## Geometric Sequences

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

1) -1, 6, -36, 216, ...

2) -1, 1, 4, 8, ...

3) 4, 16, 36, 64, ...

4) -3, -15, -75, -375, ...

5) -2, -4, -8, -16, ...

6) 1, -5, 25, -125, ...

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

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

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

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

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

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

-1-

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

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

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

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

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

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

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

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) 
$$a_1 = -4$$
,  $r = 6$ 

18) 
$$a_1 = 4$$
,  $r = 6$ 

19) 
$$a_1 = 2$$
,  $r = 6$ 

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

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

-2-

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

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

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

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

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

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

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

## Geometric Sequences

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

1) 
$$-1$$
, 6,  $-36$ , 216, ...  $r = -6$ 

4) 
$$-3$$
,  $-15$ ,  $-75$ ,  $-375$ , ...  $r = 5$ 

5) 
$$-2$$
,  $-4$ ,  $-8$ ,  $-16$ , ...  $r = 2$ 

6) 1, -5, 25, -125, ...
$$r = -5$$

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  $a_s = 2187$ 

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

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

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

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

Next 3 terms: -16, -64, -256 Recursive:  $a_n = a_{n-1} \cdot 4$ 

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, -125Explicit:  $a_n = -0.2 \cdot (-5)^{n-1}$ 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) 
$$a_1 = -12$$
 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  $a_2 = 12$ 

 $a_{8} = 49152$ 

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

 $a_{\circ} = 32768$ Recursive:  $a_n = a_{n-1} \cdot -4$  $a_{1} = -2$ 

$$21) u_5 = 700 \text{ and } u_2 = 12$$

Recursive:  $a_n = a_{n-1} \cdot 4$  $a_{1} = 3$ 

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

 $a_{\circ} = 839808$ Recursive:  $a_n = a_{n-1} \cdot 6$  $a_{1} = 3$ 

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