Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Exponential Rules, Graphs, Growth & Decay | Algebra 1 | 4-Topic Bundle

4-topic bundle | 384 problems | Four activity formats

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01 **Exponential Function Rules and Evaluation**

View individual product and its full preview

02 **Graphing Exponential Functions**

View individual product and its full preview

03 **Exponential Growth Models**

View individual product and its full preview

04 **Exponential Decay Models**

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.

32 PDFs and 4 READMEs; 330 buyer PDF pages across the 4 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

Exponential Function Rules and Evaluation

Exponential Function Rules and Evaluation | A1-U07-P12

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Exponential Function Rules and Evaluation.

8 PDFs and a README; 57 buyer pages.

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

Exponential Function Rules and Evaluation

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

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

What output does $f(x) = 4(5)^x$ assign to the origin input $x = 0$? Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. Bank label: _____	Find $q(2)$ for $q(x) = (\frac{3}{4})4^x$, applying the coefficient after the power. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. Bank label: _____
Evaluate $z(2)$ for $z(x) = 25(\frac{1}{5})^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. Bank label: _____	Find $F(-1)$ for $F(x) = 7(\frac{1}{7})^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. Bank label: _____
Evaluate $G(-3)$ under $G(x) = -16(\frac{1}{2})^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. Bank label: _____	Compute $J(-1)$ for $J(x) = 10(\frac{1}{10})^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. Bank label: _____
Evaluate $K(-4)$ exactly if $K(x) = -3(2)^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. Bank label: _____	Evaluate $M(-2)$ for $M(x) = -2(3)^x$, and explain why combining -2 and 3 into a base -6 changes the rule. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions. Bank label: _____

Algebra 1

Exponential Function Rules and Evaluation

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

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

Under the convention $f(x) = ab^x$ with $a \neq 0, b > 0$, and $b \neq 1$, classify $f(x) = 3(2)^x$.	Is $g(x) = x^3$ an exponential function of x under the stated constant-base convention? Explain the structural reason.
Classify $h(x) = 5x + 2$ as exponential or nonexponential and give one decisive feature.	Does $p(x) = 7(\frac{1}{2})^x$ qualify as a nonconstant exponential function on the real numbers?
Classify $q(x) = -4(3)^x$. Does the negative coefficient prevent exponential structure?	A model is $F(t) = 12(3)^t$, where t is years after 2018 and F is measured in colonies. Interpret 12 and 3.

Algebra 1

Exponential Function Rules and Evaluation

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

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

Incoming: $D(0) = -9$.

Find $h(\frac{1}{2})$ for $h(x) = 18(\frac{1}{36})^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions.

Your response: _____

Incoming: $A(3) = -32$.

Evaluate $C(-2)$ for $C(x) = 3(\frac{1}{3})^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions.

Your response: _____

Incoming: $j(3) = 56$; equal input step 3; output ratio 8.

The displayed table for $k(x) = 3(4)^x$ begins at $x = 1$. Supply the missing middle value. For the match, record all missing values in table order together with the equal input step and its output ratio, and complete the original verification.

Rule: $k(x) = 3(4)^x$

x	k(x)
1	12
2	_____
3	192

Your response: _____

START

Evaluate $f(2)$ for $f(x) = 3(2)^x$. Use the full requested exact result as the matching response and complete the original explanation. Retain all supplied root facts, units and input conditions.

Your response: _____

Algebra 1

Exponential Function Rules and Evaluation

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

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

Complete the missing entry in the table for $f(x) = 3(2)^x$, then verify the equal-step ratios. Choose how to fill the missing entries: substitute the missing inputs directly into the given rule, or use a known table output with the multiplier for the actual input step. Explain why your chosen route applies, use it, and complete the original ratio verification.

Rule: $f(x) = 3(2)^x$

x	f(x)
0	3
1	_____
2	12

For $g(x) = 20(\frac{1}{2})^x$, fill the $x = 1$ row and use it to check the listed value at $x = 3$. Choose how to fill the missing entries: substitute the missing inputs directly into the given rule, or use a known table output with the multiplier for the actual input step. Explain why your chosen route applies, use it, and complete the original ratio verification.

Rule: $g(x) = 20(\frac{1}{2})^x$

x	g(x)
0	20
1	_____
3	$\frac{5}{2}$

Exponential Function Rules and Evaluation

Full Worked Solutions - excerpt

Worked example

Problem. Compare $A(x) = 6(2)^x$ and $B(x) = 3(2)^{x+1}$ for an arbitrary real x.

Answer. $A(x) = B(x)$ for every real x.

Explanation and check.

$B(x) = 3(2)(2^x) = 6(2^x)$, which is exactly $A(x)$.

Worked example

Problem. Without separately evaluating both powers, compare $f(3)$ and $f(4)$ for $f(x) = 3(2)^x$.

Answer. $f(4) > f(3)$, and $f(4) = 2f(3)$.

Explanation and check.

The inputs differ by one, so the later output contains one additional factor of the base 2.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Graphing Exponential Functions

Graphing Exponential Functions | A1-U07-P14

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Graphing Exponential Functions.

8 PDFs and a README; 152 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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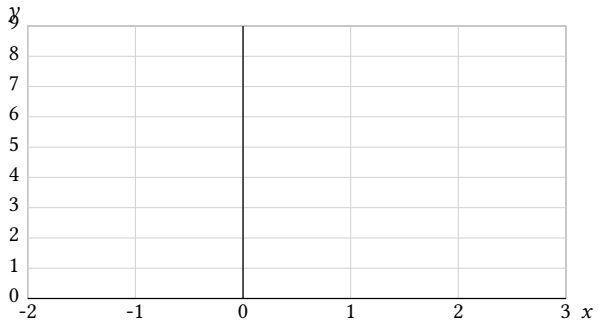
Algebra 1

Graphing Exponential Functions

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

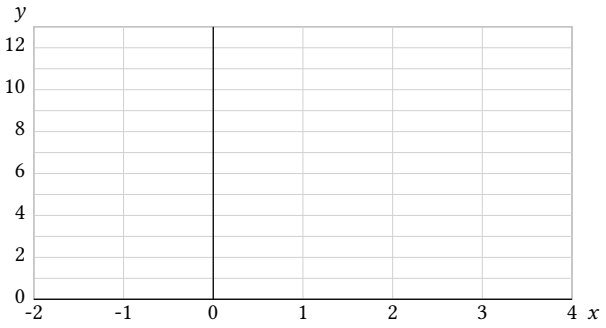
Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

On the stated grid, graph $f(x) = 2^x$. Label three exact points, the y-intercept, and the horizontal asymptote, then indicate the direction of growth. For matching, use the complete constructed graph with the original required anchors, boundary points, asymptote, scale and labels. The graphing work remains required; a formula-only response does not replace it.



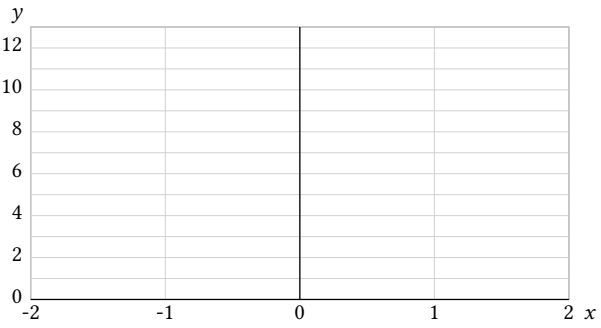
Bank label: _____

Construct the graph of $g(x) = 3(\frac{1}{2})^x$ in the given window. Supply three consecutive-input points and identify the line the curve approaches. For matching, use the complete constructed graph with the original required anchors, boundary points, asymptote, scale and labels. The graphing work remains required; a formula-only response does not replace it.



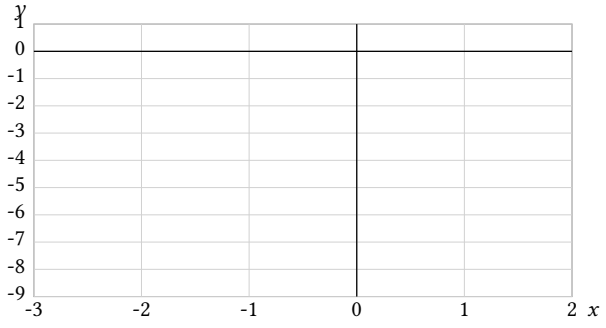
Bank label: _____

Plot $h(x) = 4(3)^x$ using the required inputs $-1, 0$, and 1. State the intercept and asymptote that complete the sketch. For matching, use the complete constructed graph with the original required anchors, boundary points, asymptote, scale and labels. The graphing work remains required; a formula-only response does not replace it.



Bank label: _____

Graph $p(x) = -2(2)^x$ on the unit grid. Label its y-intercept, two neighboring points, and describe its rightward behavior. For matching, use the complete constructed graph with the original required anchors, boundary points, asymptote, scale and labels. The graphing work remains required; a formula-only response does not replace it.



Bank label: _____

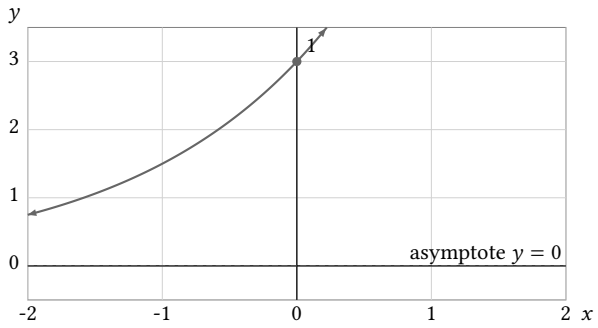
Algebra 1

Graphing Exponential Functions

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

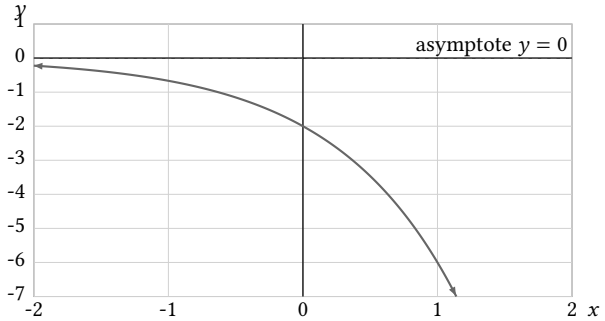
Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

A displayed continuous exponential curve is labeled $y = 3(2)^x$, passes through $(0, 3)$, and approaches $y = 0$ from above. State its domain, range, and y-intercept.

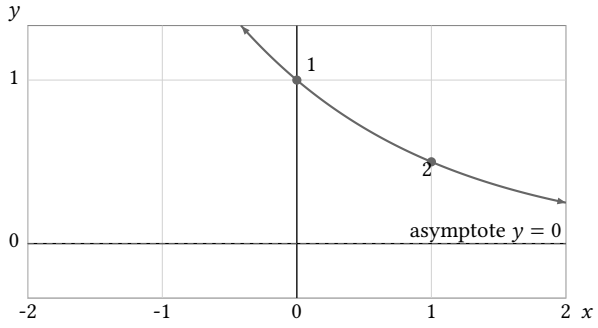


Marker	Exact coordinate	Boundary status
1	$(0, 3)$	included

The graph is the full curve $y = -2(3)^x$ with horizontal asymptote $y = 0$. Give its domain, range, and y-intercept.

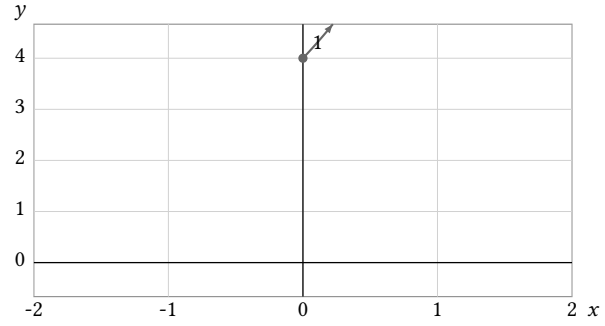


A continuous curve passes through $(0, 1)$ and $(1, \frac{1}{2})$, is labeled $y = (\frac{1}{2})^x$, and approaches $y = 0$. Name the y-intercept and tell whether it increases or decreases.



Marker	Exact coordinate	Boundary status
1	$(0, 1)$	included
2	$(1, \frac{1}{2})$	included

The displayed branch $y = 4(2)^x$ begins with a closed point at $(0, 4)$ and continues right. State the restricted domain and range.



Marker	Exact coordinate	Boundary status
1	$(0, 4)$	included

Algebra 1

Graphing Exponential Functions

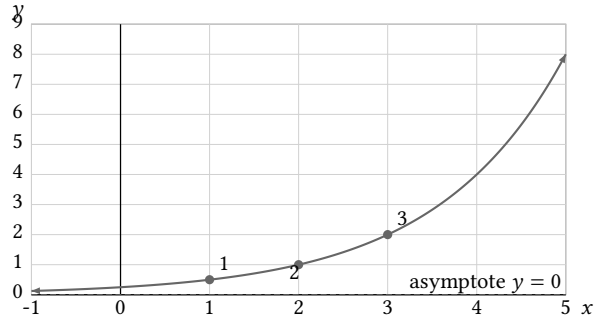
Name: _____ **Date:** _____ **Class:** _____

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

Incoming: The anchors become $(1, \frac{1}{2}), (2, 1)$, and $(3, 2)$; the graph is shifted 2 units right and retains asymptote $y = 0$.

Using the reference points for $y = 3^x$, graph $y = 3^{x+1}$. Where do the three points move? For matching, use the complete constructed graph with the original required anchors, boundary points, asymptote, scale and labels. The graphing work remains required; a formula-only response does not replace it.Graph for the incoming match

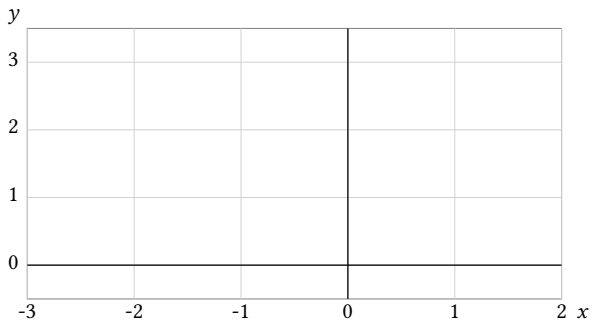
Window x: $[-1, 5]$, y: $[0, 9]$. Tick intervals: $x1$, $y1$.



Marker	Exact coordinate	Boundary status
1	$(1, \frac{1}{2})$	included
2	$(2, 1)$	included
3	$(3, 2)$	included

Graphing grid

Window x: $[-3, 2]$, y: $[-\frac{1}{2}, \frac{7}{2}]$. Tick intervals: $x1$, $y1$.



First value / input	Second value / output
-1	$\frac{1}{3}$
0	1
1	3

Your response: _____

Algebra 1

Graphing Exponential Functions

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

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

Which window shows all required anchors of $y = 3(2)^x$ at $x = 0, 1, 2$, and 3? Justify using the largest output.

A

Axis	Window interval
x	$[-1, 4]$
y	$[0, 30]$

B

Axis	Window interval
x	$[-1, 4]$
y	$[0, 10]$

Select a window that displays both the initial value and decay through $x = 6$ for $y = 64(\frac{1}{2})^x$.

A

Axis	Window interval
x	$[0, 6]$
y	$[0, 70]$

B

Axis	Window interval
x	$[0, 6]$
y	$[0, 5]$

Graphing Exponential Functions

Full Worked Solutions - excerpt

Worked example

Problem. The graphs $f(x) = 2^x$ and $g(x) = 3^x$ share $(0, 1)$. Which is higher for positive x, and which is higher for negative x?

Answer. For $x > 0$, g is higher; for $x < 0$, f is higher. They are equal at $x = 0$.

Explanation and check.

The larger base grows faster to the right but has smaller reciprocal powers to the left.

Worked example

Problem. For the reflected growth graphs u and v, which curve lies lower? Describe the relationship between their outputs. Compare $U(x) = -2(2)^x$ and $V(x) = -6(2)^x$ with asymptote $y = 0$.

Answer. v lies lower for every real x, and $v(x) = 3u(x)$. Both decrease and approach $y = 0$ from below on the left.

Explanation and check.

Multiplying a negative output by 3 makes it more negative, so the larger coefficient magnitude places the curve lower.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Exponential Growth Models

Exponential Growth Models | A1-U07-P15

96 problems · Four activity formats

Topic focus

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

8 PDFs and a README; 62 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

Exponential Growth Models

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

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

Write the culture size $C(t)$ after t hours, assuming the percent update applies once per hour. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Initial: 200 Origin: $t = 0$ at observation Given rate: 20% per hour Bank label: _____	Build $F(t)$ when the known value 90 occurs at $t = -1$. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Input: cycle-time coordinate t Given rate: 10% per cycle Value at t minus1: 90 Bank label: _____
The clock labels the observation time as $t = -2$. Write a rule valid across $t = 0$. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Input: signed hour t Given rate: 10% per hour Value at t minus2: 300 Bank label: _____	Build a model that uses $n = 0$ before the first update and matches the observed value 120 at $n = 1$. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Domain: n nonnegative integers Input: n intervals from pre-update time Given rate: 20% per interval Value after interval1: 120 Bank label: _____

Algebra 1

Exponential Growth Models

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

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

Find the multiplier for each statement and explain why the phrases are not equivalent. Given statements: A: next value is 18% of current B: next value is 18% more than current	A trial's output increases by 140% after each launch. Determine the factor and interpret it as a percent of the preceding output. Given rate: 140% increase per launch
Give the quarterly factor for 2.5% growth as both a decimal and a fraction. Given rate: 2.5% per quarter	A quantity grows by 200% each interval. Is its factor 2 or 3? Justify. Given rate: 200% increase per interval
Find the multiplier, and state the implied percent increase. Given statement: the next count is 120% of the current count	Find the final amount after the two successive growth intervals. Initial: 100 Rates: 10%, 20%

Algebra 1

Exponential Growth Models

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

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

START

A quantity increases by 5% each interval. What multiplier represents one interval of growth? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation.

Given rate: 5% per interval

Your response: _____

Incoming: 1.05

Membership grows 12% per month. Give the monthly growth factor. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation.

Given rate: 12% per month

Your response: _____

Incoming: 100

Determine the cycle-0 quantity. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation.

Cycles: 2

Later: 675

Given rate: 50% per cycle

Your response: _____

Incoming: $A(t) = 500(1.20)^{t-3}$.

Under the continuous interval model, find $F(\frac{1}{2})$. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation.

Model: $F(t) = 180(1.44)^t$ for real $t \geq 0$

Time: $\frac{1}{2}$ interval

Your response: _____

Incoming: 1.0004

What multiplier implements the stated update after one round? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation.

Given statement: add 30% of the current amount after each round

Your response: _____

Incoming: 1.75

A measurement increases 0.1% each hour. What hourly multiplier should be used? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation.

Given rate: 0.1% per hour

Your response: _____

Algebra 1

Exponential Growth Models

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

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

Find the modeled amount after two periods. Choose a calculation route: substitute the elapsed update count directly into the model, or track successive interval multiplications when the stated time and domain permit complete updates. Explain why the selected route fits these givens, use it, and preserve the original time origin and rounding instruction.

Model: $A(n) = 100(1.10)^n$

Time: 2

What is the modeled quantity after three complete cycles? Choose a calculation route: substitute the elapsed update count directly into the model, or track successive interval multiplications when the stated time and domain permit complete updates. Explain why the selected route fits these givens, use it, and preserve the original time origin and rounding instruction.

Cycles: 3

Initial: 80

Given rate: 50% per cycle

Exponential Growth Models

Full Worked Solutions - excerpt

Worked example

Problem. Find the multiplier for each statement and explain why the phrases are not equivalent.

Given statements: A: next value is 18% of current B: next value is 18% more than current

Answer. A uses 0.18; B uses 1.18.

Explanation and check.

Percent of names the entire next amount, while percent more names an addition to the retained original.

Worked example

Problem. A quantity grows by 200% each interval. Is its factor 2 or 3? Justify.

Given rate: 200% increase per interval

Answer. The factor is 3.

Explanation and check.

The increase is two copies of the current amount; adding the retained copy makes three copies total.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Exponential Decay Models

Exponential Decay Models | A1-U07-P16

96 problems · Four activity formats

Topic focus

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

8 PDFs and a README; 59 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

Exponential Decay Models

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

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

After one 20% loss, 80 remains. What amount was present immediately before the loss? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Bank label: _____	A quantity is 45 just after it is halved. Find its value just before that event. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Bank label: _____
What input amount gives 306 after multiplication by the retention factor 0.85? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Bank label: _____	If 72 is 60% of the amount that existed before a loss, what was that earlier amount? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Bank label: _____
A modeled amount is 240 after one 4% decrease. Find the amount one interval earlier. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Bank label: _____	Find the amount two decay steps before 128 when each step retains 80%. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Bank label: _____
After three successive halvings, a quantity is 18. What was it before any halving? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Bank label: _____	An amount is 81 after four steps that each retain 75%. Find its value before the four steps. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation. Bank label: _____

Algebra 1

Exponential Decay Models

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

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

For this fictional mathematical model, write $V(y)$. The initial amount is 15000 and loses 12% per year. Let y be the elapsed years.	Construct $I(w)$ for w weeks after the reference count. The amount is 1200 at week 0 and loses 8% per week.
Model the amount after n completed filter passes and state the domain. The initial amount is 250 and loses 12% per pass. Let n be a nonnegative integer.	Write the model in hours without turning the rate into an hourly rate. The initial amount is 40 and loses 5% every 2 hours. Let t be elapsed hours.
Construct the model in years. The initial amount is 900 and loses 3% per half-year. Let y be elapsed years.	Construct the decay rule in elapsed days. The initial amount is 240 and loses 9% every 3 days. Let d be elapsed days.

Algebra 1

Exponential Decay Models

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

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

Incoming: 12.5% per step.

A constant retention factor acts twice. Determine the exact fraction lost on each action.

The amount changes from 144 to 100 after two steps.

Your response: _____

Incoming: 36% per step.

What percent is lost during each of the four equal periods? Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation.

period	**0**	**4**
quantity	256	16

Your response: _____

Incoming: 13%.

Solve for q, then state the percent loss for the update. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation.

Use $250q = 232.5$, where q is the retention factor.

Your response: _____

Incoming: 40% per period.

Determine the constant loss percentage for each of the two equal time intervals. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation.

time	**0**	**2**
value	400	225

Your response: _____

Incoming: 25% per interval.

Solve for the admissible q and express the corresponding percent loss. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation.

Use $1000q^3 = 729$ with $0 < q < 1$.

Your response: _____

Incoming: $\frac{1}{3}$ is lost per period.

For the positive decay factor q, state the percent lost per step. Use the complete requested model, rate with its interval, or amount with its units and required precision as the matching response. Retain the original time definition and explanation.

Use $250q^2 = 40$.

Your response: _____

Algebra 1

Exponential Decay Models

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

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

Choose the correct factor and state the loss represented by each rejected choice.

The amount loses 0.08% per hour. Choose among 0.92, 0.992, and 0.9992.

Audit the claimed pair and correctly interpret factor 0.23.

A student pairs $a23\%$ loss with a factor of 0.23.

Determine Q_0 and verify it by a forward substitution.

Use $Q(n) = Q_0(0.9)^n$ with the observation $Q(2) = 243$.

Exponential Decay Models

Full Worked Solutions - excerpt

Worked example

Problem. Solve $X(0)(0.8)^3 = 64$ for $X(0)$.

Answer. $X(0) = 125$.

Explanation and check.

Because $(0.8)^3 = 0.512, X(0) = \frac{64}{0.512} = 125$.

Worked example

Problem. A sequence has constant ratio 0.9 and $A_7 = 196.83$. Find A_4.

Answer. $A_4 = 270$.

Explanation and check.

There are three forward factors from index 4 to 7, so $A_4 = \frac{196.83}{(0.9)^3} = 270$.