

Name: _____

Date: _____

UNIT 5

LESSON 6

DO NOW: Which of the following sequences is a geometric sequence?

(a) {2, 4, 6, 8, 10, ...}

(b) {2, 4, 8, 16, 32, ...}

(c) {2, 4, 7, 11, 16, ...}

(d) {2, 8, 14, 20, 26, ...}

AIM: How can we use the explicit formula to find the n^{th} term in a geometric sequence?

Geometric Formula to find the n^{th} term

$$a_n = a_1 r^{n-1}$$

Vocabulary of Sequences

a_1 = the first term in the sequence

a_n = the n^{th} term in the sequence

n = the term number

r = the common ratio

***You do NOT have to memorize! It's on the reference sheet!**

1. Given the geometric sequence 2, 6, 18, 54.....

$a_1 =$

a) Write the explicit formula

$r =$

Sequence term	a_n
a_1	
a_2	
a_3	
a_4	
a_5	

b) Use the explicit formula to find the 12th term.

2. Given the geometric sequence 160, 80, 40

$a_1 =$

a) Write the explicit formula

$r =$

Sequence term	a_n
a_1	
a_2	
a_3	
a_4	
a_5	

b) Use the explicit formula to find the 8th term.

To summarize the process of writing a recursive formula for a geometric sequence:

1. Determine if the sequence is geometric (*Do you multiply or divide the same amount from one term to the next?*)
2. Find the common ratio. (*The number you multiply or divide.*)
3. Create a recursive formula by stating the first term, and then stating the formula to be the common ratio times the previous term.

$a_1 = \text{first term}$ ← always state first term

$a_n = r \cdot a_{n-1}$

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common ratio previous term

3. Consider the sequence following: 3, 9, 27, 81...

a) Write a *recursive formula* for the sequence.

b) Write an *explicit formula* for the sequence.

c) Use the explicit formula to find the 10th term.

4. Consider the sequence following: 4, 8, 16, 32, 64...

a) Write a *recursive formula* for the sequence.

b) Write an *explicit formula* for the sequence.

c) Use the explicit formula to find the 16th term.

***STRATEGIES for answering multiple choice questions below:

- First determine whether the sequence is arithmetic or geometric.
- Then write down the sequence formula from the reference sheet.
- Eliminate choices that do not resemble the formula!
- If needed, plug in terms into the choices left over!

$$a_n = a_1 r^{n-1}$$

OR

$$a_n = a_1 + (n - 1)d$$

5. A sequence has the following terms: $a_1 = 4$, $a_2 = 10$, $a_3 = 25$, $a_4 = 62.5$. Which formula represents the n th term in the sequence?

- 1) $a_n = 4 + 2.5n$
- 2) $a_n = 4 + 2.5(n - 1)$
- 3) $a_n = 4(2.5)^n$
- 4) $a_n = 4(2.5)^{n-1}$

6. What is a formula for the n th term of sequence B shown below?

$$B = 10, 12, 14, 16, \dots$$

- 1) $b_n = 8 + 2n$
- 2) $b_n = 10 + 2n$
- 3) $b_n = 10(2)^n$
- 4) $b_n = 10(2)^{n-1}$

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EXIT TICKET

Given the geometric sequence 16, 32, 64, 128.....

a) Write the *explicit formula for the sequence*.

$$a_n = a_1 r^{n-1}$$

b) Use the explicit formula to find the 17th term.

c) Write a *recursive formula* for the sequence.