

**11-3 Study Guide and Intervention****Geometric Sequences**

**Geometric Sequences** A **geometric sequence** is a sequence in which each term after the first is the product of the previous term and a constant called the **constant ratio**.

<b><math>n</math>th Term of a Geometric Sequence</b>	$a_n = a_1 \cdot r^{n-1}$ , where $a_1$ is the first term, $r$ is the common ratio, and $n$ is any positive integer
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**Example 1** Find the next two terms of the geometric sequence **1200, 480, 192, ...**

Since  $\frac{480}{1200} = 0.4$  and  $\frac{192}{480} = 0.4$ , the sequence has a common ratio of 0.4. The next two terms in the sequence are  $192(0.4) = 76.8$  and  $76.8(0.4) = 30.72$ .

**Example 2** Write an equation for the  $n$ th term of the geometric sequence **3.6, 10.8, 32.4, ...**

In this sequence  $a_1 = 3.6$  and  $r = 3$ . Use the  $n$ th term formula to write an equation.

$$\begin{aligned} a_n &= a_1 \cdot r^{n-1} && \text{Formula for } n\text{th term} \\ &= 3.6 \cdot 3^{n-1} && a_1 = 3.6, r = 3 \end{aligned}$$

An equation for the  $n$ th term is  $a_n = 3.6 \cdot 3^{n-1}$ .

**Exercises**

Find the next two terms of each geometric sequence.

1. 6, 12, 24, ...

2. 180, 60, 20, ...

3. 2000, -1000, 500, ...

4. 0.8, -2.4, 7.2, ...

5. 80, 60, 45, ...

6. 3, 16.5, 90.75, ...

Find the first five terms of each geometric sequence described.

7.  $a_1 = \frac{1}{9}, r = 3$

8.  $a_1 = 240, r = -\frac{3}{4}$

9.  $a_1 = 10, r = \frac{5}{2}$

Find the indicated term of each geometric sequence.

10.  $a_1 = -10, r = 4, n = 2$

11.  $a_1 = -6, r = -\frac{1}{2}, n = 8$

12.  $a_3 = 9, r = -3, n = 7$

13.  $a_4 = 16, r = 2, n = 10$

14.  $a_4 = -54, r = -3, n = 6$

15.  $a_1 = 8, r = \frac{2}{3}, n = 5$

Write an equation for the  $n$ th term of each geometric sequence.

16. 500, 350, 245, ...

17. 8, 32, 128, ...

18. 11, -24.2, 53.24, ...

**11-3 Skills Practice****Geometric Sequences**

Find the next two terms of each geometric sequence.

1.  $-1, -2, -4, \dots$

2.  $6, 3, \frac{3}{2}, \dots$

3.  $-5, -15, -45, \dots$

4.  $729, -243, 81, \dots$

5.  $1536, 384, 96, \dots$

6.  $64, 160, 400, \dots$

Find the first five terms of each geometric sequence described.

7.  $a_1 = 6, r = 2$

8.  $a_1 = -27, r = 3$

9.  $a_1 = -15, r = -1$

10.  $a_1 = 3, r = 4$

11.  $a_1 = 1, r = \frac{1}{2}$

12.  $a_1 = 216, r = -\frac{1}{3}$

Find the indicated term of each geometric sequence.

13.  $a_1 = 5, r = 2, n = 6$

14.  $a_1 = 18, r = 3, n = 6$

15.  $a_1 = -3, r = -2, n = 5$

16.  $a_1 = -20, r = -2, n = 9$

17.  $a_8$  for  $-12, -6, -3, \dots$

18.  $a_7$  for  $80, \frac{80}{3}, \frac{80}{9}, \dots$

Write an equation for the  $n$ th term of each geometric sequence.

19.  $3, 9, 27, \dots$

20.  $-1, -3, -9, \dots$

21.  $2, -6, 18, \dots$

22.  $5, 10, 20, \dots$

Find the geometric means in each sequence.

23.  $4, \underline{\quad}, \underline{\quad}, \underline{\quad}, 64$

24.  $1, \underline{\quad}, \underline{\quad}, \underline{\quad}, 81$