Name: _____ Date: _____

13.5 NOTES: Explicit Formulas for Geometric Sequences Algebra 1

Warm-up: Identify the following sequences as arithmetic, geometric, or neither.

1. $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \ldots$.

2. 1, 1, 2, 3, 5, 8, 13,

3. -3, -2, -1, 0,

4. 8, 11, 14, 17, . . .

Consider the following geometric sequence.

$a_1, a_2, a_3, a_4, \ldots$

3, 6, 12, 24, . . .

a_1 =_____

r = _____

Each term in a geometric sequence can be expressed in terms of the first term, a_1, and the common ratio, *r*.

term	symbol	numbers	In terms of a_1 and *r*
first term	a_1	3	a_1
second term			
third term			
fourth term			
. . .	. . .	. . .	. . .
n^{th} term			

Now, use the formula above to find the 15^{th} term.

This is the _____ form of a geometric sequence. Locate it on your reference sheet.

Find a_{21}.

5. -0.5, -1, -2, -4, -8, -16, . . .

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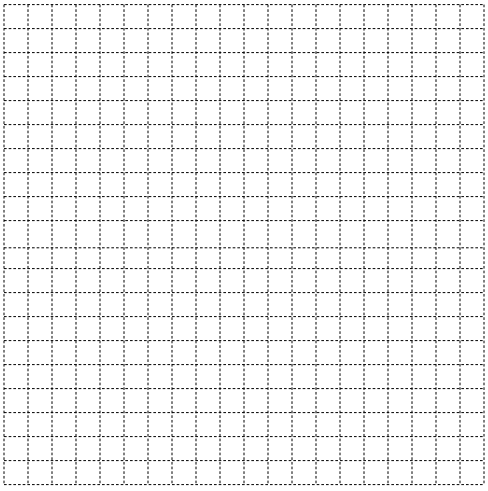
6. a. Write an *explicit* equation for the n^{th} term of the geometric sequence 1, 3, 9, 27, . . .

b. Write the 9^{th} term of the sequence.

c. Graph the first five terms of the sequence.

n	a_n	(n, a_n)



So, does a geometric sequence graph to be linear or exponential?
(circle one)

Let's review what you know so far by filling in the following chart.

	Arithmetic	Geometric
Recursive formula		
Explicit formula		

Practice:

7. Consider the following geometric explicit formula: $a_n = 2(3)^{n-1}$
   a. Identify the first term of the sequence, a_1, and the common ratio, r.

   b. Write the first five terms of the sequence.

   c. Find a_{17}.

8. Write an *explicit* equation for the n^{th} term of the geometric sequence below.

$$\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \ldots.$$

9. Find a_{11}.

3, -15, 75, -375, . . .

Challenge Problems:

10. Find a_{20}.

17,000, 18,190, 19,463.3, 20,825.731 . . . .

11. Find a_9 of a sequence whose *recursive* formula is given below.

$$a_n = \frac{1}{2}a_{n-1},\ a_1 = 4 \text{ and } n \geq 2$$