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COLLEGE ALGEBRA: BUILDING CONCEPTS AND CONNECTIONS 2E

PREFACE TO INSTRUCTORS

STUDY SKILLS **NEW**

8 - ALGEBRA REVIEW

1 - EQUATIONS AND INEQUALITIES

2 - FUNCTIONS AND GRAPHS

3 - POLYNOMIAL AND RATIONAL FUNCTIONS

4 - EXPONENTIAL AND LOGARITHMIC FUNCTIONS

5 - SYSTEMS OF EQUATIONS AND INEQUALITIES

6 - CONIC SECTIONS

7 - MORE TOPICS IN ALGEBRA

ANSWERS

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**Linear Equations and Applications 1.1**

**Objectives**

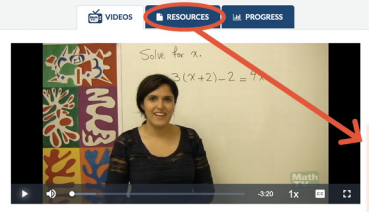
- Solve simple linear equations.
- Solve equations involving fractions.
- Solve fractions involving decimals.
- Solve equations for one variable in terms of another.
- Solve applied problems.

**Equation-Solving Strategies**

When solving an equation, you may need to use one or more of the following steps.

- Simplify an expression by removing parentheses. Then combine like terms, that is, combine real numbers or expressions with the same variable names.
- Add or subtract the same real number or expression to, or from, both sides of the equation.
- $a = b$  is equivalent to  $a + c = b + c$ .
- Multiply or divide both sides of the equation by the same nonzero real number.
- $a = b$  is equivalent to  $ac = bc, c \neq 0$ .

We first examine solutions of a **linear equation**, that is, an equation that can be written in the form  $ax + b = 0$ , where  $a, b$  are real numbers and  $a \neq 0$ . This is the most elementary type of equation.



Click on **RESOURCES** to access Selected Answers by section, and other resources for students

Click on **PRACTICE EXAMPLE ICONS** to work similar problems to each example

Click on **VIDEO ICONS** to watch tutorial videos that match each example

Click to see problem in **WOLFRAM ALPHA**

Select a **VIDEO TUTOR** to watch tutorials for each example in the section.

**PRACTICE EXAMPLE**

Solve for  $x$ :  $2 + 4(2x - 1) - 5x = 30$

$x =$

CHECK ANSWER

**WolframAlpha**

Solve for x: 2 + 4(2x - 1) - 5x = 30

**Example 1** Solving an Equation

Solve the following equation for  $x$ .

$$3(x + 2) - 2 = 4x$$

Subtract 6 from both sides of the equation.

$$3x + 6 - 2 = 4x$$

$$3x + 4 = 4x$$

Subtract  $4x$  from both sides of the equation.

$$3x + 4 - 4x = 4x - 4x$$

$$-x + 4 = 0$$

Combine like terms.

Isolate term containing  $x$ .

Multiply both sides of the equation by  $-1$ .

$$-x + 4 = 0$$

$$x - 4 = 0$$

Given equation

Subtract 4 from both sides of the equation. Check the solution by substituting  $x = 4$  into the given equation.

$$3(4 + 2) - 2 \stackrel{?}{=} 4(4)$$

$$16 - 2 \stackrel{?}{=} 16$$

$$14 \neq 16$$

Isolate term containing  $x$ .

Multiply both sides of the equation by  $-1$ .

$$-x + 4 = 0$$

$$x - 4 = 0$$

Given equation

Subtract 4 from both sides of the equation. Check the solution by substituting  $x = 4$  into the given equation.

$$3(4 + 2) - 2 \stackrel{?}{=} 4(4)$$

$$16 - 2 \stackrel{?}{=} 16$$

$$14 \neq 16$$

**EXAMPLE VIDEO**

Solve the following equation for  $x$ .

$$3(x + 2) - 2 = 4x$$

**Example 1**

Solve the following equation for  $x$ .

$$3(x + 2) - 2 = 4x$$

Saba **Play** Lauren **Play** Gordon **Play** Julieta **Play** gspatio

**Example 2**

Solve the equation:

$$\frac{x + 5}{2} + \frac{2x - 1}{5} = 5$$

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