

Reteaching 5-1

Solving Systems by Graphing

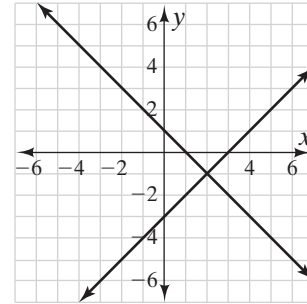
A system of equations is a set of two or more equations that have the same variables.

The solution of a system is an ordered pair that satisfies all equations in the system.

One method of solving a system of linear equations is to graph each equation and find any intersecting points.

$$y = x - 3 \quad \leftarrow \text{The slope is 1. The } y\text{-intercept is } -3.$$

$$y = -x + 1 \quad \leftarrow \text{The slope is } -1. \text{ The } y\text{-intercept is } 1.$$



The lines appear to intersect at $(2, -1)$. Check:

$$y = x - 3 \qquad y = -x + 1$$

$$-1 = 2 - 3 \qquad -1 = -(2) + 1$$

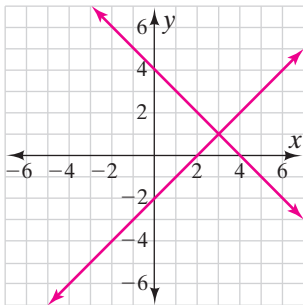
$$-1 = -1 \qquad -1 = -1$$

The solution of the system is $(2, -1)$.

Solve each system by graphing.

1. $x - y = 2$

$$y = -x + 4$$



The solution to the system of equations is

$(3, 1)$

Check your answer.

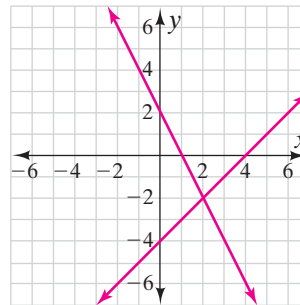
$$\underline{x - y = 2 \qquad y = -x + 4}$$

$$\underline{3 - 1 = 2 \qquad 1 = -3 + 4}$$

$$\underline{2 = 2 \qquad 1 = 1}$$

2. $2x + y = 2$

$$y = x - 4$$



The solution to the system of equations is

$(2, -2)$

Check your answer.

$$\underline{2x + y = 2 \qquad y = x - 4}$$

$$\underline{2(2) + (-2) = 2 \qquad -2 = 2 - 4}$$

$$\underline{4 - 2 = 2 \qquad -2 = -2}$$

$$\underline{2 = 2}$$

Reteaching 5-2

Solving Systems by Substitution

You can solve systems of equation by substitution.

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

<p>Step 1</p> <p>$x + y = 8$</p> <p>$y = -x + 8$</p>	<p>Solve one of the equations for one of the variables.</p> <p>← Write the second equation.</p> <p>← Subtract x from both sides.</p>
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<p>Step 2</p> <p>$-2x + 4y = 2$</p> <p>$-2x + 4(-x + 8) = 2$</p> <p>$-2x - 4x + 32 = 2$</p> <p>$-6x + 32 = 2$</p> <p>$-6x = -30$</p> <p>$x = 5$</p>	<p>Substitute $-x + 8$ for y in the other equation.</p> <p>← Write the first equation.</p> <p>← Substitute $-x + 8$ for y.</p> <p>← Use the Distributive Property.</p> <p>← Simplify.</p> <p>← Subtract 32 from each side.</p> <p>← Divide each side by -6.</p>
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<p>Step 3</p> <p>$x + y = 8$</p> <p>$5 + y = 8$</p> <p>$y = 3$</p> <p>The solution is $(5, 3)$.</p>	<p>Substitute 5 for x in either equation and solve for y.</p> <p>← Write either equation.</p> <p>← Substitute 5 for x.</p> <p>← Subtract 5 from both sides.</p>
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Solve each system by substitution. Check your answer.

1. $y = -x + 1$
 $-2x - y = 2$

$(-3, 4)$

2. $2x + y = 6$
 $6x - y = 2$

$(1, 4)$

3. $4x - y = 2$
 $2x + y = 10$

$(2, 6)$

Reteaching 5-3

Solving Systems by Elimination

You can solve some systems of equations by adding.

Step 1: Eliminate one variable.

$$2x + 3y = 12$$

$$\frac{x - 3y = -3}{3x + 0 = 9}$$

$$3x + 0 = 9 \quad \leftarrow \text{Add}$$

$$x = 3 \quad \leftarrow \text{Solve for } x.$$

Step 2: Substitute the value you found into one equation.

$$2x + 3y = 12 \quad \leftarrow \text{Write either equation.}$$

$$2(3) + 3y = 12 \quad \leftarrow \text{Substitute 3 for } x.$$

$$6 + 3y = 12 \quad \leftarrow \text{Simplify.}$$

$$3y = 6 \quad \leftarrow \text{Divide by 3.}$$

$$y = 2 \quad \leftarrow \text{Solve for } y.$$

The solution is (3, 2).

You can solve some systems of equations by subtracting.

Step 1: Eliminate one variable.

$$3a + 2b = 3$$

$$\frac{-(3a + b = 0)}{b = 3}$$

$$b = 3 \quad \leftarrow \text{Subtract.}$$

Step 2: Substitute the value you found into one equation.

$$3a + 2b = 3 \quad \leftarrow \text{Write either equation.}$$

$$3a + 2(3) = 3 \quad \leftarrow \text{Substitute 3 for } b.$$

$$3a + 6 = 3 \quad \leftarrow \text{Simplify.}$$

$$3a = -3 \quad \leftarrow \text{Divide by 3.}$$

$$a = -1 \quad \leftarrow \text{Solve for } a.$$

The solution is (-1, 3).

You can solve some systems of equations by multiplying.

$$3x + 2y = 14$$

$$-6x + 4y = 4$$

Step 1: To eliminate x , multiply each side of the first equation by 2. Then add.

$$2(3x + 2y) = 2(14) \quad 6x + 4y = 28$$

$$-6x + 4y = 4$$

$$\frac{-6x + 4y = 4}{8y = 32}$$

$$8y = 32$$

$$y = 4$$

Step 2: Substitute 4 in either original equation and solve for x .

$$3x + 2y = 14 \quad \leftarrow \text{Use the first equation.}$$

$$3x + 2(4) = 14 \quad \leftarrow \text{Substitute 4 for } y.$$

$$3x + 8 = 14 \quad \leftarrow \text{Simplify.}$$

$$3x = 6 \quad \leftarrow \text{Subtract 8 from each side.}$$

$$x = 2 \quad \leftarrow \text{Divide each side by 3.}$$

The solution is (2, 4).

Reteaching 5-3 (continued)**Solving Systems by Elimination**
.....**Solve each system of equations by elimination. Check your solution.**

1. $x + y = 9$

$x - y = 1$

(5, 4)

2. $3x + 2y = 2$

$x - 2y = 6$

(2, -2)

3. $x + y = -1$

$2x + 3y = 0$

(-3, 2)

4. $2x + y = -2$

$x - 2y = 9$

(1, -4)

5. $-x + y = -2$

$3x - y = 4$

(1, -1)

6. $3x + y = 9$

$3x + 3y = 21$

(1, 6)

Reteaching 5-4

Systems in the Real World

There are several different ways to solve systems of equations. You can use any method to solve real-world problems.

Methods for Solving Systems of Equations	
Method	When to Use
Graphing	When you want a visual display of the equations When you want to estimate a solution
Substitution	When one question is solved for one of the variables When it is easy to solve for one of the variables
Elimination	When the coefficients of one variable are the same or additive inverses

The class is selling food at the school fair. Pretzels cost \$1.50, and bottles of water cost \$1.00. The class sold a total of 107 items and collected \$128.

- Write a system of equations to represent the situation.

$$1.5p + w = 128 \quad p + w = 107$$

- Choose a method to solve the system. Use the coordinate grid below if you choose to use graphing. Explain why you chose the method.

Check students' work.

- How many pretzels and bottles of water did they sell?

They sold 42 pretzels and 65 bottles of water.

- Use a different method to check your answer. Use the coordinate grid below if you choose to use graphing.

Check students' work.

