

# 5.3

## SOLVING SYSTEMS OF LINEAR EQUATIONS BY ELIMINATION

### 5-3 Solve Linear Systems by Adding

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So far, you've learned two methods to solve a linear system:

- 1) graphing
- 2) substitution

Today, you'll learn a third method where your goal is to **ELIMINATE** one of the variables by either adding or subtracting the two equations.

**Example 1**

$$\begin{array}{r} 3x + 4y = 8 \\ -3x + 5y = 10 \end{array}$$

#### Example 2

$$\begin{array}{r} -5x + y = 18 \\ 3x - y = -10 \end{array}$$

### Now you try...

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1)	$3x - 4y = 6$	2)	$-2x + y = -5$
	$2x + 4y = 9$		$3x - y = 4$

## 5-3 Solve Linear Systems by Subtracting

Yesterday you learned a third method where your goal is to **ELIMINATE** one of the variables by looking for **OPPOSITES** and then adding the two equations together.

Use **SUBTRACTION** when there are the **exact same terms** (including coefficients) in each equation.

**Example 1**

$$\begin{array}{rcl} 5x + 6y & = & 4 \\ 7x + 6y & = & 8 \end{array}$$

### Example 2

$$\begin{array}{rcl} 4x + 2y & = & 14 \\ 4x - 3y & = & -11 \end{array}$$

## Now you try...

1)  $\begin{array}{rcl} 2x + y & = & 7 \\ x + y & = & 1 \end{array}$

2)  $\begin{array}{rcl} 2x + y & = & 3 \\ 2x + 3y & = & 13 \end{array}$

Can you make a variable cancel by first multiplying?

### Example 1

$$\begin{array}{rcl} -2x + 4y & = & -8 \\ x - y & = & 4 \end{array}$$

Example 2

$$2x + y = -9$$

$$4x + 11y = 9$$

Example 3

$$x + 3y = 1$$

$$5x + 6y = 14$$

Now you try...

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1)  $4x - y = 2$

$$3x + 2y = 7$$

2)  $3x - y = 10$

$$2x + 5y = 35$$