

9.1 Solving Linear Equations

Objective:

- To Solve Linear Equations

An **equation** is a statement in which two expressions are equal.

Two equations are **equivalent** if they have the same solutions.

Transformations that produce equivalent equations

- * Add the same number to both sides
- * Subtract the same number from both sides
- * Multiply both sides by the same nonzero number
- * Divide both sides by the same nonzero number

Examples: Solve for the missing variable.

Goal: to isolate the variable on one side of the equation

1. $\frac{3x}{7} + 9 = 15$

$$\frac{3}{7}x = 6$$

$$\cdot \left(\frac{7}{3}\right) \quad \cdot \left(\frac{7}{3}\right)$$

$$x = 14$$

3. $5n + 11 = 7n - 9$

$$-5n \quad -5n$$

$$11 = 2n - 9$$

$$+9 \quad +9$$

$$20 = 2n$$

$$\div 2 \quad \div 2$$

$$10 = n$$

2. $\frac{2x}{9} + 8 = 16$

$$\frac{2}{9}x = 8$$

$$\cdot \left(\frac{9}{2}\right) \quad \cdot \left(\frac{9}{2}\right)$$

$$x = 36$$

4. $12n - 3 = 4n + 21$

$$-4n \quad -4n$$

$$8n - 3 = 21$$

$$+3 \quad +3$$

$$8n = 24$$

$$\div 8 \quad \div 8$$

$$n = 3$$

5. $4(3x - 5) = -2(-x + 8) - 6x$

$$12x - 20 = 2x - 16 - 6x$$

$$12x - 20 = -4x - 16$$

$$+4x \quad +4x$$

$$16x - 20 = -16$$

$$+20 \quad +20$$

$$16x = 4$$

$$x = \frac{1}{4}$$

6. $\frac{1}{3}x + \frac{1}{4} = x - \frac{1}{6}$

$$\cdot (12) \quad \cdot (12)$$

$$4x + 3 = 12x - 2$$

$$-4x \quad -4x$$

$$3 = 8x - 2$$

$$+2 \quad +2$$

$$5 = 8x$$

$$x = \frac{5}{8}$$

Homework: 1.3 Practice A Worksheet