

DO NOW: Write the first 4 terms of the recursive sequence:

$$a_1 = -5$$

$$a_n = 2 \cdot a_{n-1}$$

AIM: HOW CAN WE USE THE EXPLICIT FORMULA TO SOLVE FOR GEOMETRIC SEQUENCE WORD PROBLEMS?

Geometric Sequence Formula: $a_n = a_1 r^{n-1}$



ON
Reference
Sheet

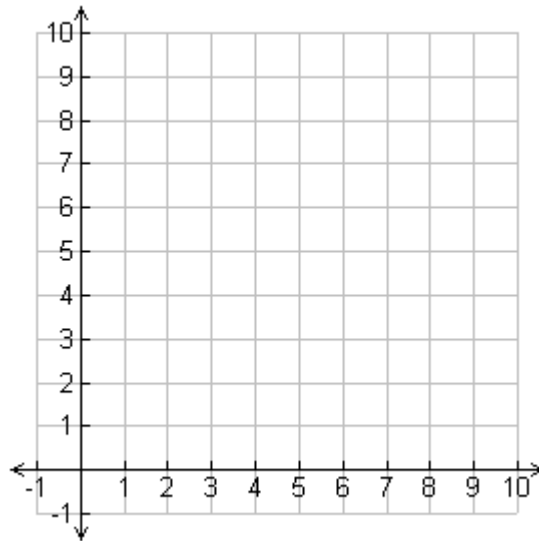
Geometric Recursive Formula: _____



NOT ON
Reference
Sheet

1. A ball is dropped from 8 feet. When it bounces, it rises to 50% of the height from which it was dropped.
a) Fill in the table.

Peaks	Height
0	8
1	
2	
3	
4	
5	
6	



- b) What type of graph will the ball represent? _____
- c) Write the explicit formula for this sequence. _____
- d) Write the recursive formula for this sequence. _____

2. Thomas is saving pennies in a jar. The first day he saves three pennies, the second day twelve pennies, the third day forty-eight pennies, and so on. How many pennies does Thomas save on the eighth day?

3. A salesman offered to sell David a new \$48,000 car for 15 monthly payments. He said the first payment would be \$3 and would then double each month for the 15 months.

a) If David accepts the seemingly great deal, what would his 12th payment be?

b) What would his last payment be?

c) Should he accept the deal? Explain.

4. What is the formula for the n th term of the sequence 100, 50, 25...?

1) $a_n = \left(\frac{1}{2}\right)^n$

2) $a_n = 100\left(\frac{1}{2}\right)^n$

3) $a_n = 100\left(\frac{1}{2}\right)^{n-1}$

4) $a_n = 100^n$

5. A large snowfall of 45 inches fell on Buffalo.
- If one-third of the snow melts each day, how much snow will remain after Day 1?
 - Write a recursive formula for the sequence.
 - Write an explicit formula for the sequence.
 - After 5 days, will there be more or less than an inch of snow on the ground. Explain.
 - If you were to graph the sequence of the snowfall, what type of graph would it be?

6. A virus reproduces by dividing into two, and after a certain growth period, it divides into two again. As the virus continues to reproduce, it will continue to divide in two. How many viruses will be in a system starting with a single virus AFTER 10 divisions?
- Is the sequence arithmetic or geometric?
 - Write an explicit formula for the sequence.
 - How many viruses will be in a system starting with a single virus AFTER 10 division?
7. Suppose you drop a tennis ball from a height of 15 feet. After the ball hits the floor, it rebounds to 85% of its previous height. How high will the ball rebound after its third bounce? Round to the nearest tenth.
- Is the sequence arithmetic or geometric?
 - Write an explicit formula for the sequence.
 - Use the explicit formula to solve the problem.

2. A virus reproduces by dividing into two, and after a certain growth period, it divides into two again. As the virus continues to reproduce, it will continue to divide in two. How many viruses will be in a system starting with a single virus AFTER 10 divisions?

a. Is the sequence arithmetic or geometric? Explain your answer.

The virus is dividing by 2 a.k.a. multiplied by $\frac{1}{2}$

b. Write out the sequence using blanks where appropriate. Fill in the first three terms.

1, 2, 4, 8, 16, ...

c. Write an explicit formula for the sequence.

$$g_n = 2(2)^{n-1}$$

d. How many viruses will be in a system starting with a single virus AFTER 10 divisions?

$$g_{10} = 2(2)^{10-1} = 2(2)^9 = \boxed{1024}$$

e. Write your final answer as a sentence.

There will be 1024 viruses after 10 divisions.

2. Suppose you drop a tennis ball from a height of 15 feet. After the ball hits the floor, it rebounds to 85% of its previous height. How high will the ball rebound after its third bounce? Round to the nearest tenth.

a. Write an explicit formula for the sequence. Explain where you found the numbers you are putting in the formula.

$$a_n = 15(.85)^{n-1}$$

15 → 1st term / starting point
r = .85 → amount multiplied by each bounce.

b. Identify the value of n and explain where you found it. Use the explicit formula to solve the problem.

$$n = 3$$

$$a_3 = 15(.85)^{3-1} = 15(.85)^2 = \boxed{10.84}$$

c. Write your final answer as a sentence.

After the 3rd bounce the ball rebounds to a height of 10.84 ft.