Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Linear vs Exponential Models

Linear vs Exponential Models | A1-U07-P17

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Linear vs Exponential Models.

8 PDFs and a README; 70 buyer pages.

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

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Algebra 1

Linear vs Exponential Models

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

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

Use the equal-step behavior to classify this table, including its one-unit factor. Use the complete requested model pair and predictions, or the classification with its decisive numerical change/factor, as the matching response. Retain all original assumptions, units and evidence qualifications.

Precision of given values: exact

x	y
−2	1
−1	3
0	9

Bank label: _____

Classify the relationship and quantify its unit change. Use the complete requested model pair and predictions, or the classification with its decisive numerical change/factor, as the matching response. Retain all original assumptions, units and evidence qualifications.

Precision of given values: exact

x	y
−1	6
0	4
1	2

Bank label: _____

Determine the relationship class and distinguish its ratios from its differences. Use the complete requested model pair and predictions, or the classification with its decisive numerical change/factor, as the matching response. Retain all original assumptions, units and evidence qualifications.

Precision of given values: exact

n	A
0	100
1	90
2	81
3	72.9

Bank label: _____

Classify the table and report the rate per one x-unit. Use the complete requested model pair and predictions, or the classification with its decisive numerical change/factor, as the matching response. Retain all original assumptions, units and evidence qualifications.

Precision of given values: exact

x	y
0	2
3	14
6	26

Bank label: _____

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

Account for the unequal x-gaps and classify the relationship.

Precision of given values: exact

x	y
0	2
1	4
3	16

Use change per x-unit, not raw y-differences, to classify the table.

Precision of given values: exact

x	y
0	4
2	10
5	19

A student notices the first ratio is 2. Decide whether the whole table supports an exponential model.

Precision of given values: exact

x	y
0	10
1	20
3	50

State why these rows alone do not select uniquely between the two model classes.

Precision of given values: exact

x	y
0	2.5
2	2.5
5	2.5
9	2.5

Do not decide from the first pair alone. Classify using all intervals.

Precision of given values: exact

x	y
0	50
1	45
2	39
3	32

Can the table alone establish a global linear or exponential mechanism? Explain.

Model assumption: none

x	y
0	5
1	10

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

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

Incoming: Exponential decay with unit factor $\frac{1}{9}$.

Rewrite with one exponential base, then classify the change. Rule: $e(x) = 6\frac{2^x}{3^x}$

Your response: _____

Incoming: The linear rule $L(x) = 5x$ predicts 15; the exponential rule $E(x) = 2.5(2)^x$ predicts 20.

Build decreasing linear and exponential candidates through the rows and compare the missing middle value. Use the complete requested model pair and predictions, or the classification with its decisive numerical change/factor, as the matching response. Retain all original assumptions, units and evidence qualifications.

Target x: 1

x	y
0	16
2	4

Your response: _____

Incoming: $L(x) = 100 + 10.5x$ gives 110.5; $E(x) = 100(1.1)^x$ gives 110, a difference of 0.5.

Build the models and evaluate both one unit after $x = 0$. Use the complete requested model pair and predictions, or the classification with its decisive numerical change/factor, as the matching response. Retain all original assumptions, units and evidence qualifications.

Target x: 1

Input	Given output
0	8
3	64

Your response: _____

Incoming: $L(x) = 6x + 10$ gives 10; $E(x) = 8(2)^x$ gives 8 at $x = 0$.

Build linear and exponential candidates and fill the missing middle value. Use the complete requested model pair and predictions, or the classification with its decisive numerical change/factor, as the matching response. Retain all original assumptions, units and evidence qualifications.

Target x: -1

x	y
-2	9
0	1

Your response: _____

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

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

Classify the relationship as linear, exponential, neither, or ambiguous, and give the decisive equal-step pattern. Choose a first diagnostic test: compare output differences for equal input steps, or compare output ratios where division is defined. Explain why that test is useful for these exact rows, use it, and complete the original classification. If the first test is inconclusive, state what further check or model assumption is needed.

Precision of given values: exact

x	y
0	3
1	7
2	11

Determine the model class supported by all consecutive entries. Choose a first diagnostic test: compare output differences for equal input steps, or compare output ratios where division is defined. Explain why that test is useful for these exact rows, use it, and complete the original classification. If the first test is inconclusive, state what further check or model assumption is needed.

Precision of given values: exact

x	y
0	2
1	6
2	18
3	54

Linear vs Exponential Models

Full Worked Solutions - excerpt

Worked example

Problem. Rewrite q in coefficient-times-power form, then classify it. Rule: $q(x) = 2^{x+1}$

Answer. $q(x) = 2(2)^x$ is exponential with unit ratio 2.

Explanation and check.

The exponent rule $2^{x+1} = 2^x$ times 2 exposes the constant multiplicative factor.

Worked example

Problem. Simplify the formula and use a change calculation to classify it. Rule: $m(x) = 9\frac{x}{3} + 5$

Answer. $m(x) = 3x + 5$ is linear, and $m(x+1) - m(x) = 3$.

Explanation and check.

Dividing the x-term by 3 gives a constant coefficient of 3.