

## Section 10.3 Geometric Sequences and Series

**Objective:** In this lesson you learned how to recognize, write, and use geometric sequences.

Course Number

Instructor

Date

### Important Vocabulary

Define each term or concept.

**Geometric sequence**

**Infinite geometric series or geometric series**

### I. Geometric Sequences (Pages 716–718)

The common ratio of a geometric sequence is . . .

#### *What you should learn*

How to recognize and write geometric sequences

The  $n$ th term of a geometric sequence has the form

\_\_\_\_\_, where  $r$  is the common ratio of consecutive terms of the sequence. So, every geometric sequence can be written in the following form:

\_\_\_\_\_.

A geometric sequence may be thought of as a(n) \_\_\_\_\_ function whose domain is the set of natural numbers.

**Example 1:** Determine whether or not the following sequence is geometric. If it is, find the common ratio.  
60, 30, 0, -30, -60, . . .

To find the  $(n + 1)$ th term of a geometric sequence given the  $n$ th term of the same sequence, . . .

**Example 2:** Write the first five terms of the geometric sequence whose first term is  $a_1 = 5$  and whose common ratio is  $-3$ .

**Example 3:** Find the eighth term of the geometric sequence that begins with 15 and 12.

**II. The Sum of a Finite Geometric Sequence** (Page 719)

The sum of the geometric sequence  $a_1, a_1r, a_1r^2, a_1r^3, a_1r^4, \dots, a_1r^{n-1}$  with common ratio  $r \neq 1$  is given by

\_\_\_\_\_.

When using the formula for the sum of a geometric sequence, be careful to check that the index begins with  $i = 1$ . If the index begins at  $i = 0, \dots$

***What you should learn***

How to find an  $n$ th partial sum of a geometric sequence

**Example 4:** Find the sum  $\sum_{i=1}^{10} 2(0.5)^i$ .

**III. Geometric Series** (Page 720)

If  $|r| < 1$ , the sum of the infinite geometric series  $a_1, a_1r, a_1r^2, a_1r^3, a_1r^4, \dots, a_1r^{n-1}, \dots$  is \_\_\_\_\_.

***What you should learn***

How to find the sum of an infinite geometric series

**Example 5:** If possible, find the sum:  $\sum_{i=1}^{\infty} 9(0.25)^{i-1}$ .

**IV. Applications of Geometric Sequences** (Page 721)

Describe a real-life problem that could be solved by finding the sum of a finite geometric sequence.

***What you should learn***

How to use geometric sequences to model and solve real-life problems

**Homework Assignment**

Page(s)

Exercises