

## Lesson 13-3

### Example 1 Subtract Polynomials

Find each difference.

a.  $(7x + 8) - (2x + 3)$

$$\begin{array}{r} 7x + 8 \\ (-) 2x + 3 \\ \hline 5x + 5 \end{array} \quad \begin{array}{l} \text{Align like terms.} \\ \text{Subtract.} \end{array}$$

The difference is  $5x + 5$ .

b.  $(2b^2 + 4b - 7) - (6b^2 + 2b + 3)$

$$\begin{array}{r} 2b^2 + 4b - 7 \\ (-) 6b^2 + 2b + 3 \\ \hline -4b^2 + 2b - 10 \end{array} \quad \text{Align like terms.}$$

The difference is  $-4b^2 + 2b - 10$ .

### Example 2 Subtract Using the Additive Inverse

Find each difference.

a.  $(5x + 2) - (3x + 4)$

The additive inverse of  $3x + 4$  is  $(-1)(3x + 4)$  or  $-3x - 4$ .

$$\begin{aligned} (5x + 2) - (3x + 4) \\ &= (5x + 2) + (-3x - 4) && \text{To subtract } (3x + 4), \text{ add } -3x - 4. \\ &= (5x + -3x) + (2 + -4) && \text{Group the like terms.} \\ &= 2x - 2 && \text{Simplify.} \end{aligned}$$

b.  $(3x^3 + 2x^2y^2 + 7y^2) - (5x^3 - 6xy + 9y^2)$

The additive inverse of  $5x^3 - 6xy + 9y^2$  is  $(-1)(5x^3 - 6xy + 9y^2)$  or  $-5x^3 + 6xy - 9y^2$ .  
Align the like terms and add the additive inverse.

$$\begin{array}{r} 3x^3 + 2x^2y^2 \quad + 7y^2 \\ (-) 5x^3 \quad - 6xy + 9y^2 \\ \hline \end{array} \quad \rightarrow \quad \begin{array}{r} 3x^3 + 2x^2y^2 \quad + 7y^2 \\ (+) -5x^3 \quad + 6xy - 9y^2 \\ \hline -2x^3 + 2x^2y^2 + 6xy - 2y^2 \end{array}$$

The difference is  $-2x^3 + 2x^2y^2 + 6xy - 2y^2$ .

**Example 3 Subtract Polynomials to Solve a Problem**

**PRODUCTION** The cost of producing  $x$  units is  $750 + 2.5x$ . The revenue earned from the sale of  $x$  units is  $14.5x$ . Write an expression for the profit earned when producing and selling  $x$  units. Remember, profit = revenue – cost.

$$\text{profit} = \text{revenue} - \text{cost}$$

$$= 14.5x - (750 + 2.5x)$$

$$= 14.5x + (-750 - 2.5x)$$

$$= (14.5x + -2.5x) + (-750)$$

$$= 12x - 750$$

Formula for profit

Replace revenue with  $14.5x$  and cost with  $750 + 2.5x$ .

Add additive inverse.

Group the like terms.

Simplify.

The profit for producing and selling  $x$  items can be expressed by  $12x - 750$ .