

# Chapter 9 Sequences, Series, and Probability

Course Number

Instructor

Date

## Section 9.1 Sequences and Series

**Objective:** In this lesson you learned how to use sequence, factorial, and summation notation to write the terms and sums of sequences.

### Important Vocabulary

Define each term or concept.

**Recursive**

### I. Sequences (Pages 618–620)

An **infinite sequence** is . . .

#### *What you should learn*

How to use sequence notation to write the terms of a sequence

The function values  $a_1, a_2, a_3, a_4, \dots, a_n, \dots$  are the \_\_\_\_\_ of an infinite sequence.

A **finite sequence** is . . .

To find the first three terms of a sequence, given an expression for its  $n$ th term, . . .

**Example 1:** Find the first five terms of the sequence given by

$$a_n = 5 + 2n(-1)^n.$$

### II. Factorial Notation (Pages 620–621)

If  $n$  is a positive integer,  **$n$  factorial** is defined by

#### *What you should learn*

How to use factorial notation

By definition, zero factorial is \_\_\_\_\_.

**Example 2:** Evaluate the factorial expression  $\frac{n!}{(n+1)!}$ .

### III. Summation Notation (Pages 622–623)

The sum of the first  $n$  terms of a sequence is represented by the **summation or sigma notation**,

$$\sum_{i=1}^n a_i = \underline{\hspace{2cm}}$$

where  $i$  is called the \_\_\_\_\_,  $n$  is the \_\_\_\_\_, and 1 is the \_\_\_\_\_.

**What you should learn**  
How to use summation notation to write sums

**Example 3:** Find the following sum:  $\sum_{i=2}^7 (2 + 3i)$ .

### IV. Series (Page 623)

The sum of the terms of a finite or infinite sequence is called a \_\_\_\_\_.

**What you should learn**  
How to find the sum of an infinite series

Consider the infinite sequence  $a_1, a_2, a_3, \dots, a_i, \dots$ . The sum of all terms of the infinite sequence is called a(n) \_\_\_\_\_

and is denoted by  $a_1 + a_2 + a_3 + \dots + a_i + \dots = \sum_{i=1}^{\infty} a_i$ . The sum of

the first  $n$  terms of the sequence is called a(n) \_\_\_\_\_ or the \_\_\_\_\_ of the sequence and is denoted by

$$a_1 + a_2 + a_3 + \dots + a_n = \sum_{i=1}^n a_i .$$

#### Homework Assignment

Page(s)

Exercises