AP Precalc

Write your questions and thoughts here!

2.1 Change in Arithmetic and Geometric Sequences

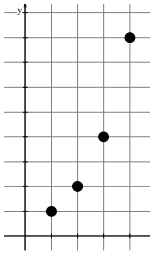
2.1 Notes

What is a sequence?

- A sequence is an ordered list of numbers. It could be finite or infinite.
- Each listed number is a term.

$\{1, 2, 4, 8, \dots\}$

The graph of a sequence contains discrete points, not a connected line or curve.



Arithmetic Sequence

If each successive term in a sequence has a _____ (or a constant rate of change), the sequence is called **arithmetic**. The nth term of an arithmetic sequence is given by

$$a_n =$$

where ___ is the initial value [zero term] and ___ is the common difference.

1. Find an equation (rule) that represents the sequence $\{2, 5, 8, 11, \dots\}$. Using your equation, find the 100^{th} term of the sequence?

You can write the equation for the sequence using ANY term, not just the initial term.

$$a_n =$$

where _____ is the _____ term of the sequence.

2. What are other ways a rule can be written for the sequence $\{2, 5, 8, 11, \dots\}$

***k*th term**	**Equation** $\boldsymbol{a_n = a_k + d(n - k)}$
$k = 1$	$a_n =$
$k = 2$	$a_n =$
$k = 3$	$a_n =$
$k = 4$	$a_n =$

3. Subtraction is still arithmetic. It is adding a negative number. Find an equation for the sequence $\{7, 2, -3, -8, \dots\}$ using the 1^{st} term $(k = 1)$ to set your rule.

Write your questions and thoughts here!

Geometric Sequence

If each successive term in a sequence has a _____ (or constant proportional change), the sequence is called geometric. The nth term of a geometric sequence is given by

$$g_n =$$

where ____ is the initial value [zero term] and ____ is the common ratio.

4. Find an equation (rule) that represents the sequence $\{2, 6, 18, 54, \dots\}$.

You can write the equation for the sequence using ANY term, not just the initial term.

$$g_n =$$

where ____ is the ____ term of the sequence.

5. What are other ways a rule can be written for the sequence $\{2, 6, 18, 54, \dots\}$

6. Division is still geometric. It is multiplying by a fraction between 0 and 1. What is a rule for the sequence $\{64, 16, 4, 1, \dots\}$ for $k = 1$?

2.1 Change in Arithmetic and Geometric Sequences

AP Precalculus

2.1 Practice

Find an equation that gives the nth term of each sequence. Use the initial value $(k = 0)$ of the sequence in your equation.

1. $\{9, 27, 81, 243, \dots\}$	2. $\{-4, -1, 2, 5, \dots\}$	3. $\{-1, -4, -16, -64, \dots\}$

Find an equation that gives the *n*th term of each sequence. Use the initial value ($k = 0$) of the sequence in your equation.

4. $\left\{10, 5, \frac{5}{2}, \frac{5}{4}, \ldots\right\}$

5. $\{-5, -9, -13, -17, \ldots\}$

6. $\left\{\frac{4}{3}, 1, \frac{3}{4}, \frac{9}{16}, \ldots\right\}$

Find an equation that gives the *n*th term of each sequence. Instead of the initial value use the *k*th term of the sequence in your equation. *k* is given for each problem.

7. $\left\{75, 15, 3, \frac{3}{5}, \ldots\right\}$ $k = 2$

8. $\{44, 36, 28, 20, \ldots\}$ $k = 4$

9. $\{-10, -100, -1{,}000, -10{,}000, \ldots\}$ $k = 3$

10. $\{11, 22, 33, 44, \ldots\}$ $k = 2$

11. $\left\{\frac{9}{4}, \frac{3}{2}, 1, \frac{2}{3}, \ldots\right\}$ $k = 3$

12. $\left\{\frac{1}{9}, \frac{1}{3}, 1, 3, \ldots\right\}$ $k = 2$

Find the *n*th term of each sequence. Write an equation for each sequence before finding the nth term.

13. $\{105, 95, 85, 75, \ldots\}$ What is the 87^{th} term?

14. $\left\{\frac{1}{6}, 1, \frac{11}{6}, \frac{8}{3}, \ldots\right\}$ What is the 34^{th} term?

15. $\{-86, -80, -74, -68, \ldots\}$ What is the 52^{nd} term?

16. $\{-21, -25, -29, -33, \ldots\}$ What is the 120^{th} term?

17. Which of the following equations could represent the sequence $\{10, 2, -6, -14, \ldots\}$?

I. $f(n) = 10 - 8(n-1)$ II. $f(n) = -8 + 10n$ III. $f(n) = -8 + 10(n-1)$

IV. $f(n) = 18 - 8n$ V. $f(n) = 10 - 8n$ VI. $f(n) = 2 - 8(n+2)$

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18. Which of the following equations could represent the sequence $\left\{\frac{1}{2}, 2, 8, 32, \ldots\right\}$?

I. $f(n) = \frac{1}{2}\left(\frac{1}{4}\right)^{n-1}$ II. $f(n) = \frac{1}{2}(4)^{n-1}$ III. $f(n) = 8(4)^{n+3}$

IV. $f(n) = 2\left(\frac{1}{4}\right)^{n-2}$ V. $f(n) = \frac{1}{8}(4)^{n}$

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19. The first term of an arithmetic sequence is 4, and the common difference of the sequence is 3. What is the seventh term of the sequence?

(A) 22 (B) 25 (C) 972 (D) 2,916