

LESSON
2.2**Study Guide**

For use with the lesson "Solve One-Step Equations"

GOAL Solve one-step equations using algebra.**Vocabulary****Inverse operations** are two operations that undo each other, such as addition and subtraction.**Equivalent equations** are equations that have the same solution(s).**Properties of Equality****Addition Property of Equality** Adding the same number to each side of an equation produces an equivalent equation.**Subtraction Property of Equality** Subtracting the same number from each side of an equation produces an equivalent equation.**Multiplication Property of Equality** Multiplying each side of an equation by the same nonzero number produces an equivalent equation.**Division Property of Equality** Dividing each side of an equation by the same nonzero number produces an equivalent equation.**EXAMPLE 1** Solve an equation using subtraction**Solve** $x + 11 = 15$.**Solution**

$$x + 11 = 15$$

Write original equation.

$$x + 11 - 11 = 15 - 11$$

Use subtraction property of equality:
Subtract 11 from each side.

$$x = 4$$

Simplify.

The solution is 4. Check by substituting 4 for x in the original equation.**CHECK** $x + 11 = 15$ Write original equation.

$$4 + 11 = 15$$
 Substitute 4 for x .

$$15 = 15 \checkmark$$
 Solution checks.

EXAMPLE 2 Solve an equation using addition**Solve** $x - 8 = 17$.**Solution****Horizontal format**

$$x - 8 = 17$$

Write original equation.

$$x - 8 + 8 = 17 + 8$$

Add 8 to each side.

$$x = 25$$

Simplify.

The solution is 25.

Vertical format

$$x - 8 = 17$$

$$\begin{array}{r} + 8 \\ + 8 \\ \hline x = 25 \end{array}$$

LESSON
2.2**Study Guide** *continued*
For use with the lesson "Solve One-Step Equations"**Exercises for Examples 1 and 2****Solve the equation. Check your solution.**

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|-----------------|-----------------|------------------|
| 1. $x + 9 = 5$ | 2. $y + 2 = -5$ | 3. $19 = w + 13$ |
| 4. $8 = z - 11$ | 5. $m - 3 = 7$ | 6. $n - 4 = -12$ |

EXAMPLE 3 **Solve an equation using division****Solve $7x = -63$.**

$$7x = -63$$
 Write original equation.

$$\frac{7x}{7} = \frac{-63}{7}$$
 Divide each side by 7.

$$x = -9$$
 Simplify.

EXAMPLE 4 **Solve an equation using multiplication****Solve $\frac{x}{12} = 4$.**

$$\frac{x}{12} = 4$$
 Write original equation.

$$12 \cdot \frac{x}{12} = 12 \cdot 4$$
 Multiply each side by 12.

$$x = 48$$
 Simplify.

EXAMPLE 5 **Solve an equation by multiplying by a reciprocal****Solve $\frac{3}{5}x = 6$.**The coefficient of x is $\frac{3}{5}$. The reciprocal of $\frac{3}{5}$ is $\frac{5}{3}$.

$$\frac{3}{5}x = 6$$
 Write original equation.

$$\frac{5}{3}\left(\frac{3}{5}x\right) = \frac{5}{3}(6)$$
 Multiply each side by the reciprocal, $\frac{5}{3}$.

$$x = 10$$
 Simplify.

Exercises for Examples 3, 4, and 5**Solve the equation. Check your solution.**

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|-------------------------|-------------------------|-------------------------|
| 7. $-9x = -36$ | 8. $7y = 21$ | 9. $\frac{x}{3} = -24$ |
| 10. $18 = \frac{y}{-2}$ | 11. $-\frac{2}{5}z = 8$ | 12. $16 = \frac{4}{7}m$ |