1.6 Algebraic Expressions, Translations, and Exponents

Algebraic Expressions

OBJECTIVES

- To translate algebraic expressions to word phrases and word phrases to algebraic expressions
- To write algebraic expressions using exponents
- To solve applied problems involving algebraic expressions

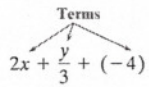
Suppose that each week, you spend $\frac{2}{5}$ of your time on campus working in the student activities area. If the *variable* n represents the total number of hours that you spend during a particular week on campus, then the *algebraic expression* $\frac{2}{5} \cdot n$ stands for the amount of time you worked in the student activities area that week.

In algebra, a variable is used in two ways—as an unknown quantity or as a quantity that can change in value. We can use any letter or symbol to represent a variable. By contrast, a *constant* is a known quantity whose value does not change. So n is a variable, whereas $\frac{2}{5}$ is a constant. An algebraic expression is an expression in which constants and variables are combined using standard arithmetic operations. So $\frac{2}{5} \cdot n$ is an example of an algebraic expression. When writing an algebraic expression involving a product, we usually omit any multiplication symbol. For instance, we would write $\frac{2}{5}n$ rather than $\frac{2}{5} \cdot n$.

Algebraic expressions consist of one or more *terms*, separated by addition signs. If there are subtraction signs, we can rewrite the expression in an equivalent form using addition. For instance, we can think of the algebraic expression

$$2x + \frac{y}{3} - 4 \quad \text{as} \quad 2x + \frac{y}{3} + (-4).$$

This algebraic expression is made up of three terms.



Definition

A **term** is a number, a variable, or the product or quotient of numbers and variables.

EXAMPLE 1

Find the number of terms in each expression.

a. $3y + 1$ **b.** $\frac{a}{b}$

Solution

a. The expression $3y + 1$ has two terms.

b. The expression $\frac{a}{b}$ has one term.

PRACTICE 1

Determine how many terms are in each expression.

a. $2a + 3 - b$ **b.** $-4xy$