3.2 Solve Two-Step Equations

Before	You solved one-step equations.
Now	You will solve two-step equations.
Why?	So you can find a scuba diver's depth, as in Example 4.

Key Vocabulary
• **like terms,** *p. 97*
• **input,** *p. 35*
• **output,** *p. 35*

The equation $\frac{x}{2} + 5 = 11$ involves two operations performed on x: division by 2 and addition by 5. You typically solve such an equation by applying the inverse operations in the reverse order of the order of operations. This is shown in the table below.

Operations performed on x	Operations to isolate x
1. Divide by 2. 2. Add 5.	1. Subtract 5. 2. Multiply by 2.

EXAMPLE 1 Solve a two-step equation

Solve $\frac{x}{2} + 5 = 11$.

$\frac{x}{2} + 5 = 11$ **Write original equation.**

$\frac{x}{2} + 5 - 5 = 11 - 5$ **Subtract 5 from each side.**

$\frac{x}{2} = 6$ **Simplify.**

$2 \cdot \frac{x}{2} = 2 \cdot 6$ **Multiply each side by 2.**

$x = 12$ **Simplify.**

▶ The solution is 12. Check by substituting 12 for x in the original equation.

CHECK $\frac{x}{2} + 5 = 11$ **Write original equation.**

$\frac{12}{2} + 5 \overset{?}{=} 11$ **Substitute 12 for x.**

$11 = 11 \checkmark$ **Simplify. Solution checks.**

✓ **GUIDED PRACTICE** for Example 1

Solve the equation. Check your solution.

1. $5x + 9 = 24$ **2.** $4y - 4 = 16$ **3.** $-1 = \frac{z}{3} - 7$