

# Solve Two-Step Equations

## ONE-STEP EQUATIONS

$$\boxed{\frac{5x}{5}} = \frac{20}{5}$$
$$x = 4$$

$$\cancel{y - 4} = -3$$
$$+4 \quad +4$$
$$y = 1$$

## TWO-STEP EQUATIONS

$$\cancel{5x - 4} = 16$$
$$+4 \quad +4$$

$$\boxed{\frac{5x}{5}} = \frac{20}{5}$$
$$x = 4$$

$$5(4) - 4 \stackrel{?}{=} 16$$
$$20 - 4$$
$$16 = 16$$
$$j$$

$$\cancel{\frac{y}{6} + 3} = 9$$
$$-3 \quad -3$$

$$\cancel{6} \cdot \frac{y}{\cancel{6}} = 6 \cdot 6$$
$$y = 36$$

$$\frac{36}{6} + 3 \stackrel{?}{=} 9$$
$$6 + 3$$
$$9 = 9$$

j

## Lesson 6-4 Solve Two-Step Equations

To solve a two-step equation, undo the addition or subtraction first. Then undo the multiplication or division.

### Example 1

Solve  $7v - 3 = 25$ . Check your solution.

$$\begin{array}{r} 7v - 3 = 25 \\ +3 = +3 \\ \hline 7v = 28 \\ \frac{7v}{7} = \frac{28}{7} \\ v = 4 \end{array}$$

Write the equation.

Undo the subtraction by adding 3 to each side.

Simplify.

Undo the multiplication by dividing each side by 7.

Simplify.

**Check**

$$\begin{array}{l} 7v - 3 = 25 \\ 7(4) - 3 \stackrel{?}{=} 25 \\ 28 - 3 \stackrel{?}{=} 25 \\ 25 = 25 \checkmark \end{array}$$

Write the original equation.

Replace  $v$  with 4.

Multiply.

The solution checks.

The solution is 4.

### Example 2

Solve  $-10 = 8 + 3x$ . Check your solution.

$$\begin{array}{r} -10 = 8 + 3x \\ -8 = -8 \\ \hline -18 = 3x \\ \frac{-18}{3} = \frac{3x}{3} \\ -6 = x \end{array}$$

Write the equation.

Undo the addition by subtracting 8 from each side.

Simplify.

Undo the multiplication by dividing each side by 3.

Simplify.

**Check**

$$\begin{array}{l} -10 = 8 + 3x \\ -10 \stackrel{?}{=} 8 + 3(-6) \\ -10 \stackrel{?}{=} 8 + (-18) \\ -10 = -10 \checkmark \end{array}$$

Write the original equation.

Replace  $x$  with  $-6$ .

Multiply.

The solution checks.

The solution is  $-6$ .

### Exercises

Solve each equation. Check your solution.

1.  $4y + 1 = 13$

$$\begin{array}{r} 4y + 1 = 13 \\ -1 \quad -1 \\ \hline 4y = 12 \\ \frac{4y}{4} = \frac{12}{4} \\ y = 3 \end{array}$$

2.  $6x + 2 = 26$

$$\begin{array}{r} 6x + 2 = 26 \\ -2 \quad -2 \\ \hline 6x = 24 \\ \frac{6x}{6} = \frac{24}{6} \\ x = 4 \end{array}$$

3.  $-3 = 5k + 7$

$$\begin{array}{r} -3 = 5k + 7 \\ -7 \quad -7 \\ \hline -10 = 5k \\ \frac{-10}{5} = \frac{5k}{5} \\ -2 = k \end{array}$$

$-3 \stackrel{?}{=} 5(-2) + 7$   
 $-10 + 7$   
 $-3 = -3$

9.  $11 + \frac{7}{9}n = 4$

10.  $35 = 7 + 4b$

11.  $-15 + \frac{4}{5}p = 9$

## Lesson 4 Skills Practice

### Solve Two-Step Equations

Solve each equation. Check your solution.

1.  $2x + 1 = 9$

2.  $5b + 2 = 17$

5.  $4t - 2 = 14$

6.  $7k - 3 = 32$

9.  $2 + \frac{1}{6}a = -4$

10.  $9 + 4b = 17$

13.  $-\frac{3}{2}w + 5 = 4$

14.  $8x + 7 = -9$

17.  $11x - 24 = -2$

18.  $15a - 54 = -9$

21.  $-9d - 1 = 17$

22.  $-\frac{4}{5}f + 1 = -13$