Key

Math 1

Name _____

4-1 Homework

Date _____

Learning goals:

- *I can convert a sequence into a recursive or explicit formula.*
- *I can use a formula to find missing terms in a sequence.*
- *I can determine the common difference/ratio from a sequence.*
- *I can identify linear and exponential situations and distinguish between the two.*
- *I can construct a linear or exponential function from an arithmetic sequence, table of values or verbal description.*

Determine if the sequence is geometric. If it is, find the common ratio.

1.) $-1,-3,-9,-27,\ldots$

Yes. $r=3$

2.) $\frac{3}{2},\frac{5}{4},\frac{7}{8},\frac{9}{16},\ldots$ No. No common ratio.

$\frac{\frac{5}{4}}{\frac{3}{2}} = \frac{5}{4}\cdot\frac{2}{3} = \frac{5}{6}$ $\quad \frac{\frac{7}{8}}{\frac{5}{4}} = \frac{7}{10}$

3.) $4,\frac{4}{5},\frac{4}{25},\frac{4}{125},\ldots$

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

4.) $\frac{1}{3},\frac{2}{5},\frac{3}{7},\frac{4}{9},\ldots$

No. No common ratio.

Ms. M's favorite student was here. -Batman

5.) $-3,-6,-12,-24,\ldots$

Yes. $r=2$

6.) $-1,5,-25,125,\ldots$

Yes. $r=-5$

Find the common ratio and the next three terms in each sequence below.

7.) $-3,9,-27,81,\ldots$

$r=\frac{9}{-3}=-3$

$\ldots, -243, 729, -2187$

8.) $-3,-15,-75,-375,\ldots$

$r=\frac{-15}{-3}=5$

$\ldots, -1875, -9375, -46875$

9.) $4,24,144,864,\ldots$

$r=\frac{24}{4}=6$

~~3456, 13824, 55296~~

$\ldots, 5184, 31104, 186624$

10.) $-1,-4,-16,-64,\ldots$

$r=\frac{-4}{-1}=4$

$\ldots, -256, -1024, -4096$

Given the first term and the common ratio of a geometric sequence find the first four terms and the explicit formula. + recursive formula.

11.) $a_1 = 2, r = 3$

2, 6, 18, 54

Recursive: $\begin{cases} a_1 = 2 \\ a_n = a_{n-1} \cdot 3 \end{cases}$

Explicit: $a_n = 2(3)^{n-1}$

12.) $a_1 = 1, r = 5$

1, 5, 25, 125

$\begin{cases} a_1 = 1 \\ a_n = a_{n-1} \cdot 5 \end{cases}$

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

13.) $a_1 = 3, r = -6$

3, -18, 108, -648

$\begin{cases} a_1 = 3 \\ a_n = a_{n-1} \cdot -6 \end{cases}$

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

14.) $a_1 = -48, r = \frac{1}{2}$

-48, -24, -12, -6

$\begin{cases} a_1 = -48 \\ a_n = a_{n-1} \cdot \frac{1}{2} \end{cases}$

$a_n = -48\left(\frac{1}{2}\right)^{n-1}$

15.) $a_1 = -3, r = -6$

-3, 18, -108, 648

$\begin{cases} a_1 = -3 \\ a_n = a_{n-1} \cdot -6 \end{cases} \quad a_n = -3(-6)^{n-1}$

16.) $a_1 = -0.8, r = 5$

-0.8, -4, -20, -100

$a_1 = -0.8$

$a_n = a_{n-1} \cdot 5 \quad a_n = -0.8(5)^{n-1}$

17. Use the explicit formula to find the 10th term in the sequence from Number 14.

$a_{10} = -48\left(\frac{1}{2}\right)^{10-1} = -48\left(\frac{1}{2}\right)^{9} = -0.09375$

18. Use the explicit formula to find the 12th term in the sequence from Number 11.

$a_{12} = 2(3)^{11} = 354{,}294$

Find the missing terms in the geometric sequences below.

19. 3.7, ± 7.4, 14.8, ± 29.6, 59.2, ± 118.4, 236.8

$\frac{3.7 \cdot r^6}{3.7} = \frac{236.8}{3.7} \rightarrow r^6 = 64 \rightarrow \sqrt[6]{r^6} = \sqrt[6]{64} \rightarrow r = \pm 2$

20. 13, ± 15.6, 18.72, ± 22.464, 26.9568

$13 \cdot r^4 = 26.9568$

$r^4 = 2.0736 \rightarrow r = \sqrt[4]{2.0736} \quad r = \pm 1.2$