

## Lesson 11-2

### Example 1 Expressions with Like Radicands

Simplify each expression.

a.  $-3\sqrt{2} - \sqrt{2} + 6\sqrt{2}$   
 $-3\sqrt{2} - \sqrt{2} + 6\sqrt{2} = (-3 - 1 + 6)\sqrt{2}$  Distributive Property  
 $= 2\sqrt{2}$  Simplify.

b.  $10\sqrt{11} - 4\sqrt{3} + 5\sqrt{11} - 2\sqrt{3}$   
 $10\sqrt{11} - 4\sqrt{3} + 5\sqrt{11} - 2\sqrt{3} = 10\sqrt{11} + 5\sqrt{11} - 4\sqrt{3} - 2\sqrt{3}$  Commutative Property  
 $= (10 + 5)\sqrt{11} + (-4 - 2)\sqrt{3}$  Distributive Property  
 $= 15\sqrt{11} - 6\sqrt{3}$  Simplify.

### Example 2 Expressions with Unlike Radicands

Simplify  $-5\sqrt{28} + 6\sqrt{63} - 11\sqrt{7}$ .

$$\begin{aligned} -5\sqrt{28} + 6\sqrt{63} - 11\sqrt{7} &= -5\sqrt{2^2 \cdot 7} + 6\sqrt{3^2 \cdot 7} - 11\sqrt{7} \\ &= -5(\sqrt{2^2} \cdot \sqrt{7}) + 6(\sqrt{3^2} \cdot \sqrt{7}) - 11\sqrt{7} \\ &= -5(2\sqrt{7}) + 6(3\sqrt{7}) - 11\sqrt{7} \\ &= -10\sqrt{7} + 18\sqrt{7} - 11\sqrt{7} \\ &= -3\sqrt{7} \end{aligned}$$

### Example 3 Multiply Radical Expressions

Find the product of  $(2\sqrt{3} + 5\sqrt{2})(3\sqrt{3} - 2\sqrt{2})$ .

$$\begin{aligned} &(2\sqrt{3} + 5\sqrt{2})(3\sqrt{3} - 2\sqrt{2}) \\ &\quad \begin{array}{cccc} \text{First} & \text{Outer} & \text{Inner} & \text{Last} \\ \text{terms} & \text{terms} & \text{terms} & \text{terms} \end{array} \\ &= (2\sqrt{3})(3\sqrt{3}) + (2\sqrt{3})(-2\sqrt{2}) + (5\sqrt{2})(3\sqrt{3}) + (5\sqrt{2})(-2\sqrt{2}) \\ &= 6\sqrt{9} + -4\sqrt{6} + 15\sqrt{6} + -10\sqrt{4} \quad \text{Multiply.} \\ &= 6\sqrt{3^2} - 4\sqrt{6} + 15\sqrt{6} - 10\sqrt{2^2} \quad \text{Prime factorization} \\ &= 18 - 4\sqrt{6} + 15\sqrt{6} - 20 \quad \text{Simplify.} \\ &= -2 + 11\sqrt{6} \quad \text{Combine like terms.} \end{aligned}$$