A **linear equation in one variable** is an equation that is equivalent to one of the form $ax + b = 0$, where $a$ and $b$ are real numbers and $a \neq 0$.

A **quadratic equation** is an equation that is equivalent to one of the form $ax^2 + bx + c = 0$, where $a$, $b$, and $c$ are real numbers and $a \neq 0$.

## Equation-Solving Principles

For any real numbers $a$, $b$, and $c$,

**The Addition Principle:** If $a = b$ is true, then $a + c = b + c$ is true.

**The Multiplication Principle:** If $a = b$ is true, then $ac = bc$ is true.

**The Principle of Zero Products:** If $ab = 0$ is true, then $a = 0$ or $b = 0$, and if $a = 0$ or $b = 0$, then $ab = 0$.

**The Principle of Square Roots:** If $x^2 = k$, then $x = \sqrt{k}$ or $x = -\sqrt{k}$.

Solve:

1. $6x - 15 = 45$

3. $5x - 10 = 45$

5. $9t + 4 = -5$

15. $3m - 7 = -13 + m$

17. $11 - 3x = 5x + 3$

19. $2(x + 7) = 5x + 14$

**31.** $x^2 - 8x = 0$

**33.** $y^2 + 6y + 9 = 0$

**35.** $x^2 + 100 = 20x$

**45.** $14 = x(x - 5)$

**47.** $x^2 - 36 = 0$

**49.** $z^2 = 144$

**51.** $2x^2 - 20 = 0$

**57.** $3[5 - 3(4 - t)] - 2 = 5[3(5t - 4) + 8] - 26$

**59.** $x - \{3x - [2x - (5x - (7x - 1))]\} = x + 7$

*Exercise Set R.7*

**1.** 10   **3.** 11   **5.** $-1$   **7.** $-12$   **9.** 2   **11.** $-1$   **13.** $\frac{18}{5}$
**15.** $-3$   **17.** 1   **19.** 0   **21.** $-\frac{1}{10}$   **23.** 5   **25.** $-\frac{3}{2}$
**27.** $\frac{20}{7}$   **29.** $-7, 4$   **31.** $0, 8$   **33.** $-3$   **35.** 10
**37.** $-4, 8$   **39.** $-2, -\frac{2}{3}$   **41.** $-\frac{3}{4}, \frac{2}{3}$   **43.** $-\frac{4}{3}, \frac{7}{4}$
**45.** $-2, 7$   **47.** $-6, 6$   **49.** $-12, 12$   **51.** $-\sqrt{10}, \sqrt{10}$
**53.** $-\sqrt{3}, \sqrt{3}$   **55.** Discussion and Writing   **57.** $\frac{23}{66}$   **59.** 8
**61.** $-\frac{6}{5}, -\frac{1}{4}, 0, \frac{2}{3}$   **63.** $-3, -2, 3$