Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Data Analysis & Modeling Collection | Algebra 1 | 17-Topic Bundle

17-topic bundle | 1,632 problems | Four activity formats

Included topics

The following pages list all 17 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.

136 PDFs and 17 READMEs; 2,177 buyer PDF pages across the 17 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

17-topic bundle | 1,632 problems | Four activity formats

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01 **Mean, Median, and Mode**

View individual product and its full preview

02 **Range, Quartiles, and IQR**

View individual product and its full preview

03 **Dot Plots**

View individual product and its full preview

04 **Histograms**

View individual product and its full preview

05 **Box Plots and Outliers**

View individual product and its full preview

06 **Comparing Data Distributions**

View individual product and its full preview

07 **Scatter Plots and Bivariate Data**

View individual product and its full preview

08 **Correlation and Linear Association**

View individual product and its full preview

09 **Correlation vs Causation**

View individual product and its full preview

10 **Lines of Best Fit**

View individual product and its full preview

11 **Interpreting Regression Slope and Intercept**

View individual product and its full preview

17 included resources | Complete resource previews follow this guide.

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12 **Interpolation and Extrapolation**

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13 **Calculating Residuals**

View individual product and its full preview

14 **Residual Plots**

View individual product and its full preview

15 **Two-Way Frequency Tables**

View individual product and its full preview

16 **Conditional Relative Frequency**

View individual product and its full preview

17 **Selecting Models from Data**

View individual product and its full preview

17 included resources | Complete resource previews follow this guide.

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Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Mean, Median, and Mode

Mean, Median, and Mode | A1-U10-P01

96 problems · Four activity formats

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.

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

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 $\{2, 5\}$.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Range, Quartiles, and IQR

Range, Quartiles, and IQR | A1-U10-P02

96 problems · Four activity formats

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.

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

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 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.

IQR$= Q3 - Q1 = 8 - 2 = 6$. Diagnosis: $Q3$ was named as the IQR without subtracting $Q1$. Therefore $Q3$ is 8 but IQR is 6.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Dot Plots

Dot Plots | A1-U10-P03

96 problems · Four activity formats

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.

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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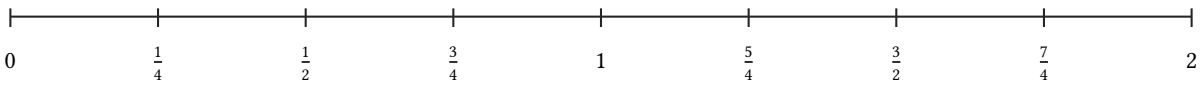
Algebra 1

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	<table><tr><td>Start</td><td>0</td></tr><tr><td>End</td><td>3</td></tr><tr><td>Tick step</td><td>1</td></tr><tr><td>Ticks</td><td>0, 1, 2, 3</td></tr><tr><td>Uniform</td><td>Yes</td></tr></table>
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

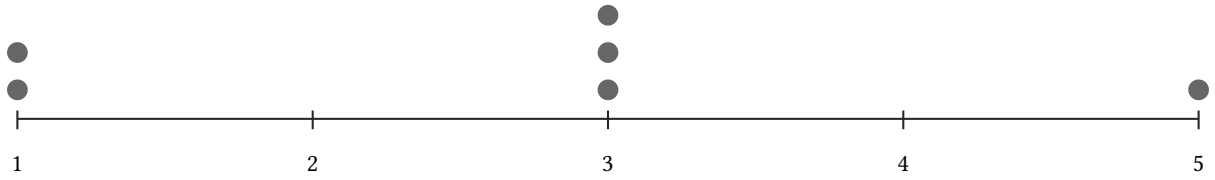
Dot Plots

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: _____

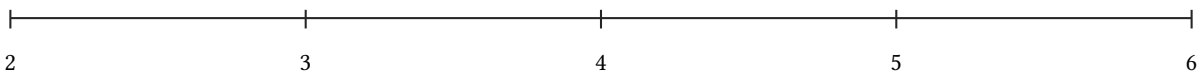
Algebra 1

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.



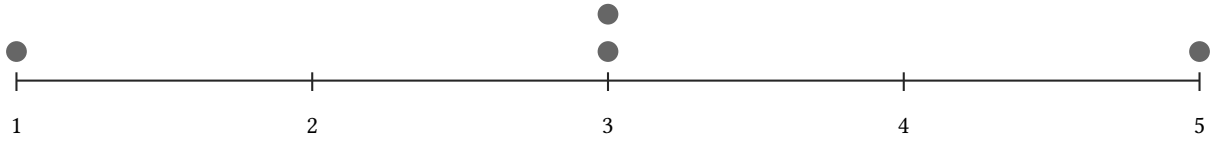
Raw observations	2, 4, 6
Axis	<table><tr><td>Start</td><td>2</td></tr><tr><td>End</td><td>6</td></tr><tr><td>Tick step</td><td>1</td></tr><tr><td>Ticks</td><td>2, 3, 4, 5, 6</td></tr><tr><td>Uniform</td><td>Yes</td></tr></table>
Key	one dot represents one observation
Unit	score

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.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Histograms

Histograms | A1-U10-P04

96 problems · Four activity formats

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.

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.

Published by Tusils LLC.

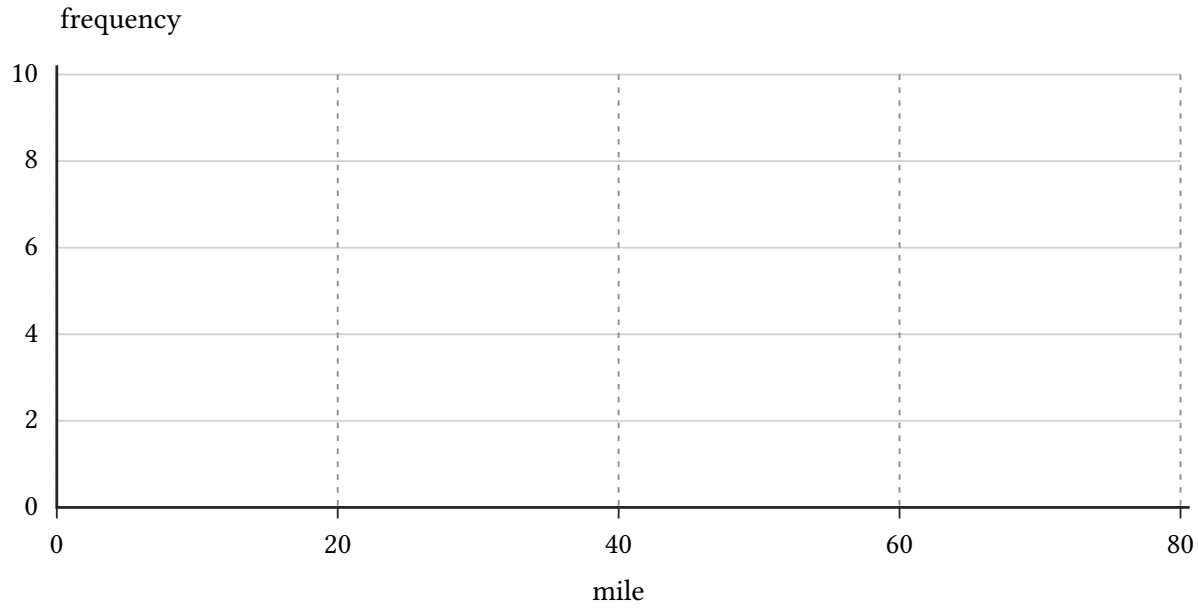
Algebra 1

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: _____

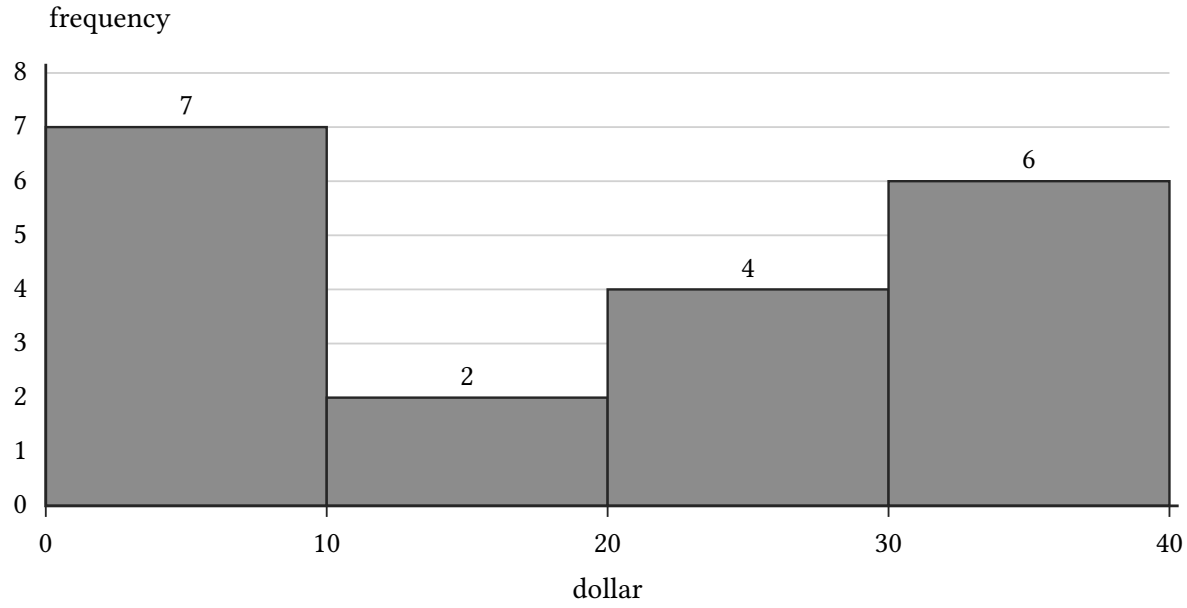
Algebra 1

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

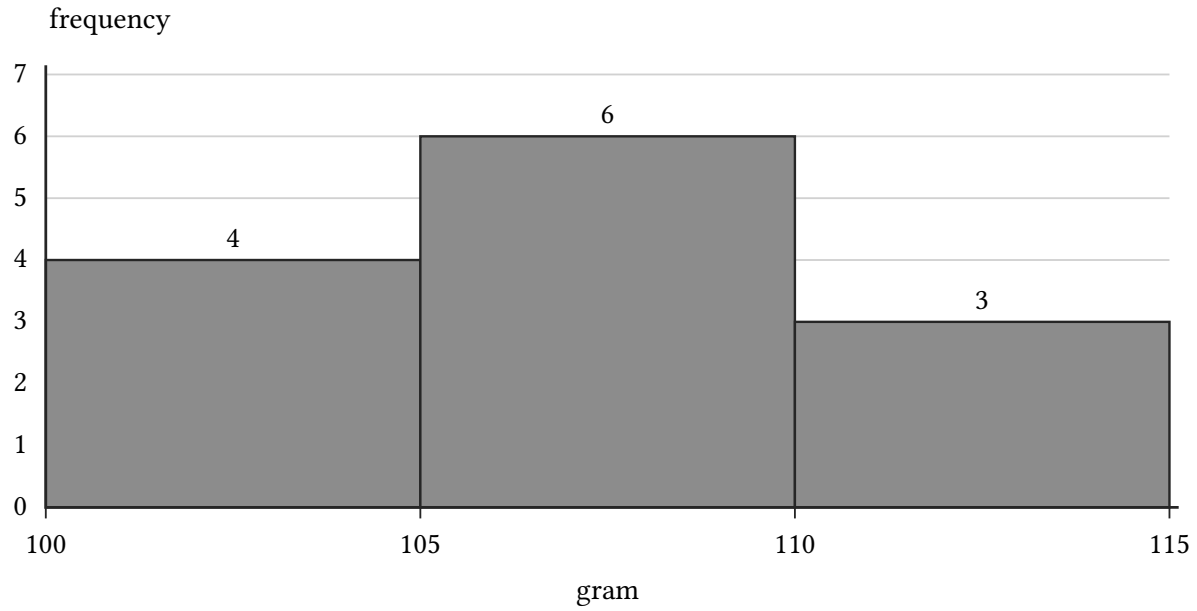
Histograms

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: _____

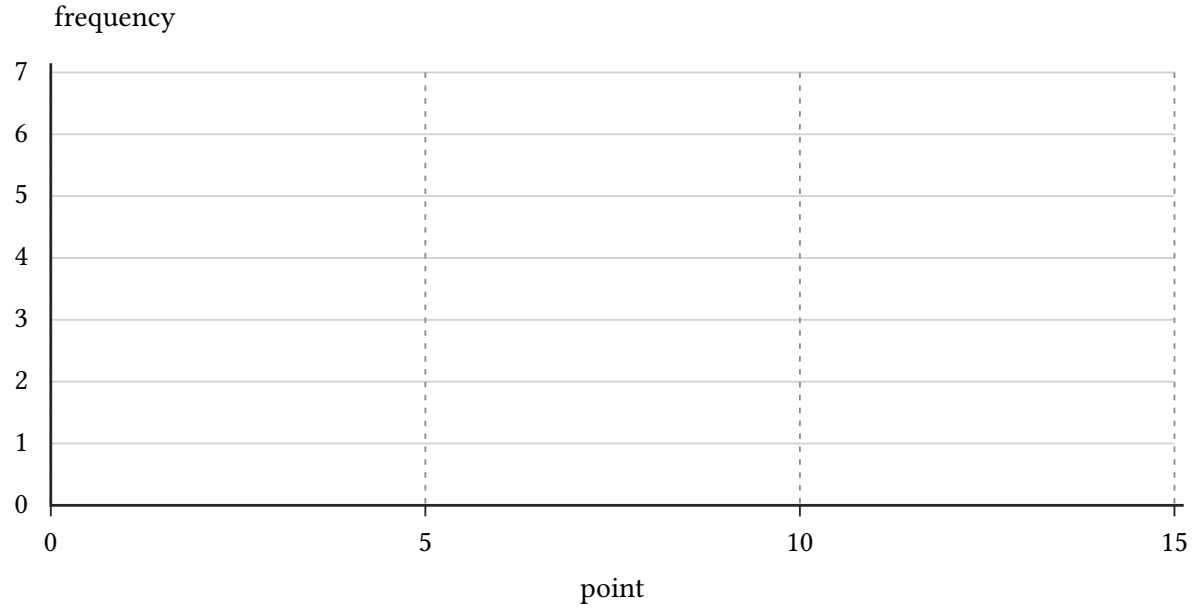
Algebra 1

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 $\frac{14}{N} = \frac{7}{20}$: $N = 14(\frac{20}{7}) = 40$.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Box Plots and Outliers

Box Plots and Outliers | A1-U10-P05

96 problems · Four activity formats

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.

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

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: _____

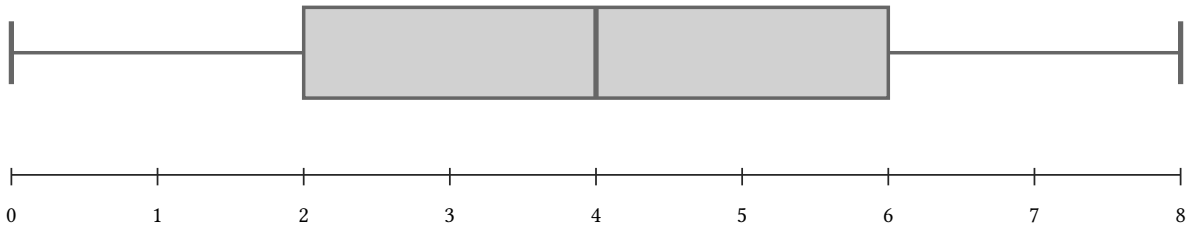
Algebra 1

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·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 $Q1 - 1.5$·IQR and $Q3 + 1.5$·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.

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·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 $Q1 - 1.5$·IQR and $Q3 + 1.5$·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.

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.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Comparing Data Distributions

Comparing Data Distributions | A1-U10-P06

96 problems · Four activity formats

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.

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

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: _____

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: _____

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: _____

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: _____

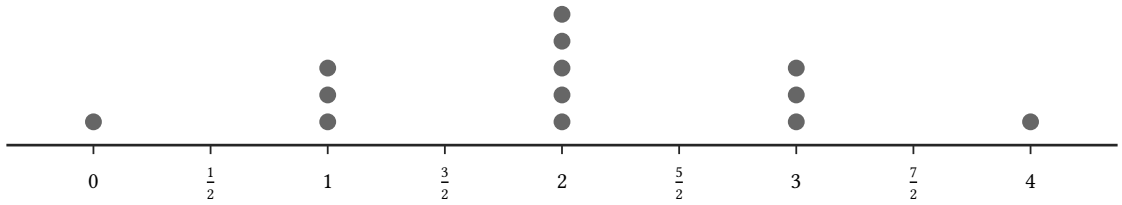
Algebra 1

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.



points

Value	Frequency
0	1
1	3
2	5
3	3
4	1

Algebra 1

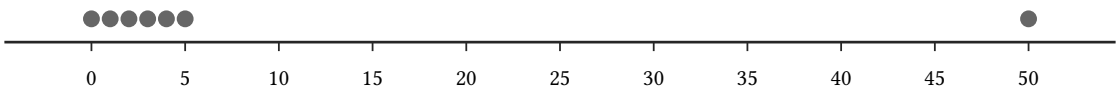
Comparing Data Distributions

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.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Scatter Plots and Bivariate Data

Scatter Plots and Bivariate Data | A1-U10-P07

96 problems · Four activity formats

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.

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.

Published by Tusils LLC.

Algebra 1

Scatter Plots and Bivariate Data

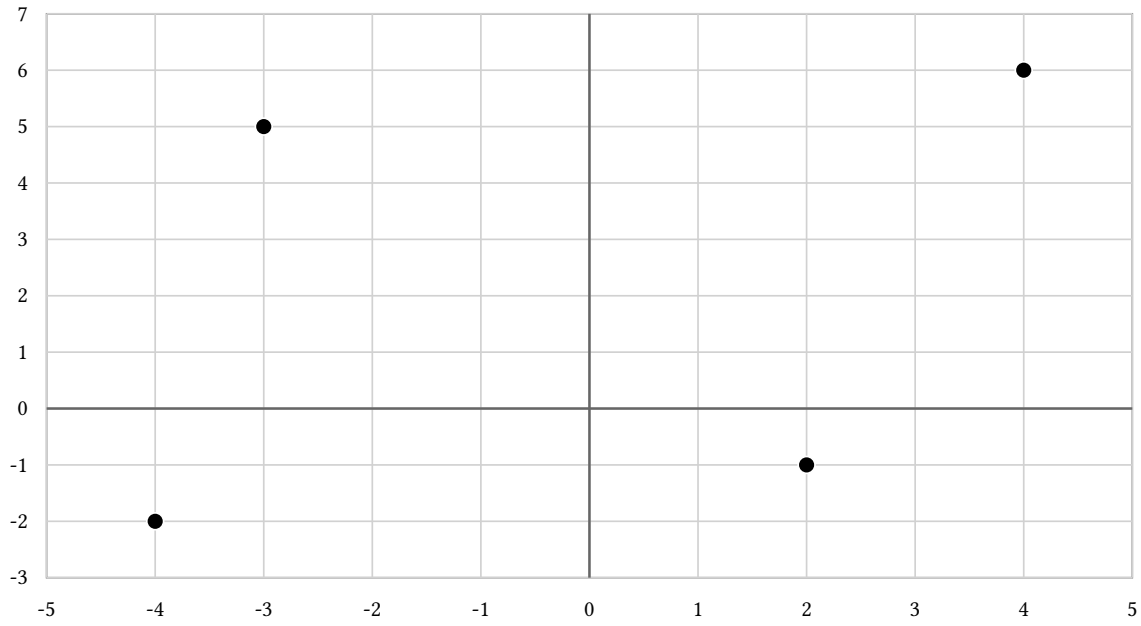
Name: _____ **Date:** _____ **Class:** _____

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.

Given scatter plot

Vertical axis: y change (units)



Bank label: _____

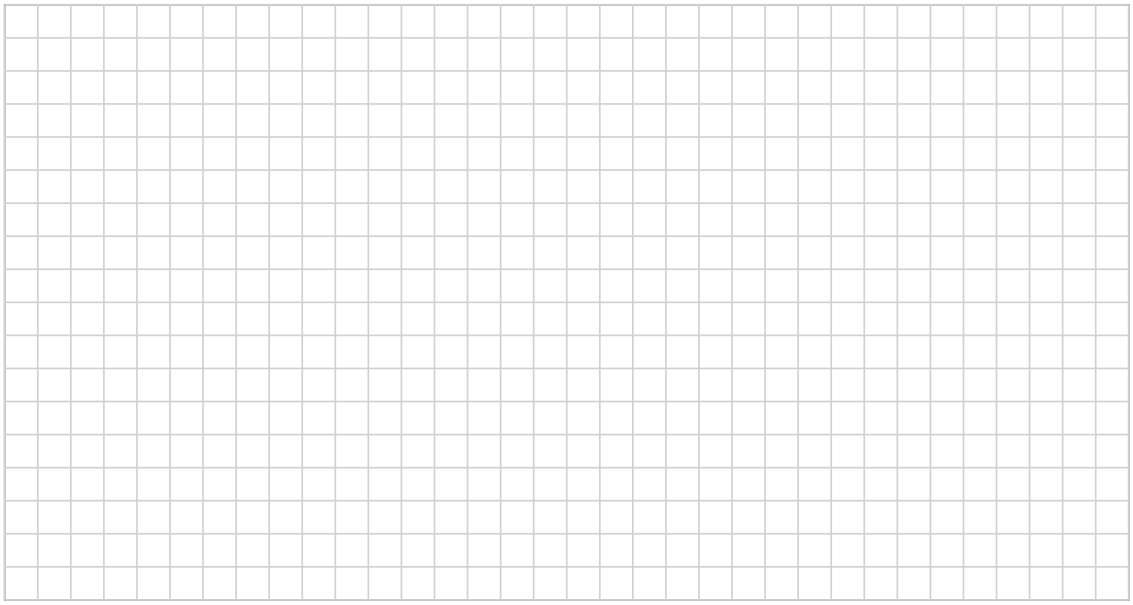
Algebra 1

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)
A	1	3
B	2	5
C	3	8

Algebra 1

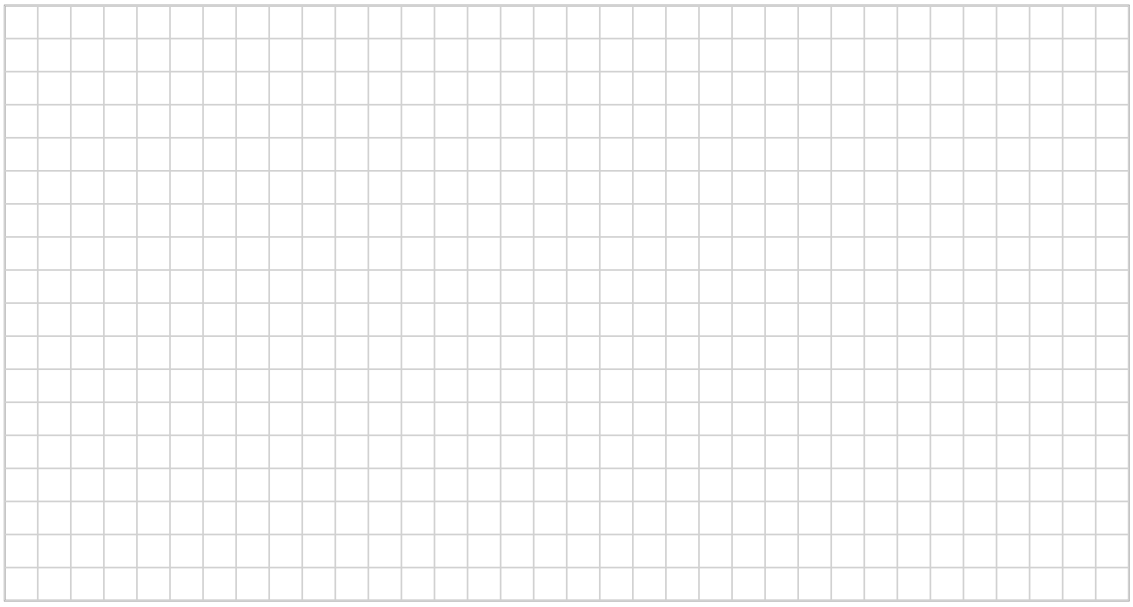
Scatter Plots and Bivariate Data

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: _____

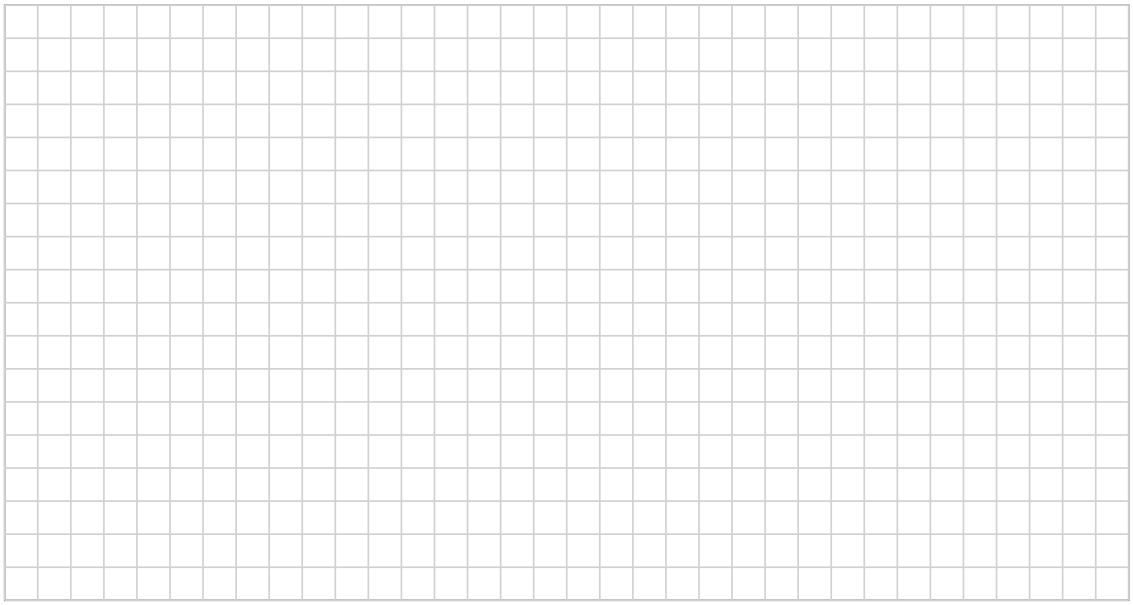
Algebra 1

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

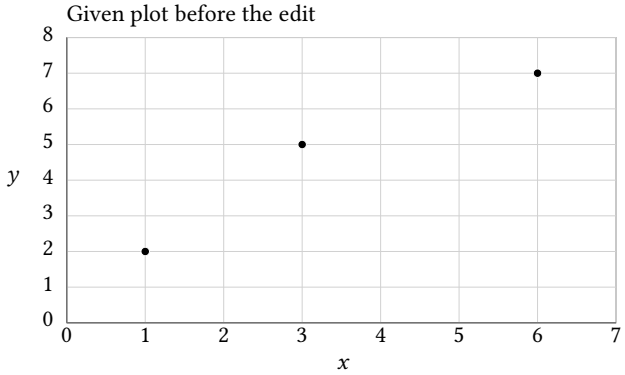
Full Worked Solutions - excerpt

Worked example

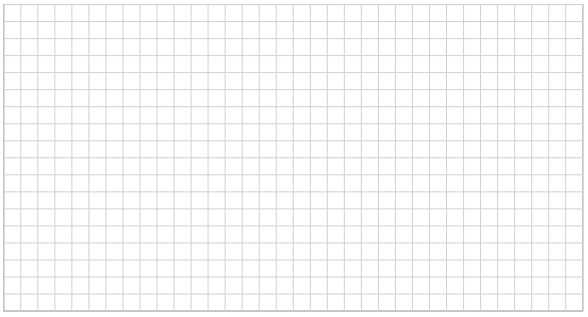
Problem. The current scatter plot contains the ordered-pair multiset $(1,2)$; $(3,5)$; $(6,7)$. A new observation has $x = 4$ and $y = 9$. Update the plot exactly, leaving every unaffected observation unchanged. Add it without connecting points.

Graph 1

Given plot before the edit



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.

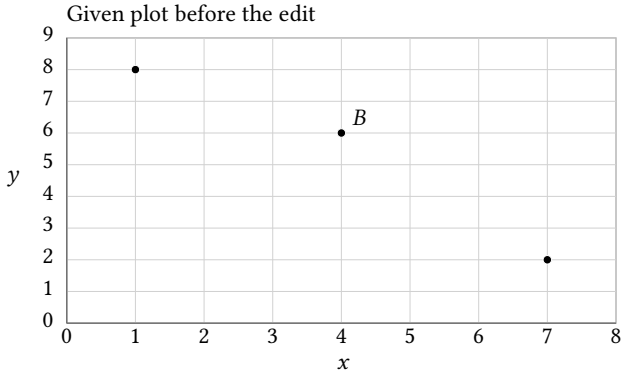
Remove no existing point; add $(4,9)$. The updated multiset is $(1,2)$; $(3,5)$; $(4,9)$; $(6,7)$. Scatter points remain unconnected.

Worked example

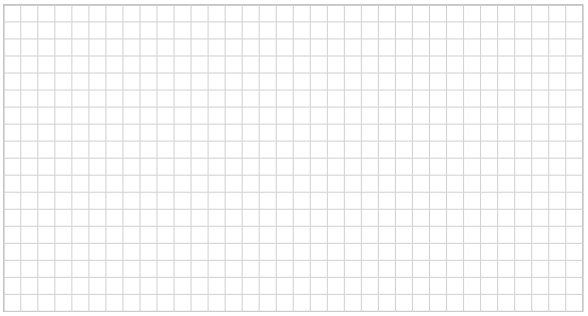
Problem. The current scatter plot contains the ordered-pair multiset $(1,8)$; $(4,6)$; $(7,2)$. Record B was transcribed as $(4,6)$; its source row is actually $(5,9)$. Update the plot exactly, leaving every unaffected observation unchanged. Treat this as one paired replacement, not two observations.

Graph 1

Given plot before the edit



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.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Correlation and Linear Association

Correlation and Linear Association | A1-U10-P08

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for evidence-based linear association statement.

8 PDFs and a README; 140 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.

Published by Tusils LLC.

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: _____

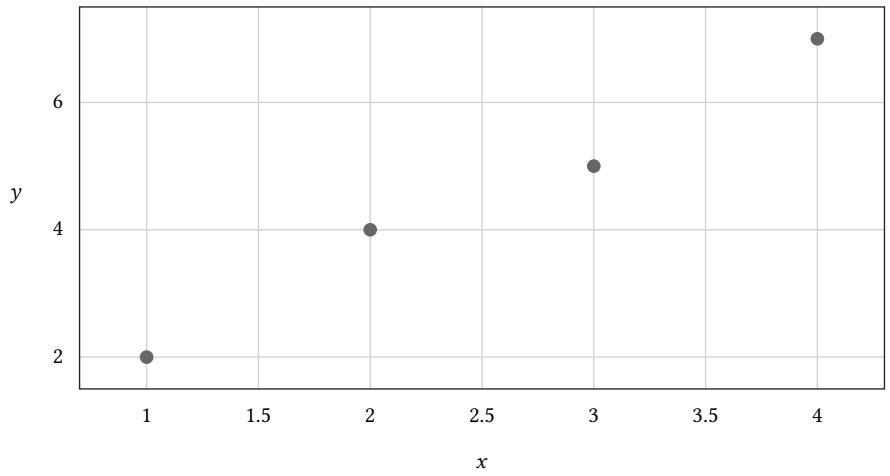
Algebra 1

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

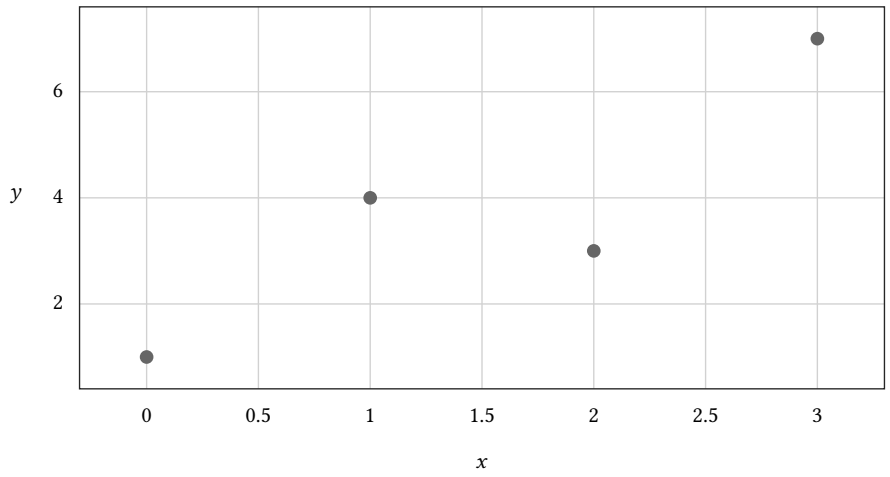
Correlation and Linear Association

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: _____

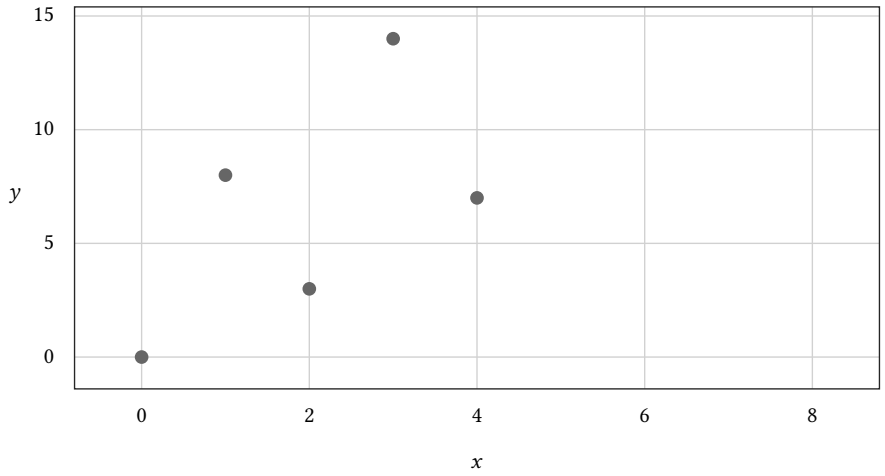
Algebra 1

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_new= $x - 100$ and y_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.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Correlation vs Causation

Correlation vs Causation | A1-U10-P09

96 problems · Four activity formats

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.

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

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 $X \to Y$ and $Y \to X$. 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.

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.

Published by Tusils LLC.

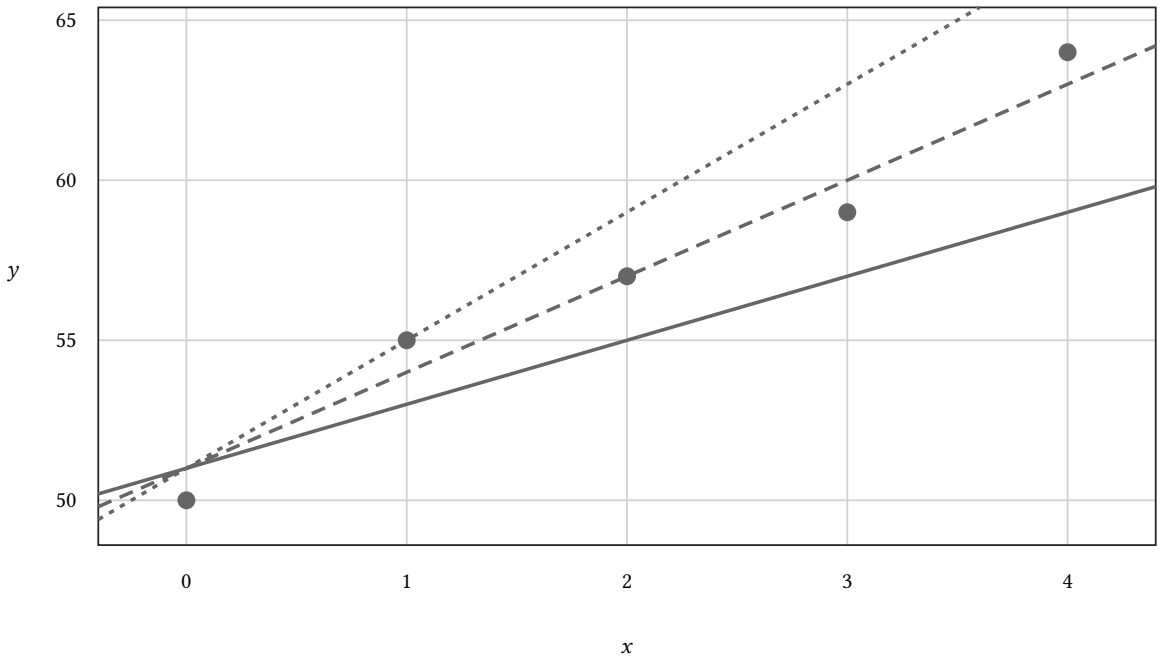
Algebra 1

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: _____

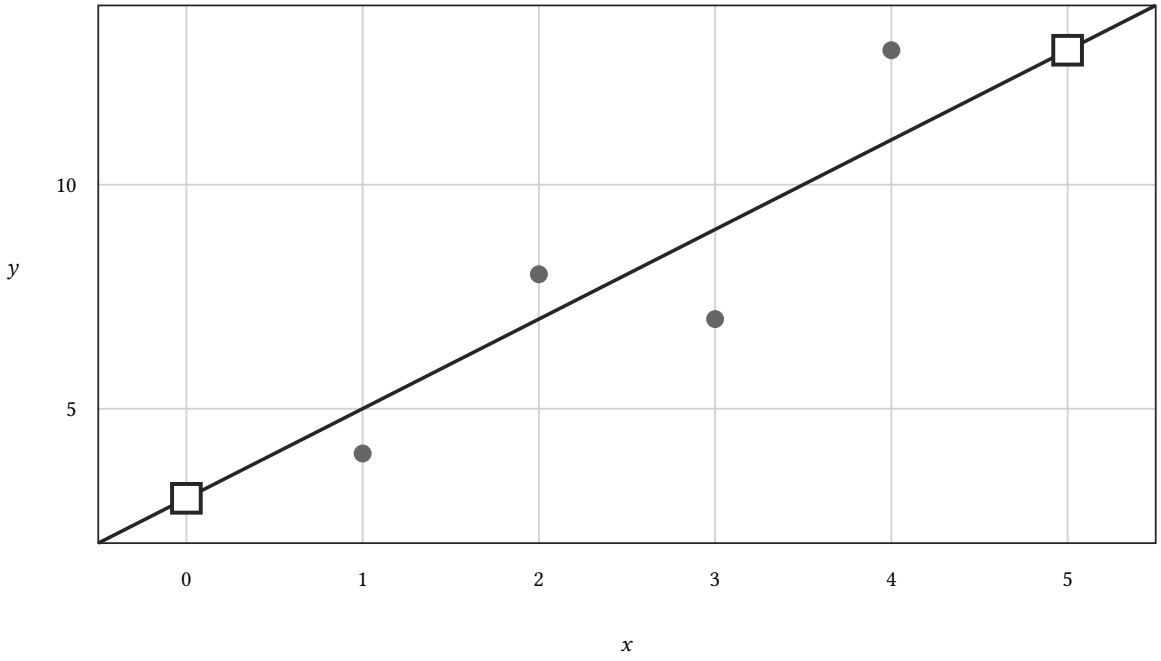
Algebra 1

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

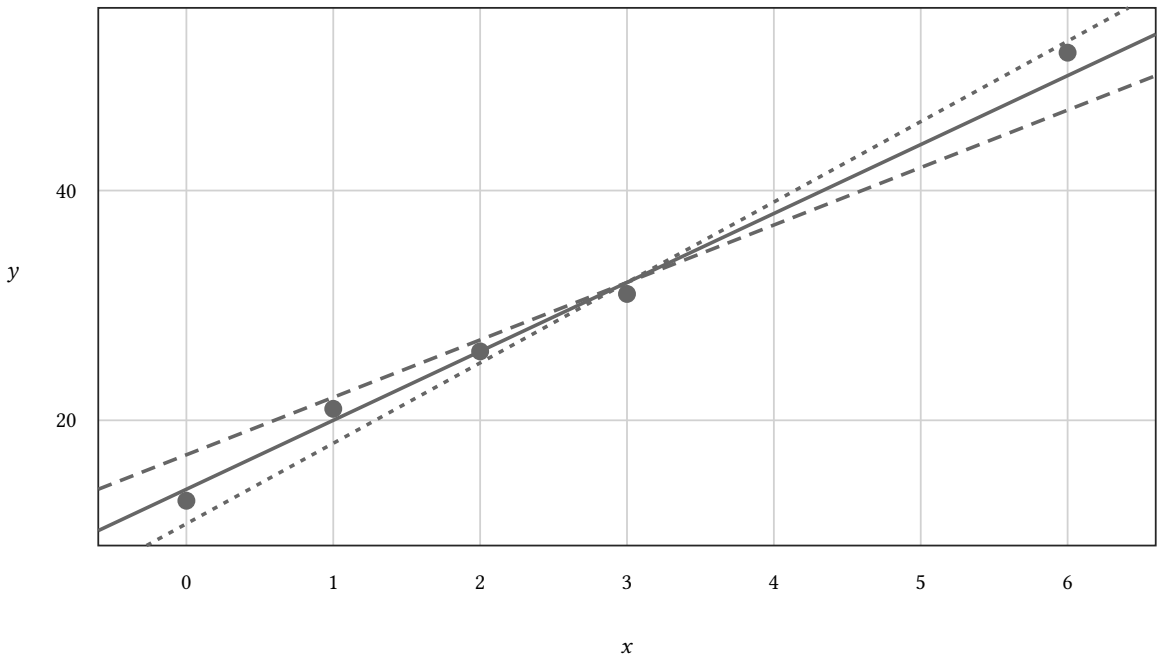
Lines of Best Fit

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.

Published by Tusils LLC.

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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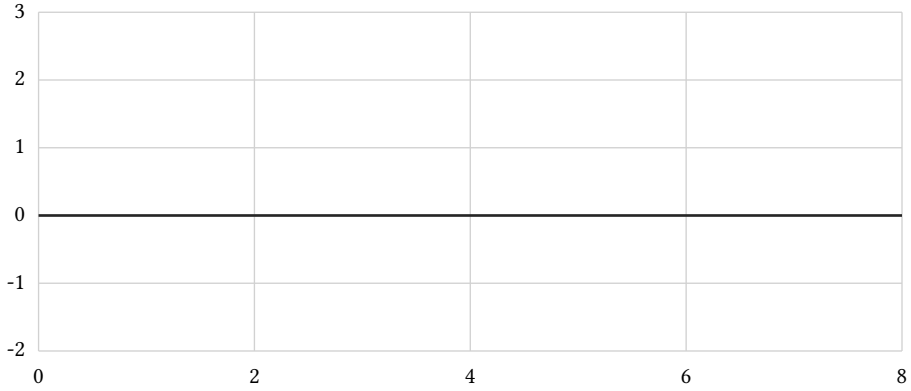
Algebra 1

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

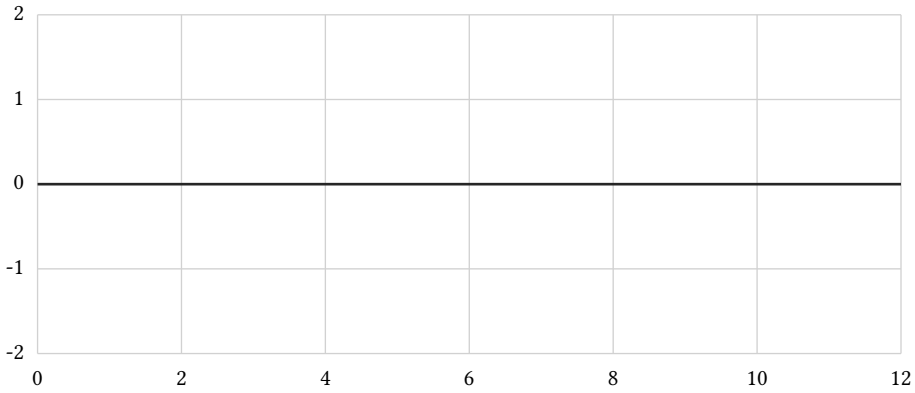
Residual Plots

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: _____

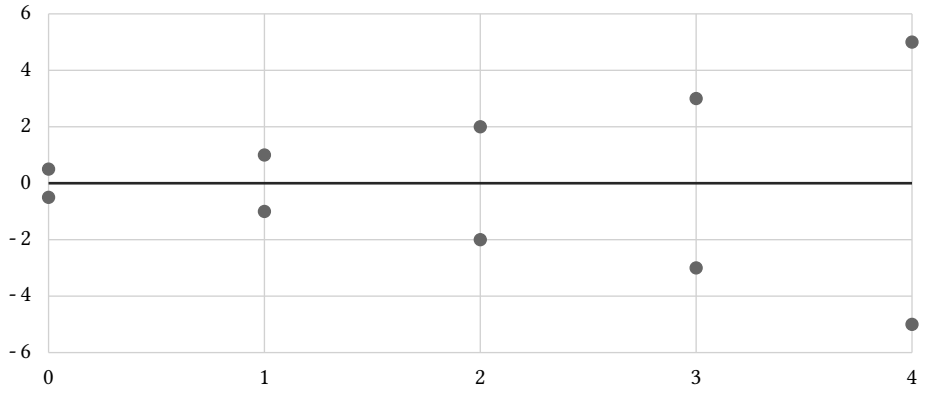
Algebra 1

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.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Two-Way Frequency Tables

Two-Way Frequency Tables | A1-U10-P15

96 problems · Four activity formats

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.

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

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 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 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 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.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Conditional Relative Frequency

Conditional Relative Frequency | A1-U10-P16

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for conditional frequency with named reference group.

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.

Published by Tusils LLC.

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: 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: 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 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.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Selecting Models from Data

Selecting Models from Data | A1-U10-P17

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for qualified model preference with decisive evidence.

8 PDFs and a README; 205 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.

Published by Tusils LLC.

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 $y = 21 + 4.5$ times x
exponential	predicted $y = 21$ times 1.17 to the x power
quadratic	predicted $y = 0.15$ times x squared + 3.9 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 $y = -4.9$ times x squared + 18 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 $y = 75$ times 0.91 to the x 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.