You need to gather your notebook and your clicker.

We are beginning the next phase of our slope studies, systems of equations.

Get ready for your warm-up questions.

True or False
31.6 x 10^2 is written in scientific notation.

A True

B False

Find the area of a parallelogram whose base is 4 inches and whose height is 9 inches

A 36 inches

B 36 inches squared

C 36 inches cubed

Write 3/8 as a decimal, including the zero before the decimal point.

Use your number keypad and text in your answer now.

True or false? A function is a rule that assigns to each input exactly one output.

A True

B False

True or false:
In the slope-intercept form equation y = 3x - 2, the slope is -2.

A True

B False

What is the y-intercept in this equation? y = 2/3x + 1

Use your number keypad and text in your number answer now.

5-1 Solving Systems by Graphing

What You'll Learn

To solve systems of two linear equations in two variables by graphing the equations

New Vocabulary solution of a system, system of equations

Why Learn This?

Graphing systems of equations can help you compare different rental options.

New definitions - add these to your notebook.

A **system of equations** is a set of two or more equations that have the same variables. The **solution of a system** is any 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 intersection points.

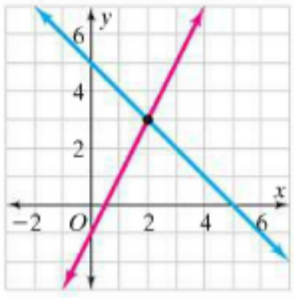
EXAMPLE 1 Solving a System by Graphing

Solve the system by graphing. $y = 2x - 1$, $y = -x + 5$

Graph both equations in the same coordinate plane.

$y = 2x - 1$ ← The slope is 2. The y-intercept is −1.

$y = -x + 5$ ← The slope is −1. The y-intercept is 5.



The lines appear to intersect at (2, 3). Check by replacing x with 2 and y with 3 in each equation.

$y = 2x - 1$ $\quad$ $y = -x + 5$

$3 \stackrel{?}{=} 2(2) - 1$ $\quad$ $3 \stackrel{?}{=} -(2) + 5$

$3 = 3$ ✓ $\quad$ $3 = 3$ ✓

The solution of the system is (2, 3).

Vocabulary Tip

The lines intersect at one point. This means that the system of equations has one solution.

❶ Solving a System by Graphing Solve the system by graphing.

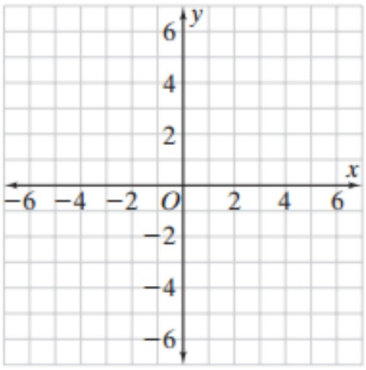
$$y = 3x - 5$$
$$y = -2x + 5$$

$y = 3x - 5$ ← **The slope is** ☐.

← **The *y*-intercept is** ☐.

$y = -2x + 5$ ← **The slope is** ☐.

← **The *y*-intercept is** ☐.



Graph both equations on the same coordinate plane.
The lines intersect at (☐, ☐).

Check Substitute ☐ for x and ☐ for y in each equation.

$y = 3x - 5$

☐ ≟ 3 · ☐ − 5

☐ = ☐ ✓

$y = -2x + 5$

☐ ≟ −2 · ☐ + 5

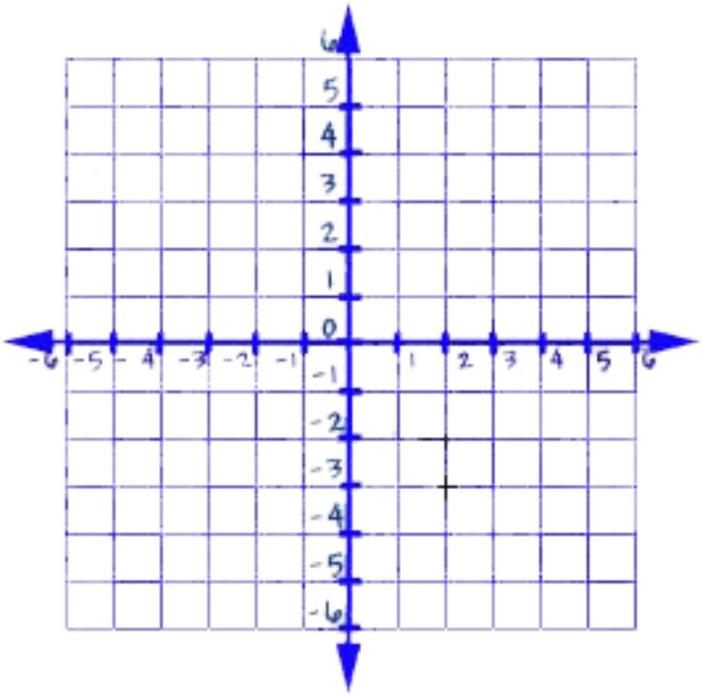
☐ = 1 · ☐ ✓

The solution of the system is ☐.

Quick Check

1. Solve the system of equations by graphing. Check the solution.

$$y = 2x - 4$$
$$y = -\frac{1}{2}x + 1$$



Another way to solve a system is by making a table for each equation.

2x + 5 = y

Start out by choosing at least three numbers to be x, then do the math and figure out y

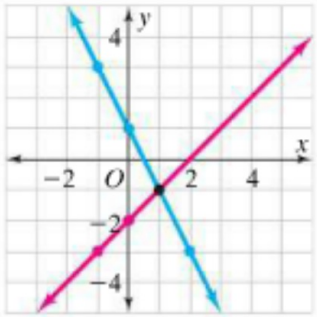
x	2x + 5	y
1	2(1) + 5	7
2	2(2) + 5	9
3	2(3) + 5	11

This will be useful for the last question on your homework today.

You can also use tables when graphing systems of equations.

EXAMPLE **Solving a System by Graphing**

2 Solve the system by graphing. $x - y = 2$, $2x + y = 1$



Make a table for each equation in the system.

$x - y = 2$	
x	y
−1	−3
0	−2
1	−1

$2x + y = 1$	
x	y
−1	3
0	1
1	−1

Notice that $(1, -1)$ is an ordered pair in both tables.

Graph both equations in the same coordinate plane. The lines intersect at $(1, -1)$.

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

❷ Solving a System by Graphing Solve the system by graphing.

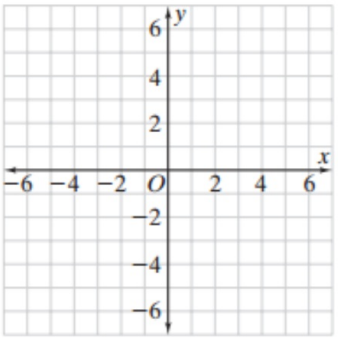
$$-2x + y = 2$$
$$x + y = 5$$

Complete the tables.

x	$-2x + y = 2$	y	(x, y)
-2			
0			
2			

x	$x + y = 5$	y	(x, y)
-2			
0			
2			

Graph both equations on the same coordinate plane.
The lines intersect at (☐, ☐).



Check Substitute ☐ for x and ☐ for y in each equation.

$$-2x + y = 2 \qquad x + y = 5$$
$$-2 \cdot \square + \square \stackrel{?}{=} 2 \qquad \square + \square \stackrel{?}{=} 5$$
$$\square = \square \checkmark \qquad \square = \square \checkmark$$

The solution of the system is ☐.

EXAMPLE Application: Comparison Shopping

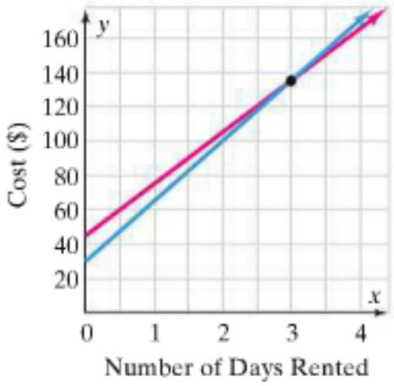
3 You need to rent a video camera. Video Barn charges a \$30 rental fee plus \$35 per day. Allied Rental charges a \$45 rental fee plus \$30 per day. Which company should you choose? Justify your answer.

Step 1 Write a system of equations to represent the situation. Let x = the number of days and y = the total cost.

$y = 30 + 35x$ ← **The slope is 35. The *y*-intercept is 30.**
$y = 45 + 30x$ ← **The slope is 30. The *y*-intercept is 45.**

Step 2 Graph both equations in the same coordinate plane. The lines appear to intersect at (3, 135).

Step 3 Analyze the graph. For a rental of up to 3 days, Video Barn is less expensive. For a 3-day rental, both companies charge \$135. For rentals longer than 3 days, Allied Rental is less expensive.



When graphing a system of linear equations, the point where the lines intersect is the _____ of the system.

A. focus

B. solution

C. intersection

D. slope

What is the solution of this linear system?

A. (3, -2)

B. (-3, 2)

C. (-2, 3)

D. (2, -3)

Can a system of two linear equations have exactly two solutions? Yes or No

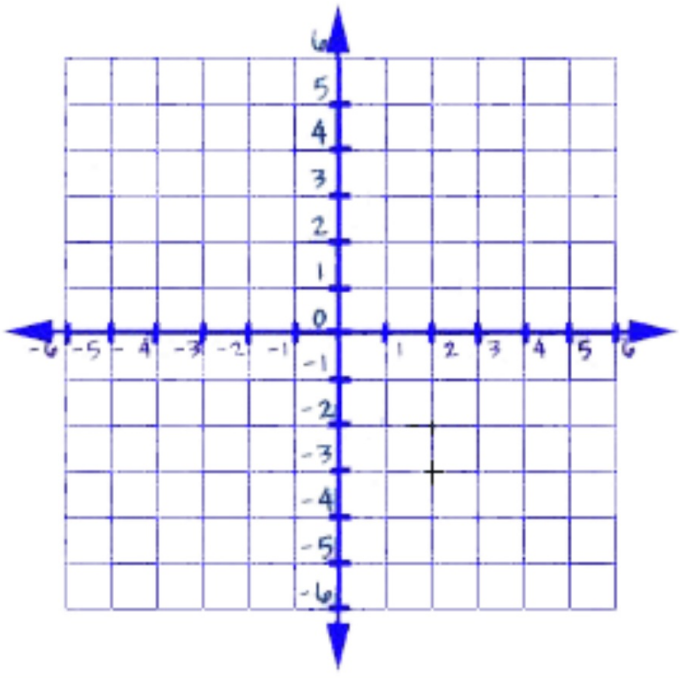
A Yes

B No

Quickly sketch out a coordinate plane, and use it to determine is (1,4) is a solution of the system for y=2x + 2 and y = 4x -6

A True

B False



Power down your clickers and put them away.

You have a practice worksheet (5 questions), due tomorrow. Only 5 questions but worth 14 points.

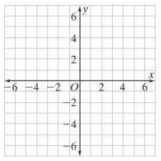
Name _____ Class _____ Date _____

Practice 5-1

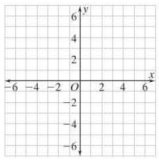
Proportional Relationships

Solve each system of equations by graphing. Check your solution.

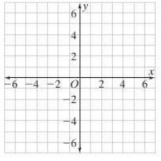
1. $y = x + 3$
$y = 4x - 3$



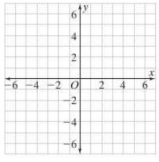
2. $y = \frac{1}{3}x + \frac{4}{3}$
$y = -\frac{1}{2}x + \frac{11}{2}$



3. $x + y = -1$
$-2x + y = 5$



4. $\frac{1}{2}x - y = 4$
$x + 2y = -4$



5. During a football game, a concession stand sold a family 3 hamburgers and 2 hotdogs for a total of $13. It sold another family 2 hamburgers and 5 hotdogs for a total of $16. What are the prices of a hamburger and a hotdog?

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