

Warm Up:

Write the formula for the n th term of each arithmetic sequence. Then write the first five terms of the sequence.

*** REMINDER from Module 4: $a_n = a_1 + d(n - 1)$ ***

1. $a_1 = 4, d = 3$ (Example)

$$a_n = 4 + 3(n - 1)$$

$$a_n = 4 + 3n - 3$$

$$a_n = 3n + 1$$

First 5 Numbers: 4, 7, 10, 13, 16

2. $a_1 = -3, d = 5$

3. $a_1 = 2, d = -4$

Speak Like A Mathematician

geometric sequence: a _____ of numbers that begins with a non-

_____ term and each term after is found by _____

the previous term by a non-zero constant, r .

common ratio: the ratio of _____ terms of a

_____ sequence.

explicit formula: a way to define a _____ or function

directly in terms of its input.

How can I meet today's standards?

*I can **generate geometric sequences and write exponential functions** by using common ratios.*

Example 1 & 2: Geometric Sequences

Determine whether the geometric sequences are geometric.

- A) -432, 144, -48, 16, ...
- B) 4, 9, 25, 36, ...
- C) 16, 12, 8, 4, ...

D)

n	a_n
1	36
1	-18
3	9
4	-4.5

Example 3: Find Terms of Geometric Sequences

Find the next three terms in each geometric sequence.

- A) 64, 16, 4, 1, ...
- B) 8, 12, 18, 27, ...
- C) 3, -6, 12, -24, ...
- D) 96, 48, 24, 12, ...

Key Concept: Geometric Sequences as Exponential Functions

Terms	Symbols	In Terms of a_1 and r	Example
1st Term			
2nd Term			
3rd Term			
4th Term			
5 th Term			
6 th Term			
7 th Term			

Function for Finding the n th
Term of Any Geometric Sequence

Example 3: Find Terms of Geometric Sequences

Use an explicit formula to find the n^{th} term of each sequence.

A) 512, 256, 128, 64, ... find a_{11} .

B) -8, 24, -72, 216, ... find a_9

C) 5, 3, 1.8, 1.08, ... find a_8 .

Example 4: Find Terms of Geometric Sequences

A) North Dakota's population is increasing more quickly than any other state. In 2011, the population was 685,242 and it has been increasing by an average of 2.5% each year. If this trend continues, determine the estimated population in 2030.

B) Although vinyl record sales make up only a small percentage of the music market, they are becoming more popular. Global record sales have been increasing at an average rate of 26% each year. Global record sales in 2014 were \$267 million. Determine the estimated vinyl record sales for 2025.