

Algebra 1                  6.4  
Solve systems by elimination  
Solve problems using elimination

solve  
elimination  
zero pairs  
multiplication property of equality  
whiteboards

Elimination (so far)

What is the goal?

What if they don't "match up?"

If I multiply all terms by the same amount, is it still equal?

$$\begin{aligned} 2 \cdot 3 &= 3 \cdot 2 \\ \frac{1}{2} \cdot 2x &= 8 \cdot \frac{1}{2} \\ x &= 4 \end{aligned}$$

Goal: make zero pairs...

### Example 1 Multiply One Equation to Eliminate a Variable

Use elimination to solve the system of equations.

$$5x + 6y = -8$$

$$2x + 3y = -5$$

$$4x + -9y = -5$$

$$\begin{array}{r} -5x - 6y = 8 \\ 4x + 6y = -10 \end{array}$$

$$(2, -3)$$

$$5 \cdot 2 + 6y = -8$$

$$10 + 6y = -8$$

$$\begin{array}{r} -10 \quad y = -10 \\ \hline 6y = -18 \\ y = -3 \end{array}$$

$$\begin{array}{r} -x = -2 \\ \hline -1 \quad -1 \end{array}$$

$$x = 2$$

### **KeyConcept** Solving by Elimination

**Step 1** Multiply at least one equation by a constant to get two equations that contain opposite terms.

**Step 2** Add the equations, eliminating one variable. Then solve the equation.

**Step 3** Substitute the value from Step 2 into one of the equations and solve for the other variable.  
Write the solution as an ordered pair.

Goal: make zero pairs

**Example 2** Multiply Both Equations to Eliminate a Variable

Use elimination to solve the system of equations.

$$\rightarrow 4x + 2y = 8$$

$$3x + 3y = 9$$

$$\textcircled{1}) 3 + 6 = 9$$

$$-12x - 6y = -24$$

$$12x + 12y = 36$$

(1, 2)

$$4x + 4 = 8$$

$$\begin{array}{r} -4 \quad -4 \\ \hline 4x = 4 \\ \frac{4}{4} \quad \frac{4}{4} \\ x = 1 \end{array}$$

$$6y = 12$$

$$\frac{6}{6} \quad \frac{12}{6}$$

$$y = 2$$

**Guided Practice**

1A.  $6x - 2y = 10$   
 $3x - 7y = -19$

$$\begin{array}{r} 6x - 8 = 10 \\ + 8 \quad + 8 \\ \hline 6x = 18 \\ \underline{6} \quad \underline{6} \\ x = 3 \end{array}$$

$$\begin{array}{r} 6x - 2y = 10 \\ -6x + 14y = 38 \\ \hline \end{array}$$

$$\begin{array}{r} 12y = 48 \\ \underline{12} \quad \underline{12} \\ y = 4 \end{array}$$

$$(3, 4)$$

$(y, r)$

1B.  $9r + q = 13$   
 $3r + 2q = -4$

$$9r + q = 13$$

$$3r + 2q = -4$$

**Guided**Practice

**2A.**  $5x - 3y = 6$   
 $2x + 5y = -10$

$(0, -2)$

**2B.**  $6a + 2b = 2$   
 $4a + 3b = 8$

$(a, b)$

6,4 p. 360  
7-19 all

1.  $2x - y = 4$   
 $7x + 3y = 27$

**2.**  $2x + 7y = 1$   
 $x + 5y = 2$