Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Recursive Geometric Sequence Rules

Recursive Geometric Sequence Rules | A1-U07-P11

96 problems · Four activity formats

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.

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

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

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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. 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

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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: $a_1 = -10, a_2 = -20$, 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: $a_2 = 27, a_3 = 9$, 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: $a_3 = 10, a_4 = 20, a_5 = 40$, 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: $a_2 = 6$ 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: $a_3 = 2, a_4 = -\frac{2}{3}$, 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: _____

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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.