Kuta Software - Infinite Algebra 2 Name Key

Geometric Sequences

Date_____ Period____

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

1) $-1, 6, -36, 216, \ldots$

$r = -6$

2) $-1, 1, 4, 8, \ldots$

Not geometric

3) $4, 16, 36, 64, \ldots$

Not geometric

4) $-3, -15, -75, -375, \ldots$

$r = 5$

5) $-2, -4, -8, -16, \ldots$

$r = 2$

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

$r = -5$

Given the explicit formula for a geometric sequence find the first five terms and the 8th term.

7) $a_n = 3^{n-1}$

1, 3, 9, 27, 81

$a_8 = 2187$

8) $a_n = 2 \cdot \left(\frac{1}{4}\right)^{n-1}$

$2, \frac{1}{2}, \frac{1}{8}, \frac{1}{32}, \frac{1}{128}$

$a_8 = \frac{1}{8192}$

9) $a_n = -2.5 \cdot 4^{n-1}$

-2.5, -10, -40, -160, -640

$a_8 = -40960$

10) $a_n = -4 \cdot 3^{n-1}$

-4, -12, -36, -108, -324

$a_8 = -8748$

Given the recursive formula for a geometric sequence find the common ratio, the first five terms, and the explicit formula.

11) $a_n = a_{n-1} \cdot 2$
$a_1 = 2$

$r = 2$

2, 4, 8, 16, 32

$a_n = 2^n$

12) $a_n = a_{n-1} \cdot -3$
$a_1 = -3$

$r = -3$

-3, 9, -27, 81, -243

$a_n = (-1)^n \cdot 3^n$

13) $a_n = a_{n-1} \cdot 5$
$a_1 = 2$

$r = 5$

2, 10, 50, 250, 1250

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

14) $a_n = a_{n-1} \cdot 3$
$a_1 = -3$

$r = 3$

-3, -9, -27, -81, -243

$a_n = -(3^n)$

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

15) $a_1 = 0.8,\ r = -5$

.8, -4, 20, -100, 500

$a_n = .8(-5)^{n-1}$

16) $a_1 = 1,\ r = 2$

1, 2, 4, 8, 16

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

Given the first term and the common ratio of a geometric sequence find the recursive formula and the three terms in the sequence after the last one given.

17) $a_1 = -4,\ r = 6$ -24, -144, -864

$\begin{cases} a_1 = -4 \\ a_n = 6(a_{n-1}) \end{cases}$

18) $a_1 = 4,\ r = 6$ 24, 144, 864

$a_1 = 4$

$a_n = 6 \cdot a_{n-1}$

19) $a_1 = 2,\ r = 6$ 12, 72, 432

$\begin{cases} a_1 = 2 \\ a_n = 6 \cdot a_{n-1} \end{cases}$

20) $a_1 = -4,\ r = 4$ -16, -64, -256

$\begin{cases} a_1 = -4 \\ a_n = 4 \cdot a_{n-1} \end{cases}$

Given a term in a geometric sequence and the common ratio find the first five terms, the explicit formula, and the recursive formula.

21) $a_4 = 25,\ r = -5$

$25 = a_1(-5)^{4-1}$

$a_1 = -.2$

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

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

22) $a_1 = 4,\ r = 5$

$a_n = 4(5)^{n-1}$

$\begin{cases} a_1 = 4 \\ a_n = 5 \cdot a_{n-1} \end{cases}$

Given two terms in a geometric sequence find the 8th term and the recursive formula.

23) $a_4 = -12$ and $a_5 = -6$

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

$-12 = a_1(\frac{1}{2})^3$

$a_1 = -96$

$\begin{cases} a_1 = -96 \\ a_n = \frac{1}{2} \cdot a_{n-1} \end{cases}$

$a_8 = -96(\frac{1}{2})^7 = -\frac{3}{4}$

24) $a_5 = 768$ and $a_2 = 12$ $r = \sqrt[3]{\frac{768}{12}} = 4$

$12 = a_1(4)^1$

$\begin{cases} a_1 = 3 \\ a_n = 4 \cdot a_{n-1} \end{cases}$

$a_8 = 3(4)^7$

$= 49,152$

25) $a_1 = -2$ and $a_5 = -512$

$r = \sqrt[4]{\frac{-512}{-2}} = 4$

$a_8 = -2(4)^7$

$= -32,768$

$\begin{cases} a_1 = -2 \\ a_n = 4 \cdot a_{n-1} \end{cases}$

26) $a_5 = 3888$ and $a_3 = 108$

$r = \sqrt{\frac{3888}{108}} = 6$

$108 = a_1(6)^2$

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

$a_8 = 3(6)^7$

$= 839,808$