

Precalculus
Sequences to Linear & Exponential Models | 2-Topic Precalculus Bundle

2-topic bundle | 192 problems | Four activity formats

01 Arithmetic vs Geometric Sequences

[View individual product and its full preview](#)

02 Sequences to Linear and Exponential 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.

16 PDFs and 2 READMEs; 113 buyer PDF pages across the 2 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.

AP Precalculus
Arithmetic vs Geometric Sequences

Arithmetic vs Geometric Sequences | APPC-U02-P01

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 terms, safe explicit form, and exponential limitation, explicit rule, signs, and real-domain limitation, all ratios and sequences, possible completions, two valid completions and conclusion and classification with failure evidence.

8 PDFs and a README; 51 buyer pages.

AP Precalculus

Arithmetic vs 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.

Classify the consecutive terms 1, 4, 9, 16 as arithmetic, geometric, or neither. For the answer bank, record the classification. Complete and justify all parts of the original task in your work. _____ Bank label: _____	Determine the sequence type for $-4, -9, -14, -19$ and state its step change. For the answer bank, record the common difference. Complete and justify all parts of the original task in your work. _____ Bank label: _____
Translate $a_0=12$ and $a_n=a_{n-1}-7$ into a direct rule for whole-number n. For the answer bank, record the expression for a_n. Complete and justify all parts of the original task in your work. _____ Bank label: _____	Convert $b_n=125(0.2^{n+1})$, $n = 0, 1, 2, \dots$, to a recurrence with the correct zeroth term. For the answer bank, record the zeroth term b_0. Complete and justify all parts of the original task in your work. _____ Bank label: _____
Classify 7, 14, 28, 56 and state the common change. For the answer bank, record the common ratio. Complete and justify all parts of the original task in your work. _____ Bank label: _____	Write an explicit formula for $b_1=100$ and $b_n=b_{n-1}-15$ for $n \geq 2$. For the answer bank, record the expression for b_n. Complete and justify all parts of the original task in your work. _____ Bank label: _____
For $a_n=\frac{7-2n}{5}$ at whole-number $n \geq 0$, find a_0 and an exact recurrence. For the answer bank, record the zeroth term a_0. Complete and justify all parts of the original task in your work. _____ Bank label: _____	An arithmetic sequence has $a_{10}=1$ and decreases by 2 each step. Write a_n from $n = 1$ onward and find a_1. For the answer bank, record the first term a_1. Complete and justify all parts of the original task in your work. _____ Bank label: _____

AP Precalculus

Arithmetic vs 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.

For indices 1 through 4, the terms are 11, 11, 11, 11. Classify every arithmetic or geometric description that applies and state its invariant. 	The terms at $n = 0, 1, 2, 3$ are all 0. If a geometric classification requires defined consecutive ratios, classify the sequence and explain the zero case.
For $a_n = 5 - 3(n - 1)$, $n = 1, 2, \dots$, give the necessary initial term and a recurrence. 	An account begins with \$120, and each completed deposit adds \$25. Let n count completed deposits. Write the balance sequence and list its first three graph points.
Complete the arithmetic sequence $a_1 = 4$, $a_2 = ?$, $a_3 = 16$, $a_4 = 22$, and justify the missing term. 	Convert $g_1 = 48$ and $g_n = \left(\frac{1}{2}\right)g_{n-1}$ for $n \geq 2$ into an explicit sequence rule.

AP Precalculus

Arithmetic vs 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 Given $a_0=7$ and $a_n=a_{n-1}+4$ for $n \geq 1$, write a direct rule for whole-number n. Your response: _____	Incoming: $d = 5$ and $a_2=-1$. An arithmetic sequence has $a_3=14$ and $a_8=34$. Find its common difference and a_1. Context/domain: sequence <table border="1" data-bbox="824 611 1469 674"> <tbody> <tr> <td>3</td> <td>14</td> </tr> <tr> <td>8</td> <td>34</td> </tr> </tbody> </table> Your response: _____	3	14	8	34
3	14				
8	34				
Incoming: $r = 3$ and $a_1=-9$. A geometric sequence with positive ratio satisfies $a_2=12$ and $a_5=324$. Recover r and a_1. Your response: _____	Incoming: $d = -3$ and $a_1=31$. An arithmetic sequence satisfies $a_6=-5$ and $a_{10}=19$. Determine d and extrapolate backward to a_1. Your response: _____				
Incoming: $r = -3$, uniquely. For an arithmetic sequence indexed from 0, $a_2=5$ and $a_7=-10$. Find the common difference and a_0. Context/domain: sequence <table border="1" data-bbox="151 1472 797 1535"> <tbody> <tr> <td>2</td> <td>5</td> </tr> <tr> <td>7</td> <td>-10</td> </tr> </tbody> </table> Your response: _____	2	5	7	-10	Incoming: Geometric with ratio 0.8. A positive-ratio geometric sequence has $a_4=54$ and $a_7=2$. Recover the common ratio and a_1. Your response: _____
2	5				
7	-10				

AP Precalculus

**Arithmetic vs
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 exact terms are 2, 10, 50, 245. A student calls them geometric with ratio 5. Evaluate the claim and state the fourth term that would make it true. Student work/claim: The first two ratios equal 5, so all four given terms form a geometric sequence. Identify the first invalid step or inference in the displayed work. Correct it and complete the original task.

A student labels 10, 7, 4, 1, -3 arithmetic with $d = -3$. Decide whether the complete exact list supports the claim and repair the last term if needed. Student work/claim: Every difference in the given list is -3 . Identify the first invalid step or inference in the displayed work. Correct it and complete the original task.

Can the blank in 4, ?, 14, 19, 25 be filled so the entire exact list is arithmetic? Explain which evidence is decisive. Student work/claim: Filling the blank with 9 makes the entire list arithmetic. Identify the first invalid step or inference in the displayed work. Correct it and complete the original task.

Arithmetic vs Geometric Sequences

Full Worked Solutions - excerpt

Worked example

Problem. Given $a_0 = 7$ and $a_n = a_{n-1} + 4$ for $n \geq 1$, write a direct rule for whole-number n .

Answer. $a_n = 7 + 4n$ for $n = 0, 1, 2, \dots$

Explanation and check.

From index 0 to index n there are n additions of 4, so the term is $7 + 4n$.

Worked example

Problem. Starting at $a_3 = 81$, each later term is one third of the previous term. Write the explicit rule for $n \geq 3$.

Answer. $a_n = 81\left(\frac{1}{3}\right)^{n-3}$.

Explanation and check.

The exponent is zero at the first allowed index and counts the subsequent divisions by 3.

AP Precalculus

Sequences to Linear and Exponential Models

Sequences to Linear and Exponential Models | APPC-U02-P02

96 problems · Four activity formats

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Topic focus

Across 96 tasks this topic asks for differences, ratios, interpretation, domain judgment, domain distinction, two compatible models, existence and reason and class and amount.

8 PDFs and a README; 62 buyer pages.

AP Precalculus

Sequences to Linear
and 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.

Extend $a(n) = -4 + 1.5n$ from whole-number indices to all real x and evaluate $f(-2)$. For the answer bank, record the complete response required by the original task; use the given context to distinguish responses that share a numerical value. _____ Bank label: _____	An account begins with \$140 and receives exactly \$25 each week with no interest. Is the weekly pattern linear or exponential, and what is the balance after one week? For the answer bank, record the complete response required by the original task; use the given context to distinguish responses that share a numerical value. _____ Bank label: _____
A sequence starts at 18 and increases by 6 per index. If the constant rate is extended between indices, what is its value at index 2.5? For the answer bank, record the complete response required by the original task; use the given context to distinguish responses that share a numerical value. The starting value is the value at index 0. _____ Bank label: _____	A material starts at 250g and loses 12% of current mass per hour. Give its factor and model. For the answer bank, record the complete response required by the original task; use the given context to distinguish responses that share a numerical value. _____ Bank label: _____

AP Precalculus

Sequences to Linear
and Exponential 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. A value without its unit is not a complete answer.

The sequence rule is $a(n) = 3 + 2n$ for whole-number n at least 0. Extend the same linear rule to real x at least 0, then find $f(2.5)$. 	Exact samples at $x = 0, 1, 2, 3$ are 5, 8, 11, 14. Which model class is consistent, and what does the finite table not prove? Context/domain: real-input data <table border="1"> <tbody> <tr><td>0</td><td>5</td></tr> <tr><td>1</td><td>8</td></tr> <tr><td>2</td><td>11</td></tr> <tr><td>3</td><td>14</td></tr> </tbody> </table> 	0	5	1	8	2	11	3	14
0	5								
1	8								
2	11								
3	14								
A balance starts at \$200 and rises each hour by 10% of the initial \$200, not its current value. Construct a real-time rule and classify it. 	For exact points (0, 1), (2, 7), and (5, 16), compare change per input unit rather than raw differences. Which class is supported? Context/domain: real-input data <table border="1"> <tbody> <tr><td>0</td><td>1</td></tr> <tr><td>2</td><td>7</td></tr> <tr><td>5</td><td>16</td></tr> </tbody> </table> 	0	1	2	7	5	16		
0	1								
2	7								
5	16								
$L(x) = 4 + 16x$ and $E(x) = 4(3^x)$ share (0, 4) and (2, 36). Compare their values at $x = 1$. Context/domain: matched models <table border="1"> <tbody> <tr><td>0</td><td>4</td></tr> <tr><td>2</td><td>36</td></tr> </tbody> </table> 	0	4	2	36	A linear table gives 10, 15, 20 and an exponential table gives 10, 15, 22.5 at $x = 0, 1, 2$. After the shared +5, what differs? 				
0	4								
2	36								

AP Precalculus

Sequences to Linear
and Exponential 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

Production starts at 12 units and adds 6 units per minute. Write the model. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Your response: _____

Incoming: Both give factor 0.8: $\sqrt{0.64} = 0.8$ and cube root of $0.512 = 0.8$.

A sequence has value -2 at index 0 and adds 5 at each next whole-number index. Extend its constant-rate rule to real x and evaluate it at $x = -1.5$. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Your response: _____

Incoming: L keeps $+5$ while ratios fall; E keeps ratio 2 while increments grow 5, 10, 20.

At consecutive inputs $-2, -1, 0, 1$, the exact outputs are $-7, -2, 3, 8$. Classify the data from their change pattern. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Context/domain: integer samples

-2	-7
-1	-2
0	3
1	8

Your response: _____

Incoming: Linear: 105. Exponential: 15.

A population starts at 90 and grows 7% of current size per year. Write the model. Use the complete final response to identify the next Match & Move card; show the reasoning required by the original task.

Your response: _____

AP Precalculus

**Sequences to Linear
and Exponential 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.

A display begins with 46 items and staff add exactly 7 items each day. Classify the model and find the count after four days. Student work: exponential; 74 items. Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens.

Use $L(x) = 12 + 6x$ and $E(x) = 12(2^x)$ to refute “same starting value means same change.” Identify the precise error or unsupported step in the stated claim or method, then give the corrected conclusion and justify it from the supplied information.

Pallet count is $p(n) = 40 + 6n$ after n completed trucks. Does $p(2.5) = 55$ describe a sequence term in this context? Student work: No. The algebraic line gives 55, but 2.0 completed trucks is outside the stated event domain. Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens.

An amount starts at 400mg and loses 5% of its current amount each hour. Classify the change and find the amount after two hours. Student work: linear decay; 361mg. Identify the precise mathematical error or omitted condition, then complete the original task and verify the correction from the supplied givens.

Sequences to Linear and Exponential Models

Full Worked Solutions - excerpt

Worked example

Problem. A tank starts with $500L$ and drains at a fixed $30L$ per day. Write the model and name its change type.

Answer. $V(t) = 500 - 30t$, a linear decrease while $V(t) \geq 0$.

Explanation and check.

A fixed amount per time unit gives slope -30 rather than a percentage.

Worked example

Problem. An investment starts at \$ 600 and grows 5% of its current balance per year. State its factor and continuous-time rule.

Answer. The factor is 1.05 , so $B(t) = 600(1.05^t)$.

Explanation and check.

Current-value growth preserves a 1.05 multiplier while dollar increments change.