

## Section 8.3 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 601–603)

The common ratio of a geometric sequence is . . .

**What you should learn**  
How to recognize, write, and find the  $n$ th terms of 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:

\_\_\_\_\_.

If you know the  $n$ th term of a geometric sequence, you can find the  $(n + 1)$ th term by \_\_\_\_\_. That is,

$$a_{n+1} = \underline{\hspace{2cm}}.$$

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

**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 604)

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

\_\_\_\_\_.

***What you should learn***

How to find  $n$ th partial sums of geometric sequences

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  $i = 0, \dots$

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

**III. Geometric Series** (Pages 605–606)

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

***What you should learn***

How to find sums of infinite geometric series

If  $|r| \geq 1$ , the series \_\_\_\_\_ a sum.

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

**IV. Applications of Geometric Sequences** (Page 606)

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