Section 1.2 Linear Equations in One Variable

Objective: In this lesson you learned how to solve linear equations in one variable.

Important Vocabulary

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<td>Define each term or concept.</td>
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I. Equations and Solutions of Equations (Page 88)

To solve an equation in \( x \) means to . . .

The values of \( x \) for which the equation is true are called its

Example 1: Identify which of the following equations are equations in one variable.

(a) \( 7 + 6x = 5x - 4 \)  (b) \( 9x + 5y = -3 \)

(c) \( I = prt \)  (d) \( 8 = 3x^2 + 4x + 5 \)

II. Linear Equations in One Variable (Pages 88–90)

A linear equation in one variable \( x \) is an equation that can be written in the standard form \( ax + b = 0 \), where \( a \) and \( b \) are real numbers with \( a \neq 0 \).

A linear equation has \( \frac{b}{a} \) solution(s).

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

1. }

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(2)

(3)

(4)

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

**Example 2:** Solve \( 5(x + 3) = 35 \).

III. **Equations That Lead to Linear Equations** (Page 91)

To solve an equation involving fractional expressions, ...

When is it possible to introduce an extraneous solution?

An equation with a single fraction on each side can be cleared of denominators by ____________, which is equivalent to multiplying by the LCD and then dividing out.

**Example 3:** Solve: (a) \( \frac{5x}{7} = \frac{9}{14} \) (b) \( \frac{1}{x + 1} + \frac{5x}{x^2 - 1} = -\frac{4}{x - 1} \)

IV. **Finding Intercepts Algebraically** (Page 92)

To find \( x \)-intercepts, ...

To find \( y \)-intercepts, ...

**Example 4:** For the equation \( 3x - 4y = 12 \), find:
(a) the \( x \)-intercept(s), and (b) the \( y \)-intercept(s).
Section 1.4 Quadratic Equations

Objective: In this lesson you learned how to solve quadratic equations.

Important Vocabulary

Quadratic equation
Quadratic formula
Discriminant

What you should learn

I. Factoring (Page 109)

To use the Zero-Factor Property to solve a quadratic equation.

Example 1: Solve \( x^2 - 12x = -27 \) by factoring.

II. Extracting Square Roots (Page 110)

Solving an equation of the form \( u^2 = d \) without going through the steps of factoring is called ____________________________.

The equation \( u^2 = d \), where \( d > 0 \), has exactly two solutions:
\[ u = \text{__________________} \text{ and } u = \text{__________________} \]
These solutions can also be written as \( u = \text{__________________} \).

Example 2: Solve \( 5(x - 4)^2 = 45 \) by extracting square roots.
III. Completing the Square (Page 111)

To complete the square for the expression $x^2 + bx$, add \underline{\hspace{2cm}}\hspace{1cm} which is the square of half the coefficient of $x$.

When solving quadratic equations by completing the square, you must add this term to \underline{\hspace{2cm}}\hspace{1cm} in order to maintain equality.

The completing the square method can be used to solve a quadratic equation when...

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.

IV. The Quadratic Formula (Pages 112–113)

The verbal statement of the Quadratic Formula is ...

When using the Quadratic Formula, remember that before the formula can be applied, ...

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

The discriminant of the quadratic expression $ax^2 + bx + c$ can be used to ...
If the discriminant $b^2 - 4ac$ of the quadratic equation
$ax^2 + bx + c = 0$, $a \neq 0$, is:

1) positive, then the quadratic equation . . .

2) zero, then the quadratic equation . . .

3) negative, then the quadratic equation . . .

**Example 5:** Use the discriminant to find the number and type of solutions of the quadratic equation
$6x^2 - 5x + 18 = 0$.

**V. Applications of Quadratic Equations** (Pages 114–117)
Describe two real-life situations in which quadratic equations often occur.

The **position equation** giving the height of an object above the Earth’s surface is ________________, where . . .

**Homework Assignment**
Page(s)
Exercises
Section 1.6 Other Types of Equations

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

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<th>Define each term or concept.</th>
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<tbody>
<tr>
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I. Polynomial Equations (Pages 130–131)

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

Example 1: Describe a strategy for solving the polynomial equation $x^3 + 2x^2 - x = 2$. Then find the solutions.

An equation is of quadratic type if . . .

Example 2: Solve the equation of quadratic type:

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

II. Equations Involving Radicals (Page 132)

A(n) __________________ is a solution to an equation that does not satisfy the original equation.

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

What you should learn
How to solve equations involving radicals
Operations that can introduce extraneous solutions include, . . .

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

Example 3: Describe a strategy for solving the following equation involving a radical expression:
\[
\sqrt{8-x} - 15 = 0
\]

III. Equations with Fractions or Absolute Values
(Pages 133–134)

To solve an equation involving fractions, . . .

Example 4: Solve:
\[
\frac{2}{x} - 1 = \frac{1}{x + 1}
\]

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

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