

Algebra 1
Geometric Sequences to Exponential Models

6-topic bundle | 576 problems | Four activity formats

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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.

48 PDFs and 6 READMEs; 352 buyer PDF pages across the 6 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.

Algebra 1
Identifying Geometric Sequences

Identifying Geometric Sequences | A1-U07-P09

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for compatible ratio set, set of compatible ratios, ratio in exact form, common ratio, geometric decision and ratio and three indexed terms.
8 PDFs and a README; 59 buyer pages.

Algebra 1

Identifying Geometric Sequences

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.

For $n = 1, 2, 3, 4$, a sequence has terms 2, 6, 18, 54. Is the displayed sequence geometric? If so, give the common ratio. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification.

Index n	Given term
1	2
2	6
3	18
4	54

Bank label: _____

Determine whether 80, 40, 20, 10 has a constant multiplicative step. State that step as a common ratio. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification.

Bank label: _____

Does the finite sequence $7, -7, 7, -7, 7$ have one common ratio? Explain the alternating signs. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification.

Bank label: _____

At indices 3 through 6, the terms are $-4, 8, -16, 32$. Decide whether these consecutive terms are geometric and identify r . Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification.

Index n	Given term
3	-4
4	8
5	-16
6	32

Bank label: _____

Algebra 1

Identifying Geometric Sequences

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 table gives $a_0 = -5$, $a_1 = -15$, $a_2 = -45$, and $a_3 = -135$. Test every transition for a common ratio.

Index n	Given term
0	-5
1	-15
2	-45
3	-135

The first four terms in a table are $-81, -27, -9, -3$. Are they geometric, and why do the terms remain negative?

Index n	Given term
1	-81
2	-27
3	-9
4	-3

A table lists 3, 12, 48, 193 at consecutive indices. Test the geometric claim and identify the first transition that fails.

Index n	Given term
1	3
2	12
3	48
4	193

A table starts at $n = 4$ with $a_4 = 9$, $a_5 = 27$, $a_6 = 81$, and $a_7 = 243$. Does the nonunit starting index affect the common-ratio test?

Index n	Given term
4	9
5	27
6	81
7	243

Observed terms at $n = 1$ through 4 are 4, 12, 36, 108. State the common ratio supported by these data, then explain what the finite table does not prove about later terms.

At four consecutive indices the terms are 2, -4 , 8, -15.5 . Test the proposed geometric pattern, locate the failure, and state the term that would preserve the earlier ratio.

Index n	Given term
5	2
6	-4
7	8
8	-15.5

Algebra 1

Identifying Geometric Sequences

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 entries $\frac{5}{2}$, $\frac{5}{4}$, $\frac{5}{8}$, and $\frac{5}{16}$ are consecutive terms. Verify or reject the claim that they form a geometric sequence. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification. Your response: _____	Incoming: The common ratio is $-\frac{2}{3}$. Assume 4, 12 begin a geometric sequence. Find the next term. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification. Your response: _____						
Incoming: Yes; $r = 2$. A table row reads 243, 81, 27, 9 at consecutive indices. Determine its common ratio. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification. Your response: _____	Incoming: 48, -6 A geometric sequence has $a_2 = 1.2$ and $a_3 = 6$. Determine a_4 from the ratio in the table. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="text-align: left;">Index n</th> <th style="text-align: left;">Given term</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>1.2</td> </tr> <tr> <td>3</td> <td>6</td> </tr> </tbody> </table> Your response: _____	Index n	Given term	2	1.2	3	6
Index n	Given term						
2	1.2						
3	6						
Incoming: The sequence is geometric with $r = -\frac{1}{2}$. A geometric sequence has $a_1 = 3$ and $a_2 = 6$. Find a_3 and a_4. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="text-align: left;">Index n</th> <th style="text-align: left;">Given term</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>3</td> </tr> <tr> <td>2</td> <td>6</td> </tr> </tbody> </table> Your response: _____	Index n	Given term	1	3	2	6	Incoming: $r = \frac{1}{5}$ Use exact fraction arithmetic to test $\frac{3}{2}$, -1, $\frac{2}{3}$, $-\frac{4}{9}$ for one common ratio. Use the complete originally requested ratio or ordered list of terms as the matching response, keeping each requested position and the original geometric-assumption scope. Provide the original verification. Your response: _____
Index n	Given term						
1	3						
2	6						

Algebra 1**Identifying Geometric Sequences****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 geometric sequence 5, 15, _____, 135 has one missing term. Recover it and verify both neighboring transitions. Choose a recovery method justified by the given positions: use a quotient of known adjacent nonzero terms, or use the multiplicative relation across an index gap. Explain which information supports your choice, apply it, and check every possible ratio or missing term against the original sign and geometric conditions.

A real geometric sequence has consecutive terms 64, x , 16. Find every possible x and the corresponding common ratio. Choose a recovery method justified by the given positions: use a quotient of known adjacent nonzero terms, or use the multiplicative relation across an index gap. Explain which information supports your choice, apply it, and check every possible ratio or missing term against the original sign and geometric conditions.

Identifying Geometric Sequences

Full Worked Solutions - excerpt

Worked example

Problem. Starting with $a_9 = 125$, apply $r = \frac{1}{5}$ to complete a_{10} and a_{11} .

Answer. $a_{10} = 25$ and $a_{11} = 5$.

Explanation and check.

Successive division by 5 produces 25 and 5.

Worked example

Problem. Given $a_3 = 1$ and $r = -4$, supply the next two entries.

Answer. $a_4 = -4$ and $a_5 = 16$.

Explanation and check.

Multiply by -4 twice: 1 becomes -4 , then 16.

Algebra 1
Explicit Geometric Sequence Rules

Explicit Geometric Sequence Rules | A1-U07-P10

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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Topic focus
This topic is a focused set of 96 practice tasks on Explicit Geometric Sequence Rules.
8 PDFs and a README; 54 buyer pages.

Algebra 1

Explicit Geometric Sequence Rules

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.

Term 0 of a geometric sequence is 7. Every step doubles the preceding term. Give an explicit formula valid for whole-number indices. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____	The fifth term is 9 and the common ratio is 1. Give an anchor-form rule for all positive indices. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____
A two-sided integer-indexed geometric sequence satisfies $a_3 = -11$ and $r = 1$. State an anchor rule and its simplest equivalent form. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____	A finite geometric sequence is indexed from 1 through 14, has $a_{10} = 1024$, and uses $r = \frac{1}{2}$. Give a single explicit expression on precisely that domain. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____
The value at $n = 5$ is -32 in a geometric sequence with ratio -2. State a formula and explicitly retain the whole-number index domain. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____	<i>Abi</i>-infinite geometric sequence is indexed by all integers, has $a_{-2} = 5$, and uses $r = 3$. Build the explicit rule from that negative-index anchor. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____
State a_n for integer $n \geq 6$ if $a_8 = \frac{1}{16}$ and the sequence advances by a factor of -2. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____	For indices 1 through 9, build an anchor rule from $a_5 = \frac{3}{32}$ and $r = \frac{1}{2}$, then give an equivalent expression anchored at index 1. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. _____ Bank label: _____

Algebra 1

Explicit Geometric Sequence Rules

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.

Let m be a real number. A geometric sequence begins its stated domain at $n = 2$ with $a_2 = m$ and ratio 5. Give a formula that retains m as a parameter. 	Let q be a nonzero real number. An integer-indexed geometric sequence has $a_0 = 8$ and ratio q. Give its explicit rule for every integer index.
For real parameter c, write the positive-index geometric sequence satisfying $a_4 = c$ and $r = -3$. 	A positive-index geometric sequence has first term 8 and common ratio 0. Give an explicit rule that is valid at $n = 1$ without relying on 0^0.
At time index 0 a discrete state is -3; every later state is obtained by multiplying the current state by 0. State its explicit value for all nonnegative indices, handling the initial index explicitly. 	A sequence begins with $a_1 = 5$ and has common ratio 0; the observed $a_4 = 0$ is consistent with that rule. Write a complete explicit description rather than substituting into $5(0)^{n-1}$ at $n = 1$.

Algebra 1

Explicit Geometric Sequence Rules

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: $a_n = -81\left(-\frac{1}{3}\right)^{n-6}, n \geq 1$. For nonnegative integer n, describe the geometric sequence anchored by $a_0 = \frac{5}{2}$ with common ratio 6. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. Your response: _____	Incoming: $A_n = 50(4)^{n-3}, n \geq 1$. Indices 2 through 8 form a finite geometric list. Its index-3 entry is -7 and its ratio is -4. Give a rule only for those listed indices. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. Your response: _____
Incoming: $R_n = 15(2)^{n-7}, n \geq 1$. After discount round 2, a modeled price is 72 dollars. Every additional round retains $\frac{4}{5}$ of the preceding price, and rounds begin at 0. Write the round-n sequence. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. Your response: _____	Incoming: $a_n = 48\left(-\frac{1}{2}\right)^{n-4}, n \geq 1$. On the index domain $n \geq 4$, a geometric sequence has $a_7 = 2$ and $r = 3$. Write a rule whose exponent visibly counts from index 7. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. Your response: _____
Incoming: $a_n = 160\left(\frac{3}{4}\right)^{n-3}, n \geq 0$. Form the nth-term expression for a geometric sequence with $a_6 = -81$ and $r = -\frac{1}{3}$. Its index set is 1, 2, 3, Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. Your response: _____	Incoming: $a_n = 6(5)^{n-4}, n \geq 1$. A sequence indexed by $n = 0, 1, 2, \dots$ has $a_2 = 12$ and common ratio -2. Express a_n using the supplied anchor. Use the full requested explicit formula with its index domain, or the requested exact term value, as the matching response. Keep the original indexing and verification requirements. Your response: _____

Algebra 1

Explicit Geometric Sequence Rules

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 geometric table begins with $(n, a_n) = (1, 3)$ and $(2, 6)$. Recover its explicit nth-term rule. Choose an explicit-rule construction method: anchor the formula at a supplied indexed term, or first recover the term at the stated starting index and anchor there. Explain which is more direct for these givens, use that method, and verify all supplied indexed terms and any sign restrictions. Retain every admissible rule if the data do not select one.

Index n	Given value
1	3
2	6

The entries at indices 0 and 1 are 5 and 15 in a geometric sequence. Find r and express a_n for every nonnegative integer n . Choose an explicit-rule construction method: anchor the formula at a supplied indexed term, or first recover the term at the stated starting index and anchor there. Explain which is more direct for these givens, use that method, and verify all supplied indexed terms and any sign restrictions. Retain every admissible rule if the data do not select one.

Explicit Geometric Sequence Rules

Full Worked Solutions - excerpt

Worked example

Problem. Decide whether $a_n = 2(-1)^{n-1}$ and $b_n = -2(-1)^n$ produce the same alternating values at matching positive indices.

Answer. Yes, they are identical on $n \geq 1$.

Explanation and check.

Multiplying $(-1)^n$ by -1 is the same as lowering the exponent by one: $-2(-1)^n = 2(-1)^{n-1}$.

Worked example

Problem. Construct the positive-index rule satisfying $a_3 = -4$, $a_5 = -16$, and $r > 0$.

Answer. $a_n = -4(2)^{n-3}, n \geq 1$.

Explanation and check.

The two-step relation yields $r^2 = 4$, with real candidates ± 2 . The stated positive ratio selects 2 .

Algebra 1

Recursive Geometric Sequence Rules

Recursive Geometric Sequence Rules | A1-U07-P11

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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Topic focus

This topic is a focused set of 96 practice tasks on Recursive Geometric Sequence Rules.

8 PDFs and a README; 61 buyer pages.

Algebra 1

Recursive Geometric Sequence Rules

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.

A discrete state is -2 at time 0 and is quadrupled at every tick. Give its initial condition and one-step recurrence. Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Bank label: _____

State a recurrence for a sequence whose first declared term is $a_5 = 9$ and whose common ratio is 2. Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given indexed term	Value
a_5	9

Bank label: _____

Convert the table values $\frac{1}{3}, \frac{2}{3}, \frac{4}{3}$ at consecutive positive indices into a recursive definition. Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given index	Given value
1	$\frac{1}{3}$
2	$\frac{2}{3}$
3	$\frac{4}{3}$

Bank label: _____

Write a complete recurrence for the positive-index terms 64, -16 , 4, preserving the exact signed factor. Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given index	Given value
1	64
2	-16
3	4

Bank label: _____

Algebra 1

Recursive Geometric Sequence Rules

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.

Let c be real. Define recursively the positive-index geometric sequence with first value c and multiplier 4.

Given indexed term	Value
a_1	c

For real parameter q , write the zero-indexed recurrence having $a_0 = 7$ and common multiplier q .

Given indexed term	Value
a_0	7

Only $a_1 = 2$ and $a_3 = 18$ are known. Write every real geometric recurrence compatible with those observations, including each initial condition and update range.

Given indexed term	Value
a_1	2
a_3	18

The table shows 0 at indices 1, 2, and 3. Give two different complete geometric recurrences that extend this table and explain why the displayed values do not identify one multiplier.

Given index	Given value
1	0
2	0
3	0

A nonzero sequence value at index 5 is x . Moving one index left multiplies a value by 3. Write the forward recurrence and choose a valid initial condition at index 5 for the domain $n \geq 5$.

Given indexed term	Value
a_5	x

Starting at $a_{-2} = 3$ and multiplying the immediately prior term by -2 , fill a_{-1} , a_0 , a_1 , and a_2 .

Given indexed term	Value
a_{-2}	3

Algebra 1

Recursive Geometric Sequence Rules

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: $a_2 = 7$ and $a_3 = 7$.

For $a_0 = 8$ and $a_n = 0a_{n-1}$, find a_1 and a_2 . Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given indexed term	Value
a_0	8

Your response: _____

Incoming: $a_2 = 27$, $a_3 = 9$, and $a_4 = 3$.

A recurrence is anchored by $a_4 = \frac{1}{5}$ and multiplies by 5. Find a_5 through a_7 . Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given indexed term	Value
a_4	$\frac{1}{5}$

Your response: _____

Incoming: $a_2 = 6$ and $a_3 = -12$.

Given $a_3 = 4$ and $a_n = 5a_{n-1}$, evaluate a_4 and a_5 . Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given indexed term	Value
a_3	4

Your response: _____

Incoming: $a_1 = -10$, $a_2 = -20$, and $a_3 = -40$.

A table has 64 at index 4 and uses the multiplier $-\frac{1}{2}$. Determine the entries at indices 5, 6, and 7. Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given indexed term	Value
a_4	64

Your response: _____

Incoming: $a_3 = 10$, $a_4 = 20$, $a_5 = 40$, and $a_6 = 80$.

A geometric update starts from $a_5 = -2$ and multiplies by 4. Determine a_6 , a_7 , and a_8 . Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given indexed term	Value
a_5	-2

Your response: _____

Incoming: $a_3 = 2$, $a_4 = -\frac{2}{3}$, and $a_5 = \frac{2}{9}$.

Use the index-7 initial condition 10 and multiplier 3 to determine the next two indexed terms. Use the full requested recursive definition (initial indexed value, update and valid range), or the complete ordered list of requested term values, as the matching response. Retain the original verification.

Given indexed term	Value
a_7	10

Your response: _____

Algebra 1

Recursive Geometric Sequence Rules

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 first three terms are 2, 6, 18 at indices 1, 2, 3. Write a recursive definition that includes its starting value and valid update range. Choose how to establish the update multiplier from these givens: infer it from an available adjacent nonzero pair, or translate/use the supplied per-step multiplier or description. Explain which evidence supports your route, then give the complete recursive specification in the originally requested index form and range.

Given index	Given value
1	2
2	6
3	18

A table starts at $n = 0$ with values 5, 10, 20. State its geometric recurrence using the zero-index convention. Choose how to establish the update multiplier from these givens: infer it from an available adjacent nonzero pair, or translate/use the supplied per-step multiplier or description. Explain which evidence supports your route, then give the complete recursive specification in the originally requested index form and range.

Given index	Given value
0	5
1	10
2	20

Recursive Geometric Sequence Rules

Full Worked Solutions - excerpt

Worked example

Problem. The recurrence $a_1 = 4, a_n = a_{n-1} + 3$ is attached to the geometric table 4, 12, 36. Repair the update operation.

Answer. $a_1 = 4; a_n = 3a_{n-1}$ for $n \geq 2$.

Explanation and check.

The values triple rather than increase by 3, so the recurrence must multiply the preceding term by 3.

Worked example

Problem. Audit $a_0 = 7, a_n = 2a_{n-1}$ for $n \geq 0$. Repair the range so the initial condition is not also forced to reference an undefined a_{-1} .

Answer. $a_0 = 7; a_n = 2a_{n-1}$ for $n \geq 1$.

Explanation and check.

Index 0 is supplied directly, so the first recurrence output is index 1.

Algebra 1
Exponential Function Rules and Evaluation

Exponential Function Rules and Evaluation | A1-U07-P12

96 problems · Four activity formats

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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.

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: _____

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.

Algebra 1
Exponential Growth Models

Exponential Growth Models | A1-U07-P15
96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Exponential Growth Models.
8 PDFs and a README; 62 buyer pages.

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: <i>A</i>: next value is 18% of current <i>B</i>: 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.

Algebra 1
Exponential Decay Models

Exponential Decay Models | A1-U07-P16

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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Topic focus
This topic is a focused set of 96 practice tasks on Exponential Decay Models.
8 PDFs and a README; 59 buyer pages.

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. <table border="1" data-bbox="824 604 1469 667"> <thead> <tr> <th>period</th> <th>0</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>quantity</td> <td>256</td> <td>16</td> </tr> </tbody> </table> Your response: _____	period	0	4	quantity	256	16
period	0	4					
quantity	256	16					
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. <table border="1" data-bbox="824 1039 1469 1102"> <thead> <tr> <th>time</th> <th>0</th> <th>2</th> </tr> </thead> <tbody> <tr> <td>value</td> <td>400</td> <td>225</td> </tr> </tbody> </table> Your response: _____	time	0	2	value	400	225
time	0	2					
value	400	225					
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 a 23% 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 $A_4 = \frac{196.83}{(0.9)^3} = 270$.