

HW 2 - GEOMETRIC SEQUENCES

NAME Key Spring 17

Determine if the following are Arithmetic (A), Geometric (G), or neither (N). If it is Arithmetic or Geometric, find the recursive and explicit formulas.

1. -9, -2, 5, 12, 19

Arithmetic

Recursive: $a_1 = -9$ $a_n = a_{n-1} + 7$

Explicit: $a_n = -9 + (n-1)(7)$
 $a_n = -9 + 7n - 7$

$a_n = 7n - 16$

2. 5, 25, 125, 625

Geometric

Recursive: $a_1 = 5$ $a_n = a_{n-1} \cdot 5$

Explicit: $a_n = 5(5)^{n-1}$

3. $\frac{1}{4}, \frac{2}{5}, \frac{3}{6}, \frac{4}{7}$

Neither

4. -3, 18, -54, ...

Geometric

Recursive: $a_1 = -3$ $a_n = a_{n-1} \cdot -6$

Explicit: $a_n = -3(6)^{n-1}$

5. Find the 7th term of the sequence

$a_1 = -1$ -1, 5, -25 ...

$r = -5$
 $n = 7$

$a_7 = -1(-5)^{7-1}$

$a_7 = -15,625$

6. State the 10th term of the sequence

$a_1 = \frac{5}{128}$ $\frac{5}{128}, \frac{5}{64}, \frac{5}{32}, \dots$

$r = 2$ $a_{10} = \frac{5}{128}(2)^{10-1}$

$a_{10} = 20$

7. Complete the sequence:

$a_1 = 4$ 4, 8, 16, 32, 64, 128

$a_6 = 128$

$128 = 4(r)^{6-1}$

$32 = r^5$

$\sqrt[5]{32} = r$

$2 = r$

8. Complete the sequence:

$a_1 = \frac{1}{25}$ $\frac{1}{25}, _, _, _, 25$

$a_5 = 25$
 $25 = \frac{1}{25}(r)^{5-1}$

$625 = r^4$

$\pm \sqrt[4]{625} = r$

$\pm 5 = r$

$\frac{1}{5}, \frac{1}{1}, \frac{5}{1}$

OR
 $\frac{-1}{5}, \frac{1}{1}, \frac{-5}{1}$

9. The 3rd term of a geometric progression is 432

And the 5th term is 243. Find the 8th term.

$$a_3 = 432 \quad a_5 = 243 \quad a_8 = ?$$

manipulate eqn : $a_n = 432(r)^{n-3}$

find r : $243 = 432(r)^{5-3}$

$$\frac{9}{16} = r^2$$

$$+ \frac{3}{4} = r$$

$r = \frac{3}{4}$:

$r = -\frac{3}{4}$:

$$a_8 = 432\left(\frac{3}{4}\right)^{8-3}$$

$$a_8 = 432\left(-\frac{3}{4}\right)^{8-3}$$

$$a_8 = \frac{6561}{64}$$

OR

$$a_8 = \frac{-6561}{64}$$

11. How many terms are in the sequence:

11250, 2250, 450, ... 18

$$a_1 = 11250$$

$$r = \frac{1}{5}$$

$$a_n = 18$$

$$18 = 11250\left(\frac{1}{5}\right)^{n-1}$$

$$.0016 = \left(\frac{1}{5}\right)^{n-1}$$

$$\log_{\frac{1}{5}} .0016 = n-1$$

$$4 = n-1$$

$$n = 5$$

10. If $a_2 = 12$ and $a_5 = -324$ find a_{11} .

manipulate eqn : $a_n = 12(r)^{n-2}$

find r : $-324 = 12(r)^{5-2}$
 $-27 = r^3$
 $-3 = r$

find a_{11} : $a_{11} = 12(-3)^{11-2}$

$$a_{11} = -236196$$

12. Which term is 729 in the sequence:

$\frac{1}{27}, \frac{1}{9}, \frac{1}{3}, \dots$

$$a_1 = \frac{1}{27}$$

$$r = 3$$

$$a_n = 729$$

$$729 = \frac{1}{27}(3)^{n-1}$$

$$19683 = 3^{n-1}$$

$$\log_3 19683 = n-1$$

$$9 = n-1$$

$$10 = n$$