1.2 Lesson



Solving Multi-Step Equations

To solve multi-step equations, use inverse operations to isolate the variable.

EXAMPLE 1 Solving a Two-Step Equation

Solve 3x + 15 = 24.

$$3x + 15 = 24$$
Undo the addition.
$$-15 - 15$$

$$3x = 9$$

Subtraction Property of Equality

Undo the multiplication.
$$\rightarrow \frac{3x}{3} = \frac{9}{3}$$

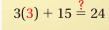
Simplify. **Division Property** of Equality

Write the equation.

Check 3x + 15 = 24

ndo the multiplication.
$$\frac{3x}{3} =$$

Simplify.



The solution is x = 3.

x =

Try It Solve the equation. Check your solution.

1.
$$2z - 1 = -5$$

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$$2z - 1 = -5$$
 2. $-3z + 1 = 7$

3.
$$\frac{1}{2}x - 9 = -25$$

24 = 24

EXAMPLE 2 Solving a Multi-Step Equation

Solve 8x - 6x - 25 = -35.

$$8x - 6x - 25 = -35$$

Write the equation.

$$2x - 25 = -35$$

Combine like terms.

Undo the subtraction.
$$\rightarrow +25$$
 $+25$

Addition Property of Equality

$$2x = -10$$

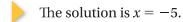
Simplify.

Undo the multiplication.
$$\Rightarrow \frac{2x}{2} = \frac{-10}{2}$$

Division Property of Equality

$$x = -5$$

Simplify.



Try It Solve the equation. Check your solution.

4.
$$-4n - 8n + 17 = 23$$

5.
$$10 = 3n + 20 - n$$

Math Practice

Look for StructureShow how to solve

the equation without using the Distributive

Property.

Solve
$$2(1-5x)+4=-8$$
.

$$2(1-5x)+4=-8$$

Write the equation.

$$2(1) - 2(5x) + 4 = -8$$

Distributive Property

$$2 - 10x + 4 = -8$$

Multiply.

$$-10x + 6 = -8$$

Combine like terms.

$$-6 - 6$$

Subtraction Property of Equality

$$-10x = -14$$

Simplify.

$$\frac{-10x}{-10} = \frac{-14}{-10}$$

Division Property of Equality

$$x = 1.4$$

Simplify.



The solution is x = 1.4.

Try It Solve the equation. Check your solution.

6.
$$-3(x+2) + 5x = -9$$

7.
$$5 + 1.5(2d - 1) = 0.5$$



Self-Assessment for Concepts & Skills

Solve each exercise. Then rate your understanding of the success criteria in your journal.

SOLVING AN EQUATION Solve the equation. Check your solution.

8.
$$-5x + 1 = 31$$

9.
$$\frac{1}{3}x - 9 = -12$$

10.
$$-n-6n+4=53$$

11.
$$14 = 6n + 6 - 2n$$

12.
$$-8(x+1) + 2x = -32$$

13.
$$3 + 4.5(2d - 3) = 7.5$$

14. WRITING Write the sentence as an equation, then solve.

2 more than 3 times a number x is 17.

15. OPEN-ENDED Explain how to solve the equation 2(4x - 11) + 9 = 19.

16. CRITICAL THINKING How can you solve 3(x + 2) = 9 without distributing the 3?