

## Lesson 10-3 Operations with Radical Expressions

**Essential Understanding** You can use properties of real numbers to perform operations with radical expressions.

For example, you can use the Distributive Property to simplify sums or differences of radical expressions by combining *like radicals*. **Like radicals**, such as  $3\sqrt{5}$  and  $7\sqrt{5}$ , have the same radicand. **Unlike radicals**, such as  $4\sqrt{3}$  and  $-2\sqrt{2}$ , have different radicands.



### Problem 1 Combining Like Radicals

What is the simplified form of each expression?

**A**  $6\sqrt{11} + 9\sqrt{11}$

**B**  $\sqrt{3} - 5\sqrt{3}$

### Problem 2 Simplifying to Combine Like Radicals

What is the simplified form of  $5\sqrt{3} - \sqrt{12}$ ?

### Problem 3 Multiplying Radical Expressions

What is the simplified form of each expression?

**A**  $\sqrt{10}(\sqrt{6} + 3)$

**B**  $(\sqrt{6} - 2\sqrt{3})(\sqrt{6} + \sqrt{3})$

**Got It?** 3. What is the simplified form of each expression?

$$(\sqrt{11} - 2)^2$$

## Practice 10-3

## Operations with Radicals Expressions

Simplify each sum or difference. Show all work!

1.  $3\sqrt{7} + 5\sqrt{7}$

2.  $8\sqrt{3} + \sqrt{3}$

3.  $11\sqrt{5} - 4\sqrt{5}$

4.  $2\sqrt{11} - 6\sqrt{11}$

5.  $4\sqrt{13} + 4\sqrt{13}$

6.  $\sqrt{7} - 4\sqrt{7}$

7.  $4\sqrt{7} - \sqrt{63}$

8.  $8\sqrt{3} + 2\sqrt{48}$

9.  $6\sqrt{8} - 2\sqrt{50}$

10.  $3\sqrt{20} - 2\sqrt{45}$

11.  $5\sqrt{18} + 4\sqrt{32}$

12.  $\sqrt{12} - 7\sqrt{75}$

Simplify each product.

13.  $\sqrt{3}(\sqrt{12} + 4)$

14.  $\sqrt{8}(\sqrt{3} + 3)$

$$15. \sqrt{7}(\sqrt{7}-2)$$

$$16. (\sqrt{3}-4)^2$$

$$17. (2\sqrt{3}+\sqrt{5})(6\sqrt{5}-4\sqrt{3})$$

$$18. (7+3\sqrt{5})(7-3\sqrt{5})$$

$$19. (5+\sqrt{7})^2$$