

LESSON
12.3

Solving Subtraction Equations

Goal: Solve one-step subtraction equations.

EXAMPLE 1 Working Backward

You can also solve the equation in Example 1 by getting the variable by itself as you did in Lesson 12.2. Instead of subtracting a number from each side of the equation, you add a number to each side of the equation.

Shopping You went to a clothing store and bought a shirt for \$25. When you got home from the store you had \$8 left in your wallet. How much money did you go to the store with? You can find the amount of money m you went to the store with by solving the equation $m - 25 = 8$.

Solution

One way to solve the equation to find the amount of money you went to the store with is to work backward.

After spending \$25, you have \$8 left. $m - 25 = 8$

To find the amount of money m you had before subtracting 25, you can to undo the subtraction.

$$m - 25 = 8$$

$$\text{input} = m$$

Handwritten: $m + 25 = 8 + 25$
 $m = 33$

Answer: You went to the store with \$ *33*

✓ Check $m - 25 = 8$

$$\text{input} - 25 \stackrel{?}{=} 8$$

$$8 = 8 \checkmark$$

Write original equation.

Substitute for m .

Solution checks.

Solving Subtraction Equations

To solve a subtraction equation, the same number to each side so that the is by itself on one side.

goal: get the variable alone

$x + 4 = 9$
 $x = 5$

EXAMPLE 2 Solving Subtraction Equations

Solve the equation.

a. $17 = w - 9$

b. $a - 2.4 = 15.75$

Solution

a. In this equation, the variable is on the right side of the equation.

$17 = w - 9$
 $+9 \quad +9$
 $26 = w$ or $w = 26$

Write the original equation.
 add 9 to each side.

Simplify.

b. $a - 2.4 = 15.75$

$a - 2.4 = 15.75$
 $+2.4 \quad +2.4$
 $a = 18.15$

Write the original equation.
 add 2.4 to each side.

Simplify.

WATCH OUT!
 Line up decimal points correctly before adding decimals.

WRONG	RIGHT
$\begin{array}{r} 11.95 \\ + 3.1 \\ \hline 12.26 \end{array}$	$\begin{array}{r} 11.95 \\ + 3.10 \\ \hline 15.05 \end{array}$

EXAMPLE 3 Using a Subtraction Equation

Weather According to a 5 o'clock news report, the temperature has dropped 6 degrees since noon to 19°F. What was the temperature at noon?

Solution

Let n represent the temperature at noon.

$n - 6 = 19$
 $+6 \quad +6$
 $n = 25$

Write an equation.
 add 6 to each side.

Simplify.

Answer: The temperature was 25°F at noon.

Your turn now Solve the equation. Then check the solution.

1. $y - 8 = 5$	2. $32 = d - 14$	3. $7.8 = m - 4.9$
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