

**LESSON**  
**8-2**

# Solving Systems by Substitution

## Reteach

You can use substitution to solve a system of equations if one of the equations is already solved for a variable.

**Solve**  $\begin{cases} y = x + 2 \\ 3x + y = 10 \end{cases}$

**Step 1:** Choose the equation to use as the substitute.

Use the first equation  $y = x + 2$  because it is already solved for a variable.

**Step 2:** Solve by substitution.

$x + 2$

$$\begin{aligned} 3x + y &= 10 \\ 3x + (x + 2) &= 10 && \text{Substitute } x + 2 \text{ for } y. \\ 4x + 2 &= 10 && \text{Combine like terms.} \\ \underline{-2} \quad \underline{-2} & && \\ 4x &= 8 \\ \frac{4x}{4} &= \frac{8}{4} \\ x &= 2 \end{aligned}$$

**Step 3:** Now substitute  $x = 2$  back into one of the original equations to find the value of  $y$ .

$$\begin{aligned} y &= x + 2 \\ y &= 2 + 2 \\ y &= 4 \end{aligned}$$

The solution is  $(2, 4)$ .

**Check:**

Substitute  $(2, 4)$  into both equations.

$y = x + 2$	$3x + y = 10$
$4 \stackrel{?}{=} 2 + 2$	$3(2) + 4 \stackrel{?}{=} 10$
$4 \stackrel{?}{=} 4 \checkmark$	$6 + 4 \stackrel{?}{=} 10$
	$10 \stackrel{?}{=} 10 \checkmark$

**Solve each system by substitution. Check your answer.**

1.  $\begin{cases} x = y - 1 \\ x + 2y = 8 \end{cases}$

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2.  $\begin{cases} y = x + 2 \\ y = 2x - 5 \end{cases}$

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3.  $\begin{cases} y = x + 5 \\ 3x + y = -11 \end{cases}$

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4.  $\begin{cases} x = y + 10 \\ x = 2y + 3 \end{cases}$

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