

Name: _____

Explicit and Recursive Review for Arithmetic and Geometric Sequences

The following are the formulas that we have been studying this unit. Please write the correct formula along with what each variable in the formulas mean.

1) Explicit Arithmetic

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

a_n = n^{th} term

n = term #

a_1 = 1st term

d = common difference

2) Recursive Arithmetic

$$a_n = a_{n-1} + d$$

$a_1 = \#$

a_n = n^{th} term

n = term #

a_1 = 1st term

d = common difference

a_{n-1} = previous term

3) Explicit Geometric

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

a_n = n^{th} term

n = term #

a_1 = 1st term

r = common ratio

4) Recursive Geometric

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

$a_1 = \#$

a_n = n^{th} term

n = term #

a_1 = 1st term

r = common ratio

a_{n-1} = previous term

5) What is the difference between an arithmetic sequence and a geometric sequence?

Common
difference

Common
ratio

Determine whether the following sequences are arithmetic, geometric, or neither and state the common difference or common ratio.

6) -5, -10, -20,

#2

geometric $r=2$

7) 0, 5, 10, 15, 20,

Arithmetic $d=5$

8) 200, 100, 50, 25,

geometric $r=\frac{1}{2}$

9) 1, 10, 100, 1000,

geometric $r=10$

10) -7, 7, -14, 28,

neither

11) -4, 16, -64,

geometric $r=-4$

Find the first 3 terms of each sequence.

12) $a_1 = 0.4$ and $r = -3$

$a_2 = -1.2$ $a_3 = 3.6$ $a_4 = -10.8$

14) $a_1 = -2$ and $d = -4$

$a_2 = -6$ $a_3 = -10$ $a_4 = -14$

13) $a_n = 3^{n-1} + 2$

$a_1 = 3^0 + 2 = 3$
 $a_2 = 3^1 + 2 = 5$
 $a_3 = 3^2 + 2 = 11$

15) $a_n = -7 - n$

$a_1 = -7 - 1 = -8$
 $a_2 = -7 - 2 = -9$
 $a_3 = -7 - 3 = -10$

Find the 12th term for each sequence.

16) $a_n = -5 \cdot 2^{n-1}$

$a_{12} = -5 \cdot 2^{12-1}$
 $a_{12} = -5 \cdot 2^{11}$

$a_{12} = -10240$

17) $a_n = -3 + 5n$

$a_{12} = -3 + 5(12)$
 $a_{12} = -3 + 60$

$a_{12} = 57$

Given the following information, write the explicit and the recursive formulas.

18) $a_1 = -10$ and $d = 8$

$a_n = -10 + (n-1)8$
 $a_n = -10 + 8n - 8$
 $a_n = 8n - 18$

Explicit: $a_n = 8n - 18$

Recursive: $a_n = a_{n-1} + 8$
 $a_1 = -10$

19) $a_{12} = 36$ and $d = 10$

$36 = a_1 + (12-1)10$
 $36 = a_1 + 11(10)$
 $36 = a_1 + 110$
 $-74 = a_1$
 $a_n = -74 + (n-1)10$
 $a_n = -74 + 10n - 10$

Explicit: $a_n = 10n - 84$

Recursive: $a_n = a_{n-1} + 10$
 $a_1 = -74$

21) $a_3 = -64$ and $r = 4$

$-64 = a_1 \cdot 4^3$
 $\frac{-64}{64} = a_1 \cdot \frac{64}{64}$
 $-1 = a_1$

Explicit: $a_n = -1 \cdot 4^{n-1}$

Recursive: $a_n = a_{n-1} \cdot 4$
 $a_1 = -1$

Explicit: $a_n = -1 \cdot 4^{n-1}$

Recursive: $a_n = a_{n-1} \cdot 4$
 $a_1 = -1$