-to-right order. Bins are left-closed/right-open, except the final bin includes its right endpoint. Find the count in $[0, 10)$ or $[30, 40]$.



Interval	frequency
$[0, 10)$	7
$[10, 20)$	2
$[20, 30)$	4
$[30, 40]$	6

Algebra 1

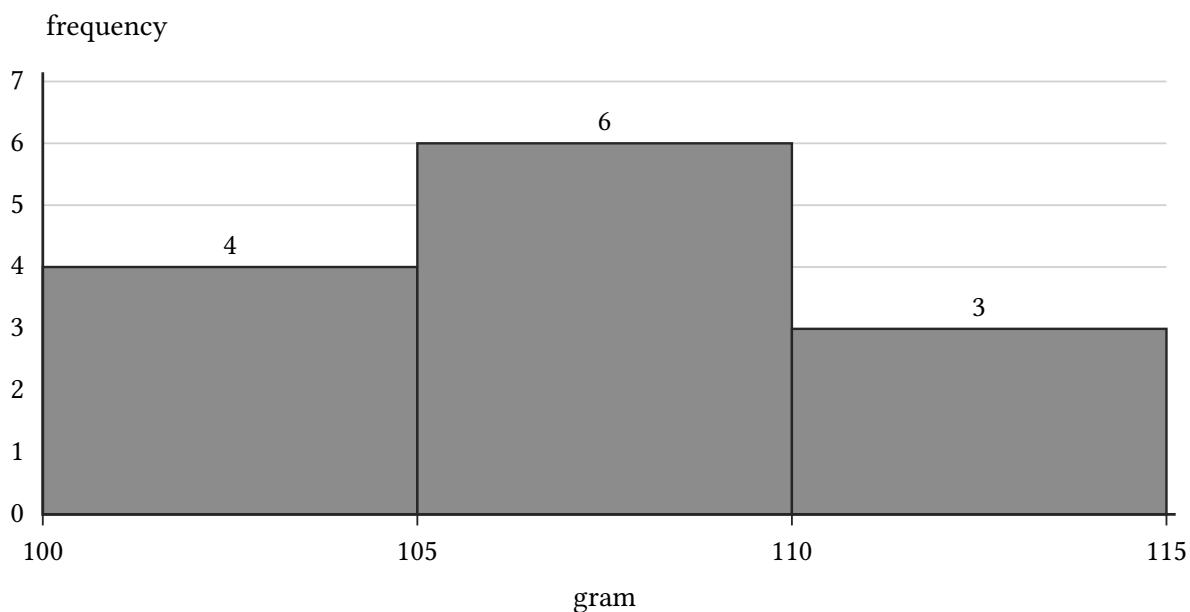
Histograms

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: Frequency by interval (degree Celsius): $[-2, -1)$: 1; $[-1, 0)$: 2; $[0, 1)$: 2; $[1, 2]$: 3. Total: 8 observations.

Each observation contributes to exactly one bar. A frequency histogram has bin edges 100, 105, 110, 115 and bar heights 4, 6, 3 in left-to-right order. Bins are left-closed/right-open, except the final bin includes its right endpoint. How many observations does the entire histogram represent? Match the complete originally requested histogram, count, fraction or density-frequency response. Preserve bar boundaries, the frequency/density distinction, exact endpoint rules and units.



Interval	frequency
$[100, 105)$	4
$[105, 110)$	6
$[110, 115]$	3

Your response: _____

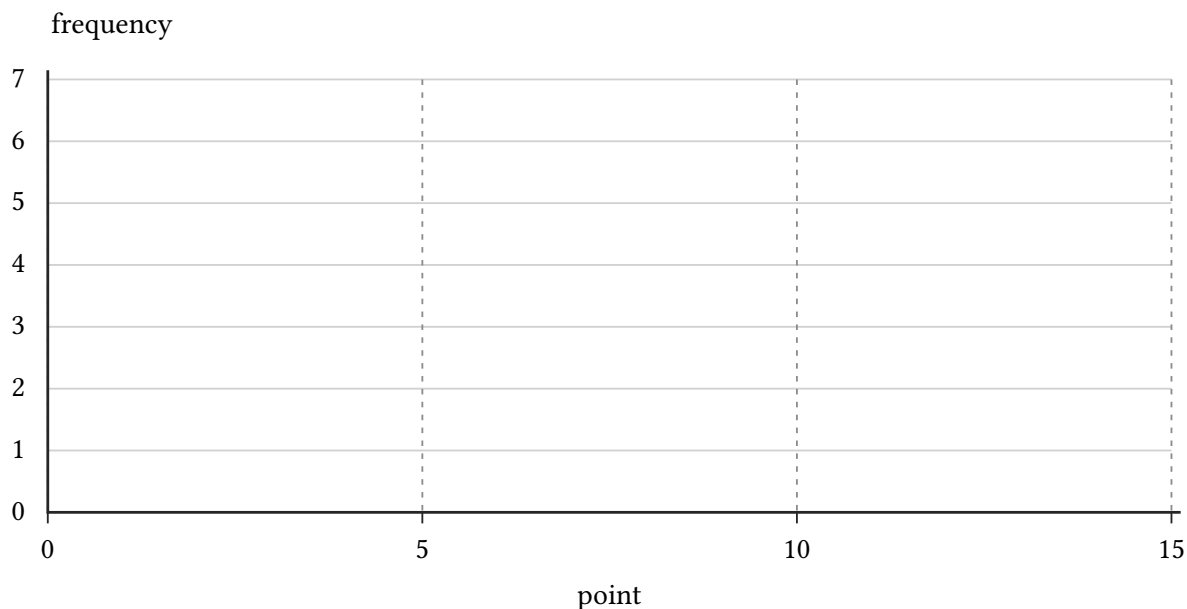
Algebra 1

Histograms

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

No observation lies on an interior edge. Construct a frequency histogram for the exact point observations 1, 2, 6, 7, 8, 11, 14 using equal-width bin edges 0, 5, 10, 15. Every bin is left-closed/right-open, except the final bin includes its right endpoint. Tally each value once, report every bar height, and retain empty bins. All three bars are occupied. Choose a binning strategy: sort the observations before counting intervals, or tally each observation directly into its bin. Justify the efficient route and use the original edge-inclusion convention to construct the histogram.



Position	Supplied value
1	1
2	2
3	6
4	7
5	8
6	11
7	14

Histograms

Full Worked Solutions - excerpt

Worked example

Problem. In one histogram, a bar contains 9 observations. The corresponding relative-frequency bar has height 0.15. Determine the sample size. Match the complete originally requested histogram, count, fraction or density-frequency response. Preserve bar boundaries, the frequency/density distinction, exact endpoint rules and units.

Answer. 60

Explanation and check.

If $\frac{9}{N} = 0.15$, then $N = \frac{9}{0.15} = 60$.

Worked example

Problem. One bar contains 14 observations. Its relative frequency is exactly $\frac{7}{20}$. Find the total number of observations. Match the complete originally requested histogram, count, fraction or density-frequency response. Preserve bar boundaries, the frequency/density distinction, exact endpoint rules and units.

Answer. 40

Explanation and check.

Solve $\frac{14}{N} = \frac{7}{20}$: $N = 14(\frac{20}{7}) = 40$.

Algebra 1
Box Plots and Outliers

Box Plots and Outliers | A1-U10-P05
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for iQR, both fences, and each candidate classification, iQR, both fences, and each candidate classification, iQR, both fences, and each candidate classification, iQR, both fences, and each candidate classification, iQR, both fences, and each candidate classification and iQR, both fences, and each candidate classification.
8 PDFs and a README; 175 buyer pages.

Algebra 1

Box Plots
and Outliers

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

One candidate equals the upper fence. For a dataset, $Q1 = 10$ and $Q3 = 20$ points. Under the supplied 1.5-IQR rule, values strictly below the lower fence or strictly above the upper fence are outliers. Classify the candidate observations 5, 10, 20, 35, 36. Fence equality remains included.

$q1$	10
$q3$	20
Candidate values	5, 10, 20, 35, 36
Unit	points
Rule	strictly outside $Q1 - 1.5 \cdot IQR$ and $Q3 + 1.5 \cdot IQR$

Bank label: _____

Candidates straddle both exact cutoff values. For a dataset, $Q1 = 4$ and $Q3 = 8$ units. Under the supplied 1.5-IQR rule, values strictly below the lower fence or strictly above the upper fence are outliers. Classify the candidate observations $-2, -3, 14, 15$. Apply the strict signs separately on the two sides.

$q1$	4
$q3$	8
Candidate values	$-2, -3, 14, 15$
Unit	units
Rule	strictly outside $Q1 - 1.5 \cdot IQR$ and $Q3 + 1.5 \cdot IQR$

Bank label: _____

Only the farthest upper candidate crosses its fence. For a dataset, $Q1 = 2$ and $Q3 = 6$ scores. Under the supplied 1.5-IQR rule, values strictly below the lower fence or strictly above the upper fence are outliers. Classify the candidate observations 0, 6, 12, 13. Do not compare values merely with $Q3$.

$q1$	2
$q3$	6
Candidate values	0, 6, 12, 13
Unit	scores
Rule	strictly outside $Q1 - 1.5 \cdot IQR$ and $Q3 + 1.5 \cdot IQR$

Bank label: _____

The low candidates lie on opposite sides of the cutoff. For a dataset, $Q1 = 5$ and $Q3 = 9$ minutes. Under the supplied 1.5-IQR rule, values strictly below the lower fence or strictly above the upper fence are outliers. Classify the candidate observations $-2, -1, 5, 9$. Use the computed lower fence rather than the minimum.

$q1$	5
$q3$	9
Candidate values	$-2, -1, 5, 9$
Unit	minutes
Rule	strictly outside $Q1 - 1.5 \cdot IQR$ and $Q3 + 1.5 \cdot IQR$

Bank label: _____

Algebra 1

**Box Plots
and Outliers**

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Both quartiles coincide. For a dataset, $Q1 = 5$ and $Q3 = 5$ ratings. Under the supplied 1.5-IQR rule, values strictly below the lower fence or strictly above the upper fence are outliers. Classify the candidate observations 4, 5, 6, 5. With IQR zero, both fences equal 5.

$q1$	5
$q3$	5
Candidate values	4, 5, 6, 5
Unit	ratings
Rule	strictly outside $Q1 - 1.5 \cdot \text{IQR}$ and $Q3 + 1.5 \cdot \text{IQR}$

Algebra 1

Box Plots
and Outliers

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: lower fence: -24 ; lower whisker: -18 ; outlier marks: ; upper fence: 20 ; upper whisker: 5

A signed dataset has no separated extremes. The ordered-source net-points data are $-6, -4, -2, 0, 2, 4, 6, 8$. Use median-of-halves quartiles and the modified-box rule: strict 1.5-IQR outliers are marked separately, while each whisker ends at the most extreme observed nonoutlier. Determine both whisker endpoints and every outlier mark. Preserve the negative lower coordinate.



Raw data	$-6, -4, -2, 0, 2, 4, 6, 8$
Unit	net-points
Quartile convention	median of halves; exclude overall median for odd n
Outlier rule	strictly outside 1.5-IQR fences

Your response: _____

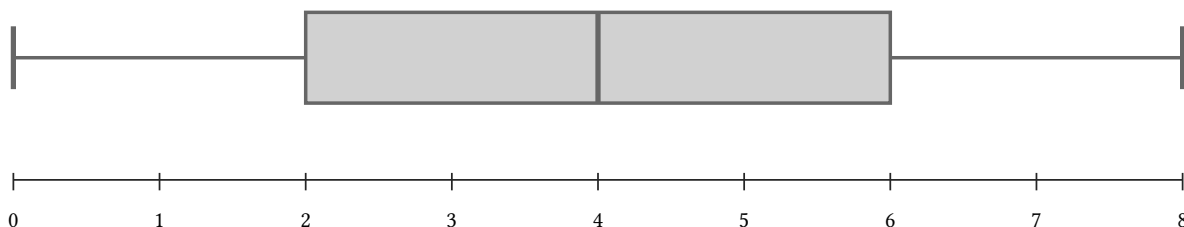
Algebra 1

Box Plots
and Outliers

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

The summary need not identify one sample. Use the median-of-halves convention, excluding the overall median for odd n . The required five-number summary is (0, 2, 4, 6, 8) in minimum/ $Q1$ /median/ $Q3$ /maximum order. Use 7 integer observations in each list. Give two different compatible samples. Before calculating or constructing, choose how to test compatibility: translate the summary into ordered-position constraints and use the additional stated restrictions, or use only a proposed total/mean. Explain which information your method must check, then carry out the original construction or impossibility proof.



Lower whisker	Q1	Median	Q3	Upper whisker	Outlier marks
0	2	4	6	8	none

Five number summary	0, 2, 4, 6, 8
Quartile convention	median of halves; exclude overall median for odd n
Conditions	Use 7 integer observations in each list.

Box Plots and Outliers

Full Worked Solutions - excerpt

Worked example

Problem. The low candidates lie on opposite sides of the cutoff. For a dataset, $Q1 = 5$ and $Q3 = 9$ minutes. Under the supplied $1.5 \cdot \text{IQR}$ rule, values strictly below the lower fence or strictly above the upper fence are outliers. Classify the candidate observations $-2, -1, 5, 9$. Use the computed lower fence rather than the minimum.

$q1$	5
$q3$	9
Candidate values	$-2, -1, 5, 9$
Unit	minutes
Rule	strictly outside $Q1 - 1.5 \cdot \text{IQR}$ and $Q3 + 1.5 \cdot \text{IQR}$

Answer. classifications: (classification: low outlier; value: -2), (classification: not an outlier; value: -1), (classification: not an outlier; value: 5), (classification: not an outlier; value: 9); iqr: 4 ; lower fence: -1 ; upper fence: 15

Explanation and check.

$\text{IQR} = 4$. The lower fence is

$$5 - 1.5(4) = -1$$

and the upper fence is

$$9 + 1.5(4) = 15$$

-2 is low outlier; -1 is not an outlier; 5 is not an outlier; 9 is not an outlier. Only -2 is strictly below the lower fence -1 .

Worked example

Problem. Candidates straddle both exact cutoff values. For a dataset, $Q1 = 4$ and $Q3 = 8$ units. Under the supplied $1.5 \cdot \text{IQR}$ rule, values strictly below the lower fence or strictly above the upper fence are outliers. Classify the candidate observations $-2, -3, 14, 15$. Apply the strict signs separately on the two sides.

$q1$	4
$q3$	8
Candidate values	$-2, -3, 14, 15$
Unit	units
Rule	strictly outside $Q1 - 1.5 \cdot \text{IQR}$ and $Q3 + 1.5 \cdot \text{IQR}$

Answer. classifications: (classification: not an outlier; value: -2), (classification: low outlier; value: -3), (classification: not an outlier; value: 14), (classification: high outlier; value: 15); iqr: 4 ; lower fence: -2 ; upper fence: 14

Explanation and check.

$\text{IQR} = 4$. The lower fence is

$$4 - 1.5(4) = -2$$

and the upper fence is

$$8 + 1.5(4) = 14$$

-2 is not an outlier; -3 is low outlier; 14 is not an outlier; 15 is high outlier. The equality cases -2 and 14 are nonoutliers.

Algebra 1
Comparing Data Distributions

Comparing Data Distributions | A1-U10-P06
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for artifact, alignment operation, and supported comparison, before/after A summaries, fixed B summaries, and revised comparison, contextual comparison of center and spread with supported limitation, chosen center and spread plus purpose-specific justification, verified shared summaries and decisive structural difference and shape label qualified by tail, modes, gaps, clusters, and evidence.
8 PDFs and a README; 136 buyer pages.

Algebra 1

Comparing Data Distributions

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Centers are close while spreads differ sharply. Context: part lengths. For Supplier A, the median is 100 millimeters and the IQR is 40 millimeters. For Supplier B, the corresponding values are 102 and 8 millimeters. Compare typical value and variability together, naming the groups and avoiding causal claims. Identify the more practically striking contrast.

Group	median (millimeters)	IQR (millimeters)
Supplier A	100	40
Supplier B	102	8

Bank label: _____

Higher average accompanies higher variability. Context: daily output. For Plant A, the mean is 45 units and the standard deviation is 12 units. For Plant B, the corresponding values are 38 and 5 units. Compare typical value and variability together, naming the groups and avoiding causal claims. Avoid choosing a winner without a goal.

Group	mean (units)	standard deviation (units)
Plant A	45	12
Plant B	38	5

Bank label: _____

Both groups are tightly clustered. Context: task times. For Method A, the median is 12 minutes and the IQR is 2 minutes. For Method B, the corresponding values are 25 and 3 minutes. Compare typical value and variability together, naming the groups and avoiding causal claims. Describe separation using both summaries.

Group	median (minutes)	IQR (minutes)
Method A	12	2
Method B	25	3

Bank label: _____

Average calibration agrees. Context: calibration readings. For Scale A, the mean is 200 grams and the standard deviation is 15 grams. For Scale B, the corresponding values are 200 and 4 grams. Compare typical value and variability together, naming the groups and avoiding causal claims. Use standard deviation to compare repeatability.

Group	mean (grams)	standard deviation (grams)
Scale A	200	15
Scale B	200	4

Bank label: _____

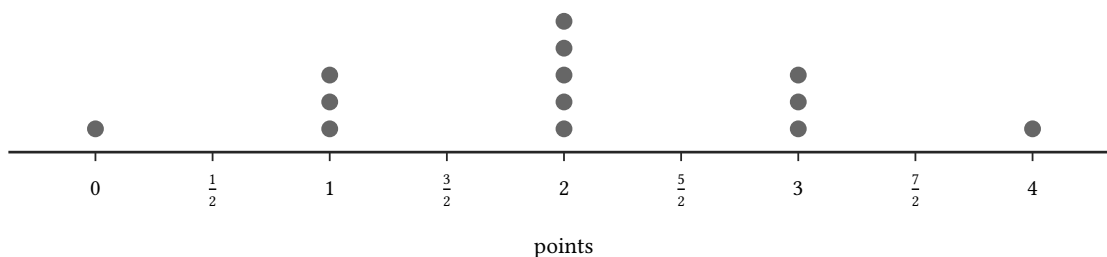
Algebra 1

Comparing Data Distributions

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

The frequencies mirror around 2. An exact dot plot has horizontal values 0, 1, 2, 3, 4 and corresponding frequencies 1, 3, 5, 3, 1. Describe the supported distribution shape, including tail direction, modality, and any meaningful gap or cluster. Name the center of symmetry.



Value	Frequency
0	1
1	3
2	5
3	3
4	1

Algebra 1

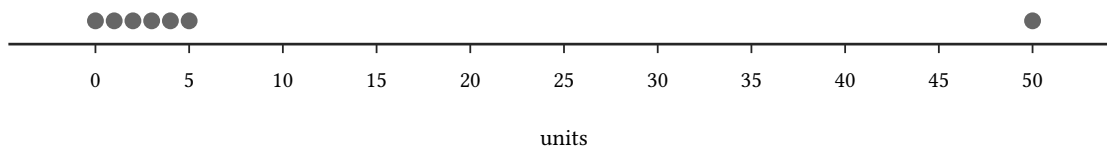
Comparing Data Distributions

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: a after: iqr: 10; mean: $\frac{52}{3}$; median: 8; n: 9; range: 100; a before: iqr: 8; mean: 7; median: 7; n: 8; range: 14; b: iqr: 10; mean: 9; median: 9; n: 9; range: 16; conclusion: Mean and range surge; the odd-sample *re-split* can also alter $Q3$ and IQR even though the new value lies far outside the middle.

A initially appears far more variable by range. Group A initially has 0, 1, 2, 3, 4, 5, 50 units; Group B has 0, 2, 4, 6, 8, 10. Remove 50 from A for a declared sensitivity analysis. Group A becomes 0, 1, 2, 3, 4, 5. Recompute A's mean, median, range, and IQR, then revise the A-versus-B comparison. Re-evaluate range and IQR rankings separately. For quartiles, use the median of each half; for odd sample sizes, exclude the overall median from both halves.



Value	Frequency
0	1
1	1
2	1
3	1
4	1
5	1
50	1

Value	Frequency
0	1
1	1
2	1
3	1
4	1
5	1

Value	Frequency
0	1
2	1
4	1
6	1
8	1
10	1

Your response: _____

Algebra 1

Comparing Data Distributions

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Two classes share one typical score. Context: test scores. For Class A, the median is 70 points and the IQR is 8 points. For Class B, the corresponding values are 70 and 20 points. Compare typical value and variability together, naming the groups and avoiding causal claims. State which is more consistent.

Group	median (points)	IQR (points)
Class A	70	8
Class B	70	20

The middle-half spreads match. Context: travel times. For Route A, the median is 18 minutes and the IQR is 6 minutes. For Route B, the corresponding values are 23 and 6 minutes. Compare typical value and variability together, naming the groups and avoiding causal claims. Describe the location shift.

Group	median (minutes)	IQR (minutes)
Route A	18	6
Route B	23	6

Comparing Data Distributions

Full Worked Solutions - excerpt

Worked example

Problem. A few large observations pull the tail right. The distribution is described as strongly right-skewed with a long high-value tail. The reporting goal is to report a resistant typical value and middle spread. Choose a center/spread pair and justify its sensitivity or robustness. No formula computation is requested.

Answer. center: median; justification: Median and IQR resist the high tail better than mean and standard deviation.; spread: IQR

Explanation and check.

Use median with IQR. Median and IQR resist the high tail better than mean and standard deviation.

Worked example

Problem. Reorder one fixed multiset into two datasets that have different distribution shapes or different numbers of modes. Decide whether the requested pair can exist, and justify without inventing data.

Answer. possible: False; proof: Impossible: reordering does not change value frequencies, so the empirical distribution and its modes remain the same.

Explanation and check.

Impossible: reordering does not change value frequencies, so the empirical distribution and its modes remain the same.

Algebra 1
Scatter Plots and Bivariate Data

Scatter Plots and Bivariate Data | A1-U10-P07

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for removed/added coordinates and updated ordered-pair multiset, axis assignment, labeled bounds/ticks, and role justification, axis labels and complete plotted ordered-pair multiset, qualifying complete ordered pairs and interpretation, missing coordinate or pair, with uniqueness/ambiguity justification and error diagnosis, exact removals/additions, and corrected multiset.

8 PDFs and a README; 188 buyer pages.

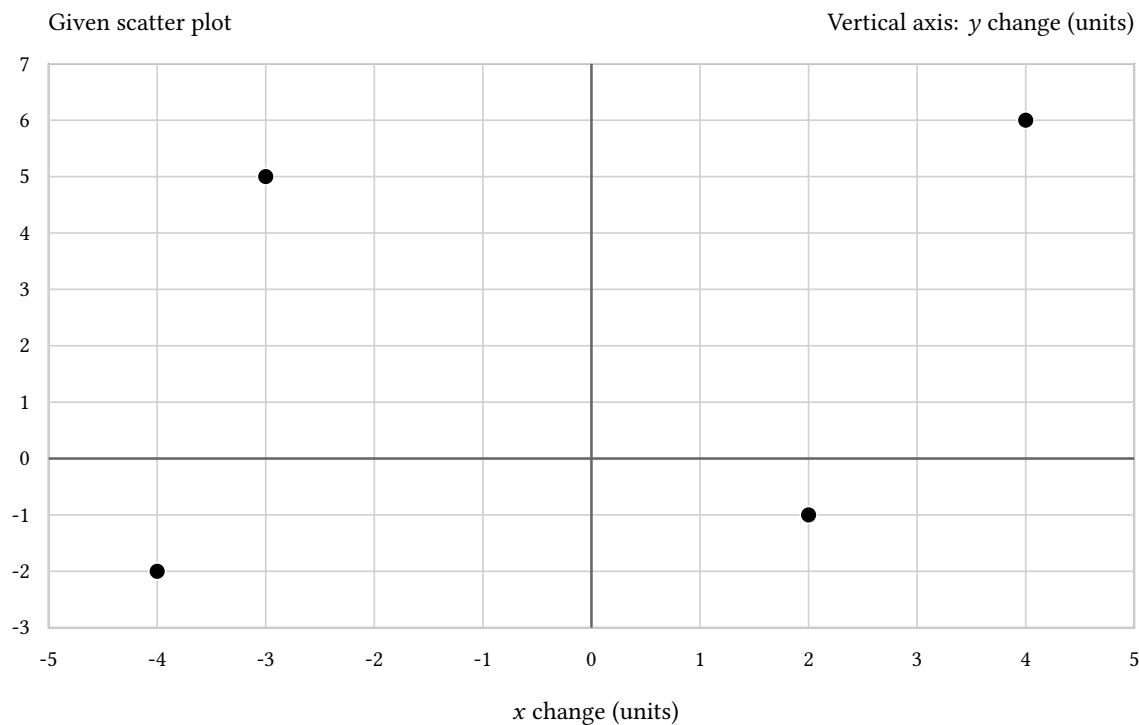
Algebra 1

Scatter Plots and
Bivariate Data

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

An exact scatter plot contains the points $(-4, -2)$; $(-3, 5)$; $(2, -1)$; $(4, 6)$. The horizontal axis is x change (units); the vertical axis is y change (units). Find the record with both coordinates negative. Return complete ordered pairs with units and preserve any stated multiplicity.



Bank label: _____

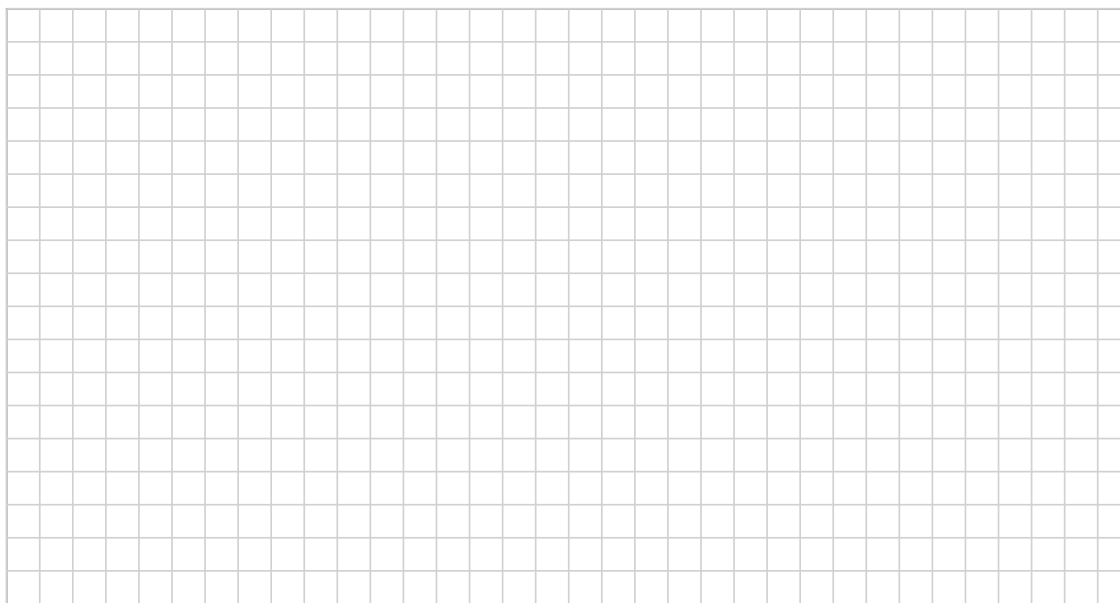
Algebra 1

Scatter Plots and
Bivariate Data

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Three seedlings are measured. The paired table records age (days) and height (*cm*): *A*: (1, 3), *B*: (2, 5), *C*: (3, 8). Put age on the horizontal axis and height on the vertical axis. Plot all three records and list the ordered pairs used.



Choose and label axes, bounds and uniform tick intervals.

Record	age (days)	height (cm)
<i>A</i>	1	3
<i>B</i>	2	5
<i>C</i>	3	8

Algebra 1

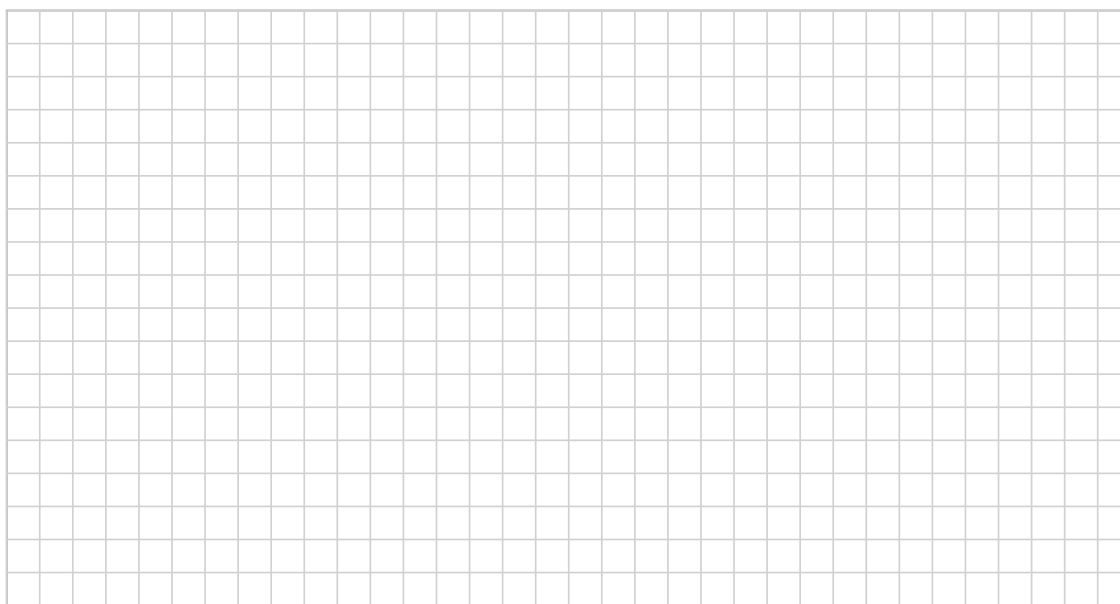
Scatter Plots and
Bivariate Data

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: horizontal axis: input change (units); plot note: The origin has multiplicity 2, not one observation.; points: 0 and 0, 0 and 0, 1 and 2, 2 and 1; vertical axis: output change (units)

Study time is paired with a percentage. The paired table records study time (minutes) and accuracy (percent): A: (15, 55), B: (30, 72), C: (45, 68), D: (60, 88). Put study time on the horizontal axis and accuracy on the vertical axis. Label the vertical quantity as percent and retain the dip at 45 minutes.



Choose and label axes, bounds and uniform tick intervals.

Record	study time (minutes)	accuracy (percent)
A	15	55
B	30	72
C	45	68
D	60	88

Your response: _____

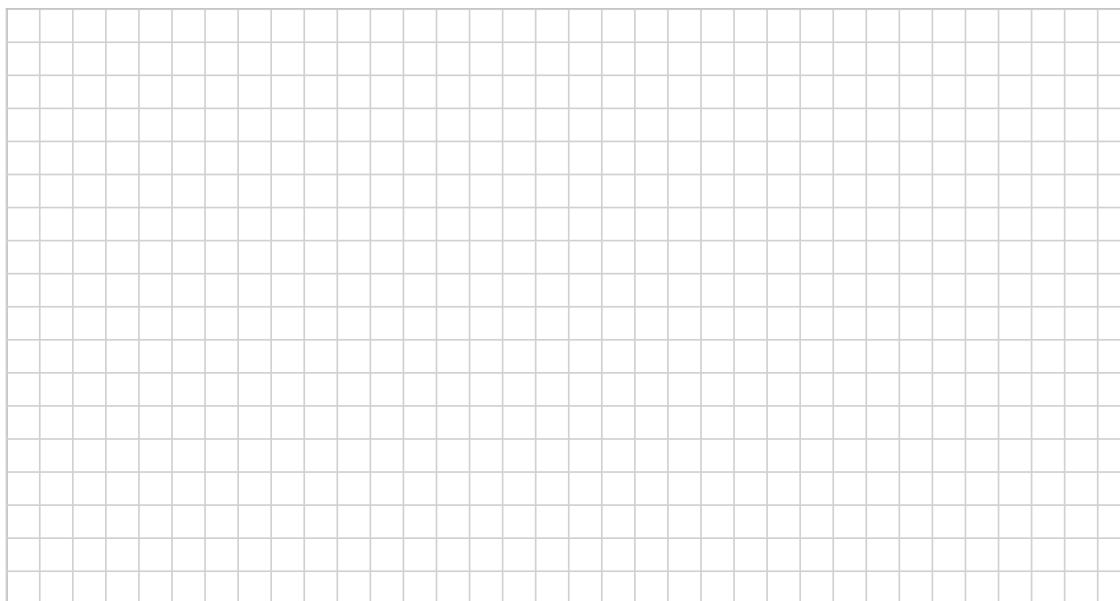
Algebra 1

Scatter Plots and Bivariate Data

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Dose is deliberately set before measuring response. The paired variables are dose (mg) with observed range 0 to 50, and response (points) with observed range 12 to 88. Investigation question: How does response vary as dose is changed? Choose horizontal and vertical variables, give explicit uniform axis bounds and tick intervals, and justify the role assignment.



Choose and label axes, bounds and uniform tick intervals.

Variable	Unit	Observed range
dose	mg	0 to 50
response	points	12 to 88

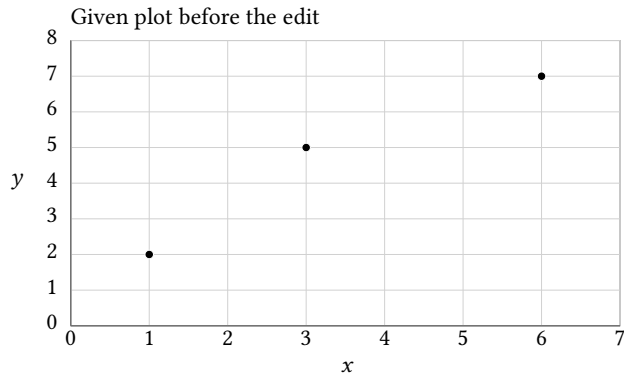
Scatter Plots and Bivariate Data

Full Worked Solutions - excerpt

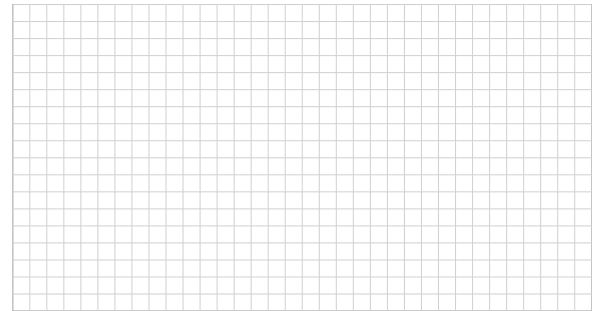
Worked example

Problem. The current scatter plot contains the ordered-pair multiset $(1, 2); (3, 5); (6, 7)$. A new observation has $x = 4$ and $y = 9$. Update the plot exactly, leaving every unaffected observation unchanged. Add it without connecting points.

Graph 1



Graph 2



Choose and label axes, bounds and uniform tick intervals.

Answer. add: 4 and 9; after: 1 and 2, 3 and 5, 4 and 9, 6 and 7; note: Scatter points remain unconnected.; remove:

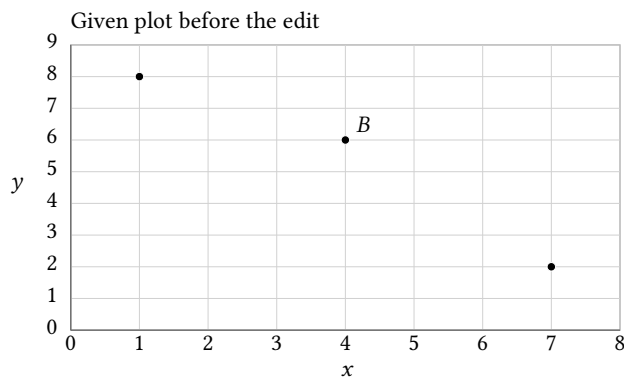
Explanation and check.

Remove no existing point; add $(4, 9)$. The updated multiset is $(1, 2); (3, 5); (4, 9); (6, 7)$. Scatter points remain unconnected.

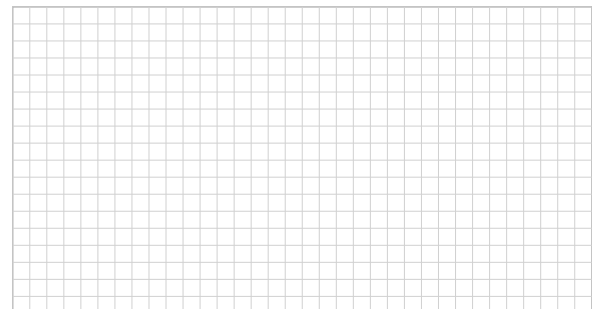
Worked example

Problem. The current scatter plot contains the ordered-pair multiset $(1, 8); (4, 6); (7, 2)$. Record B was transcribed as $(4, 6)$; its source row is actually $(5, 9)$. Update the plot exactly, leaving every unaffected observation unchanged. Treat this as one paired replacement, not two observations.

Graph 1



Graph 2



Choose and label axes, bounds and uniform tick intervals.

Answer. add: 5 and 9; after: 1 and 8, 5 and 9, 7 and 2; note: One record moves in both coordinates.; remove: 4 and 6

Explanation and check.

Remove $(4, 6)$; add $(5, 9)$. The updated multiset is $(1, 8); (5, 9); (7, 2)$. One record moves in both coordinates.

Algebra 1
Correlation and Linear Association

Correlation and Linear Association | A1-U10-P08
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for evidence-based linear association statement.
8 PDFs and a README; 140 buyer pages.

Algebra 1

Correlation and
Linear Association

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Technology reports $r = 1.0$ for two nonconstant measurements. All points lie on a rising line. Interpret sign and magnitude as linear association, using context-calibrated language rather than a universal cutoff. State the exact implication. _____ Bank label: _____	Technology reports $r = -1.0$ for two nonconstant measurements. All points lie on a falling line. Interpret sign and magnitude as linear association, using context-calibrated language rather than a universal cutoff. State the exact implication. _____ Bank label: _____
Technology reports $r = 0.96$ for height and arm span in one sample. The scatter plot is a tight rising band. Interpret sign and magnitude as linear association, using context-calibrated language rather than a universal cutoff. Use ordinary descriptive language. _____ Bank label: _____	Technology reports $r = -0.94$ for speed and travel time for a fixed route. The plot is a tight falling band. Interpret sign and magnitude as linear association, using context-calibrated language rather than a universal cutoff. Interpret the sign. _____ Bank label: _____
Technology reports $r = 0.03$ for shoe size and quiz score. No curved pattern is visible. Interpret sign and magnitude as linear association, using context-calibrated language rather than a universal cutoff. Limit the conclusion to linear association. _____ Bank label: _____	Technology reports $r = 0.58$ for practice hours and performance score. Points generally rise with noticeable scatter. Interpret sign and magnitude as linear association, using context-calibrated language rather than a universal cutoff. Avoid an absolute cutoff claim. _____ Bank label: _____
Technology reports $r = -0.62$ for outside temperature and heating use. Points generally fall with scatter. Interpret sign and magnitude as linear association, using context-calibrated language rather than a universal cutoff. Use units only in context, not for r. _____ Bank label: _____	Technology reports $r = 0.21$ for screen time and sleep duration. The upward tendency is faint. Interpret sign and magnitude as linear association, using context-calibrated language rather than a universal cutoff. State uncertainty descriptively. _____ Bank label: _____

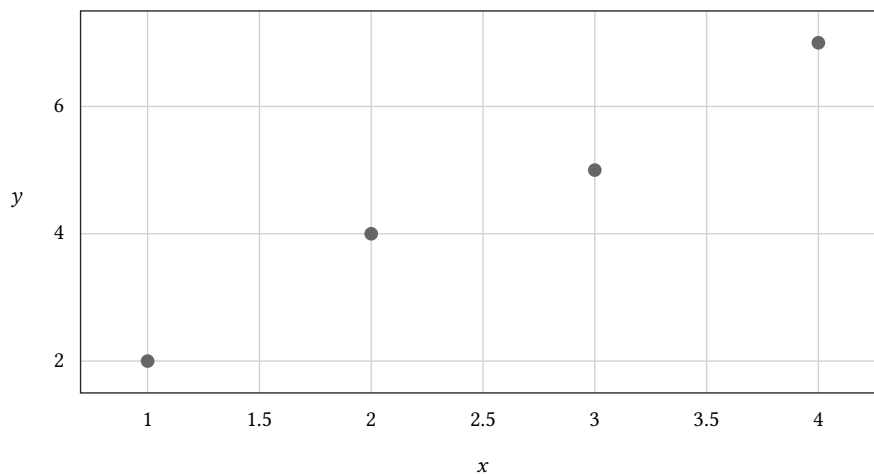
Algebra 1

Correlation and
Linear Association

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

An exact scatter plot contains (1, 2); (2, 4); (3, 5); (4, 7). Points rise left to right. Classify the visible linear direction and distinguish any nonlinear structure. Use the whole pattern.



Observation	Original x	Original y
1	1	2
2	2	4
3	3	5
4	4	7

Algebra 1

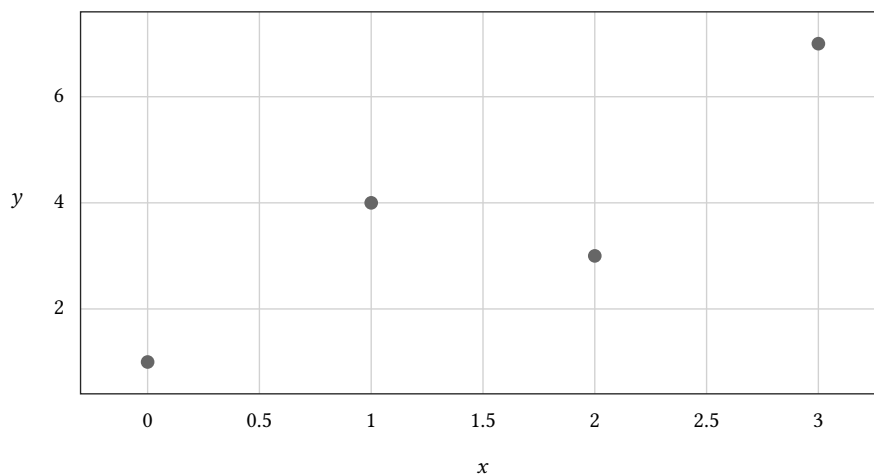
Correlation and
Linear Association

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: plot a r : 0.88; plot b r : 0.88; qualification: Matching is not unique by value because both are intentionally equal.; reasoning: Translations preserve r exactly.

Two exact scatter plots are given. Plot A: $(0, 1); (1, 4); (2, 3); (3, 7)$. Plot B: $(0, -1); (1, -4); (2, -3); (3, -7)$. Candidate correlations are 0.88, -0.88 . B negates y . Match each plot to the compatible supplied r using direction, relative tightness, and any nonlinear limitation. Match.



Observation	Original x	Original y
1	0	1
2	1	4
3	2	3
4	3	7

Observation	Original x	Original y
1	0	-1
2	1	-4
3	2	-3
4	3	-7

Your response: _____

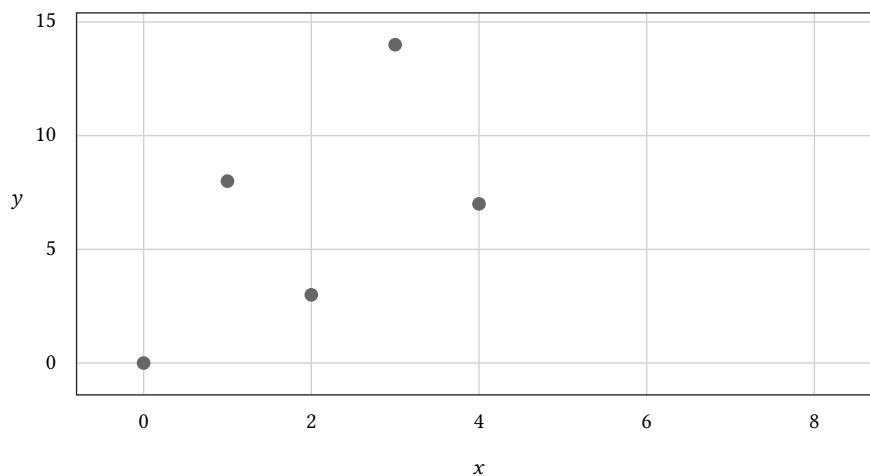
Algebra 1

Correlation and Linear Association

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Plot A uses the stated common scale and contains $(0, 0)$; $(1, 8)$; $(2, 3)$; $(3, 14)$; $(4, 7)$. Plot B contains $(0, 2)$; $(2, 3)$; $(4, 4)$; $(6, 5)$; $(8, 6)$. A is steeper but scattered; B is shallow and exact. Compare linear strength by closeness to a line, not by slope steepness or sign. Rank strength.



Observation	Original x	Original y
1	0	0
2	1	8
3	2	3
4	3	14
5	4	7

Observation	Original x	Original y
1	0	2
2	2	3
3	4	4
4	6	5
5	8	6

Correlation and Linear Association

Full Worked Solutions - excerpt

Worked example

Problem. A dataset has correlation $r = 0.69$. Interchange x and y , including their axis labels. Predict the new correlation and justify using affine transformation rules. Do not confuse swapping with negating.

Answer. effect: preserved; justification: Correlation is symmetric: $r(x, y) = r(y, x)$.; new r : 0.69; original r : 0.69

Explanation and check.

The new correlation is 0.69. Correlation is symmetric: $r(x, y) = r(y, x)$.

Worked example

Problem. A dataset has correlation $r = -0.33$. Use $x_{\text{new}} = x - 100$ and $y_{\text{new}} = y + 12$. Predict the new correlation and justify using affine transformation rules. Track two translations.

Answer. effect: preserved; justification: Translations of either or both variables preserve r .; new r : -0.33 ; original r : -0.33

Explanation and check.

The new correlation is -0.33 . Translations of either or both variables preserve r .

Algebra 1
Correlation vs Causation

Correlation vs Causation | A1-U10-P09

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for direction-by-direction timing assessment, comparative causal support and scoped conclusion, selected evidence with rival-specific predictions, classification with decisive language and scope, two explicit arrows and qualified rival explanation and evidence-limited rewrite and named overreach.

8 PDFs and a README; 57 buyer pages.

Algebra 1

Correlation vs Causation

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Fictional study summary: In one sample, taller plants also had wider leaves. Statement: "Taller sampled plants tended to have wider leaves." Classify the statement as descriptive association, prediction, or causation, and identify the exact words or logical move that determine the class. Do not add a mechanism. _____ Bank label: _____	Fictional study summary: Two variables were observed at one time. Statement: "Increasing light causes leaf width to grow." Classify the statement as descriptive association, prediction, or causation, and identify the exact words or logical move that determine the class. Focus on the verb. _____ Bank label: _____
Fictional study summary: Fictional towns with more parks reported more walking. Statement: "Park count is associated with reported walking." Classify the statement as descriptive association, prediction, or causation, and identify the exact words or logical move that determine the class. Classify. _____ Bank label: _____	Fictional study summary: Students chose their own study times. Statement: "More study time leads to higher scores." Classify the statement as descriptive association, prediction, or causation, and identify the exact words or logical move that determine the class. Classify logical content. _____ Bank label: _____
Fictional study summary: A score is used to forecast a later fictional rating. Statement: "The first score helps predict the later rating." Classify the statement as descriptive association, prediction, or causation, and identify the exact words or logical move that determine the class. Separate forecasting from intervention. _____ Bank label: _____	Fictional study summary: Device settings and heat were merely recorded. Statement: "Turning the setting down reduces heat." Classify the statement as descriptive association, prediction, or causation, and identify the exact words or logical move that determine the class. Classify. _____ Bank label: _____
Fictional study summary: Two observed groups had different means. Statement: "Group A was higher on average than Group B." Classify the statement as descriptive association, prediction, or causation, and identify the exact words or logical move that determine the class. Do not infer why. _____ Bank label: _____	Fictional study summary: A fitted rule forecasts fictional sales from temperature. Statement: "If tomorrow is warmer, the model predicts more sales." Classify the statement as descriptive association, prediction, or causation, and identify the exact words or logical move that determine the class. Classify model language. _____ Bank label: _____

Algebra 1

Correlation vs Causation

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Fictional study summary: Users selected whether to enable a fictional filter. Statement: “The filter prevents errors.” Classify the statement as descriptive association, prediction, or causation, and identify the exact words or logical move that determine the class. Classify. 	Fictional study summary: Two trends rose over calendar time. Statement: “Trend X is responsible for Trend Y.” Classify the statement as descriptive association, prediction, or causation, and identify the exact words or logical move that determine the class. Classify.
Fictional study summary: An observational chart is shown. Statement: “X explains the increase in Y.” Classify the statement as descriptive association, prediction, or causation, and identify the exact words or logical move that determine the class. Interpret “explains” here. 	Fictional study summary: Two fictional rates peak in the same weeks. Statement: “High X coincides with high Y.” Classify the statement as descriptive association, prediction, or causation, and identify the exact words or logical move that determine the class. Classify.
Fictional study summary: Participants self-selected exposure. Statement: “Exposure raises the probability of outcome Y.” Classify the statement as descriptive association, prediction, or causation, and identify the exact words or logical move that determine the class. Classify. 	Fictional study summary: Two values are correlated. Statement: “Y is high because X is high.” Classify the statement as descriptive association, prediction, or causation, and identify the exact words or logical move that determine the class. Classify.

Algebra 1

Correlation vs Causation

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: common cause: job-role composition; path to x: place more technical roles in remote arrangements.; path to y: give those roles higher pay bands.; rival explanation: role mix can shift both department averages.; status: plausible alternative, not established fact Observed fictional association: step count is negatively associated with resting pulse Supplied third factor: baseline health and mobility. Explain a coherent common-cause alternative by stating how the factor could affect each measured variable. Do not claim this alternative is proven. State why measuring health would help. Your response: _____	Incoming: common cause: team size; path to x: require more storage capacity.; path to y: produce more files through more members.; rival explanation: team size can explain the association.; status: plausible alternative, not established fact Observed fictional association: departments with more remote hours have higher mean pay Supplied third factor: job-role composition. Explain a coherent common-cause alternative by stating how the factor could affect each measured variable. Do not claim this alternative is proven. Explain aggregation. Your response: _____
Incoming: common cause: storm severity; path to x: increase needed repairs and spending.; path to y: increase the number of claims.; rival explanation: storm severity can drive both totals.; status: plausible alternative, not established fact Fictional evidence: Earlier X predicts later Y and earlier Y predicts later X in separate comparisons. Candidate directions are $X \rightarrow Y$ and $Y \rightarrow X$. Assess which directions the timing excludes, permits, or supports, while keeping possibility separate from proof. Avoid declaring feedback proved. Your response: _____	Incoming: classification: descriptive association; decisive feature: “Scores were higher after the event” describes a before-after temporal pattern, without saying that the event caused the difference.; supported scope: Concurrent changes could explain the difference. Observed fictional association: fictional children with greater height read more pages Supplied third factor: age. Explain a coherent common-cause alternative by stating how the factor could affect each measured variable. Do not claim this alternative is proven. Do not say height causes reading. Your response: _____
Incoming: limitation: r does not summarize the curve.; overreach: Zero linear correlation is called no relationship.; rewrite: The sample has zero linear correlation but a visible U-shaped relationship. Fictional study: In a fictional simulation, agents selecting option X had lower Y. Headline: “Option X cures high Y.” Rewrite the headline to preserve the observed result while removing unsupported causation or universality. Name the specific limitation. Keep scenario fictional and neutral. Your response: _____	Incoming: limitation: Sampling concerns representation, not isolation of the exposure effect. No outcome direction or size was supplied.; overreach: Random sampling is confused with random assignment.; rewrite: A random-sample observational study examines self-selected X and Y; it does not establish that X causes Y. Fictional study: An assigned package changes X, resources, and schedule together. Headline: “X alone caused Y.” Rewrite the headline using only the supplied design facts, removing the unsupported attribution to X alone. Name the specific component-scope limitation. No outcome result or control comparison is supplied. Your response: _____

Algebra 1

Correlation vs Causation

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Study A: participants chose condition X or control. Study B: participants were randomly assigned to X or control; procedures otherwise matched. Compare their support for the causal claim “ X changes Y .” by checking assignment, control, and concurrent differences. Choose stronger support.

Study A: a random sample chose its own condition. Study B: a convenience sample was randomly assigned to conditions. Compare their support for the causal claim “the condition causes Y in study participants.” by checking assignment, control, and concurrent differences. Distinguish the two uses of random.

Study A: volunteers selected a high-effort program. Study B: eligible volunteers were randomly assigned high-effort or comparison conditions. Compare their support for the causal claim “the program raises scores.” by checking assignment, control, and concurrent differences. Use motivation.

Study A: this year’s X group is compared with last year’s records. Study B: current X and control groups run simultaneously. Compare their support for the causal claim “ X changes Y .” by checking assignment, control, and concurrent differences. Use calendar effects.

Correlation vs Causation

Full Worked Solutions - excerpt

Worked example

Problem. Fictional study: Observational $r = -0.80$. Headline: “More X prevents Y .” Rewrite the headline to preserve the observed result while removing unsupported causation or universality. Name the specific limitation. Keep sign.

Answer. limitation: The design does not show that increasing X reduces Y .; overreach: Negative association is called prevention.; rewrite: Higher X was associated with lower Y in the sample.

Explanation and check.

Overreach: Negative association is called prevention. Rewrite: Higher X was associated with lower Y in the sample.

Limitation: The design does not show that increasing X reduces Y .

Worked example

Problem. Fictional study summary: In one sample, taller plants also had wider leaves. Statement: “Taller sampled plants tended to have wider leaves.” Classify the statement as descriptive association, prediction, or causation, and identify the exact words or logical move that determine the class. Do not add a mechanism.

Answer. classification: descriptive association; decisive feature: “Tended to” reports *co*-variation only.; supported scope: It is limited to the sampled plants.

Explanation and check.

descriptive association. “Tended to” reports *co*-variation only. It is limited to the sampled plants.

Algebra 1

Lines of Best Fit

Lines of Best Fit | A1-U10-P10

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for line-of-fit result with decisive evidence.

8 PDFs and a README; 158 buyer pages.

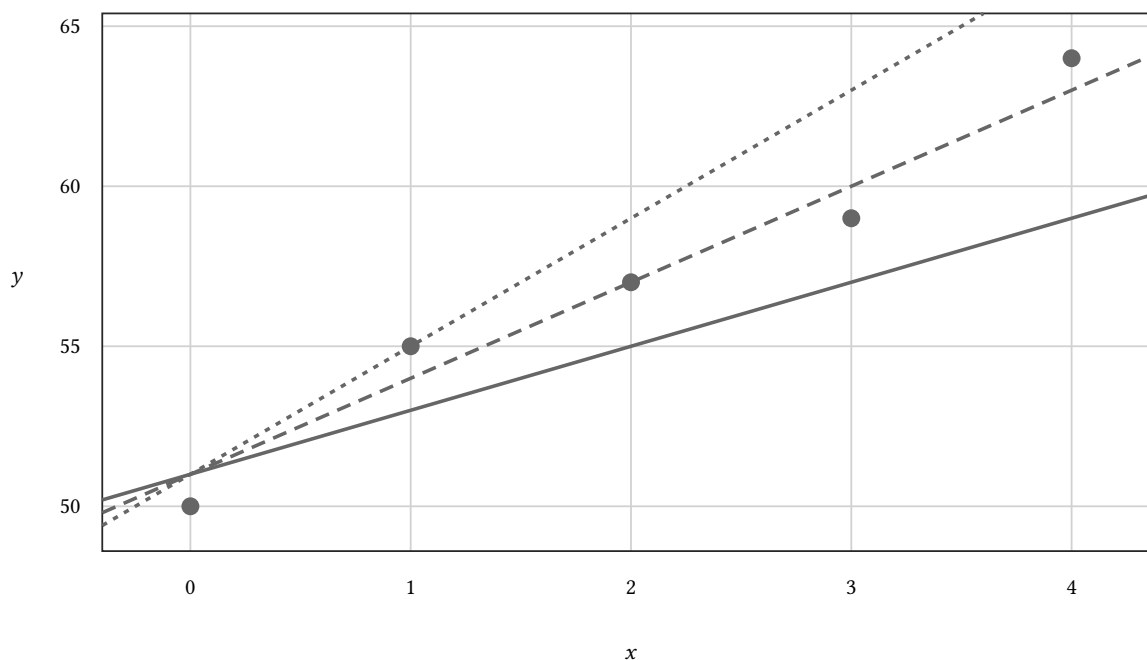
Algebra 1

Lines of Best Fit

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Paired study hours and quiz score data are (0, 50); (1, 55); (2, 57); (3, 59); (4, 64). Three proposed summaries are A: $\hat{y} = 2x + 51$; B: $\hat{y} = 3x + 51$; C: $\hat{y} = 4x + 51$. Choose the line with the smallest sum of squared vertical errors. Show the criterion value for every candidate so a line matching one conspicuous point cannot win by inspection alone.



Observation	Original x	Original y
1	0	50
2	1	55
3	2	57
4	3	59
5	4	64

Bank label: _____

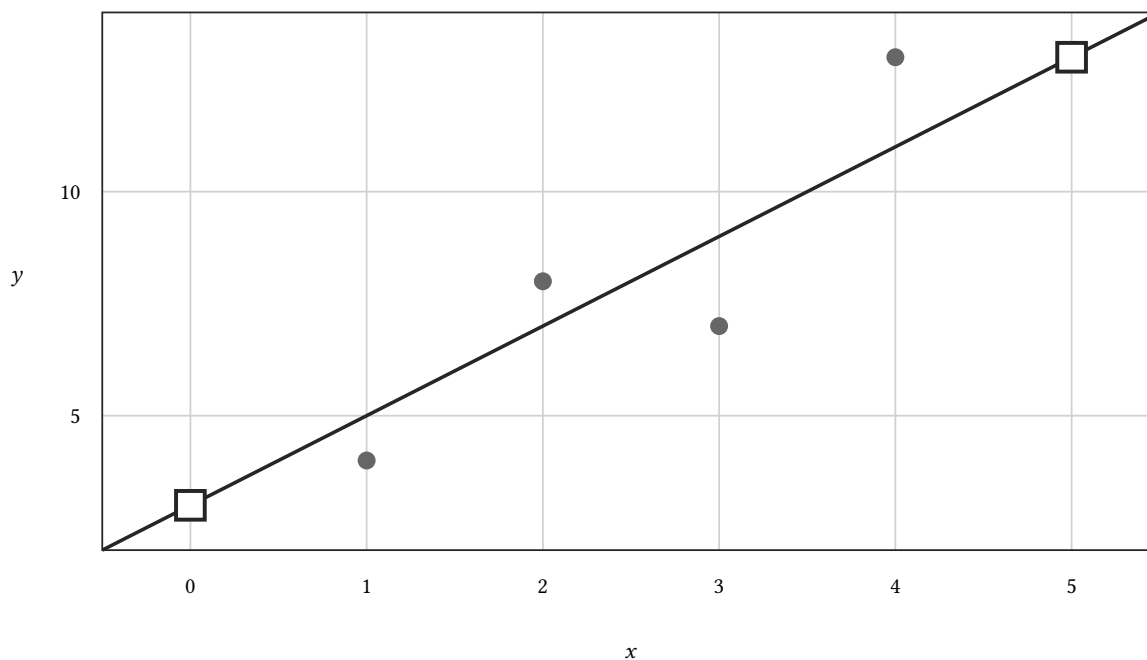
Algebra 1

Lines of Best Fit

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

A scatter graph has observed points (1, 4); (2, 8); (3, 7); (4, 13). Two emphasized fit-line points are (0, 3); (5, 13); both marked points are construction handles, not observations. Use the emphasized points to write the selected fit equation. Then state how the two marker layers differ and check how many observations are within 2 vertical units of the line.



Observation	Original x	Original y
1	1	4
2	2	8
3	3	7
4	4	13

Fit marker	Original x	Original y
1	0	3
2	5	13

Algebra 1

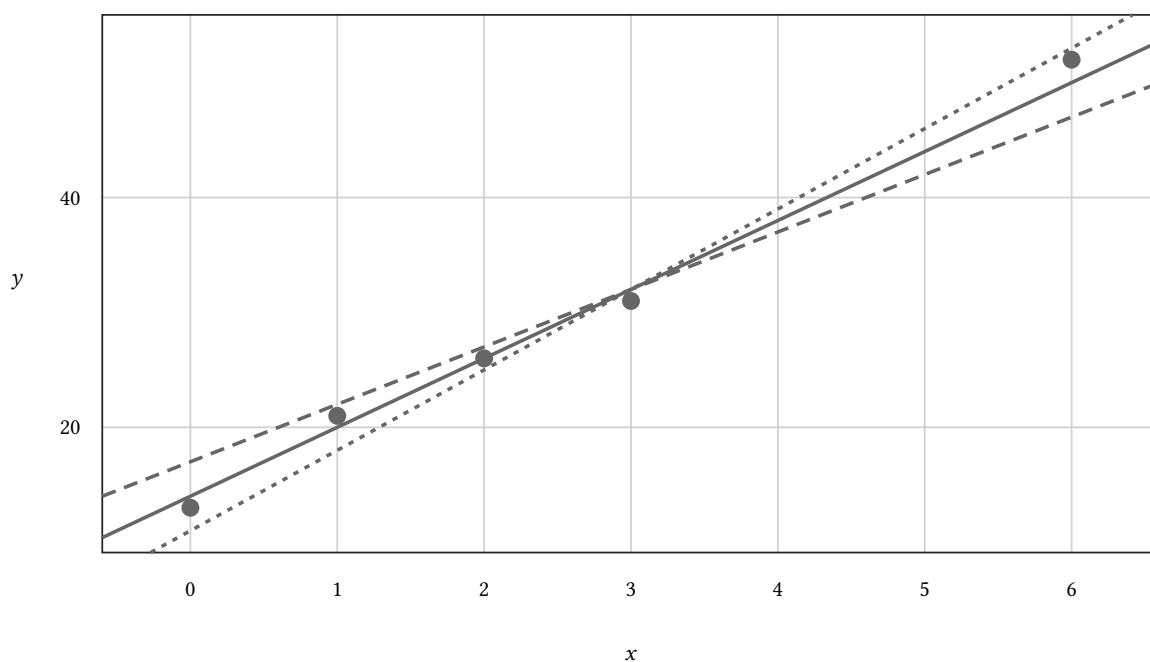
Lines of Best Fit

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

START

Paired delivery stops and minutes data are (0, 13); (1, 21); (2, 26); (3, 31); (6, 52). Three proposed summaries are A: $\hat{y} = 6x + 14$; B: $\hat{y} = 5x + 17$; C: $\hat{y} = 7x + 11$. Choose the line with the smallest sum of absolute vertical errors. Show the criterion value for every candidate so a line matching one conspicuous point cannot win by inspection alone.



Observation	Original x	Original y
1	0	13
2	1	21
3	2	26
4	3	31
5	6	52

Your response: _____

Algebra 1Lines of
Best Fit

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A least-squares summary changes after this documented data edit: a far-right point lying near the old trend is added. The supplied fit before the edit is $\hat{y} = 2x + 5$; after the edit it is $\hat{y} = 2.2x + 4.8$. Compute the slope and intercept changes, then explain the direction using the edited point's horizontal leverage and vertical position. Do not claim an exact coefficient from geometry alone—the outputs are supplied.

A least-squares summary changes after this documented data edit: the largest- x point is moved well above the old line. The supplied fit before the edit is $\hat{y} = -x + 30$; after the edit it is $\hat{y} = -0.6x + 27$. Compute the slope and intercept changes, then explain the direction using the edited point's horizontal leverage and vertical position. Do not claim an exact coefficient from geometry alone—the outputs are supplied.

A least-squares summary changes after this documented data edit: a point near mean x is raised by 8 units. The supplied fit before the edit is $\hat{y} = 3x + 4$; after the edit it is $\hat{y} = 3x + 5$. Compute the slope and intercept changes, then explain the direction using the edited point's horizontal leverage and vertical position. Do not claim an exact coefficient from geometry alone—the outputs are supplied.

A least-squares summary changes after this documented data edit: a new far-right observation falls below the former positive trend. The supplied fit before the edit is $\hat{y} = 4x + 2$; after the edit it is $\hat{y} = 3.2x + 3.6$. Compute the slope and intercept changes, then explain the direction using the edited point's horizontal leverage and vertical position. Do not claim an exact coefficient from geometry alone—the outputs are supplied.

Lines of Best Fit

Full Worked Solutions - excerpt

Worked example

Problem. Audit this fictional fitting work: Output uses $\hat{y} = a + bx$ with $a = 18$ and $b = -3$, yet a student writes $\hat{y} = 18x - 3$. Identify the precise construction or model-choice error, repair the procedure or equation, and name the evidence that must be reconsidered. A generic instruction to 'draw a better line' is insufficient.

Answer. fault: Output uses $\hat{y} = a + bx$ with $a = 18$ and $b = -3$, yet a student writes $\hat{y} = 18x - 3$.; repair: Read the displayed convention: a is intercept and b is slope, so the correction is $\hat{y} = 18 - 3x$.

Explanation and check.

Fault: Output uses $\hat{y} = a + bx$ with $a = 18$ and $b = -3$, yet a student writes $\hat{y} = 18x - 3$. Repair: Read the displayed convention: a is intercept and b is slope, so the correction is $\hat{y} = 18 - 3x$.

Worked example

Problem. Audit this fictional fitting work: A downward cloud is modeled with $\hat{y} = 2x + 9$ because the student used absolute rise and run. Identify the precise construction or model-choice error, repair the procedure or equation, and name the evidence that must be reconsidered. A generic instruction to 'draw a better line' is insufficient.

Answer. fault: A downward cloud is modeled with $\hat{y} = 2x + 9$ because the student used absolute rise and run.; repair: Preserve signed rise: the fitted slope must be negative, then recompute its intercept from actual fit-line points.

Explanation and check.

Fault: A downward cloud is modeled with $\hat{y} = 2x + 9$ because the student used absolute rise and run. Repair: Preserve signed rise: the fitted slope must be negative, then recompute its intercept from actual fit-line points.

Algebra 1
Interpreting Regression Slope and Intercept

Interpreting Regression Slope and Intercept | A1-U10-P11
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
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08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for coefficient interpretation with units and model limits.
8 PDFs and a README; 82 buyer pages.

Algebra 1

Interpreting Regression Slope and Intercept

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

A fitted line has slope 4, measured in score points per unit of practice sessions. Compare input 3 to input 9. Find the signed fitted response change, include units, and explain why the intercept is unnecessary for this difference.

Original supplied quantity	Given value
Slope	4
Input start	3
Input end	9
Input unit	practice sessions
Response unit	score points

Bank label: _____

A fitted line has slope -3 , measured in demand units per unit of temperature degrees. Compare input 20 to input 14. Find the signed fitted response change, include units, and explain why the intercept is unnecessary for this difference.

Original supplied quantity	Given value
Slope	-3
Input start	20
Input end	14
Input unit	temperature degrees
Response unit	demand units

Bank label: _____

A fitted line has slope 12, measured in kilometers per unit of hours. Compare input 1.5 to input 3.75. Find the signed fitted response change, include units, and explain why the intercept is unnecessary for this difference.

Original supplied quantity	Given value
Slope	12
Input start	1.5
Input end	3.75
Input unit	hours
Response unit	kilometers

Bank label: _____

A fitted line has slope -8 , measured in light units per unit of meters of depth. Compare input 2 to input 7. Find the signed fitted response change, include units, and explain why the intercept is unnecessary for this difference.

Original supplied quantity	Given value
Slope	-8
Input start	2
Input end	7
Input unit	meters of depth
Response unit	light units

Bank label: _____

Algebra 1

Interpreting Regression Slope and Intercept

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

A fitted data model is $\hat{y} = 3x + 4$, where x measures weeks and $\hat{y}$ measures centimeters of fitted height. Interpret the slope's sign, magnitude, and compound units using model language. Do not turn an association into an exact or causal rule.

Original supplied quantity	Given value
Model	$\hat{y} = 3x + 4$
Input unit	weeks
Response unit	centimeters of fitted height

A fitted data model is $\hat{y} = -2x + 90$, where x measures minutes and $\hat{y}$ measures degrees Celsius of fitted temperature. Interpret the slope's sign, magnitude, and compound units using model language. Do not turn an association into an exact or causal rule.

Original supplied quantity	Given value
Model	$\hat{y} = -2x + 90$
Input unit	minutes
Response unit	degrees Celsius of fitted temperature

A fitted data model is $\hat{y} = 6$, where x measures machine hours and $\hat{y}$ measures fitted defects per batch. Interpret the slope's sign, magnitude, and compound units using model language. Do not turn an association into an exact or causal rule.

Original supplied quantity	Given value
Model	$\hat{y} = 6$
Input unit	machine hours
Response unit	fitted defects per batch

A fitted data model is $\hat{y} = 5x + 48$, where x measures practice sessions and $\hat{y}$ measures fitted words per minute. Interpret the slope's sign, magnitude, and compound units using model language. Do not turn an association into an exact or causal rule.

Original supplied quantity	Given value
Model	$\hat{y} = 5x + 48$
Input unit	practice sessions
Response unit	fitted words per minute

Algebra 1

Interpreting Regression Slope and Intercept

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

START

The old fitted model for load response is $y_{\text{old-hat}} = 4x_{\text{old}} + 20$. One new input unit (trips) equals 1 old input units, and one new response unit (kilograms) equals 2.205 old response units. Rewrite the same fit in X and Y , then interpret why the coefficient numbers changed without changing the underlying relationship.

Original supplied quantity	Given value
Old model	$y_{\text{old-hat}} = 4x_{\text{old}} + 20$
Old input per new	1
Old output per new	2.205
New input unit	trips
New output unit	kilograms

Your response: _____

Incoming: new intercept: 100; new model: $Y\text{-hat} = -0.05X + 100$; new slope: -0.05 ; reason: One centimeter equals 0.01 old meter, so the per-centimeter slope is smaller.

The old fitted model for value is $y_{\text{old-hat}} = -3x_{\text{old}} + 28$. One new input unit (years) equals 1 old input units, and one new response unit (dollars) equals 0.001 old response units. Rewrite the same fit in X and Y , then interpret why the coefficient numbers changed without changing the underlying relationship.

Original supplied quantity	Given value
Old model	$y_{\text{old-hat}} = -3x_{\text{old}} + 28$
Old input per new	1
Old output per new	0.001
New input unit	years
New output unit	dollars

Your response: _____

Incoming: New intercept: 10; New model: $y\text{-hat} = 5t + 10$; Slope: 5. Changing the day label translates the origin but does not alter daily rate. If S is the original supported input set, the supported set for t is $S - (1000)$. An original interval $[L, U]$ becomes $[L - (1000), U - (1000)]$. The same observations are used; this adds no extrapolation.

A fitted model uses hours after midnight: $y\text{-hat} = -4x + 70$. Define $t = x - 12$, so t measures hours after noon. Rewrite the line in t , identify the new intercept's contextual reference, and state what happens to the slope and supported input range.

Original supplied quantity	Given value
Old model	$y\text{-hat} = -4x + 70$
Reference old x	12
New input	hours after noon

Your response: _____

Incoming: New intercept: 52; New model: $y\text{-hat} = 4t + 52$; Slope: 4. The baseline moves to age 10, so the intercept becomes the fitted age-10 response. If S is the original supported input set, the supported set for t is $S - (10)$. An original interval $[L, U]$ becomes $[L - (10), U - (10)]$. The same observations are used; this adds no extrapolation.

A fitted model uses calendar day: $y\text{-hat} = 5x - 4990$. Define $t = x - 1000$, so t measures days after launch day 1000. Rewrite the line in t , identify the new intercept's contextual reference, and state what happens to the slope and supported input range.

Original supplied quantity	Given value
Old model	$y\text{-hat} = 5x - 4990$
Reference old x	1000
New input	days after launch day 1000

Your response: _____

Algebra 1

Interpreting Regression Slope and Intercept

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Two fitted models must be compared. A is $3\text{cm}/\text{week}$ and B is $5\text{cm}/\text{week}$; compare height rates in cm/week . Decide whether the rates are directly comparable, perform any stated conversion, and do not confuse a larger rate with stronger correlation.

Original supplied quantity	Given value
Model a reported slope	3
Model b reported slope	5
Reported units	A is $3\text{cm}/\text{week}$ and B is $5\text{cm}/\text{week}$; compare height rates in cm/week .

Two fitted models must be compared. A is -4 and B is -2 thousand dollars/year; compare rates and decline magnitudes. Decide whether the rates are directly comparable, perform any stated conversion, and do not confuse a larger rate with stronger correlation.

Original supplied quantity	Given value
Model a reported slope	-4
Model b reported slope	-2
Reported units	A is -4 and B is -2 thousand dollars/year; compare rates and decline magnitudes.

Interpreting Regression Slope and Intercept

Full Worked Solutions - excerpt

Worked example

Problem. Audit this parameter interpretation: For $\hat{y} = 4x + 18$, a report calls 4 the initial fitted value. Identify whether the error concerns coefficient role, units, domain, modeled wording, or causation, and replace it with a context-safe statement.

Original supplied quantity	Given value
Faulty interpretation	For $\hat{y} = 4x + 18$, a report calls 4 the initial fitted value.

Answer. fault: For $\hat{y} = 4x + 18$, a report calls 4 the initial fitted value.; repair: The intercept 18 is the fitted value at $x = 0$; 4 is the fitted response change per input unit.

Explanation and check.

The interpretation fails its coefficient audit. The intercept 18 is the fitted value at $x = 0$; 4 is the fitted response change per input unit.

Worked example

Problem. Audit this parameter interpretation: A slope of 6 score points per hour is described as 6 hours per score point. Identify whether the error concerns coefficient role, units, domain, modeled wording, or causation, and replace it with a context-safe statement.

Original supplied quantity	Given value
Faulty interpretation	A slope of 6 score points per hour is described as 6 hours per score point.

Answer. fault: A slope of 6 score points per hour is described as 6 hours per score point.; repair: Keep response over explanatory units: 6 score points per hour.

Explanation and check.

The interpretation fails its coefficient audit. Keep response over explanatory units: 6 score points per hour.

Algebra 1
Interpolation and Extrapolation

Interpolation and Extrapolation | A1-U10-P12

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for prediction with evidential and contextual qualification.
8 PDFs and a README; 57 buyer pages.

Algebra 1

Interpolation and Extrapolation

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

The fitted linear model is $\hat{y} = 3x + 5$; x is measured in weeks, $\hat{y}$-hat in centimeters, and observed inputs span 0 to 10. Predict at $x = 10$, report according to nearest centimeter, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. _____ Bank label: _____	The fitted linear model is $\hat{y} = -2x + 78$; x is measured in minutes, $\hat{y}$-hat in degrees Celsius, and observed inputs span 0 to 15. Predict at $x = 9$, report according to nearest degree, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. _____ Bank label: _____
The fitted linear model is $\hat{y} = 14$; x is measured in filter setting, $\hat{y}$-hat in clarity units, and observed inputs span 1 to 9. Predict at $x = 7$, report according to nearest unit, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. _____ Bank label: _____	The fitted linear model is $\hat{y} = 1.5x + 4$; x is measured in hours, $\hat{y}$-hat in kilometers, and observed inputs span 0 to 8. Predict at $x = 4.5$, report according to nearest tenth, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. _____ Bank label: _____
The fitted linear model is $\hat{y} = 5x - 3$; x is measured in liters, $\hat{y}$-hat in yield kilograms, and observed inputs span 1 to 8. Predict at $x = 4$, report according to nearest kilogram, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. _____ Bank label: _____	The fitted linear model is $\hat{y} = 1.4x + 8$; x is measured in kilometers, $\hat{y}$-hat in fuel liters, and observed inputs span 0 to 10. Predict at $x = 5$, report according to nearest tenth, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. _____ Bank label: _____
The fitted linear model is $\hat{y} = 4x + 11$; x is measured in advertising blocks, $\hat{y}$-hat in expected orders, and observed inputs span 0 to 12. Predict at $x = 8$, report according to nearest whole expected order, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. _____ Bank label: _____	The fitted linear model is $\hat{y} = -3x + 20$; x is measured in signed position meters, $\hat{y}$-hat in signal units, and observed inputs span -5 to 5. Predict at $x = -2$, report according to nearest unit, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. _____ Bank label: _____

Algebra 1

Interpolation and Extrapolation

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

The fitted linear model is $\hat{y} = 2x + 4$; x is measured in miles, $\hat{y}$ in dollars, and observed inputs span 0 to 12. Predict at $x = 6$, report according to nearest cent, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. 	A table has four evenly spread observations and asks about an unlisted middle input. Observed explanatory inputs are 1, 3, 5, 7; the model is requested at $x = 4$. Classify from actual observations and qualify gaps or endpoints.
The request uses the first recorded input in a four-row table. Observed explanatory inputs are 0, 2, 6, 9; the model is requested at $x = 0$. Classify from actual observations and qualify gaps or endpoints. 	The target matches the last recorded input rather than extending past it. Observed explanatory inputs are 2, 4, 8, 10; the model is requested at $x = 10$. Classify from actual observations and qualify gaps or endpoints.
A requested input sits one unit above every measured setting. Observed explanatory inputs are 1, 2, 5, 8; the model is requested at $x = 9$. Classify from actual observations and qualify gaps or endpoints. 	The model is queried two units below the earliest recorded setting. Observed explanatory inputs are 3, 5, 7, 11; the model is requested at $x = 1$. Classify from actual observations and qualify gaps or endpoints.

Algebra 1

Interpolation and Extrapolation

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

The fitted model is $\hat{y} = 3x + 10$, and a request uses $x = -2$. Context restriction: participants must be nonnegative whole numbers. Compute the algebraic model value, then decide whether it is a usable contextual prediction; if not, name the exact input or output restriction that fails.

The fitted model is $\hat{y} = 4x + 12$, and a request uses $x = -3$. Context restriction: signed positions from -5 to 5 are allowed. Compute the algebraic model value, then decide whether it is a usable contextual prediction; if not, name the exact input or output restriction that fails.

The fitted model is $\hat{y} = \frac{1}{10}x + 0.6$, and a request uses $x = 5$. Context restriction: probability outputs must lie from 0 to 1 . Compute the algebraic model value, then decide whether it is a usable contextual prediction; if not, name the exact input or output restriction that fails.

The fitted model is $\hat{y} = -\frac{1}{5}x + 0.5$, and a request uses $x = 4$. Context restriction: probability outputs must lie from 0 to 1 . Compute the algebraic model value, then decide whether it is a usable contextual prediction; if not, name the exact input or output restriction that fails.

Interpolation and Extrapolation

Full Worked Solutions - excerpt

Worked example

Problem. A fitted model produces 18.64 people. The output represents expected attendance. Reporting rule: nearest tenth. Choose the defensible final report and explain why calculator digits, discreteness, or threshold logic require that form.

Answer. reason: A mean count may be fractional, so do not force it to an individual count.; report: 18.6 people expected

Explanation and check.

Report: 18.6 people expected. A mean count may be fractional, so do not force it to an individual count.

Worked example

Problem. A score target is sought from a positively sloped practice model. The fitted linear model is $\hat{y} = 4x + 10$, observed for inputs 0 through 10. Estimate the input for fitted response 30, then check uniqueness, support, and feasibility.

Answer. estimated input: 5; reason: Solving $4x + 10 = 30$ gives $x = 5$, inside the observed range.; status: supported

Explanation and check.

Reverse use gives input 5. Status: supported. Solving $4x + 10 = 30$ gives $x = 5$, inside the observed range.

Algebra 1
Calculating Residuals

Calculating Residuals | A1-U10-P13
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
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08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for signed residual with response units and evidence.
8 PDFs and a README; 100 buyer pages.

Algebra 1

Calculating Residuals

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

A negative input maps to a positive prediction. Using residual = observed - predicted, evaluate $y\text{-hat} = -2x + 12$ at $x = -4$ for observed $y = 18$. Report the signed residual in units and state whether the point is above, below, or on the fit.

Original supplied quantity	Given value
Model	$y\text{-hat} = -2x + 12$
X	-4
Observed y	18
Response unit	units

Bank label: _____

An exact fractional fit is compared with a decimal observation. Using residual = observed - predicted, evaluate $y\text{-hat} = \frac{7}{3}x + 5$ at $x = 4$ for observed $y = 14.6$. Report the signed residual in units and state whether the point is above, below, or on the fit.

Original supplied quantity	Given value
Model	$y\text{-hat} = \frac{7}{3}x + 5$
X	4
Observed y	14.6
Response unit	units

Bank label: _____

A supplied quadratic fit gives predicted 21 while the observation is 25. Using residual = observed - predicted, evaluate $y\text{-hat} = 21$ at $x = 6$ for observed $y = 25$. Report the signed residual in units and state whether the point is above, below, or on the fit.

Original supplied quantity	Given value
Model	$y\text{-hat} = 21$
X	6
Observed y	25
Response unit	units

Bank label: _____

A supplied exponential fit gives predicted 32 and the observation is 28. Using residual = observed - predicted, evaluate $y\text{-hat} = 32$ at $x = 5$ for observed $y = 28$. Report the signed residual in units and state whether the point is above, below, or on the fit.

Original supplied quantity	Given value
Model	$y\text{-hat} = 32$
X	5
Observed y	28
Response unit	units

Bank label: _____

Algebra 1

Calculating Residuals

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

A plant-height row lies above a rising fit. Using residual = observed - predicted, evaluate $\hat{y} = 2x + 5$ at $x = 3$ for observed $y = 13$. Report the signed residual in centimeters and state whether the point is above, below, or on the fit.

Original supplied quantity	Given value
Model	$\hat{y} = 2x + 5$
X	3
Observed y	13
Response unit	centimeters

A fare observation lies below its fitted line. Using residual = observed - predicted, evaluate $\hat{y} = 3x + 4$ at $x = 2$ for observed $y = 8$. Report the signed residual in dollars and state whether the point is above, below, or on the fit.

Original supplied quantity	Given value
Model	$\hat{y} = 3x + 4$
X	2
Observed y	8
Response unit	dollars

A sensor reading lands exactly on a horizontal fit. Using residual = observed - predicted, evaluate $\hat{y} = 9$ at $x = 5$ for observed $y = 9$. Report the signed residual in sensor units and state whether the point is above, below, or on the fit.

Original supplied quantity	Given value
Model	$\hat{y} = 9$
X	5
Observed y	9
Response unit	sensor units

A resale value exceeds a decreasing model. Using residual = observed - predicted, evaluate $\hat{y} = -4x + 40$ at $x = 6$ for observed $y = 18$. Report the signed residual in thousand dollars and state whether the point is above, below, or on the fit.

Original supplied quantity	Given value
Model	$\hat{y} = -4x + 40$
X	6
Observed y	18
Response unit	thousand dollars

Algebra 1

Calculating Residuals

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: 19.05

Response and residual use percentage points. Under $e = \text{observed} - \text{predicted}$, the known values are observed=missing, predicted=72, residual=6 percentage points. Recover the missing quantity and verify by subtraction.

Original supplied quantity	Given value
Observed	missing
Predicted	72
Residual	6
Response unit	percentage points

Your response: _____

Incoming: 9

Rounded quantities make the recovered fit approximate. Under $e = \text{observed} - \text{predicted}$, the known values are observed=12.9, predicted=missing, residual=-0.37 units. Recover the missing quantity and verify by subtraction.

Original supplied quantity	Given value
Observed	12.9
Predicted	missing
Residual	-0.37
Response unit	units

Your response: _____

Incoming: 23

A negative residual places the missing observation below prediction. Under $e = \text{observed} - \text{predicted}$, the known values are observed=missing, predicted=24, residual=-7 units. Recover the missing quantity and verify by subtraction.

Original supplied quantity	Given value
Observed	missing
Predicted	24
Residual	-7
Response unit	units

Your response: _____

START

Recover an observation from a positive residual and prediction. Under $e = \text{observed} - \text{predicted}$, the known values are observed=missing, predicted=18, residual=5 units. Recover the missing quantity and verify by subtraction.

Original supplied quantity	Given value
Observed	missing
Predicted	18
Residual	5
Response unit	units

Your response: _____

Algebra 1

Calculating Residuals

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

At $x = 4$, observed $y = 25$ and residual 3 for $\hat{y} = mx + 5$. Use the residual identity first, then decide whether the named model parameter is identified by this one row.

Original supplied quantity	Given value
X	4
Observed	25
Residual	3
Unknown parameter	slope
Known parameter	5

At $x = 6$, observed $y = 20$ and residual -2 for $\hat{y} = 3x + b$. Use the residual identity first, then decide whether the named model parameter is identified by this one row.

Original supplied quantity	Given value
X	6
Observed	20
Residual	-2
Unknown parameter	intercept
Known parameter	3

Calculating Residuals

Full Worked Solutions - excerpt

Worked example

Problem. The two reported errors use dollars and minutes. Residuals are 3, 4. Compare absolute sizes and the relevant aggregate; explain what signed cancellation can or cannot show.

Original supplied quantity	Given value
Residuals	(3, 4)

Answer. conclusion: not directly comparable; reason: Three dollars and four minutes require normalization or a stated metric.

Explanation and check.

Conclusion: not directly comparable. Three dollars and four minutes require normalization or a stated metric.

Worked example

Problem. Audit this residual work: A rounded predicted value is used to claim an exact residual. Identify the first invalid step and repair the calculation or interpretation using $e = \text{observed} - \text{predicted}$ and vertical response units.

Original supplied quantity	Given value
Worked claim	A rounded predicted value is used to claim an exact residual.

Answer. repair: Label the residual approximate unless the unrounded prediction is available.

Explanation and check.

Correction: Label the residual approximate unless the unrounded prediction is available.

Algebra 1

Residual Plots

Residual Plots | A1-U10-P14

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus

Across 96 tasks this topic asks for global residual-plot diagnostic with exact evidence.

8 PDFs and a README; 199 buyer pages.

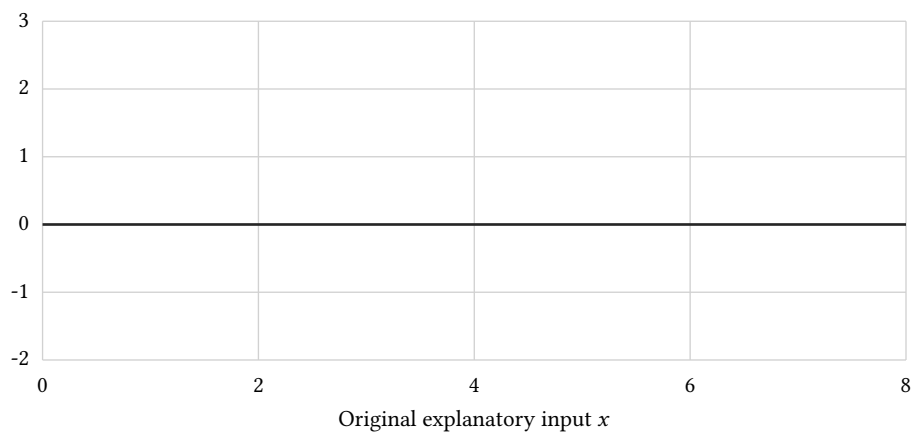
Algebra 1

Residual Plots

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Computing the table reveals positive ends and negative middle residuals. Plot the exact residual points $(0, 3)$; $(2, 0)$; $(4, -2)$; $(6, 0)$; $(8, 3)$ against the original x -values, include a horizontal $e = 0$ reference, and state the residual-axis units are response-error units.



Residual points	$(0, 3)$, $(2, 0)$, $(4, -2)$, $(6, 0)$, $(8, 3)$	
Zero reference	Yes	
Axis roles	Horizontal	original explanatory input
	Vertical	observed minus predicted response

Bank label: _____

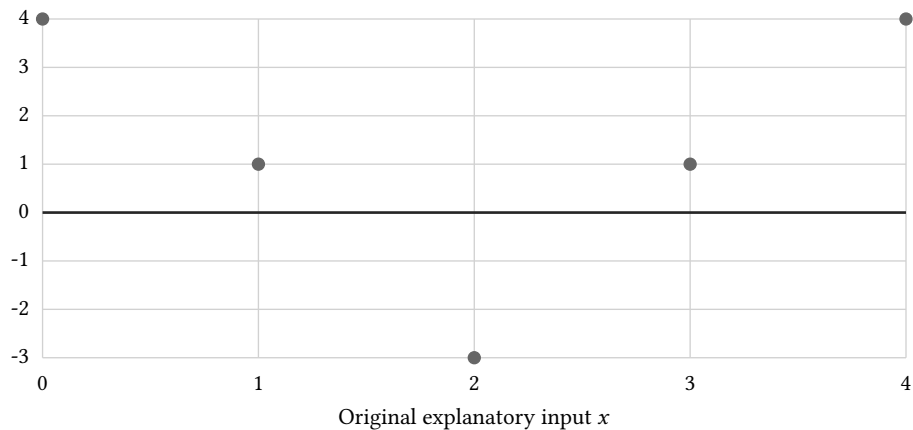
Algebra 1

Residual Plots

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Exact residual coordinates are $(0, 4)$; $(1, 1)$; $(2, -3)$; $(3, 1)$; $(4, 4)$ with zero reference $e = 0$. Decide whether there is U -shaped, inverted- U , other systematic structure, or no clear curvature; use sign runs rather than only the largest point.



Residual points	$(0, 4)$, $(1, 1)$, $(2, -3)$, $(3, 1)$, $(4, 4)$
Zero reference	Yes
Model provenance	Residual coordinates supplied for analysis.

Algebra 1

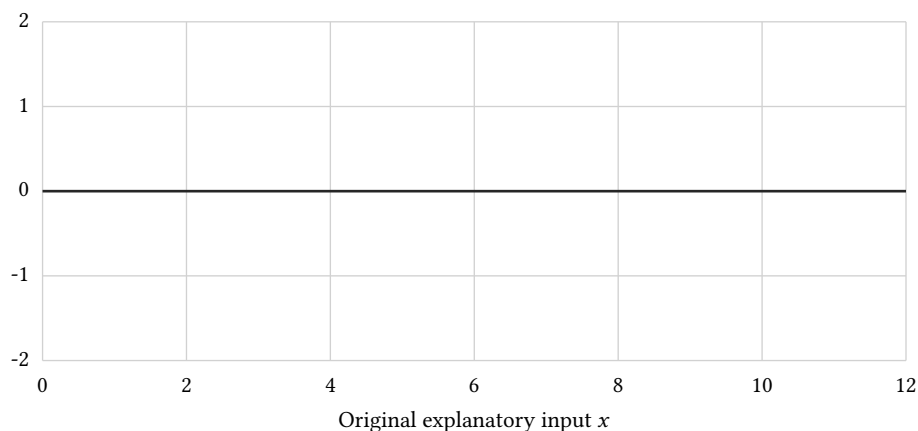
Residual Plots

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: points: (1, 1), (3, 2), (3, -2), (6, -1); zero reference: $e = 0$

Input spacing is strongly uneven. Plot the exact residual points (0, 1); (1, -2); (5, 2); (12, -1) against the original x -values, include a horizontal $e = 0$ reference, and state the residual-axis units are response-error units.



Residual points	(0, 1), (1, -2), (5, 2), (12, -1)	
Zero reference	Yes	
Axis roles	Horizontal	original explanatory input
	Vertical	observed minus predicted response

Your response: _____

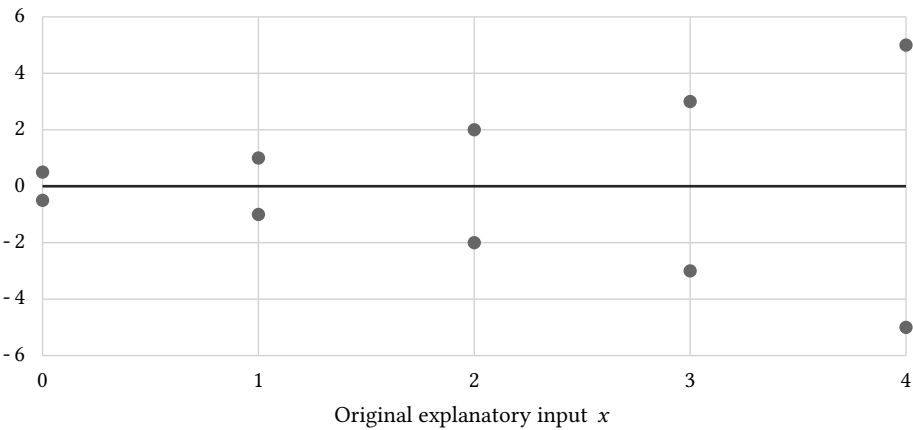
Algebra 1

Residual Plots

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Residuals begin near zero and widen toward high x . Exact residual points are $(0, -0.5)$; $(0, 0.5)$; $(1, -1)$; $(1, 1)$; $(2, -2)$; $(2, 2)$; $(3, -3)$; $(3, 3)$; $(4, -5)$; $(4, 5)$. Compare vertical spread across x -ranges, separate spread from center-pattern changes, and decide whether one error scale is adequate.



Residual points	$(0, -0.5)$, $(0, 0.5)$, $(1, -1)$, $(1, 1)$, $(2, -2)$, $(2, 2)$, $(3, -3)$, $(3, 3)$, $(4, -5)$, $(4, 5)$
Zero reference	Yes
Coverage note	Residuals begin near zero and widen toward high x .

Residual Plots

Full Worked Solutions - excerpt

Worked example

Problem. Audit this residual-plot conclusion: Residuals 8, -8 , 5, -5 sum to zero, and the fit is called perfect. Identify the evidence flaw involving scale, zero reference, omission, provenance, sign, units, pattern, or certainty, and rewrite the assessment.

Claim	Residuals 8, -8 , 5, -5 sum to zero, and the fit is called perfect.
-------	---

Answer. repair: The signed sum cancels while individual errors remain large; inspect magnitudes and patterns.

Explanation and check.

Correction: The signed sum cancels while individual errors remain large; inspect magnitudes and patterns.

Worked example

Problem. Audit this residual-plot conclusion: Six residuals look irregular, so the model is said to be proven true. Identify the evidence flaw involving scale, zero reference, omission, provenance, sign, units, pattern, or certainty, and rewrite the assessment.

Claim	Six residuals look irregular, so the model is said to be proven true.
-------	---

Answer. repair: Random-looking scatter is consistent with usefulness but cannot prove the model true.

Explanation and check.

Correction: Random-looking scatter is consistent with usefulness but cannot prove the model true.

Algebra 1
Two-Way Frequency Tables

Two-Way Frequency Tables | A1-U10-P15
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for recoded count table, fraction and percent of entire sample, complete labeled count table, classified count and scope, justified count or count range and missing integer counts plus margin check.
8 PDFs and a README; 76 buyer pages.

Algebra 1

Two-Way Frequency Tables

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Use a parcel-service sample: service by result table; standard: on time=34, delayed=6; express: on time=18, delayed=2. Report the marginal count for delayed across every service category, name it as joint, marginal, or grand, and explain the logical scope.

Row / column	on time	delayed	Row total
standard	34	6	_____
express	18	2	_____
Column total	_____	_____	_____

Bank label: _____

Use a workplace training record: format by completion table; online: complete=19, incomplete=7; in person: complete=23, incomplete=6. Report the number represented by the entire sample, name it as joint, marginal, or grand, and explain the logical scope.

Row / column	complete	incomplete	Row total
online	19	7	_____
in person	23	6	_____
Column total	_____	_____	_____

Bank label: _____

Use a theater ticket report: show by purchase table; matinee: advance=16, door=9; evening: advance=27, door=18. Report the joint count for evening and advance, name it as joint, marginal, or grand, and explain the logical scope.

Row / column	advance	door	Row total
matinee	16	9	_____
evening	27	18	_____
Column total	_____	_____	_____

Bank label: _____

Use a greenhouse experiment: fertilizer by flowering table; used: yes=25, no=5; not used: yes=14, no=16. Report the marginal count for used across every flowering category, name it as joint, marginal, or grand, and explain the logical scope.

Row / column	yes	no	Row total
used	25	5	_____
not used	14	16	_____
Column total	_____	_____	_____

Bank label: _____

Algebra 1

Two-Way Frequency Tables

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

In a commuter survey, the paired-category ledger says bus and early: 18; bus and late: 7; bike and early: 9; bike and late: 16. Organize those observations into joint cells and show all row totals, column totals, and the grand total.

Row category	Column category	Records
bus	early	18
bus	late	7
bike	early	9
bike	late	16

Row / column	early	late	Row total
bus	_____	_____	_____
bike	_____	_____	_____
Column total	_____	_____	_____

In a community-garden log, the paired-category ledger says sunny and harvested: 21; sunny and not harvested: 4; shaded and harvested: 12; shaded and not harvested: 8. Organize those observations into joint cells and show all row totals, column totals, and the grand total.

Row category	Column category	Records
sunny	harvested	21
sunny	not harvested	4
shaded	harvested	12
shaded	not harvested	8

Row / column	harvested	not harvested	Row total
sunny	_____	_____	_____
shaded	_____	_____	_____
Column total	_____	_____	_____

In a clinic appointment review, the paired-category ledger says scheduled and on time: 26; scheduled and late: 5; walk-in and on time: 10; walk-in and late: 9. Organize those observations into joint cells and show all row totals, column totals, and the grand total.

Row category	Column category	Records
scheduled	on time	26
scheduled	late	5
walk-in	on time	10
walk-in	late	9

Row / column	on time	late	Row total
scheduled	_____	_____	_____
walk-in	_____	_____	_____
Column total	_____	_____	_____

In a recycling station tally, the paired-category ledger says paper and clean: 31; paper and contaminated: 3; plastic and clean: 20; plastic and contaminated: 11. Organize those observations into joint cells and show all row totals, column totals, and the grand total.

Row category	Column category	Records
paper	clean	31
paper	contaminated	3
plastic	clean	20
plastic	contaminated	11

Row / column	clean	contami-nated	Row total
paper	_____	_____	_____
plastic	_____	_____	_____
Column total	_____	_____	_____

Algebra 1

Two-Way Frequency Tables

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: context: a field-day weather log; grand total: 40; missing counts: clear & held: 18; clear & moved indoors: 0; cloudy & held: 7

In a bakery order sample, this partial display keeps the margins from the original count: order by pickup table; custom: weekday=?, weekend=?; standard: weekday=?, weekend=13; row totals custom: 25, standard: 35; column totals weekday: 31, weekend: 29. Recover every question mark and verify the grand total two ways.

Row / column	weekday	weekend	Row total
custom	_____	_____	25
standard	_____	13	35
Column total	31	29	60

Your response: _____

Incoming: context: a help-desk case log; correct row totals: 45, 20; possible: False

The cells in a recreation survey are team by season table; school: fall=13, winter=17, spring=10; community: fall=9, winter=12, spring=19, but the reported row totals are school: 41, community: 40 while the column totals are fall: 22, winter: 29, spring: 29. Decide whether a completion is possible and identify the contradiction.

Row / column	fall	winter	spring	Row total
school	13	17	10	41
community	9	12	19	40
Column total	22	29	29	80

Your response: _____

Incoming: context: a fitness-class register; correct row totals: 20, 20, 20; possible: False

For a commuter survey, travel mode by shift table; bus: early=18, late=7; bike: early=9, late=16. Find the full-sample relative frequency of bus together with late; give an exact fraction and a percent, and state the denominator population.

Row / column	early	late	Row total
bus	18	7	25
bike	9	16	25
Column total	27	23	50

Your response: _____

Incoming: context: a book-format poll; correct row totals: 30, 35; possible: False

The cells in a lab-section roster are section by submission table; morning: early=7, on deadline=13; afternoon: early=11, on deadline=14; evening: early=9, on deadline=16, but the reported row totals are morning: 21, afternoon: 25, evening: 25 while the column totals are early: 27, on deadline: 43. Decide whether a completion is possible and identify the contradiction.

Row / column	early	on deadline	Row total
morning	7	13	21
afternoon	11	14	25
evening	9	16	25
Column total	27	43	70

Your response: _____

Algebra 1

Two-Way Frequency Tables

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

For a two-by-two version of a commuter survey, row totals are bus: 25, bike: 25 and column totals are early: 27, late: 23. Find every attainable integer value of the bus and early cell.

Row / column	early	late	Row total
bus	_____	_____	25
bike	_____	_____	25
Column total	27	23	50

For a two-by-two version of a library checkout audit, row totals are fiction: 37, nonfiction: 33 and column totals are student: 35, adult: 35. Construct one valid table that is not forced to match the original joint cells. Choose a method before constructing the table: leave one joint cell free and use all the given margins with nonnegative integer counts, or assume the full-sample total uniquely fixes every cell. Justify the choice and complete the original construction or range determination.

Row / column	student	adult	Row total
fiction	_____	_____	37
nonfiction	_____	_____	33
Column total	35	35	70

Two-Way Frequency Tables

Full Worked Solutions - excerpt

Worked example

Problem. A record from a campus transportation count has grand total 100 ; a report rounds the joint percentage for walk and Friday to 15% to the nearest whole percent. Recover exactly what count information is justified, enforce integer feasibility, and do not use a subgroup denominator.

Answer. context: a campus transportation count; possible counts: 15 ; unique: True

Explanation and check.

Counts must be integers whose percentages round to 15% ; testing the rounding interval gives 15 as the possible count set, so the rounded report does identify one exact count.

Worked example

Problem. For a two-by-two version of a clinic appointment review, row totals are scheduled: 31 , walk-in: 19 and column totals are on time: 36 , late: 14 . Test the proposed scheduled and on time count 33 and explain whether any table can satisfy it.

Row / column	on time	late	Row total
scheduled	_____	_____	31
walk-in	_____	_____	19
Column total	36	14	50

Answer. feasible interval: 17 , 31 ; possible: False; proposed: 33

Explanation and check.

The proposed count 33 exceeds the fixed-margin upper bound 31 ; it would force a negative remainder, so no table exists.

Algebra 1
Conditional Relative Frequency

Conditional Relative Frequency | A1-U10-P16

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
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05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for conditional frequency with named reference group.
8 PDFs and a README; 82 buyer pages.

Algebra 1

Conditional Relative Frequency

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Use a library reminder experiment: reminder by return; email: on time=26, late=14; paper: on time=15, late=15. among email, what proportion are late? Give a fraction and percent, and name the subgroup total used as denominator.

reminder by return (counts)

reminder	on time	late	Total
email	26	14	40
paper	15	15	30
Total	41	29	70

Bank label: _____

Use a library reminder experiment: reminder by return; email: on time=26, late=14; paper: on time=15, late=15. among on time, what proportion are paper? Give a fraction and percent, and name the subgroup total used as denominator.

reminder by return (counts)

reminder	on time	late	Total
email	26	14	40
paper	15	15	30
Total	41	29	70

Bank label: _____

Use a music-class practice poll: instrument group by practice goal; strings: reached=33, missed=7; winds: reached=24, missed=16. among strings, what proportion are missed? Give a fraction and percent, and name the subgroup total used as denominator.

instrument group by practice goal (counts)

instrument group	reached	missed	Total
strings	33	7	40
winds	24	16	40
Total	57	23	80

Bank label: _____

Use a music-class practice poll: instrument group by practice goal; strings: reached=33, missed=7; winds: reached=24, missed=16. among reached, what proportion are winds? Give a fraction and percent, and name the subgroup total used as denominator.

instrument group by practice goal (counts)

instrument group	reached	missed	Total
strings	33	7	40
winds	24	16	40
Total	57	23	80

Bank label: _____

Algebra 1

Conditional Relative Frequency

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Use a mentoring-program review: meeting format by goal status; online: met=18, not met=12; in person: met=28, not met=12. among online, what proportion are not met? Give a fraction and percent, and name the subgroup total used as denominator.

meeting format by goal status (counts)

meeting format	met	not met	Total
online	18	12	30
in person	28	12	40
Total	46	24	70

Use a mentoring-program review: meeting format by goal status; online: met=18, not met=12; in person: met=28, not met=12. among met, what proportion are in person? Give a fraction and percent, and name the subgroup total used as denominator.

meeting format by goal status (counts)

meeting format	met	not met	Total
online	18	12	30
in person	28	12	40
Total	46	24	70

Use a transit-pass survey: pass type by commute result; monthly: on time=24, late=6; single ride: on time=18, late=12. among monthly, what proportion are late? Give a fraction and percent, and name the subgroup total used as denominator.

pass type by commute result (counts)

pass type	on time	late	Total
monthly	24	6	30
single ride	18	12	30
Total	42	18	60

Use a transit-pass survey: pass type by commute result; monthly: on time=24, late=6; single ride: on time=18, late=12. among on time, what proportion are single ride? Give a fraction and percent, and name the subgroup total used as denominator.

pass type by commute result (counts)

pass type	on time	late	Total
monthly	24	6	30
single ride	18	12	30
Total	42	18	60

Algebra 1

Conditional Relative Frequency

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: For a delivery-window review: First conditional rate: $\frac{3}{5}$ (60.0%). Reversed conditional rate: $\frac{8}{17}$ (47.06%).

From a museum-ticket survey, ticket by tour; member: joined=12, not joined=8; visitor: joined=18, not joined=42. Compare 'among member, the share that are joined' with 'among joined, the share that are member.' Compute both or mark an undefined condition, then explain the denominator change.

ticket by tour (counts)

ticket	joined	not joined	Total
member	12	8	20
visitor	18	42	60
Total	30	50	80

Your response: _____

Incoming: context: a follow-up clinic audit; denominator: 40; given: text; numerator: 32; target: replied

In a tutoring attendance study, translate the statement 'among improved, the share that are morning' into a precise conditional statement. Name the target category, the given reference group, and the subgroup denominator; do not reverse them.

session by assessment (counts)

session	improved	unchanged	Total
morning	21	9	30
evening	16	24	40
Total	37	33	70

Your response: _____

Incoming: For a coding-club challenge log: First conditional rate: $\frac{9}{10}$ (90.0%). Reversed conditional rate: $\frac{3}{7}$ (42.86%).

From a pilot survey with no evening respondents, survey time by choice; evening: option A = 0, option B = 0; daytime: option A = 12, option B = 8. Compare 'among evening, the share that are option A' with 'among option A, the share that are evening.' Compute both or mark an undefined condition, then explain the denominator change.

survey time by choice (counts)

survey time	option A	option B	Total
evening	0	0	0
daytime	12	8	20
Total	12	8	20

Your response: _____

Incoming: For a produce-inspection report: First conditional rate: $\frac{19}{20}$ (95.0%). Reversed conditional rate: $\frac{38}{83}$ (45.78%).

From a library reminder experiment, reminder by return; email: on time=26, late=14; paper: on time=15, late=15. Compare 'among email, the share that are on time' with 'among on time, the share that are email.' Compute both or mark an undefined condition, then explain the denominator change.

reminder by return (counts)

reminder	on time	late	Total
email	26	14	40
paper	15	15	30
Total	41	29	70

Your response: _____

Algebra 1

Conditional Relative Frequency

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

From a mentoring-program review, meeting format by goal status; online: met= 18, not met= 12 ; in person: met= 28, not met= 12 . Compare 'among online, the share that are met' with 'among met, the share that are online.' Compute both or mark an undefined condition, then explain the denominator change.

meeting format by goal status (counts)

meeting format	met	not met	Total
online	18	12	30
in person	28	12	40
Total	46	24	70

From a transit-pass survey, pass type by commute result; monthly: on time= 24, late= 6 ; single ride: on time= 18, late= 12 . Compare 'among monthly, the share that are on time' with 'among on time, the share that are monthly.' Compute both or mark an undefined condition, then explain the denominator change.

pass type by commute result (counts)

pass type	on time	late	Total
monthly	24	6	30
single ride	18	12	30
Total	42	18	60

Conditional Relative Frequency

Full Worked Solutions - excerpt

Worked example

Problem. Design a two-by-two count table for two device groups with subgroup totals 30 and 45: make the first group's exact target rate 33%. Give target and complement counts, or prove integer impossibility, and verify both row totals.

Group	target outcome	Complement	Given subgroup total
group one	_____	_____	30
group two	_____	_____	45

Answer. For two device groups: Impossible with integer counts for subgroup totals 30 and 45.

Explanation and check.

An exact 33% of 30 would require $\frac{99}{10}$ observations, which is not an integer; therefore no count table can meet the condition.

Worked example

Problem. Design a two-by-two count table for two membership groups with subgroup totals 28 and 35: make the first group's exact target rate 45%. Give target and complement counts, or prove integer impossibility, and verify both row totals.

Group	target outcome	Complement	Given subgroup total
group one	_____	_____	28
group two	_____	_____	35

Answer. For two membership groups: Impossible with integer counts for subgroup totals 28 and 35.

Explanation and check.

An exact 45% of 28 would require $\frac{63}{5}$ observations, which is not an integer; therefore no count table can meet the condition.

Algebra 1
Selecting Models from Data

Selecting Models from Data | A1-U10-P17

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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Topic focus
Across 96 tasks this topic asks for qualified model preference with decisive evidence.
8 PDFs and a README; 205 buyer pages.

Algebra 1

Selecting Models from Data

Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

The equally spaced observations for measured heights along an arch are (0, 5); (1, 17); (2, 23); (3, 18); (4, 6). Use approximate first differences, second differences, and meaningful ratios to suggest a plausible family; qualify the choice because the data are measured, not exact.

Observed domain: horizontal positions on the physical arch

Input	Observed response
0	5
1	17
2	23
3	18
4	6

Bank label: _____

The equally spaced observations for a savings balance with fixed deposits are (0, 102); (1, 127); (2, 151); (3, 178); (4, 201). Use approximate first differences, second differences, and meaningful ratios to suggest a plausible family; qualify the choice because the data are measured, not exact.

Observed domain: months before the deposit plan ends

Input	Observed response
0	102
1	127
2	151
3	178
4	201

Bank label: _____

The equally spaced observations for water height in a fountain arc are (0, 2); (1, 11); (2, 16); (3, 13); (4, 3). Use approximate first differences, second differences, and meaningful ratios to suggest a plausible family; qualify the choice because the data are measured, not exact.

Observed domain: only while the water stream is above its basin

Input	Observed response
0	2
1	11
2	16
3	13
4	3

Bank label: _____

The equally spaced observations for a bacterial colony estimate are (0, 25); (1, 34); (2, 46); (3, 65); (4, 86). Use approximate first differences, second differences, and meaningful ratios to suggest a plausible family; qualify the choice because the data are measured, not exact.

Observed domain: before nutrients become limiting

Input	Observed response
0	25
1	34
2	46
3	65
4	86

Bank label: _____

Algebra 1

Selecting Models from Data

Name: _____ Date: _____ Class: _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

The equally spaced observations for model-rocket height samples are $(0, 0)$; $(1, 18)$; $(2, 27)$; $(3, 21)$; $(4, 2)$. Use approximate first differences, second differences, and meaningful ratios to suggest a plausible family; qualify the choice because the data are measured, not exact.

Observed domain: launch through landing

Input	Observed response
0	0
1	18
2	27
3	21
4	2

Algebra 1

Selecting Models
from Data

Name: _____ Date: _____ Class: _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: context: pages completed in a reading plan; horizon: 10; predictions: exponential: 590.126; linear: 156.0; quadratic: 162.0; qualified preference: linear until the book is finished

For yeast volume during early proofing, all three candidates fit the observed inputs 0 through 4 closely enough to remain under discussion. Evaluate each at $x = 7$, compare the divergence, and decide what the context domain temperatures and times in the experiment permits you to claim.

Observed domain: temperatures and times in the experiment

Candidate	Supplied rule
linear	predicted $y = 5 + 7$ times x
exponential	predicted $y = 8$ times 1.45 to the x power
quadratic	predicted $y = 1.2$ times x squared + 1.8 times $x + 8$

Input	Observed response	linear	exponential	quadratic
0	8	5	8.0	8.0
1	11	12	11.6	11.0
2	17	19	16.82	16.4
3	24	26	24.389	24.2
4	36	33	35.364	34.4

Your response: _____

Incoming: context: mold-covered area in a dish; horizon: 9; predictions: exponential: 395.255; linear: 55.8; quadratic: 133.5; qualified preference: exponential with a capacity warning

For water height in a fountain arc, all three candidates fit the observed inputs 0 through 4 closely enough to remain under discussion. Evaluate each at $x = 6$, compare the divergence, and decide what the context domain only while the water stream is above its basin permits you to claim.

Observed domain: only while the water stream is above its basin

Candidate	Supplied rule
linear	predicted $y = 9 + 0.1$ times x
exponential	predicted $y = 4$ times 1.2 to the x power
quadratic	predicted $y = -3.6$ times x squared + 14.5 times $x + 2$

Input	Observed response	linear	exponential	quadratic
0	2	9.0	4.0	2.0
1	11	9.1	4.8	12.9
2	16	9.2	5.76	16.6
3	13	9.3	6.912	13.1
4	3	9.4	8.294	2.4

Your response: _____

Algebra 1

Selecting Models from Data

Name: _____ Date: _____ Class: _____

Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Repair this model-selection claim for weekly equipment rentals: 'largest correlation automatically proves the nonlinear family.' Use the supplied noisy data and candidate provenance to identify the ignored evidence and write a qualified replacement.

Observed domain: weeks 0 through 10 before inventory changes

Candidate	Supplied rule
linear	predicted $y = 21 + 4.5 \text{ times } x$
exponential	predicted $y = 21 \text{ times } 1.17 \text{ to the } x \text{ power}$
quadratic	predicted $y = 0.15 \text{ times } x \text{ squared} + 3.9 \text{ times } x + 21$

Input	Observed response	linear	exponential	quadratic
0	21	21.0	21.0	21.0
1	25	25.5	24.57	25.05
2	30	30.0	28.747	29.4
3	34	34.5	33.634	34.05
4	39	39.0	39.352	39.0

Selecting Models from Data

Full Worked Solutions - excerpt

Worked example

Problem. A candidate for a downward projectile arc is quadratic predicted $y = -4.9 \text{ times } x \text{ squared} + 18 \text{ times } x + 1$. The contextual constraint is explicit in the description. Decide admissibility from coefficient sign, initial value, exponential base, orientation, and stated domain; do not infer any unstated physics.

Answer. context: a downward projectile arc; decision: admit; reason: negative leading coefficient matches a maximum

Explanation and check.

For a downward projectile arc, the decisive parameter fact is that negative leading coefficient matches a maximum. Therefore the decision is to admit the candidate under the stated constraint.

Worked example

Problem. A candidate for a proportional decay process is exponential predicted $y = 75 \text{ times } 0.91 \text{ to the } x \text{ power}$. The contextual constraint is explicit in the description. Decide admissibility from coefficient sign, initial value, exponential base, orientation, and stated domain; do not infer any unstated physics.

Answer. context: a proportional decay process; decision: admit; reason: positive initial value and base between zero and one

Explanation and check.

For a proportional decay process, the decisive parameter fact is that positive initial value and base between zero and one. Therefore the decision is to admit the candidate under the stated constraint.