Unit 1 Study Guide

Name Study Guide

1. A millionaire decides to give away half of his savings to charity every year. Would this be an example of an arithmetic or geometric sequence? Would it be increasing or decreasing?

Geometric, decreasing $r = \frac{1}{2}$

2. Hermione casts a spell on 5 coins. Every minute the number of coins increases by a factor of 10. How many minutes would it take for the number of coins to exceed 1,000,000?

$f(n) = 50 \cdot 10^{n-1}$

n	f(n)
0	5
1	50 ×10
2	500 ×10
3	5,000 ×10
4	50,000 ×10
5	500,000 ×10
6	5,000,000

3. Write the recursive equation for the equation $f(x) = 3 \cdot 8^{x-1}$

$f(1) = 3$

$f(x) = f(x-1) \cdot 8$

4. Given the first term, f(1) = 8 and the common difference of 3, find the first 5 terms.

8, 11, 14, 17, 20

n	f(n)
1	8 +3
2	11 +3
3	14 +3
4	17 +3
5	20

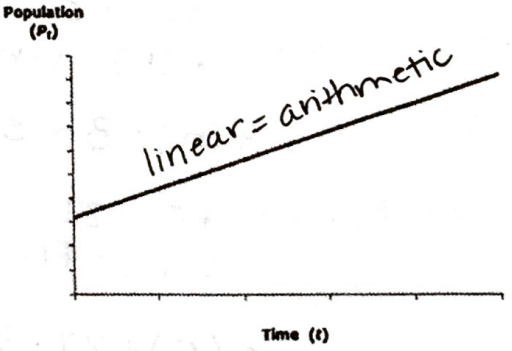
5. Which sequence could produce a graph similar to the population model shown?

✓ 20, 25, 30, 35, 40 arithmetic increasing

× 20, 40, 80, 160, 320 geometric

× 20, 15, 10, 5, 0 arithmetic decreasing

× 20, -40, 80, -160, 320 geometric



6. Given $f(n) = 5 \cdot (2.5)^{x-1}$ identify the common ratio and indicate if the function is increasing or decreasing.

$r = 2.5$, increasing

$f(n) = 1^{st}\text{ term} \cdot (\text{common ratio})^{n-1}$

7. Given the table below, what is the correct explicit equation?

0	1	2	3	4
5	20	80	320	1280

$f(n) = 20 \cdot 4^{(n-1)}$

8. Fill in the values to make a table that is arithmetic, geometric, and neither:

Arithmetic		Geometric		Neither	
Term	Value	Term	Value	Term	Value
1	2	0	2	0	1
2	4	1	4	1	-1
3	6	2	8	2	3
4	8	3	16	3	-3
5	10	4	32	4	5

9. Make an example of each of the following:

Arithmetic/Recursive Equation - $f(1) = 8$, $f(n) = f(n-1) + 3$

Arithmetic/Explicit Equation - $f(n) = 8 + 3(n-1)$; $f(n) = 3n + 5$

Geometric/Recursive Equation - $f(1) = 27$, $f(n) = f(n-1) \cdot \frac{1}{3}$

Geometric/Explicit Equation - $f(n) = 27 \cdot \frac{1}{3}^{(n-1)}$

10. Convert the recursive formula $f(n) = f(n-1) + 14$ with $f(0) = 2$ to an explicit equation:

$f(n) = 16 + 14(n-1)$; $f(n) = 2 + 14n$

11. List the first 4 terms for each of the following sequences:

a) $f(x) = 8 + 2x$

b) $f(x) = f(x-1) \cdot 2 \quad f(1) = 8$

c) $f(x) = 8 \cdot (\frac{1}{2})^{x-1}$

d) $f(x) = f(x-1) - 2 \quad f(1) = 8$

a)

n	f(n)
1	10
2	12
3	14
4	16

b)

n	f(n)
1	8
2	16
3	32
4	64

c)

n	f(n)
1	8
2	4
3	2
4	1