

Geometric Sequences

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

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

$r = -6$

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

Not geometric

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

Not geometric

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

$r = 5$

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

$r = 2$

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

$r = -5$

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

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

First Five Terms: 1, 3, 9, 27, 81

$a_8 = 2187$

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

First Five Terms: 2, $\frac{1}{2}$, $\frac{1}{8}$, $\frac{1}{32}$, $\frac{1}{128}$

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

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

First Five Terms: -2.5, -10, -40, -160, -640

$a_8 = -40960$

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

First Five Terms: -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) $a_n = a_{n-1} \cdot 2$
 $a_1 = 2$

Common Ratio: $r = 2$

First Five Terms: 2, 4, 8, 16, 32

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

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

Common Ratio: $r = -3$

First Five Terms: -3, 9, -27, 81, -243

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

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

Common Ratio: $r = 5$

First Five Terms: 2, 10, 50, 250, 1250

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

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

Common Ratio: $r = 3$

First Five Terms: -3, -9, -27, -81, -243

Explicit: $a_n = -3 \cdot 3^{n-1}$

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

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

First Five Terms: 0.8, -4, 20, -100, 500

Explicit: $a_n = 0.8 \cdot (-5)^{n-1}$

16) $a_1 = 1, r = 2$

First Five Terms: 1, 2, 4, 8, 16

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

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) $a_1 = -4, r = 6$

Next 3 terms: -24, -144, -864

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

$a_1 = -4$

18) $a_1 = 4, r = 6$

Next 3 terms: 24, 144, 864

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

$a_1 = 4$

19) $a_1 = 2, r = 6$

Next 3 terms: 12, 72, 432

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

$a_1 = 2$

20) $a_1 = -4, r = 4$

Next 3 terms: -16, -64, -256

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

$a_1 = -4$

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

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

First Five Terms: -0.2, 1, -5, 25, -125

Explicit: $a_n = -0.2 \cdot (-5)^{n-1}$

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

$a_1 = -0.2$

22) $a_1 = 4, r = 5$

First Five Terms: 4, 20, 100, 500, 2500

Explicit: $a_n = 4 \cdot 5^{n-1}$

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

$a_1 = 4$

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

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

$a_8 = -\frac{3}{4}$

Recursive: $a_n = a_{n-1} \cdot \frac{1}{2}$

$a_1 = -96$

24) $a_5 = 768$ and $a_2 = 12$

$a_8 = 49152$

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

$a_1 = 3$

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

$a_8 = 32768$

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

$a_1 = -2$

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

$a_8 = 839808$

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

$a_1 = 3$