

## 9-2 Arithmetic Sequences

### Objectives

Identify mathematical patterns found in a sequence. Use a formula to find the  $n$ th term of a sequence.

### State Standards

**A2. F.BF. A.1a** Write a function that describes a relationship between two quantities.

**A2. F.BF.A.2** Know and write arithmetic and geometric sequences with an explicit formula and use them to model situations.

**A2. F.LE.A.1** Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.

### Key Concepts

\_\_\_\_\_ - a sequence where the difference between consecutive terms is constant.

\_\_\_\_\_ - the difference between 2 consecutive values in an arithmetic sequence.

\_\_\_\_\_ - the arithmetic mean (average of 2 numbers)

take note

#### Key Concept Arithmetic Sequence

An arithmetic sequence with a starting value  $a$  and common difference  $d$  is a sequence of the form

$$a, a + d, a + 2d, a + 3d, \dots$$

A recursive definition for this sequence has two parts:

$$a_1 = a \quad \text{initial condition}$$

$$a_n = a_{n-1} + d, \text{ for } n > 1 \quad \text{recursive formula}$$

An explicit definition for this sequence is a single formula:

$$a_n = a + (n - 1)d, \text{ for } n \geq 1$$

### Examples

- (I do) Is the sequence arithmetic? If so state  $a$  and  $d$ .
  - 2, 5, 8, 11, 14, ...
  - 1, 4, 9, 16, 25, ...
- (I do) What is the 100<sup>th</sup> term of the sequence 6, 11, 16, ...?

3. (I do) What is the missing term in the sequence 15, \_\_\_\_, 59, ...?
  
  
  
  
  
  
  
  
  
  
4. (We do) What are the missing terms in the sequence 100, \_\_\_\_, \_\_\_\_, 82, ...?
  
  
  
  
  
  
  
  
  
  
5. (We do) The arithmetic mean of the monthly salaries of two employees is \$3210. One employee earns \$3470 per month. What is the monthly salary of the other employee?
  
  
  
  
  
  
  
  
  
  
6. (They do) A student deposits the same amount of money into her bank account each week. At the end of the second week, she has \$35 in her account. At the end of the third week she has \$50 in her account. How much will she have in her bank account at the end of the ninth week?

**You do: Practice 9-2: Complete your assignment on a separate sheet of paper. Show all work.**

1. Write an explicit formula and find the tenth term of the sequence.
  - a. 2, 8, 14, 20, ...
  - b. 15, 23, 31, ...
2. Find the missing term(s) of the sequence.
  - a. 4, \_\_\_\_, 22, ...
  - b. ..., 25, \_\_\_\_, \_\_\_\_, 67, ...
3. Give an example of a sequence that is not an arithmetic sequence.
4. A student claims that the next term of the arithmetic sequence 0, 2, 4, ... is 8. Explain and correct the student's error.