

## Lesson 9-1

## Example 1

Write each polynomial in standard form for the variable  $x$ .

a.  $2x + 1 + 9x^3 - 4x^2$

b.  $-3x^2y^3 + 5xy^4 + 2x^3$

## Solution

a.  $2x + 1 + 9x^3 - 4x^2 = 9x^3 - 4x^2 + 2x + 1$

b.  $-3x^2y^3 + 5xy^4 + 2x^3 = 2x^3 - 3x^2y^3 + 5xy^4$

## Example 2

Simplify.

a.  $3m^2 - 5m + 6m^2$

b.  $3a^2b + 6a^2 + 2ab^2 - 7a^2b$

## Solution

a. 
$$\begin{aligned} 3m^2 - 5m + 6m^2 &= 3m^2 + 6m^2 - 5m && \text{Use the Commutative Property.} \\ &= (3 + 6)m^2 - 5m && \text{Use the Distributive Property.} \\ &= 9m^2 - 5m \end{aligned}$$

b. 
$$\begin{aligned} 3a^2b + 6a^2 + 2ab^2 - 7a^2b &= 3a^2b - 7a^2b + 6a^2 + 2ab^2 \\ &= (3 - 7)a^2b + 6a^2 + 2ab^2 \\ &= -4a^2b + 6a^2 + 2ab^2 \end{aligned}$$

**Example 3****Simplify.**

a.  $5p + (6 - 2p)$

b.  $(4x^2y - 5x + 3y) + (3x^2y + 2x - 4y)$

**Solution**

To simplify, use the associative and commutative properties as necessary to rearrange like terms. Then use the distributive property to combine like terms.

$$\begin{aligned} \text{a. } 5p + (6 - 2p) &= (5p - 2p) + 6 \\ &= (5 - 2)p + 6 \\ &= 3p + 6 \end{aligned}$$

$$\begin{aligned} \text{b. } (4x^2y - 5x + 3y) + (3x^2y + 2x - 4y) &= 4x^2y + (-5x) + 3y + 3x^2y + 2x + (-4y) \\ &= (4x^2y + 3x^2y) + (-5x + 2x) + [3y + (-4y)] \\ &= (4 + 3)x^2y + (-5 + 2)x + (3 - 4)y \\ &= 7x^2y + (-3)x + (-1)y \\ &= 7x^2y - 3x - y \end{aligned}$$

**Example 4****Simplify.**

a.  $9g - (4g + 2)$

b.  $(3xy^2 - 6xy + 2) - (xy^2 + 4xy)$

**Solution**

Change each term of the polynomial being subtracted to its opposite. Then follow the same procedure for adding polynomials.

$$\begin{aligned} \text{a. } 9g - (4g + 2) &= 9g + [-4g + (-2)] \\ &= [9g + (-4g)] + (-2) \\ &= [9 + (-4)]g + (-2) \\ &= 5g - 2 \end{aligned}$$

$$\begin{aligned} \text{b. } (3xy^2 - 6xy + 2) - (xy^2 + 4xy) &= (3xy^2 - 6xy + 2) + [-xy^2 + (-4xy)] \\ &= [3xy^2 + (-xy^2)] + [-6xy + (-4xy)] + 2 \\ &= (3 - 1)xy^2 + (-6 - 4)xy + 2 \\ &= 2xy^2 + (-10xy) + 2 \\ &= 2xy^2 - 10xy + 2 \end{aligned}$$