

## Section 2.4 Solving Equations Algebraically

**Objective:** In this lesson you learned how to solve quadratic equations, polynomial equations, equations involving radicals, equations involving fractions, and equations involving absolute value.

Course Number

Instructor

Date

### Important Vocabulary

Define each term or concept.

**Quadratic equation**

**Second-degree polynomial equation in  $x$**

### I. Quadratic Equations (Pages 188–192)

List four methods for solving quadratic equations:

#### *What you should learn*

How to solve quadratic equations by factoring, extracting square roots, completing the square, and using the Quadratic Formula

To solve a quadratic equation by factoring, . . .

**Example 1:** Solve  $x^2 - 12x = -27$  by factoring.

Extracting square roots can be used with equations of the type

$u^2 = c$ , where  $c > 0$ , which has exactly two solutions:

$u = \underline{\hspace{2cm}}$  and  $u = \underline{\hspace{2cm}}$ . These

solutions can also be written as  $u = \underline{\hspace{2cm}}$ .

**Example 2:** Solve  $5(x - 4)^2 = 45$  by extracting square roots.

To solve a quadratic equation of the form  $x^2 + bx = c$  by completing the square, add \_\_\_\_\_, which is the square of half the coefficient of  $x$ , to both sides of the equation in order to maintain equality.

When completing the square to solve a quadratic equation, if the leading coefficient is not 1, . . .

**Example 3:** Solve  $x^2 + 10x - 8 = 0$  by completing the square.

Using the Quadratic Formula to solve the quadratic equation written in general form as  $ax^2 + bx + c = 0$  gives the solutions:

**Example 4:** For the quadratic equation  $3x - 16 = -2x^2$ , find the values of  $a$ ,  $b$ , and  $c$  to be substituted into the Quadratic Formula. Then find the solutions of the equation. Round to two decimal places.

## II. Polynomial Equations of Higher Degree (Page 193)

An equation is of quadratic type if . . .

***What you should learn***  
How to solve polynomial equations of degree three or greater

**Example 5:** Solve the equation of quadratic type:

$$x^4 - 4x^2 - 45 = 0$$

**Example 6:** Describe a strategy for solving the polynomial equation  $x^3 + 2x^2 - x = 2$ . Then find the solutions.

**III. Equations Involving Radicals** (Pages 194–195)

An equation involving a radical expression can often be cleared of radicals by . . .

*What you should learn*  
How to solve equations involving radicals

When using this procedure, remember to check for \_\_\_\_\_, which do not satisfy the original equation.

**Example 7:** Describe a strategy for solving the following equation involving a radical expression:

$$\sqrt{8-x} - 15 = 0$$

**IV. Equations Involving Fractions or Absolute Values** (Pages 195–196)

To solve an equation involving fractions, . . .

*What you should learn*  
How to solve equations involving fractions or absolute values

**Example 8:** Solve:  $\frac{2}{x} - 1 = \frac{1}{x+1}$

To solve an equation involving an absolute value, . . .

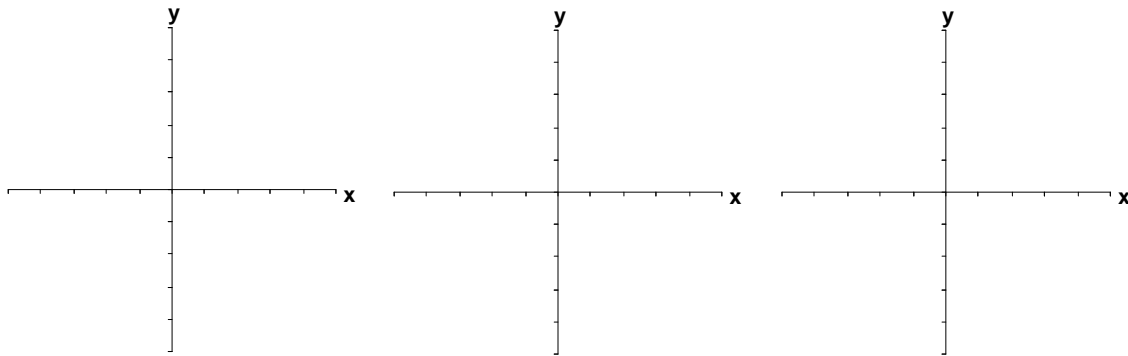
**Example 9:** Write the two equations that must be solved to solve the absolute value equation  $|3x^2 + 2x| - 5 = 0$ .

**V. Applications of Quadratic Equations** (Pages 197–199)

The **position equation** giving the height of an object above earth's surface is \_\_\_\_\_, where . . .

***What you should learn***  
How to use quadratic equations to model and solve real-life problems

Describe a real-life situation in which quadratic equations often occur.

**Additional notes****Homework Assignment**

Page(s)

Exercises