Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Linear Model Building & Residual Checks | Algebra 1 | 8-Topic Bundle

8-topic bundle | 768 problems | Four activity formats

Included topics

The following pages list all 8 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.

64 PDFs and 8 READMEs; 768 buyer PDF pages across the 8 products.

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

This is a fixed collection of the listed products. Purchase includes the existing individual resource files. To open a product's online preview, follow its title link and select View Preview.

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Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Included topics

8-topic bundle | 768 problems | Four activity formats

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01 **Direct Variation**

View individual product and its full preview

02 **Linear Models from Initial Value and Rate**

View individual product and its full preview

03 **Evaluating Linear Models in Context**

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04 **Lines of Best Fit**

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05 **Interpreting Regression Slope and Intercept**

View individual product and its full preview

06 **Interpolation and Extrapolation**

View individual product and its full preview

07 **Calculating Residuals**

View individual product and its full preview

08 **Residual Plots**

View individual product and its full preview

8 included resources | Complete resource previews follow this guide.

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Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Direct Variation

Direct Variation | A1-U05-P15

96 problems · Four activity formats

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.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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Algebra 1

Direct Variation

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

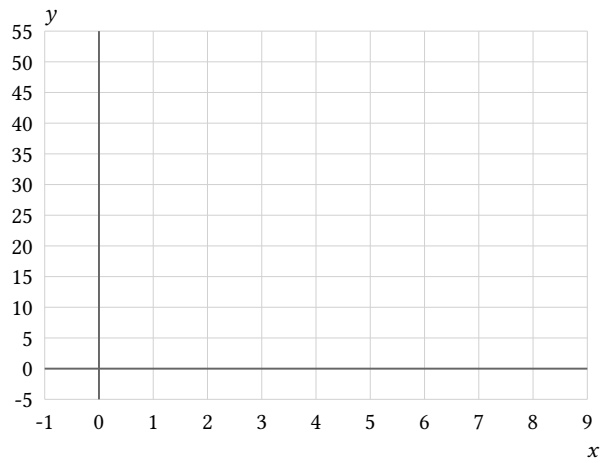
Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

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: _____

Construct the graph of $y = 6x$ on the domain $2 \le x < 8$. Use the exact sample inputs $2, 5, 7$ and state whether points should be connected.



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: _____

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.

Input x	Output y
8	6

The fractional direct-variation pair $(14, -\frac{11}{2})$ is known. Recover the input that would produce $y = \frac{33}{8}$.

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.

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.

Input x	Output y
$\frac{3}{2}$	9

Algebra 1

Direct Variation

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 $(0, 0), (1, 12), (\frac{3}{2}, 18)$. Connect the admissible points as the stated continuous domain requires. The origin is included and must be plotted.

Compare the two patterns: A has pairs $(5, -2), (15, -6), (25, -10)$. B has $(-2, 5), (-6, 15), (-10, 25)$. Classify proportional versus additive structure and name the invariant used.

Your response: _____

Incoming: both proportional, with reciprocal constants. A has $k = -\frac{2}{5}$ and B has $k = -\frac{5}{2}$; swapping coordinates changes k but not proportionality.

The direct variation contains $(12, 0)$ with a nonzero input. Determine the only possible k and describe the rule.

Input x	Output y
12	0

Your response: _____

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

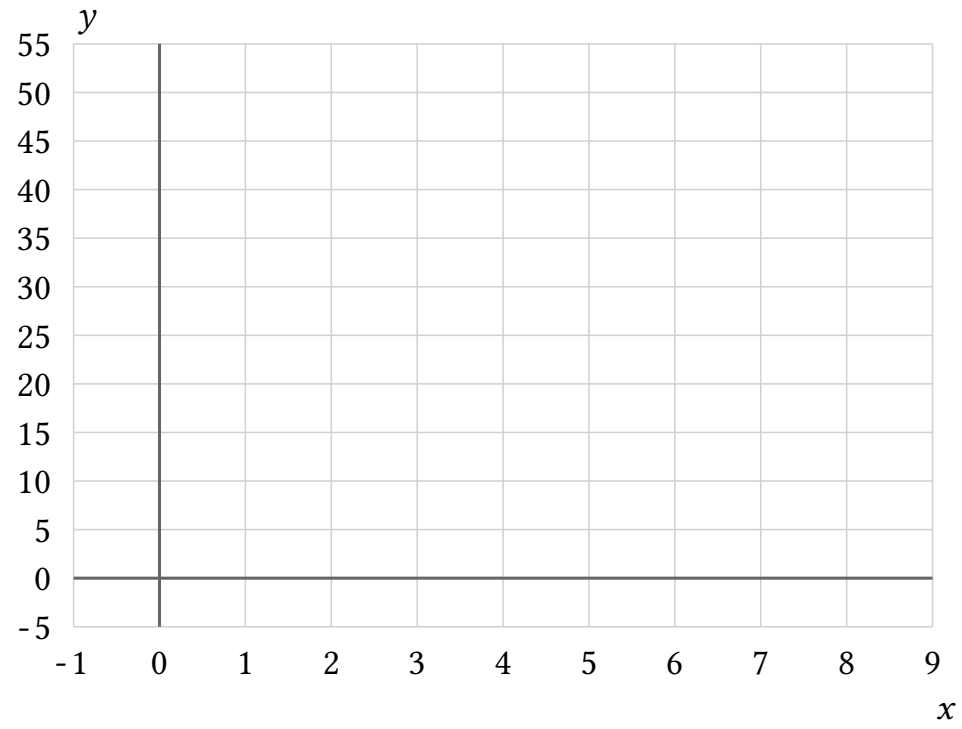
Answer. Using the known pair $(21, -14), y = 3$ at $x = -\frac{9}{2}$; $k = -\frac{2}{3}$.

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 $2 \le x < 8$. 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.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Linear Models from Initial Value and Rate

Linear Models from Initial Value and Rate | A1-U05-P16

96 problems · Four activity formats

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.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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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 $-6 \le t \le 0$, 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 $t \ge 7$, 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 $-2 \le t \le 6$, 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 $0 \le t \le 6$, 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 $0 \le t \le 12$, 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

$1000 - (-22)(40) = 1880$

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Evaluating Linear Models in Context

Evaluating Linear Models in Context | A1-U05-P17

96 problems · Four activity formats

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.

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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 $-10 \le t \le 3$. 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 $\lvert\text{observed-predicted}\rvert \le \frac{2}{3}$ as the consistency rule. Bank label: _____	A supporting table covers inputs 0 through 18, and the rule's domain is $0 \le t \le 20$. 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 $\{0, 1,...,12\}$. 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 $\{0, 1,...,10\}$. 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 $2 \le t \le 9$ 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 $0 \le t \le 18$, 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 $0 \le t \le 9$, 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 $0 \le t \le 8$, 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:** _____

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 target $\frac{95}{18}$ is reached at $t = \frac{31}{7}$ seconds, an allowed input in $0 \le t \le 6$.

A newly appended row has input 12 and output 28. Test it against $Q(t) = 80 - 5t$ with absolute tolerance 2, and say what an out-of-band result establishes.

Your response: _____

Incoming: The model predicts 20; residual observed-predicted is 8, whose absolute value is 8. That is outside the tolerance 2, so the observation is not consistent with the model at this tolerance. This comparison alone does not establish a cause.

Audit this forecast statement: A model for completed shipments reaches a target algebraically at $t = 4.6$, and the report claims the target occurs during shipment 4.6. Identify the first unjustified step and write a repaired, qualified conclusion.

Your response: _____

Incoming: The prediction changes by 6, from 26 to 32. A positive value means an increase and a negative value a decrease.

The supplied model is $Q(t) = \frac{11}{6} + \frac{7}{9}t$ on $0 \le t \le 6$. At what t, measured in seconds, does Q reach $\frac{95}{18}$? Solve and verify that the predicted input is admissible.

Your response: _____

Incoming: The target 132 is reached at $t = 7$ cycles, an allowed input in $0 \le t \le 15$.

The initial value in $Q(t) = -5 + 7t$ is recalibrated by 11 while the rate stays fixed. Quantify the prediction change at $t = 6$ and explain whether the horizon amplifies it.

Your response: _____

Incoming: This is extrapolation: -5 lies outside the observed input interval $[-2, 6]$. 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.

The supplied forecast is $Q(t) = 5 + \frac{3}{2}t$. At $t = 5$ it is being used under this condition: output counts people and must be whole. Compute the output and decide whether the contextual interpretation is feasible; identify the decisive condition.

Your response: _____

Incoming: $Q(8) = 53$ dollars. It predicts balance relative to zero of 53 dollars at 8 payments.

The zero-rate rule $Q(t) = -7$ is used on $-4 \le t \le 9$. Identify all allowed t in seconds for which $Q(t) = 5$, or explain why none exist.

Your response: _____

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 $0 \le t \le 12$. 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 $0 \le t \le 35$, 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 $-10 \le t \le 3$. 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.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Lines of Best Fit

Lines of Best Fit | A1-U10-P10

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for line-of-fit result with decisive evidence.

8 PDFs and a README; 158 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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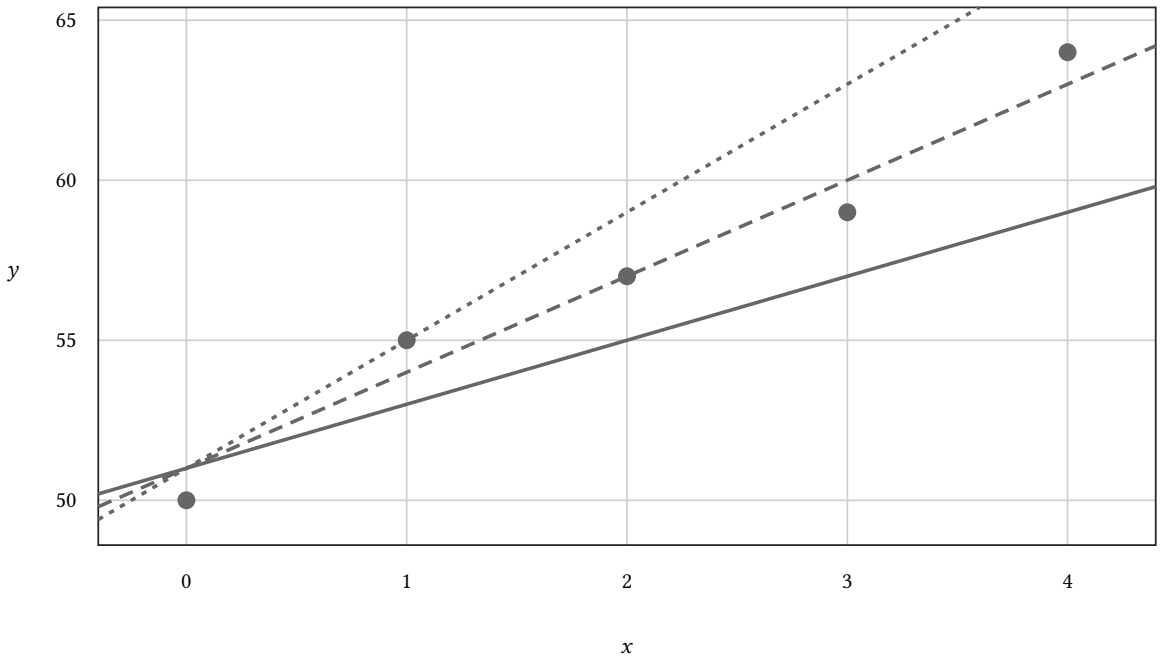
Algebra 1

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: y-hat $= 2x + 51$; B: y-hat $= 3x + 51$; C: y-hat $= 4x + 51$. 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: _____

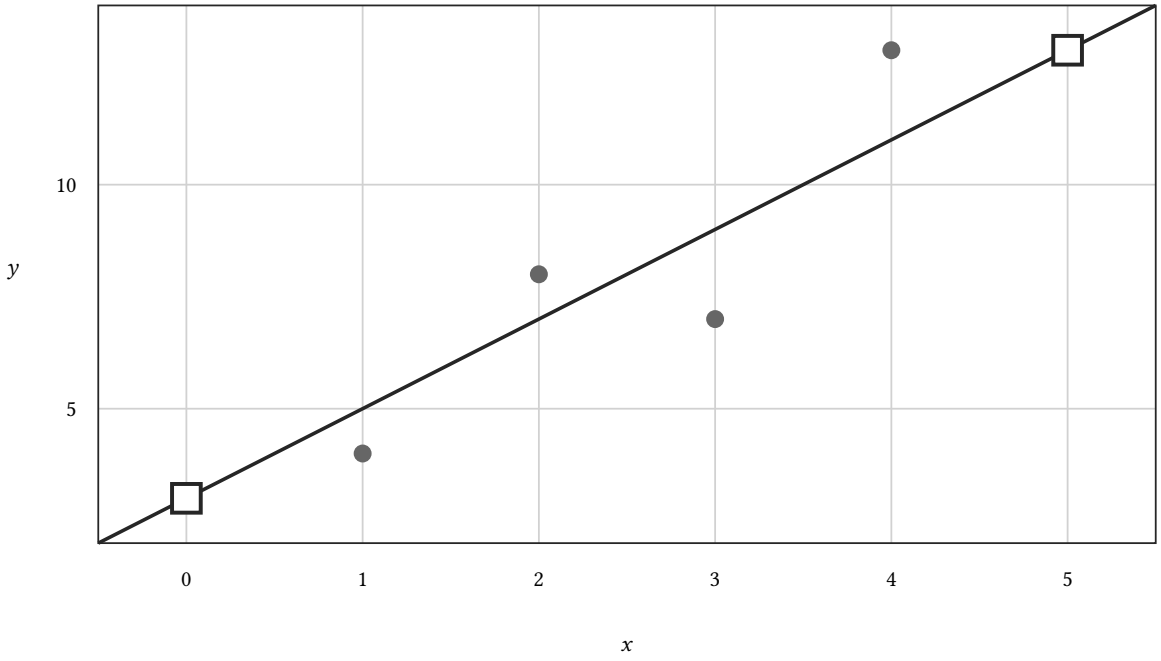
Algebra 1

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

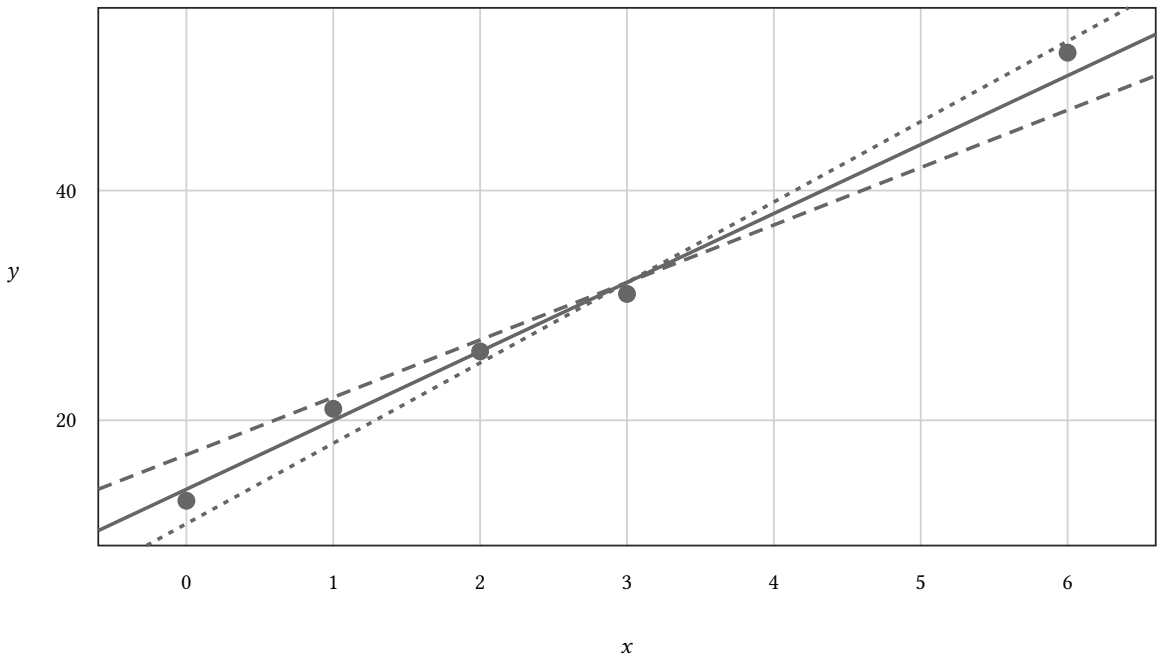
Lines of Best Fit

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: y-hat $= 6x + 14$; B: y-hat $= 5x + 17$; C: y-hat $= 7x + 11$. 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 1

Lines 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 y-hat $= 2x + 5$; after the edit it is y-hat $= 2.2x + 4.8$. 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 y-hat $= -x + 30$; after the edit it is y-hat $= -0.6x + 27$. 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 y-hat $= 3x + 4$; after the edit it is y-hat $= 3x + 5$. 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 y-hat $= 4x + 2$; after the edit it is y-hat $= 3.2x + 3.6$. 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 y-hat = $a + bx$ with $a = 18$ and $b = -3$, yet a student writes y-hat = $18x - 3$. 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 y-hat = $a + bx$ with $a = 18$ and $b = -3$, yet a student writes y-hat = $18x - 3$.; repair: Read the displayed convention: a is intercept and b is slope, so the correction is y-hat = $18 - 3x$.

Explanation and check.

Fault: Output uses y-hat = $a + bx$ with $a = 18$ and $b = -3$, yet a student writes y-hat = $18x - 3$. Repair: Read the displayed convention: a is intercept and b is slope, so the correction is y-hat = $18 - 3x$.

Worked example

Problem. Audit this fictional fitting work: A downward cloud is modeled with y-hat = $2x + 9$ 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 y-hat = $2x + 9$ 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 y-hat = $2x + 9$ 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.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Interpreting Regression Slope and Intercept

Interpreting Regression Slope and Intercept | A1-U10-P11

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for coefficient interpretation with units and model limits.

8 PDFs and a README; 82 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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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 y-hat = $3x + 4$, where x measures weeks and y-hat 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	y-hat = $3x + 4$
Input unit	weeks
Response unit	centimeters of fitted height

A fitted data model is y-hat = $-2x + 90$, where x measures minutes and y-hat 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	y-hat = $-2x + 90$
Input unit	minutes
Response unit	degrees Celsius of fitted temperature

A fitted data model is y-hat = 6, where x measures machine hours and y-hat 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	y-hat = 6
Input unit	machine hours
Response unit	fitted defects per batch

A fitted data model is y-hat = $5x + 48$, where x measures practice sessions and y-hat 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	y-hat = $5x + 48$
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_old-hat = $4x$_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_old-hat = $4x$_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-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_old-hat = $-3x$_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_old-hat = $-3x$_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-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-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-hat = $-4x + 70$
Reference old x	12
New input	hours after noon

Your response: _____

Incoming: New intercept: 52; New model: y-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-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-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 $3 cm/$ week and B is $5 cm/$ 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 $3 cm$/week and B is $5 cm$/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 y-hat = $4x + 18$, 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 y-hat = $4x + 18$, a report calls 4 the initial fitted value.

Answer. fault: For y-hat = $4x + 18$, 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.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Interpolation and Extrapolation

Interpolation and Extrapolation | A1-U10-P12

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for prediction with evidential and contextual qualification.

8 PDFs and a README; 57 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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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 y-hat = $3x + 5$; x is measured in weeks, 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 y-hat = $-2x + 78$; x is measured in minutes, 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 y-hat = 14; x is measured in filter setting, 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 y-hat = $1.5x + 4$; x is measured in hours, 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 y-hat = $5x - 3$; x is measured in liters, 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 y-hat = $1.4x + 8$; x is measured in kilometers, 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 y-hat = $4x + 11$; x is measured in advertising blocks, 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 y-hat = $-3x + 20$; x is measured in signed position meters, 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 y-hat $= 2x + 4$; x is measured in miles, y-hat 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:** _____

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: reason: Currency reporting uses cents and ordinary rounding.; report: $27.39

A fitted model produces 12.746 cm. The output represents measured length estimate. Reporting rule: nearest tenth centimeter. Choose the defensible final report and explain why calculator digits, discreteness, or threshold logic require that form.

Your response: _____

Incoming: estimated input: 5; reason: Solving $4x + 10 = 30$ gives $x = 5$, inside the observed range.; status: supported

A fractional slope must be undone before checking support. The fitted linear model is y-hat = $1.5x + 4$, observed for inputs 0 through 8. Estimate the input for fitted response 13, then check uniqueness, support, and feasibility.

Your response: _____

Incoming: estimated input: 3.5; reason: The solution x = 3.5 is not a whole number of machines.; status: contextually inadmissible

Elapsed time is continuous, so a fractional inverse can be meaningful. The fitted linear model is y-hat = $8x + 2$, observed for inputs 0 through 4. Estimate the input for fitted response 17, then check uniqueness, support, and feasibility.

Your response: _____

Incoming: estimated input: 12; reason: The exact inverse x = 12 lies beyond the observed range; report the estimate with a support warning.; status: extrapolated input

A continuous inverse falls between two feasible machine counts. The fitted linear model is y-hat = $5x + 8$, observed for inputs 0 through 10. Estimate the input for fitted response 40, then check uniqueness, support, and feasibility.

Your response: _____

Incoming: estimated input: $\frac{29}{7}$; reason: The exact solution x = $\frac{29}{7}$ lies within the observed range.; status: supported

The explanatory coordinate explicitly permits negative positions. The fitted linear model is y-hat = $-4x + 10$, observed for inputs -5 through 5. Estimate the input for fitted response 22, then check uniqueness, support, and feasibility.

Your response: _____

START

The fitted exponential model is y-hat = $40(0.75)^x$; x is measured in cycles, y-hat in remaining capacity percent, and observed inputs span 0 to 5. Predict at $x = 8$, report according to nearest tenth percent, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation.

Your response: _____

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 y-hat = $3x + 10$, 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 y-hat = $4x + 12$, 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 y-hat = $\frac{1}{10}x + 0.6$, 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 y-hat = $-\frac{1}{5}x + 0.5$, 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 y-hat $= 4x + 10$, 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.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Calculating Residuals

Calculating Residuals | A1-U10-P13

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for signed residual with response units and evidence.

8 PDFs and a README; 100 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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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-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-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-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-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-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-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-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-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 y-hat = $2x + 5$ 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	y-hat = $2x + 5$
X	3
Observed y	13
Response unit	centimeters

A fare observation lies below its fitted line. Using residual = observed - predicted, evaluate y-hat = $3x + 4$ 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	y-hat = $3x + 4$
X	2
Observed y	8
Response unit	dollars

A sensor reading lands exactly on a horizontal fit. Using residual = observed - predicted, evaluate y-hat = 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	y-hat = 9
X	5
Observed y	9
Response unit	sensor units

A resale value exceeds a decreasing model. Using residual = observed - predicted, evaluate y-hat = $-4x + 40$ 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	y-hat = $-4x + 40$
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 =observed-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 =observed-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 =observed-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 =observed-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 y-hat$= mx + 5$. 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 y-hat$= 3x + b$. 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 $e =$ observed-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.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Residual Plots

Residual Plots | A1-U10-P14

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for global residual-plot diagnostic with exact evidence.

8 PDFs and a README; 199 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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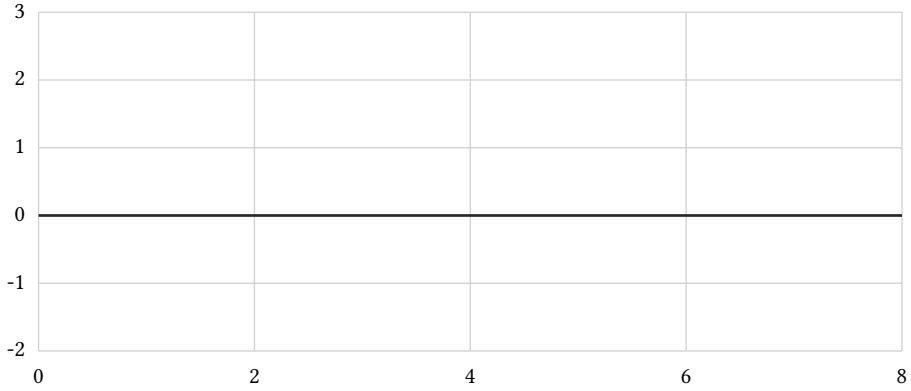
Algebra 1

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

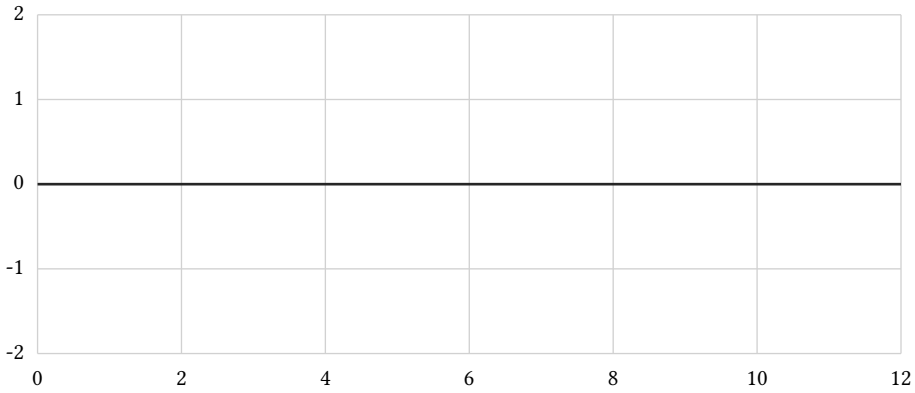
Residual Plots

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: _____

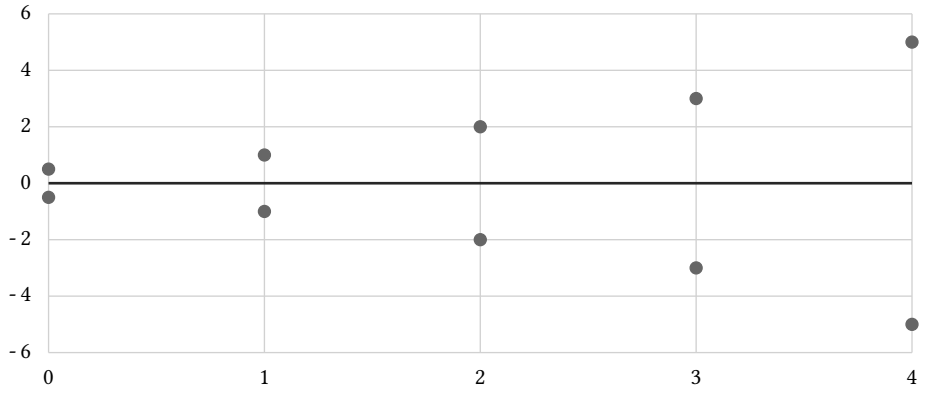
Algebra 1

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.