

2.5

Solving Equations Using Addition or Subtraction

Goal: Solve equations using addition or subtraction.

Vocabulary

Inverse operations:

Equivalent equations:

Subtraction Property of Equality

Words Subtracting the same number from each side of an equation produces an equivalent equation.

Numbers If $x + 3 = 5$, then $x + 3 - \square = 5 - \square$, or $x = \square$.

Algebra If $x + a = b$, then $x + a - \square = b - \square$, or $x = \square$.

Example 1 Solving an Equation Using Subtraction

Solve $x + 5 = -2$.

Solution

Use the subtraction property of equality to solve for x .

$$x + 5 = -2$$

Write original equation.

$$x + 5 - \square = -2 - \square$$

Subtract \square from each side.

$$x = \square$$

Simplify.

Answer: The solution is \square .

Check: $x + 5 = -2$

Write original equation.

$$\square + 5 \stackrel{?}{=} -2$$

Substitute for x .

$$\square - 2$$

$$\square$$

When you solve an equation, your goal is to write an equivalent equation that has the variable by itself on one side. This process is called *solving for the variable*.

Addition Property of Equality

Words Adding the same number to each side of an equation produces an equivalent equation.

Numbers If $x - 3 = 5$, then $x - 3 + \square = 5 + \square$, or $x = \square$.

Algebra If $x - a = b$, then $x - a + \square = b + \square$, or $x = \square$.

Example 2 Solving an Equation Using Addition

Solve $12 = y - 7$.

Solution

Use the addition property of equality to solve for y .

$$12 = y - 7 \quad \text{Write original equation.}$$

$$12 + \square = y - 7 + \square \quad \text{Add } \square \text{ to each side.}$$

$$\square = y \quad \text{Simplify.}$$

Answer: The solution is \square .

✓ **Checkpoint** Solve the equation. Check your solution.

1. $x + 6 = 19$

2. $-5 = y + 12$

3. $m - 3 = -11$