

## Section P.5 Solving Equations

**Objective:** In this lesson you learned how to solve linear, quadratic, polynomial, radical, and absolute value equations.

Course Number

Instructor

Date

### Important Vocabulary

Define each term or concept.

**Equation**

**Identity**

**Conditional equation**

**Equivalent equations**

**Extraneous solution**

**Quadratic equation**

### I. Equations and Solutions of Equations (Page 49)

To **solve** an equation in  $x$  means to . . .

The values of  $x$  for which the equation is true are called its

\_\_\_\_\_.

#### *What you should learn*

How to identify different types of equations

### II. Linear Equations (Pages 49–51)

A **linear equation** in one variable  $x$  is an equation that can be written in the standard form \_\_\_\_\_, where  $a$  and  $b$  are real numbers with  $a \neq$  \_\_\_\_\_.

A linear equation has \_\_\_\_\_ solution(s).

An equation can be transformed into an equivalent equation by one or more of the following steps:

(1)

(2)

(3)

(4)

#### *What you should learn*

How to solve linear equations in one variable

If a contradictory statement such as  $9 = 0$  is obtained while solving an equation, then the equation has \_\_\_\_\_.

**Example 1:** Solve  $5(x + 3) = 35$ .

To solve an equation involving fractional expressions, . . .

When is it possible to introduce an extraneous solution?

**Example 2:** Solve: (a)  $\frac{5x}{7} = \frac{9}{14}$     (b)  $\frac{1}{x+1} + \frac{5x}{x^2-1} = \frac{4}{x-1}$

### III. Quadratic Equations (Pages 52–54)

To solve a quadratic equation by factoring, . . .

***What you should learn***  
How to solve quadratic equations by factoring, extracting square roots, and using the Quadratic Formula

**Example 3:** Solve  $x^2 - 12x = -27$  by factoring.

The equation  $u^2 = c$ , where  $c > 0$ , has exactly two solutions:  
 $u = \underline{\hspace{2cm}}$  and  $u = \underline{\hspace{2cm}}$ . These solutions can also be written as  $u = \underline{\hspace{2cm}}$ .

Solving an equation of the form  $u^2 = c$  without going through the steps of factoring is called \_\_\_\_\_.

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

If  $ax^2 + bx + c = 0$ , then the **Quadratic Formula** gives the solutions as  $x =$  \_\_\_\_\_

A verbal statement of the Quadratic Formula is . . .

**Example 5:** For the quadratic equation  $16 - 3x = -2x^2$ , find the values of  $a$ ,  $b$ , and  $c$  to be substituted into the Quadratic Formula.

#### IV. Polynomial Equations of Higher Degree (Page 55)

One approach to solving nonquadratic polynomial equations is to . . .

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

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

**Example 7:** Solve the equation:  
 $x^4 - 4x^2 - 45 = 0$

#### V. Radical Equations (Page 56)

Operations that can introduce extraneous solutions include, . . .

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

If any of these operations is performed while solving an equation, . . .

**Example 8:** Describe a strategy for solving the following equation involving a radical expression:

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

## VI. Absolute Value Equations (Page 57)

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

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

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

**Example 10:** Solve  $|x^2 + 4x| - 5 = 0$ .

### Homework Assignment

Page(s)

Exercises