

# 11-1 Solving Two-Step Equations

*Learn* to solve two-step equations.

# Solving Algebra Equations

1. Write down the problem: Variable Side = Answer Side
2. Isolate the variable by doing the **inverse operation** on both sides- starting with the variable side.
3. **Cross out** on variable side
4. Draw answer line
5. Drop down the variable
6. Solve – find a solution
7. Check



## 11-1 Solving Two-Step Equations

When you solve equations that have one operation, you use an inverse operation to isolate the variable. You can also use inverse operations to solve equations that have more than one operation.

$$n + 7 = 15$$

$$\begin{array}{r} \underline{-7} \\ n \end{array} = \begin{array}{r} \underline{-7} \\ 8 \end{array}$$

$$2x + 3 = 23$$

$$\textcircled{2x} \begin{array}{r} \underline{-3} \\ = 20 \end{array}$$

*You need to use another operation to isolate  $x$ .*

It is often a good plan to follow the order of operations in reverse when solving equations that have more than one operation.

# 11-1 Solving Two-Step Equations

## Additional Example 1A: Solving Two-Step Equations Using Division

**Solve. Check each answer.**

**A.  $9c + 3 = 39$**

$$9c + 3 = 39$$

$$\underline{\quad - 3} \quad \underline{-3}$$

$$9c = 36$$

$$\frac{9c}{9} = \frac{36}{9}$$

$$c = 4$$

*Subtract 3 from both sides.*

*Divide both sides by 9.*

# 11-1 Solving Two-Step Equations

## Additional Example 1A Continued

**Check.**

$$9c + 3 = 39$$

$$9(4) + 3 \stackrel{?}{=} 39$$

*Substitute 4 for c.*

$$36 + 3 \stackrel{?}{=} 39$$

$$39 \stackrel{?}{=} 39 \quad \checkmark$$

*4 is a solution.*

# 11-1 Solving Two-Step Equations

## Additional Example 1B: Solving Two-Step Equations Using Division

**Solve. Check the answer.**

**B.  $4m - 6 = 34$**

*Add 6 to both sides.*

*Divide both sides by  $-4$ .*

$$m = 10$$

# 11-1 Solving Two-Step Equations

## Try This: Example 1A

**Solve. Check each answer.**

**A.  $7c + 6 = 48$**

$$7c + 6 = 48$$

$$\begin{array}{r} \underline{-6} \quad \underline{-6} \\ 7c \quad \quad = 42 \end{array}$$

$$\frac{7c}{7} = \frac{42}{7}$$

$$c = 6$$

*Subtract 6 from both sides.*

*Divide both sides by 7.*

# 11-1 Solving Two-Step Equations

## Try This: Example 1A Continued

**Check.**

$$7c + 6 = 48$$

$$7(6) + 6 \stackrel{?}{=} 48$$

*Substitute 6 for c.*

$$42 + 6 \stackrel{?}{=} 48$$

$$48 \stackrel{?}{=} 48 \quad \checkmark$$

*6 is a solution.*

# 11-1 Solving Two-Step Equations

## Try This: Example 1B

**Solve. Check the answer.**

**B.  $6m - 8 = 40$**

*Add 8 to both sides.*

*Divide both sides by  $-6$ .*

$$m = 8$$

# 11-1 Solving Two-Step Equations

## Additional Example 2A: Solving Two-Step Equations Using Multiplication

**Solve.**

$$\text{A. } \frac{y}{5} + 6 = 21$$

*Subtract 6 from both sides.*

*Multiply both sides by 5.*

$$y = 75$$

# 11-1 Solving Two-Step Equations

## Additional Example 2B: Solving Two-Step Equations Using Multiplication

Solve.

$$\text{B. } \frac{x}{7} - 26 = 9$$

*Add 11 to both sides.*

*Multiply both sides by 7.*

$$x = 245$$

# 11-1 Solving Two-Step Equations

## Try This: Example 2A

**Solve.**

$$\frac{y}{2} + 8 = 48$$

*Subtract 8 from both sides.*

*Multiply both sides by 2.*

$$y = 80$$

# 11-1 Solving Two-Step Equations

## Try This: Example 2B

Solve.

$$\text{B. } \frac{x}{5} - 31 = 19$$

$$\frac{x}{5} - 31 = 19$$

$$\underline{\quad +31 \quad +31}$$

$$\frac{x}{5} = 50$$

$$(5) \frac{x}{5} = (5) 50$$

$$x = 250$$

*Add 31 to both sides.*

*Multiply both sides by 5.*

# 11-1 Solving Two-Step Equations

## Lesson Quiz

**Solve. Check your answers.**

1.  $6x + 8 = 44$       $x = 6$

2.  $14y - 14 = 28$       $y = 3$

3.  $\frac{m}{7} + 3 = 12$       $m = 63$

4.  $\frac{v}{8} - 6 = 8$       $v = 112$

5. Last Sunday, the Humane Society had a 3-hour adoption clinic. During the week the clinic is open for 2 hours on days when volunteers are available. If the Humane Society was open for a total of 9 hours last week, how many weekdays was the clinic open? **3 days**