

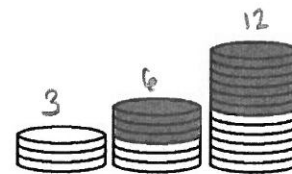
Name: _____ Per: _____ Date: _____

Serafino • Algebra 2E

8B

Geometric Sequences

Classwork/ HW Packet



I get bored again and start stacking quarters. This time, I start with a stack of 3 and each day, the stack doubles in size. How many quarters will I have on the 19th day?

This is an example of a **geometric sequence**. Others include: 3, 9, 27, 81... or 20, -10, 5, -5/2 ...

A geometric sequence is a: _____

Let: n = position of the term a_n = term in the n th position r = common ratio

Explicit Formula: $a_n = a_1 \cdot r^{(n-1)}$ or $a_n = a_k \cdot r^{(n-k)}$

Recursive Formula: $a_n = a_{n-1} \cdot r$ (must provide a_1)

Arithmetic or Geometric Sequence? Tell me which, if any, and give me d or r .

1. 1, -5, 25, -125 ...

4. 1, 3, 6, 10, ...

2. 120, 60, 20, 5 ...

5. 90, 60, 40...

3. 5, -5, -15, -25 ...

6. 10, 100, 1000, 10000 ...

Provide Recursive and Explicit Formulas based on the first few terms of a sequence. Then find the 50th term.

7. 1, 5, 25, 125 ...

 $r =$

n	1	2	3	4	7
a_n					

Recursive: _____

Explicit: _____

8. 2, -6, 18, -54 ... $r =$

n	1	2	3	4	10
a_n					

Recursive: _____

Explicit: _____

9. 2000, 500, 125, 31.25 ... $r =$

n	1	2	3	4	8
a_n					

Recursive: _____

Explicit: _____

Given one formula, give the first 4 terms and 50th term in the sequence, and the other formula.10. Recursive Formula: $a_n = a_{n-1} \cdot 3$; $a_1 = 7$

n	1	2	3	4	8
a_n					

Explicit: _____

11. Recursive Formula: $a_n = a_{n-1} \cdot \frac{1}{2}$; $a_1 = 32$

n					10
a_n					

Explicit: _____

12. Explicit Formula: $a_n = 6 \cdot -2^{n-1}$ $r =$ _____

n	1	2	3	4	9
a_n					

Recursive: _____

13. Explicit Formula: $a_n = -2 \cdot 3^{n-1}$ $r =$ _____

n	1	2	3	4	11
a_n					

Recursive: _____

Now, I will only give you one term in the sequence and the common ratio.

14. $a_6 = 64$ $r = 2$

n	1	2	3	4	12
a_n					

Recursive: _____

$a_1 =$ _____

Explicit: _____

15. $a_4 = 100$ $r = 1/3$

n	1	2	3	4	5
a_n					

Recursive: _____

$a_1 =$ _____

Explicit: _____

16. $a_{11} = -1$ $r = -1$

n	1	2	3	4	50
a_n					

Recursive: _____

$a_1 =$ _____

Explicit: _____

I also can only give you two terms in the geometric sequence. DON'T "CHEAT" – use the formula.

17. $a_4 = -8$ $a_5 = -40$ $r =$ _____

n	1	2	3	4	7
a_n					

Recursive: _____

$a_1 =$ _____

Explicit: _____

18. $a_6 = -96$ $a_9 = 768$ $r =$ _____

n	1	2	3	4	7
a_n					

Recursive: _____

$a_1 =$ _____

Explicit: _____

Sometimes, there are TWO options for r.

19. $a_3 = 36$ $a_5 = 324$ $r =$ _____

n					8
a_n					

Recursive: _____

$a_1 =$ _____

Explicit: _____

20. $a_2 = 12$ $a_6 = 192$ $r =$ _____

n					8
a_n					

Recursive (1): _____

$a_1 =$ _____

Recursive (2): _____

$a_1 =$ _____

Explicit (1): _____ (2) _____

Find if a number is a member of a sequence. If it is, tell me which term. If not, between which two terms?

21. 4, 8, 16, ...

Is 1024 a member? _____

22. -20,000, 10,000, -5,000, 2,500

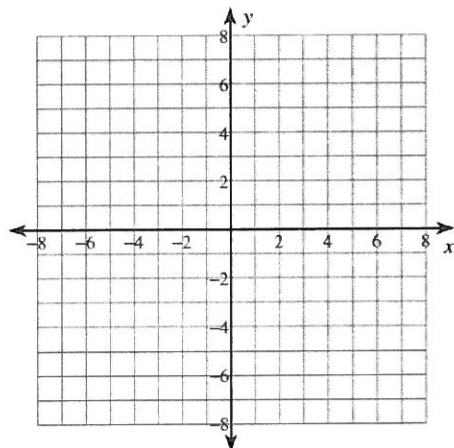
Is -625 a member? _____

Is 16,380 a member? _____

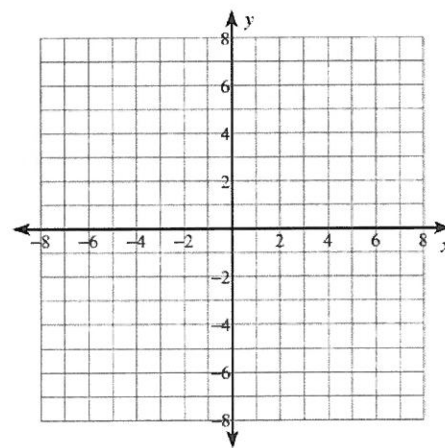
Is 625 a member? _____

23. Again, graphing is easy. Just plot the points. Don't connect. Start with $n = 1$.

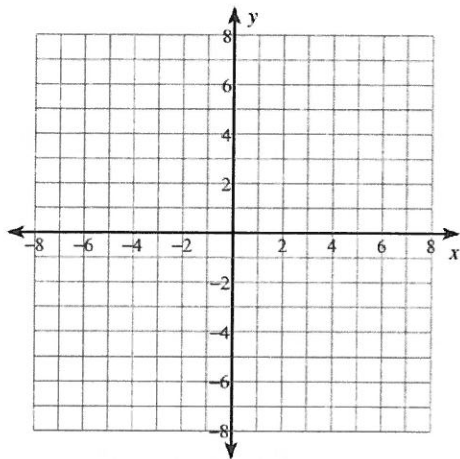
a. $a_n = 3(2)^{n-1}$



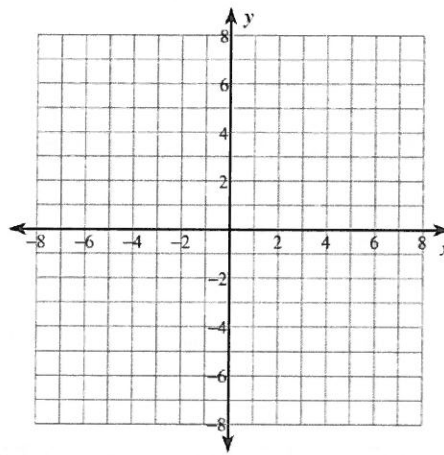
b. $a_n = 8(0.5)^{n-1}$



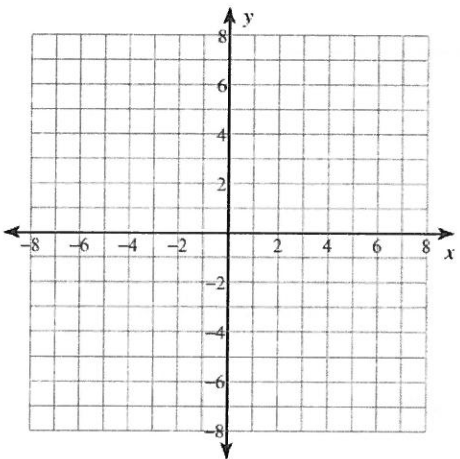
c. $a_n = -4(-1)^{n-1}$



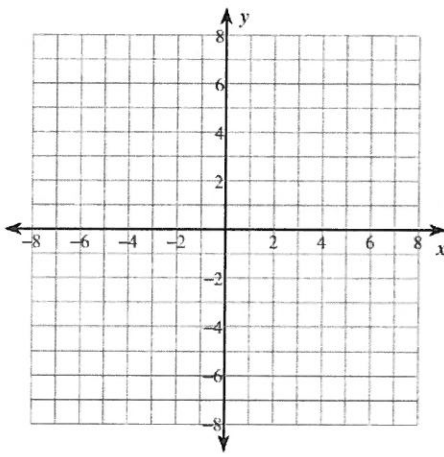
d. $a_n = 8(-0.5)^{n-1}$



e. $a_n = -1(2)^{n-1}$



f. $a_n = 1/2(-4)^{n-1}$



Put it all together! Do the following on a separate piece of paper

- Circle the letters that are geometric sequences. Give the explicit formula and use it to identify the 8th term.

a. 2, 4, 8, 12 ...	b. 100, 150, 225, ...	c. 3, -9, 27, ...
d. 21, 16, 11, 6 ...	e. $5/3, 5/9, 5/27, \dots$	d. -5, 5, -5 ...
- Stay fresh! In # 1, put a star next to the arithmetic sequence. Write the explicit formula:
- Get the first term in each sequence:
 - The 5th term is 16, 000,000, the common ratio is -20. .
 - The 6th term is -64. The common ratio is -2.

4. In each of the geometric sequences, find r and fill in the missing terms (indicate \pm if there are two possibilities).

a. 8, _____, 32, _____ ...

c. _____, 14, _____, 126 ...

b. _____, 400, _____, _____, 6.25 ...

d. -2, _____, _____, _____, _____, 2048...

5. Given the sequence: 17, -34, 68, -136, ...

Recursive: _____ Explicit: _____ a_{13} : _____

6. The $a_{12} = \frac{177147}{4096}$ and $a_{15} = \frac{45395}{311}$ (Keep in fraction form. Let your calculator do the work)

First 5 terms: _____

Recursive: _____ Explicit: _____ a_5 : _____

7. The 3rd term in a sequence is $\frac{9}{8}$. The 6th term is $\frac{243}{8}$.

a. How many possibilities exist for r ?

b. How many possibilities exist for a_1 ?

c. Write all possible explicit formulas that would capture this sequence.

8. The 3rd term in a sequence is -6. The 5th term is -13.5.

a. How many possibilities exist for r ?

b. How many possibilities exist for a_1 ?

c. Write all possible explicit formulas that would capture this sequence.

9. The 4th term in a sequence is -4. The 8th term is -5,184.

a. How many possibilities exist for r ?

b. How many possibilities exist for a_1 ?

c. Write all possible explicit formulas that would capture this sequence.

