NOTES & HOMEWORK

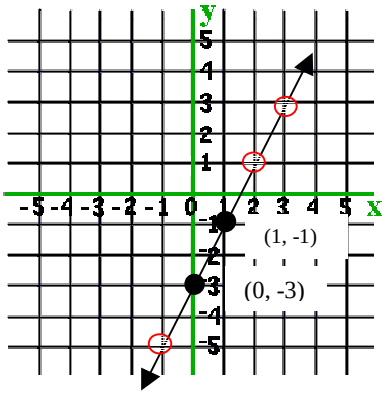
Name_____
Date _____ Period _____

Solving Systems by Graphing

How can you show all of the solutions (or possible *x* and *y* values) for the linear equation $y = 2x - 3$? Graph the line, of course! Each point on the line is a solution.

Linear Equation
$y = 2x - 3$

y-intercept = -3 So, one coordinate is (0, -3)
slope = $\frac{2}{1} = \frac{\text{rise}}{\text{run}}$ So, another coordinate is (1, -1)



Use the graph to write three different solutions (or x- and y-coordinates) of the equation $y = 2x - 3$. Then show that each ordered pair makes the equation true by plugging in the (x, y) into the equation.

(2, 1)
$1 = 2(2) - 3$
$1 = 4 - 3$
$1 = 1$

(3, 3)
$3 = 2(3) - 3$
$3 = 6 - 3$
$3 = 3$

(-1, -5)
$-5 = 2(-1) - 3$
$-5 = -2 - 3$
$-5 = -5$

Two or more linear equations together form a system of linear equations.

One way to solve a system of linear equations is by graphing. Any point common to all the lines is a solution of the system. So, any ordered pair that makes *all* the equations true is a solution of the system.

Example 1:

Solve the system of linear equations by graphing.

$y = 2x - 3$

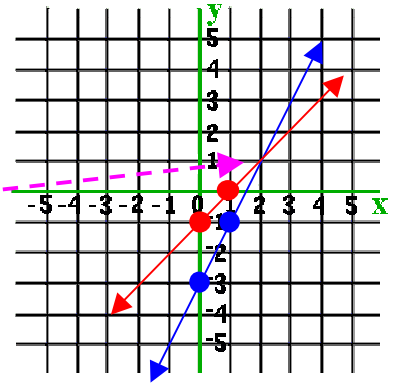
$y = x - 1$

Graph both equations on the same coordinate grid.

$y = 2x - 3$ Slope is 2 or 2/1, y-intercept is –3

$y = x - 1$ Slope is 1 or 1/1, y-intercept is –1

Find the point of intersection:



The lines intersect at (2, 1), so (2, 1) is the solution of the system.

Check: See if (2, 1) makes both equations true.

$1 = 2(2) - 3$
$1 = 4 - 3$
$1 = 1$ ☺

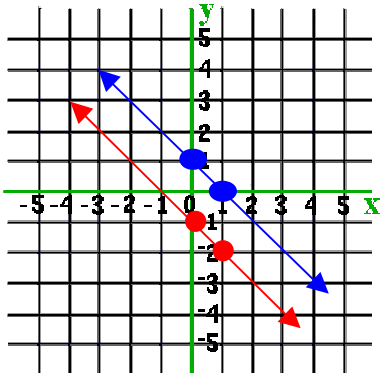
$1 = 2 - 1$
$1 = 1$ ☺

It checks, so (2, 1) is the solution of the system of the linear equations.

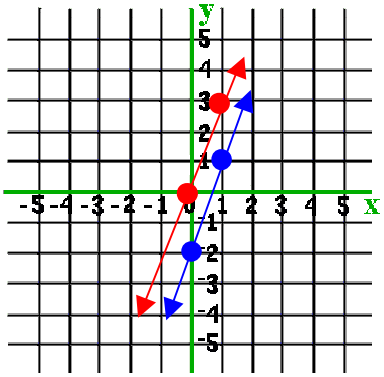
Solving Special Types of Systems:

A system of linear equation has no solution when the graphs of the equations are parallel.
There are no points of intersection, so there is no solution.
Lines are parallel when they have the same slope.

$y = -x + 1$
$y = -x - 1$



$y = 3x - 2$
$y = 3x$



A system of linear equations has infinitely many solutions when the graphs of the equations are the same line. All points on the line are solutions of the system.

Example 2:

Solve the system by graphing. $-4y = 4 + x$

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

Remember to graph, you must rearrange the equation so that it is in the slope-intercept form ($y = a + bx$)

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

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

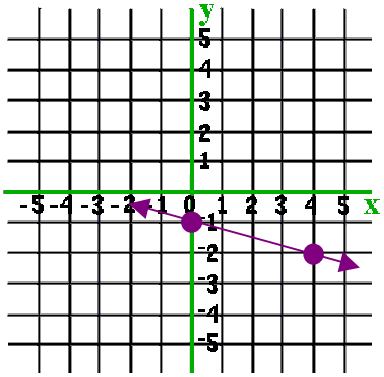
$\frac{1}{4}x + y = -1$

$-\frac{1}{4}x \qquad -\frac{1}{4}x$

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

Now, graph each line on the same coordinate plane.

Since the graphs are the same line, the system has infinitely many solutions.



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Solving Systems by Graphing

How can you show all of the solutions (or possible x and y values) for the linear equation $y = 2x - 3$? Graph the line, of course! Each point on the line is a solution.

Linear Equation
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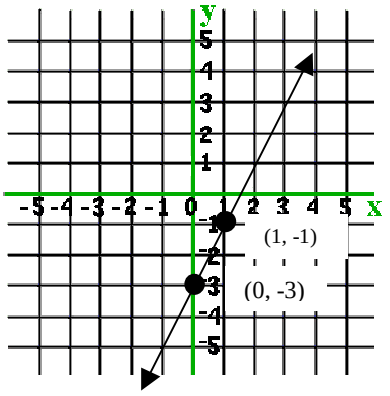


Use the graph to write three different solutions of the equation $y = 2x - 3$. Then show that each ordered pair makes the equation true.

Two or more linear equations together form a _____.

One way to solve a system of linear equations is by graphing. Any point common to all the lines is a _____. So, any ordered pair that makes *all* the equations true is a solution of the system.

Example 1:

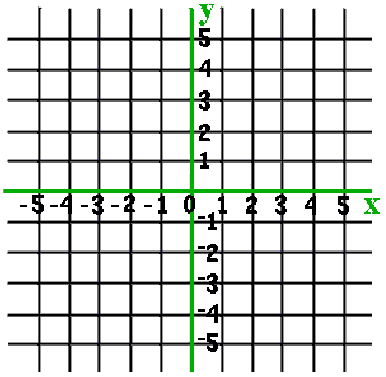
Solve the system of linear equations by graphing. $y = 2x - 3$

$y = x - 1$

Graph both equations on the same coordinate grid.

$y = 2x - 3$ Slope is ____, y-intercept is ____

$y = x - 1$ Slope is ____, y-intercept is _____



Find the point of intersection:

The lines intersect at _____, so _____ is the solution of the system.

Check: See if (2, 1) makes both equations true.

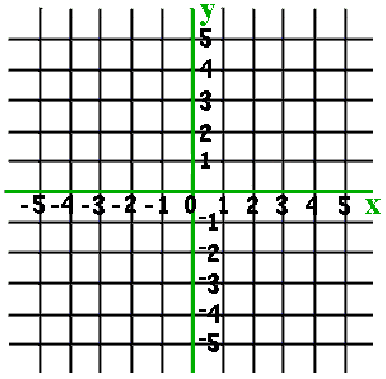
y = 2x – 3 **y = x – 1**

Solving Special Types of Systems:

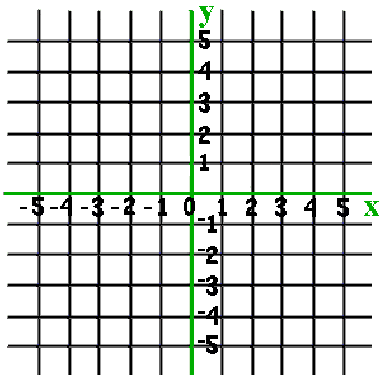
A system of linear equation has _____ when the graphs of the equations are parallel. There are no points of intersection, so there is no solution.

Lines are parallel when they have the _____.

$y = -x + 1$
$y = -x - 1$



$y = 3x - 2$
$y = 3x$



A system of linear equations has _____ when the graphs of the equations are the same line. All points on the line are solutions of the system.

Example 2:

Solve the system by graphing. $-4y = 4 + x$

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

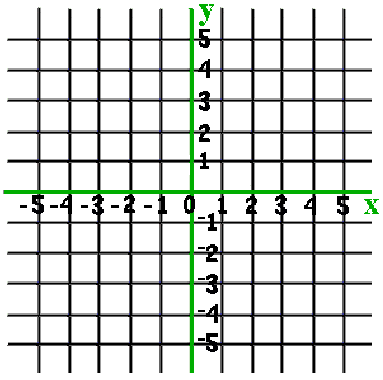
Remember to graph, you must rearrange the equation so that it is in the slope-intercept form ($y = a + bx$)

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

Now, graph each line on the same coordinate plane.

Since the graphs are the same line, the system has

_____.



Homework:

Is (-1, 5) a solution of each system? Verify your answer.
Example:
$y = x + 4$
$y = -\frac{1}{5}x$
Answer:

$y = x + 4$	$y = -\frac{1}{5}x$
$5 = (-1) + 4$	$5 = -\frac{1}{5}(-1)$
$5 = 3$	$5 = \frac{1}{5}$

No, (-1, 5) is not a solution for this system.

Is (-1, 5) a solution of each system? Verify your answer

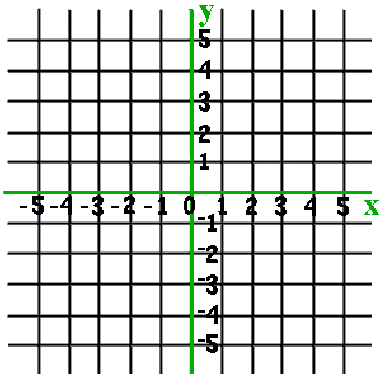
1.) $y = 5$
$x = y - 6$

2.) $y = 2x + 7$
$y = x + 6$

Solve each system by graphing. Write *no solution* or *infinitely many solutions* where appropriate. Check your answer by plugging in the coordinate of intersection back into the equations.

3.) $y = -x + 4$
$y = 2x + 1$

Graph:

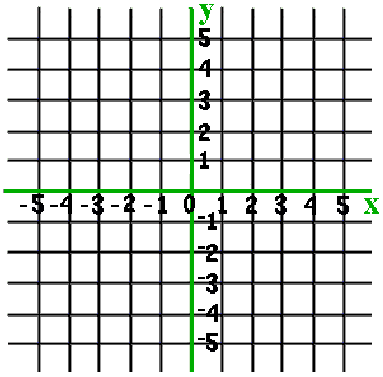


Check:

Answer: _____

4.) $y = 3x + 2$
$4y = 12x + 8$

Graph:

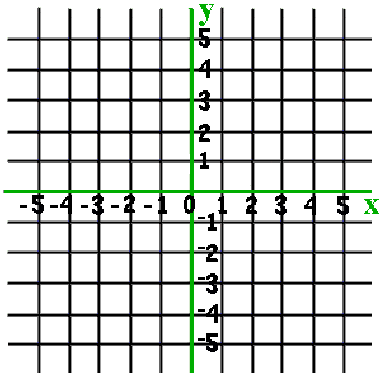


Check:

Answer: _____

5.) $2x - 2y = -4$
$y - x = 3$

Graph:

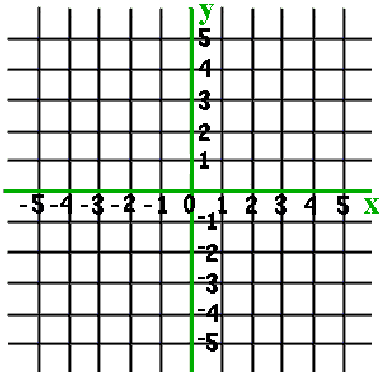


Check:

Answer: _____

6.) $y = 1$
$3y + x = 9$

Graph:

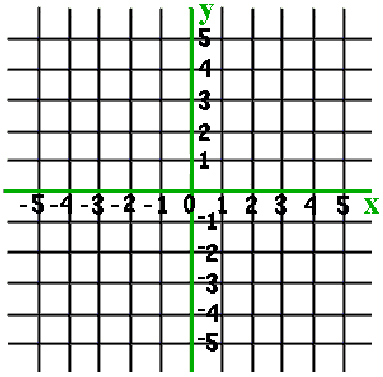


Check:

Answer: _____

7.) $y = 4x - 3$
$y = 4x + 2$

Graph:



Check:

Answer: _____

Without graphing, decide whether the lines in each system a.) *intersect, are parallel,* or *are the same line.* Then write whether there is b.) *one solution, no solutions* or *infinitely many solutions.*

8.) $y = 2x$
$y = 2x - 5$

a.)

b.)

9.) $x + y = 4$
$2x + 2y = 8$

a.)

b.)

10.) $2y - 10x = 2$
$y = 5x + 1$

a.)

b.)

11.) $3x - 5y = 0$
$y = {}^{3}/_{5}x$

a.)

b.)