Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Lines of Fit, Regression & Prediction | Algebra 1 | 3-Topic Bundle

3-topic bundle | 288 problems | Four activity formats

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01 Lines of Best Fit

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View individual product and its full preview

03 Interpolation and Extrapolation

View individual product and its full 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.

24 PDFs and 3 READMEs; 297 buyer PDF pages across the 3 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

Lines of Best Fit

Lines of Best Fit | A1-U10-P10

96 problems · Four activity formats

Topic focus

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

8 PDFs and a README; 158 buyer pages.

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

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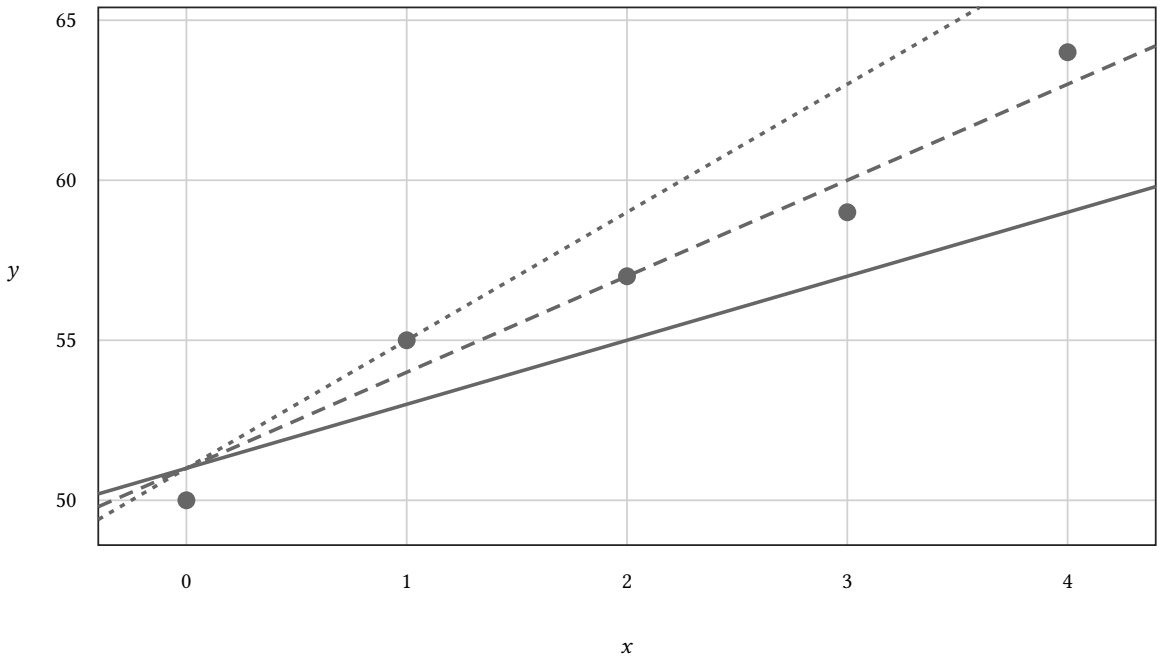
Algebra 1

Lines of Best Fit

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

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

Paired study hours and quiz score data are $(0, 50)$; $(1, 55)$; $(2, 57)$; $(3, 59)$; $(4, 64)$. Three proposed summaries are A: y-hat $= 2x + 51$; B: y-hat $= 3x + 51$; C: y-hat $= 4x + 51$. Choose the line with the smallest sum of squared vertical errors. Show the criterion value for every candidate so a line matching one conspicuous point cannot win by inspection alone.



Observation	Original x	Original y
1	0	50
2	1	55
3	2	57
4	3	59
5	4	64

Bank label: _____

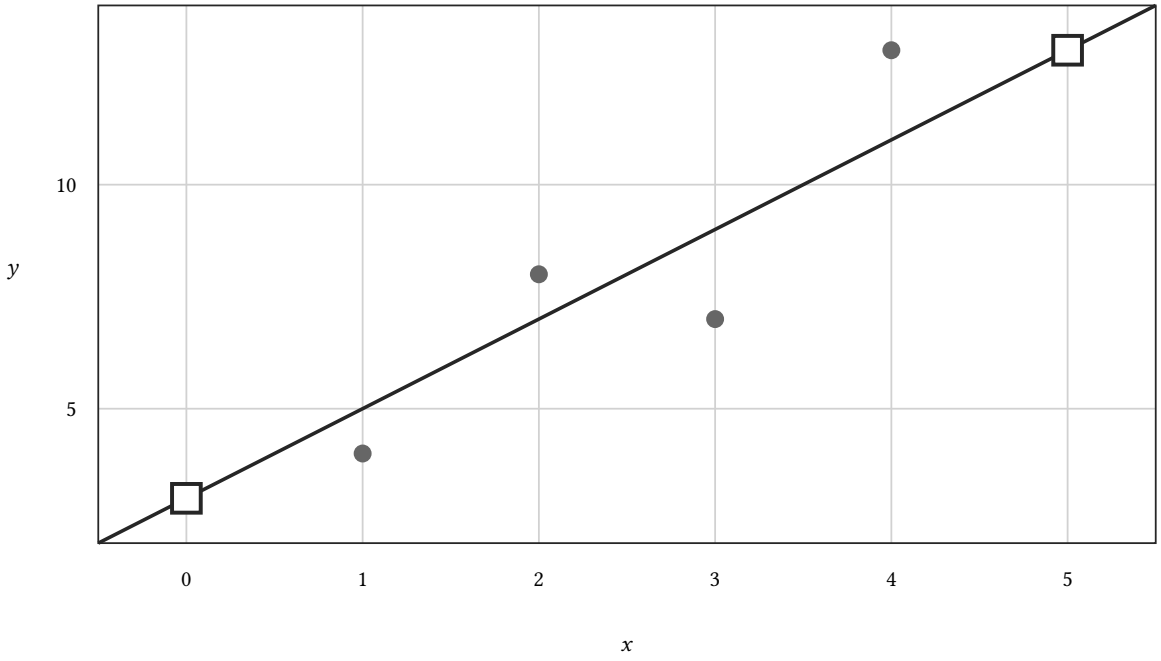
Algebra 1

Lines of Best Fit

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

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

A scatter graph has observed points (1, 4); (2, 8); (3, 7); (4, 13). Two emphasized fit-line points are (0, 3); (5, 13); both marked points are construction handles, not observations. Use the emphasized points to write the selected fit equation. Then state how the two marker layers differ and check how many observations are within 2 vertical units of the line.



Observation	Original x	Original y
1	1	4
2	2	8
3	3	7
4	4	13

Fit marker	Original x	Original y
1	0	3
2	5	13

Algebra 1

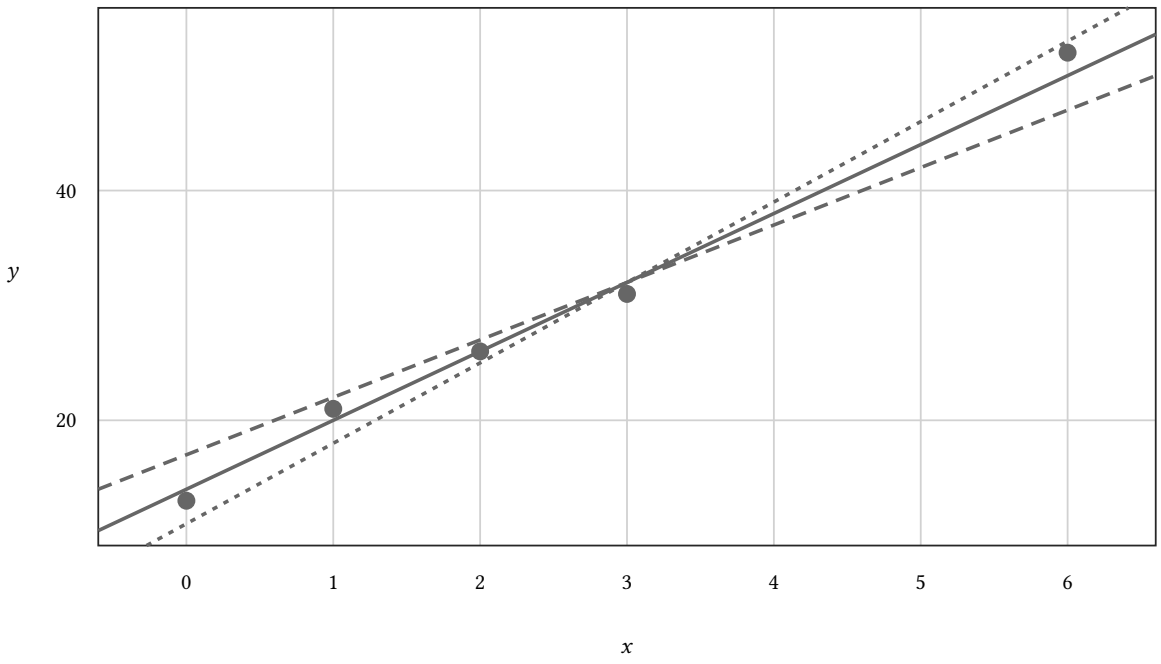
Lines of Best Fit

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

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

START

Paired delivery stops and minutes data are $(0, 13)$; $(1, 21)$; $(2, 26)$; $(3, 31)$; $(6, 52)$. Three proposed summaries are A: y-hat $= 6x + 14$; B: y-hat $= 5x + 17$; C: y-hat $= 7x + 11$. Choose the line with the smallest sum of absolute vertical errors. Show the criterion value for every candidate so a line matching one conspicuous point cannot win by inspection alone.



Observation	Original x	Original y
1	0	13
2	1	21
3	2	26
4	3	31
5	6	52

Your response: _____

Algebra 1

Lines of Best Fit

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

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

A least-squares summary changes after this documented data edit: a far-right point lying near the old trend is added. The supplied fit before the edit is y-hat $= 2x + 5$; after the edit it is y-hat $= 2.2x + 4.8$. Compute the slope and intercept changes, then explain the direction using the edited point's horizontal leverage and vertical position. Do not claim an exact coefficient from geometry alone—the outputs are supplied.

A least-squares summary changes after this documented data edit: the largest-x point is moved well above the old line. The supplied fit before the edit is y-hat $= -x + 30$; after the edit it is y-hat $= -0.6x + 27$. Compute the slope and intercept changes, then explain the direction using the edited point's horizontal leverage and vertical position. Do not claim an exact coefficient from geometry alone—the outputs are supplied.

A least-squares summary changes after this documented data edit: a point near mean x is raised by 8 units. The supplied fit before the edit is y-hat $= 3x + 4$; after the edit it is y-hat $= 3x + 5$. Compute the slope and intercept changes, then explain the direction using the edited point's horizontal leverage and vertical position. Do not claim an exact coefficient from geometry alone—the outputs are supplied.

A least-squares summary changes after this documented data edit: a new far-right observation falls below the former positive trend. The supplied fit before the edit is y-hat $= 4x + 2$; after the edit it is y-hat $= 3.2x + 3.6$. Compute the slope and intercept changes, then explain the direction using the edited point's horizontal leverage and vertical position. Do not claim an exact coefficient from geometry alone—the outputs are supplied.

Lines of Best Fit

Full Worked Solutions - excerpt

Worked example

Problem. Audit this fictional fitting work: Output uses y-hat = $a + bx$ with $a = 18$ and $b = -3$, yet a student writes y-hat = $18x - 3$. Identify the precise construction or model-choice error, repair the procedure or equation, and name the evidence that must be reconsidered. A generic instruction to 'draw a better line' is insufficient.

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

Explanation and check.

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

Worked example

Problem. Audit this fictional fitting work: A downward cloud is modeled with y-hat = $2x + 9$ because the student used absolute rise and run. Identify the precise construction or model-choice error, repair the procedure or equation, and name the evidence that must be reconsidered. A generic instruction to 'draw a better line' is insufficient.

Answer. fault: A downward cloud is modeled with y-hat = $2x + 9$ because the student used absolute rise and run.; repair: Preserve signed rise: the fitted slope must be negative, then recompute its intercept from actual fit-line points.

Explanation and check.

Fault: A downward cloud is modeled with y-hat = $2x + 9$ because the student used absolute rise and run. Repair: Preserve signed rise: the fitted slope must be negative, then recompute its intercept from actual fit-line points.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Interpreting Regression Slope and Intercept

Interpreting Regression Slope and Intercept | A1-U10-P11

96 problems · Four activity formats

Topic focus

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

8 PDFs and a README; 82 buyer pages.

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

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Algebra 1

Interpreting Regression Slope and Intercept

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

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

A fitted line has slope 4, measured in score points per unit of practice sessions. Compare input 3 to input 9. Find the signed fitted response change, include units, and explain why the intercept is unnecessary for this difference.

Original supplied quantity	Given value
Slope	4
Input start	3
Input end	9
Input unit	practice sessions
Response unit	score points

Bank label: _____

A fitted line has slope −3, measured in demand units per unit of temperature degrees. Compare input 20 to input 14. Find the signed fitted response change, include units, and explain why the intercept is unnecessary for this difference.

Original supplied quantity	Given value
Slope	−3
Input start	20
Input end	14
Input unit	temperature degrees
Response unit	demand units

Bank label: _____

A fitted line has slope 12, measured in kilometers per unit of hours. Compare input 1.5 to input 3.75. Find the signed fitted response change, include units, and explain why the intercept is unnecessary for this difference.

Original supplied quantity	Given value
Slope	12
Input start	1.5
Input end	3.75
Input unit	hours
Response unit	kilometers

Bank label: _____

A fitted line has slope −8, measured in light units per unit of meters of depth. Compare input 2 to input 7. Find the signed fitted response change, include units, and explain why the intercept is unnecessary for this difference.

Original supplied quantity	Given value
Slope	−8
Input start	2
Input end	7
Input unit	meters of depth
Response unit	light units

Bank label: _____

Algebra 1

Interpreting Regression Slope and Intercept

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

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

A fitted data model is y-hat = $3x + 4$, where x measures weeks and y-hat measures centimeters of fitted height. Interpret the slope's sign, magnitude, and compound units using model language. Do not turn an association into an exact or causal rule.

Original supplied quantity	Given value
Model	y-hat = $3x + 4$
Input unit	weeks
Response unit	centimeters of fitted height

A fitted data model is y-hat = $-2x + 90$, where x measures minutes and y-hat measures degrees Celsius of fitted temperature. Interpret the slope's sign, magnitude, and compound units using model language. Do not turn an association into an exact or causal rule.

Original supplied quantity	Given value
Model	y-hat = $-2x + 90$
Input unit	minutes
Response unit	degrees Celsius of fitted temperature

A fitted data model is y-hat = 6, where x measures machine hours and y-hat measures fitted defects per batch. Interpret the slope's sign, magnitude, and compound units using model language. Do not turn an association into an exact or causal rule.

Original supplied quantity	Given value
Model	y-hat = 6
Input unit	machine hours
Response unit	fitted defects per batch

A fitted data model is y-hat = $5x + 48$, where x measures practice sessions and y-hat measures fitted words per minute. Interpret the slope's sign, magnitude, and compound units using model language. Do not turn an association into an exact or causal rule.

Original supplied quantity	Given value
Model	y-hat = $5x + 48$
Input unit	practice sessions
Response unit	fitted words per minute

Algebra 1

Interpreting Regression Slope and Intercept

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

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

START

The old fitted model for load response is y_old-hat = $4x$_old + 20. One new input unit (trips) equals 1 old input units, and one new response unit (kilograms) equals 2.205 old response units. Rewrite the same fit in X and Y, then interpret why the coefficient numbers changed without changing the underlying relationship.

Original supplied quantity	Given value
Old model	y_old-hat = $4x$_old + 20
Old input per new	1
Old output per new	2.205
New input unit	trips
New output unit	kilograms

Your response: _____

Incoming: new intercept: 100; new model: Y-hat = $-0.05X + 100$; new slope: -0.05; reason: One centimeter equals 0.01 old meter, so the per-centimeter slope is smaller.

The old fitted model for value is y_old-hat = $-3x$_old + 28. One new input unit (years) equals 1 old input units, and one new response unit (dollars) equals 0.001 old response units. Rewrite the same fit in X and Y, then interpret why the coefficient numbers changed without changing the underlying relationship.

Original supplied quantity	Given value
Old model	y_old-hat = $-3x$_old + 28
Old input per new	1
Old output per new	0.001
New input unit	years
New output unit	dollars

Your response: _____

Incoming: New intercept: 10; New model: y-hat = $5t + 10$; Slope: 5. Changing the day label translates the origin but does not alter daily rate. If S is the original supported input set, the supported set for t is $S - (1000)$. An original interval $[L, U]$ becomes $[L - (1000), U - (1000)]$. The same observations are used; this adds no extrapolation.

A fitted model uses hours after midnight: y-hat = $-4x + 70$. Define $t = x - 12$, so t measures hours after noon. Rewrite the line in t, identify the new intercept's contextual reference, and state what happens to the slope and supported input range.

Original supplied quantity	Given value
Old model	y-hat = $-4x + 70$
Reference old x	12
New input	hours after noon

Your response: _____

Incoming: New intercept: 52; New model: y-hat = $4t + 52$; Slope: 4. The baseline moves to age 10, so the intercept becomes the fitted age-10 response. If S is the original supported input set, the supported set for t is $S - (10)$. An original interval $[L, U]$ becomes $[L - (10), U - (10)]$. The same observations are used; this adds no extrapolation.

A fitted model uses calendar day: y-hat = $5x - 4990$. Define $t = x - 1000$, so t measures days after launch day 1000. Rewrite the line in t, identify the new intercept's contextual reference, and state what happens to the slope and supported input range.

Original supplied quantity	Given value
Old model	y-hat = $5x - 4990$
Reference old x	1000
New input	days after launch day 1000

Your response: _____

Algebra 1

Interpreting Regression Slope and Intercept

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

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

Two fitted models must be compared. A is $3 cm/$ week and B is $5 cm/$ week; compare height rates in $cm/$ week. Decide whether the rates are directly comparable, perform any stated conversion, and do not confuse a larger rate with stronger correlation.

Original supplied quantity	Given value
Model a reported slope	3
Model b reported slope	5
Reported units	A is $3 cm$/week and B is $5 cm$/week; compare height rates in cm/week.

Two fitted models must be compared. A is -4 and B is -2 thousand dollars/year; compare rates and decline magnitudes. Decide whether the rates are directly comparable, perform any stated conversion, and do not confuse a larger rate with stronger correlation.

Original supplied quantity	Given value
Model a reported slope	-4
Model b reported slope	-2
Reported units	A is -4 and B is -2 thousand dollars/year; compare rates and decline magnitudes.

Interpreting Regression Slope and Intercept

Full Worked Solutions - excerpt

Worked example

Problem. Audit this parameter interpretation: For y-hat = $4x + 18$, a report calls 4 the initial fitted value. Identify whether the error concerns coefficient role, units, domain, modeled wording, or causation, and replace it with a context-safe statement.

Original supplied quantity	Given value
Faulty interpretation	For y-hat = $4x + 18$, a report calls 4 the initial fitted value.

Answer. fault: For y-hat = $4x + 18$, a report calls 4 the initial fitted value.; repair: The intercept 18 is the fitted value at $x = 0$; 4 is the fitted response change per input unit.

Explanation and check.

The interpretation fails its coefficient audit. The intercept 18 is the fitted value at $x = 0$; 4 is the fitted response change per input unit.

Worked example

Problem. Audit this parameter interpretation: A slope of 6 score points per hour is described as 6 hours per score point. Identify whether the error concerns coefficient role, units, domain, modeled wording, or causation, and replace it with a context-safe statement.

Original supplied quantity	Given value
Faulty interpretation	A slope of 6 score points per hour is described as 6 hours per score point.

Answer. fault: A slope of 6 score points per hour is described as 6 hours per score point.; repair: Keep response over explanatory units: 6 score points per hour.

Explanation and check.

The interpretation fails its coefficient audit. Keep response over explanatory units: 6 score points per hour.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Interpolation and Extrapolation

Interpolation and Extrapolation | A1-U10-P12

96 problems · Four activity formats

Topic focus

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

8 PDFs and a README; 57 buyer pages.

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

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Algebra 1

Interpolation and Extrapolation

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

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

The fitted linear model is y-hat = $3x + 5$; x is measured in weeks, y-hat in centimeters, and observed inputs span 0 to 10. Predict at $x = 10$, report according to nearest centimeter, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. Bank label: _____	The fitted linear model is y-hat = $-2x + 78$; x is measured in minutes, y-hat in degrees Celsius, and observed inputs span 0 to 15. Predict at $x = 9$, report according to nearest degree, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. Bank label: _____
The fitted linear model is y-hat = 14; x is measured in filter setting, y-hat in clarity units, and observed inputs span 1 to 9. Predict at $x = 7$, report according to nearest unit, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. Bank label: _____	The fitted linear model is y-hat = $1.5x + 4$; x is measured in hours, y-hat in kilometers, and observed inputs span 0 to 8. Predict at $x = 4.5$, report according to nearest tenth, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. Bank label: _____
The fitted linear model is y-hat = $5x - 3$; x is measured in liters, y-hat in yield kilograms, and observed inputs span 1 to 8. Predict at $x = 4$, report according to nearest kilogram, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. Bank label: _____	The fitted linear model is y-hat = $1.4x + 8$; x is measured in kilometers, y-hat in fuel liters, and observed inputs span 0 to 10. Predict at $x = 5$, report according to nearest tenth, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. Bank label: _____
The fitted linear model is y-hat = $4x + 11$; x is measured in advertising blocks, y-hat in expected orders, and observed inputs span 0 to 12. Predict at $x = 8$, report according to nearest whole expected order, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. Bank label: _____	The fitted linear model is y-hat = $-3x + 20$; x is measured in signed position meters, y-hat in signal units, and observed inputs span -5 to 5. Predict at $x = -2$, report according to nearest unit, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation. Bank label: _____

Algebra 1

Interpolation and Extrapolation

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

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

The fitted linear model is y-hat $= 2x + 4$; x is measured in miles, y-hat in dollars, and observed inputs span 0 to 12. Predict at $x = 6$, report according to nearest cent, and identify whether the result is modeled or observed and whether the input is interpolation or extrapolation.	A table has four evenly spread observations and asks about an unlisted middle input. Observed explanatory inputs are $1, 3, 5, 7$; the model is requested at $x = 4$. Classify from actual observations and qualify gaps or endpoints.
The request uses the first recorded input in a four-row table. Observed explanatory inputs are $0, 2, 6, 9$; the model is requested at $x = 0$. Classify from actual observations and qualify gaps or endpoints.	The target matches the last recorded input rather than extending past it. Observed explanatory inputs are $2, 4, 8, 10$; the model is requested at $x = 10$. Classify from actual observations and qualify gaps or endpoints.
A requested input sits one unit above every measured setting. Observed explanatory inputs are $1, 2, 5, 8$; the model is requested at $x = 9$. Classify from actual observations and qualify gaps or endpoints.	The model is queried two units below the earliest recorded setting. Observed explanatory inputs are $3, 5, 7, 11$; the model is requested at $x = 1$. Classify from actual observations and qualify gaps or endpoints.

Algebra 1

Interpolation and Extrapolation

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

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

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

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

Your response: _____

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

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

Your response: _____

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

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

Your response: _____

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

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

Your response: _____

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

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

Your response: _____

START

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

Your response: _____

Algebra 1

Interpolation and Extrapolation

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

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

The fitted model is y-hat = $3x + 10$, and a request uses $x = -2$. Context restriction: participants must be nonnegative whole numbers. Compute the algebraic model value, then decide whether it is a usable contextual prediction; if not, name the exact input or output restriction that fails.

The fitted model is y-hat = $4x + 12$, and a request uses $x = -3$. Context restriction: signed positions from -5 to 5 are allowed. Compute the algebraic model value, then decide whether it is a usable contextual prediction; if not, name the exact input or output restriction that fails.

The fitted model is y-hat = $\frac{1}{10}x + 0.6$, and a request uses $x = 5$. Context restriction: probability outputs must lie from 0 to 1. Compute the algebraic model value, then decide whether it is a usable contextual prediction; if not, name the exact input or output restriction that fails.

The fitted model is y-hat = $-\frac{1}{5}x + 0.5$, and a request uses $x = 4$. Context restriction: probability outputs must lie from 0 to 1. Compute the algebraic model value, then decide whether it is a usable contextual prediction; if not, name the exact input or output restriction that fails.

Interpolation and Extrapolation

Full Worked Solutions - excerpt

Worked example

Problem. A fitted model produces 18.64 people. The output represents expected attendance. Reporting rule: nearest tenth. Choose the defensible final report and explain why calculator digits, discreteness, or threshold logic require that form.

Answer. reason: A mean count may be fractional, so do not force it to an individual count.; report: 18.6 people expected

Explanation and check.

Report: 18.6 people expected. A mean count may be fractional, so do not force it to an individual count.

Worked example

Problem. A score target is sought from a positively sloped practice model. The fitted linear model is y-hat $= 4x + 10$, observed for inputs 0 through 10. Estimate the input for fitted response 30, then check uniqueness, support, and feasibility.

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

Explanation and check.

Reverse use gives input 5. Status: supported. Solving $4x + 10 = 30$ gives $x = 5$, inside the observed range.