Section 2.1 Simplifying Algebraic Expressions

# Objective 1: Identifying Terms, Like Terms, and Unlike Terms

A **term** is a number, a variable, or the product of a number and one or more variables raised to powers. Some examples of terms are listed below.

$-4$, $x$, $-4x$, $-4x^{3}$, $6x^{3}y^{2}$, $\frac{6x^{3}}{y^{2}}$, $\frac{3}{5}a^{2}bc^{4}$

The **coefficient** of a term is the numerical factor. For example, the coefficient of the term $6x^{3}y^{2}$ is $6$.

Terms with the same variables raised to the same powers are called **like terms**. Terms that aren’t like terms are called **unlike terms**. For example, $-4x^{3}$ and $0.8x^{3}$ are like terms. The terms $-4x^{3}$ and $4x^{2}$ are unlike terms.

Consider the term $\frac{2}{5}a^{2}bc^{4}$.

a. What is the coefficient of the term?

b. Give an example of a like term.

c. Give an example of an unlike term.

# Objective 2: Combining Like Terms

An algebraic expression containing the sum or difference of like terms can be simplified by applying the distributive property. This is called **combining like terms**.

For example, consider the expression $3x+2x$. We can use the distributive property to rewrite the sum $3x+2x$ as a product.

$$3x+2x=\left(3+2\right)x=5x$$

Simplify the expression by combining like terms.

|  |  |
| --- | --- |
| a. $-y^{2}+5y^{2}$ | b. $14a-8a+7$ |
| c. $5a+1+4a-9$ | d. $10x+3x^{2}+2x-x^{2}$ |

# Objective 3: Using the Distributive Property

When simplifying an algebraic expression containing parentheses, we often use the distributive property twice, first to remove the parentheses and then to combine any like terms.

Simplify the expression.

|  |  |
| --- | --- |
| a. $-4\left(3x+2\right)+8-10x$ | b. $3\left(2p-9\right)-(p+10)$ |
| c. $-\left(5xy+2z\right)+3z-9xy$ |  |

Write the sentence as an algebraic expression. Then simplify.

|  |  |
| --- | --- |
| d. Add $4x+2$ to $6x+5.$ | e. Subtract $4x+2$ from $6x+5$. |

# Objective 4: Writing Word Phrases As Algebraic Expressions

When presented with a problem, it is often useful to translate word phrases into algebraic expressions.

Write the phrase as an algebraic expression.

|  |  |
| --- | --- |
| a. One-third of a number, decreased by two | b. Nine times the sum of a number and three |

c. A plot of land is in the shape of a rectangle. If one side is $(4x-2)$ meters and one side is $\left(5x-6\right)$ meters, express the perimeter of the lot as a simplified expression in $x$.