

# 8 Quadratic Expressions and Equations

## Key Concepts

### Operations with Polynomials (Lessons 8-1 through 8-4)

- To add or subtract polynomials, add or subtract like terms.
- To multiply polynomials, use the Distributive Property.
- Special products:  $(a + b)^2 = a^2 + 2ab + b^2$   
 $(a - b)^2 = a^2 - 2ab + b^2$   
 $(a + b)(a - b) = a^2 - b^2$

### Factoring Using the Distributive Property (Lesson 8-5)

- Using the Distributive Property to factor polynomials with four or more terms is called factoring by grouping.  
 $ax + bx + ay + by = x(a + b) + y(a + b)$   
 $= (a + b)(x + y)$

### Solving Quadratic Equations by Factoring

(Lessons 8-6 through 8-8)

- To factor  $x^2 + bx + c$ , find  $m$  and  $p$  with a sum of  $b$  and a product of  $c$ . Then write  $x^2 + bx + c$  as  $(x + m)(x + p)$ .
- To factor  $ax^2 + bx + c$ , find  $m$  and  $p$  with a sum of  $b$  and a product of  $ac$ . Then write as  $ax^2 + mx + px + c$  and factor by grouping.
- $a^2 - b^2 = (a - b)(a + b)$

### Perfect Squares and Factoring (Lesson 8-9)

- For a trinomial to be a perfect square, the first and last terms must be perfect squares, and the middle term must be twice the product of the square roots of the first and last terms.
- For any number  $n \geq 0$ , if  $x^2 = n$ , then  $x = \pm\sqrt{n}$ .

In this chapter, you will:

- Add, subtract, and multiply polynomials.
- Factor trinomials.
- Factor differences of squares.
- Graph quadratic functions.
- Solve quadratic equations.

## Key Vocabulary

|                                    |  |
|------------------------------------|--|
| binomial (p. 465)                  | polynomial (p. 465)                    |
| degree of a monomial (p. 465)      | prime polynomial (p. 512)              |
| degree of a polynomial (p. 465)    | quadratic equation (p. 506)            |
| difference of two squares (p. 516) | quadratic expression (p. 481)          |
| factoring (p. 494)                 | Square Root Property (p. 525)          |
| factoring by grouping (p. 495)     | standard form of a polynomial (p. 466) |
| FOIL method (p. 481)               | trinomial (p. 465)                     |
| leading coefficient (p. 466)       | Zero Product Property (p. 496)         |
| perfect square trinomial (p. 522)  |  |