

Solving Equations with Terms on Both Sides

A variable (representing an unknown value) can appear in terms on both sides of an equation. Usually, you'll move all terms containing a variable to the left side of the equation.

EXAMPLE 1 Solve: $5x = 3x + 12$

STEP 1 Subtract $3x$ from each side.

Simplify each side.

STEP 2 Divide each side by 2.

Simplify each side.

$$5x = 3x + 12$$

$$5x - 3x = 3x - 3x + 12$$

$$2x = 12$$

$$\frac{2x}{2} = \frac{12}{2}$$

$$x = 6$$

ANSWER: $x = 6$

Check: $5(6) = 3(6) + 12$

$$30 = 18 + 12$$

$$\checkmark 30 = 30$$

EXAMPLE 2 Solve: $6y - 14 = 2y + 82$

STEP 1 Subtract $2y$ from each side.

Simplify each side.

STEP 2 Add 14 to each side.

Simplify each side.

STEP 3 Divide each side by 4.

Simplify each side.

$$6y - 14 = 2y + 82$$

$$6y - 2y - 14 = 2y - 2y + 82$$

$$4y - 14 = 82$$

$$4y - 14 + 14 = 82 + 14$$

$$4y = 96$$

$$\frac{4y}{4} = \frac{96}{4}$$

$$y = 24$$

ANSWER: $y = 24$

Check: $6(24) - 14 = 2(24) + 82$

$$144 - 14 = 48 + 82$$

$$\checkmark 130 = 130$$

Complete each problem. Check each answer.

1. $6x + 9 = 2x + 25$
 $6x - 2x + 9 = 2x - 2x + 25$
 $4x + 9 = 25$
 $4x + 9 - 9 = 25 - 9$

Check:
 $6(\quad) + 9 = 2(\quad) + 25$

$$6z - 19 = 3z + 47$$
$$6z - 3z - 19 = 3z - 3z + 47$$
$$3z - 19 = 47$$
$$3z - 19 + 19 = 47 + 19$$

Check:
 $6(\quad) - 19 = 3(\quad) + 47$

$$11n - 13 = 4n + 36$$
$$11n - 4n - 13 = 4n - 4n + 36$$
$$7n - 13 = 36$$
$$7n - 13 + 13 = 36 + 13$$

Check:
 $11(\quad) - 13 = 4(\quad) + 36$