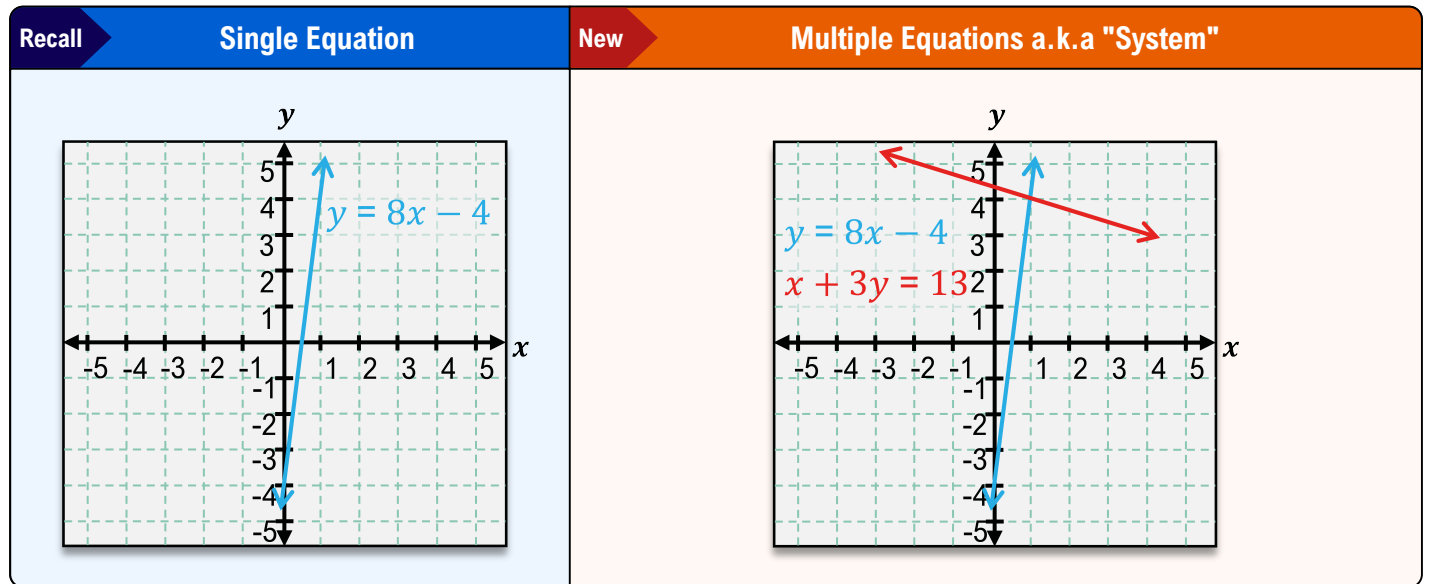


TOPIC: SOLVING SYSTEMS OF LINEAR EQUATIONS BY GRAPHING

Introduction to Systems of Linear Equations

◆ Previously, we solved & plotted *single* equations on graphs. Now we'll look at **Systems of () Equations**.

► To solve, find (x,y) which satisfy _____ equations. Graphically, this is where the lines _____.



EXAMPLE

Determine if each point is a solution to the equation.

(A) $(-2,0)$ (B) $(0,-4)$ (C) $(1,4)$

Solution: [1 | MANY] point(s)
satisfying [1 | ALL] line(s)

Determine if each point is a solution to the system of equations.

(A) $(0,-4)$ (B) $(-2,5)$ (C) $(1,4)$

Solution: [1* | MANY] point(s)
satisfying [1 | ALL] line(s)

* True for *most* problems, but there are other types of solutions

TOPIC: SOLVING SYSTEMS OF LINEAR EQUATIONS BY GRAPHING

Solve a System of Linear Equations by Graphing

◆ To solve a system of equations graphically, plot the 2 lines ($y = mx + b$ form helps!) & find their _____.

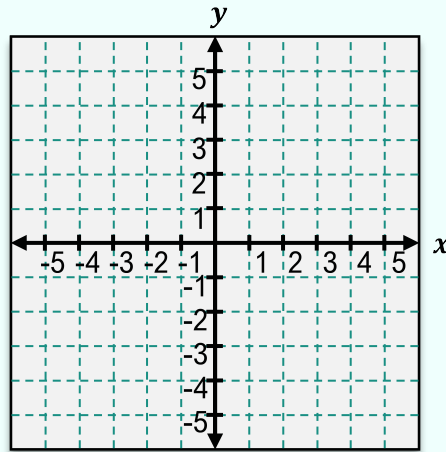
► *Always* check the solution by plugging (x,y) of intersection into BOTH equations.

EXAMPLE

Solve the system of equations by graphing.

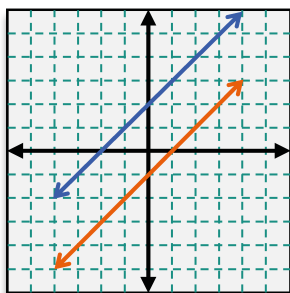
$$\begin{cases} y = x - 3 \\ 3x + y = 5 \end{cases}$$

Intersection Point: (__ , __)



◆ Most systems have 1 solution, but you might see...

Parallel Lines

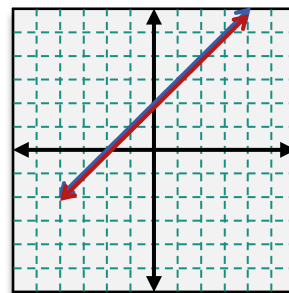


$$y = x + 2$$

$$y = x - 1$$

[0 | MANY] Solutions

Same Lines



$$y = x + 2$$

$$2y = 2x + 4$$

simplifies to

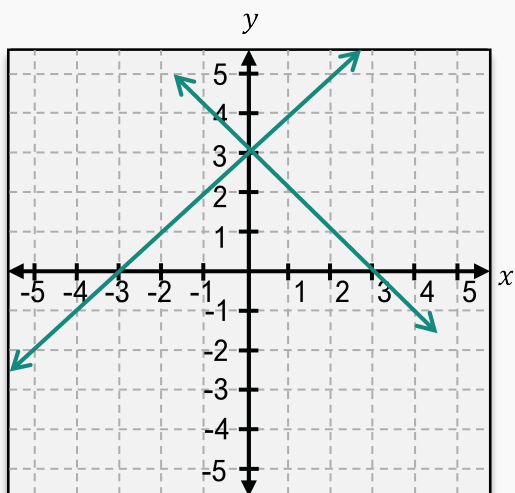
$$y = x + 2$$

[0 | MANY] Solutions

TOPIC: SOLVING SYSTEMS OF LINEAR EQUATIONS BY GRAPHING

PRACTICE

Use the graph to identify the solution to the system of equations or identify that the system has 0 or infinitely many solutions. If there is a solution, check that the point satisfies both equations.

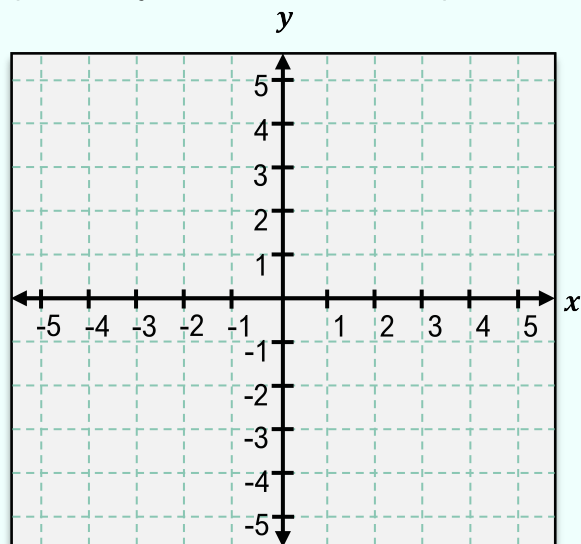


EXAMPLE

Graph the system of equations. Identify the intersection point, verify it is a solution to both equations.

$$y = 2x + 3$$

$$y = x + 4$$

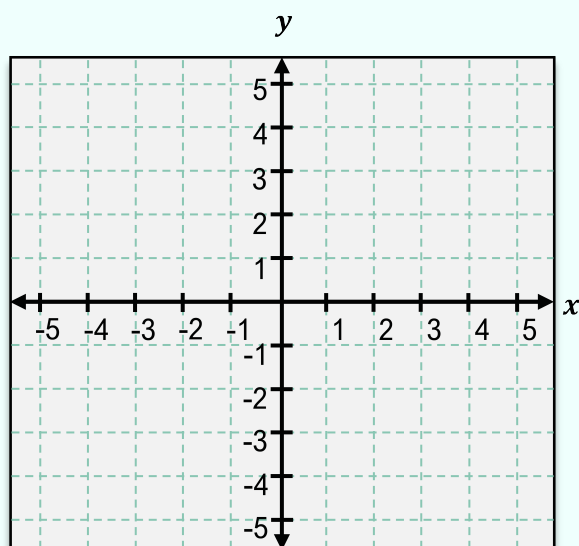


TOPIC: SOLVING SYSTEMS OF LINEAR EQUATIONS BY GRAPHING

EXAMPLE

Solve the system of equations by graphing.

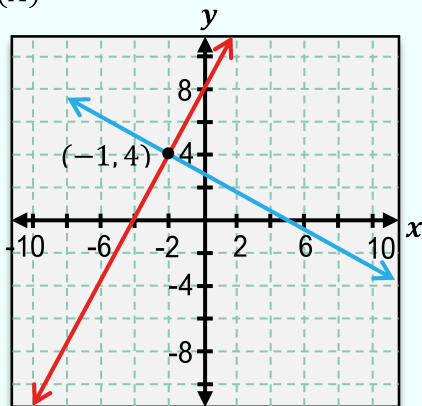
$$\begin{cases} 6y + 2x = -6 \\ 3y + x = -3 \end{cases}$$



EXAMPLE

Match each system of equations to its graph and solution.

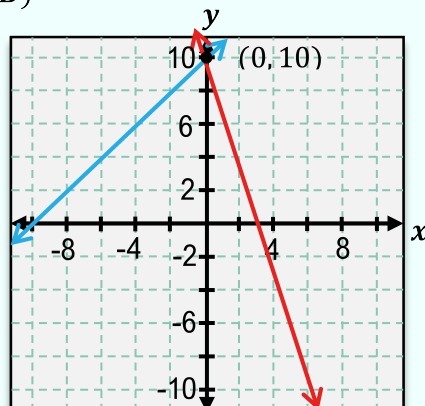
(A)



(1)

$$\begin{aligned} y &= 3x + 5 \\ y &= -2x + 10 \end{aligned}$$

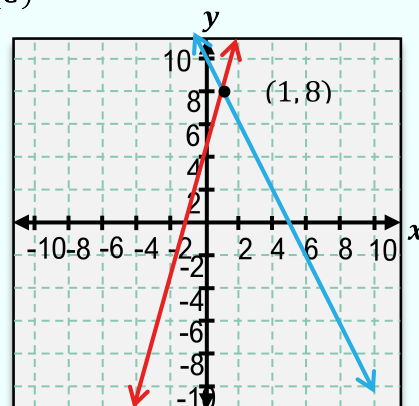
(B)



(2)

$$\begin{aligned} y &= 4x + 8 \\ 2x + 3y &= 10 \end{aligned}$$

(C)



(3)

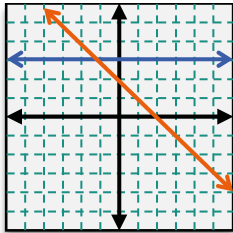
$$\begin{aligned} 3x + y &= 10 \\ -x + y &= 10 \end{aligned}$$

TOPIC: SOLVING SYSTEMS OF LINEAR EQUATIONS BY GRAPHING

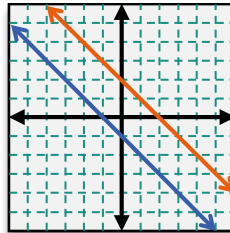
Determining Number of Solutions in a System

◆ Recall: There are **3 types** of system of equations based on the number of solutions they have.

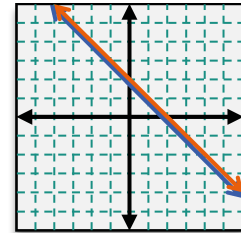
1 Solution



0 Solutions



Infinitely Many Solutions



◆ To find the # of solutions in a system *without graphing*, write equations as $y = mx + b$, _____ m 's & b 's.
(Slope-Intercept Form)

EXAMPLE

Determine how many solutions each system has.

(A) $y = 3$ $x + y = 2$ $m =$ $m =$ $b =$ $b =$ Slopes are [SAME DIFF] [1 0 ∞] solutions "Consistent" & "Independent"	(B) $y = -x - 1$ $x + y = 2$ $m =$ $m =$ $b =$ $b =$ Slopes are [SAME DIFF] y-ints are [SAME DIFF] [1 0 ∞] solutions "Inconsistent"	(C) $-x - y = -2$ $x + y = 2$ $m =$ $m =$ $b =$ $b =$ Slopes are [SAME DIFF] y-ints are [SAME DIFF] [1 0 ∞] solutions "Consistent" & "Dependent"
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TOPIC: SOLVING SYSTEMS OF LINEAR EQUATIONS BY GRAPHING

PRACTICE

Determine the number of solutions the system of equations has *without* graphing.

(A)

$$\begin{cases} y + 2x = 8 \\ y - 5x = -6 \end{cases}$$

(A) 1

(B) Infinitely Many

(C) 0

(B)

$$\begin{cases} y = \frac{1}{4}x + 11 \\ y = \frac{1}{4}x - 6 \end{cases}$$

(A) 1

(B) Infinitely Many

(C) 0

PRACTICE

Without using a graph, determine the number of solutions in the following systems of equations, then classify the system.

$$\begin{cases} y + 2x = 8 \\ y - 5x = -6 \end{cases}$$

(A) Independent and Consistent

(B) Dependent and Consistent

(C) Inconsistent