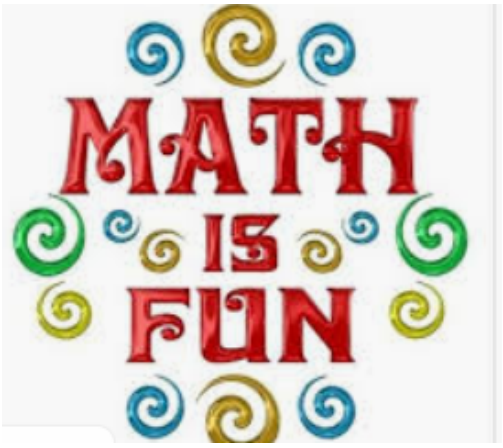
Warm-Up 2/1/2021

1. Solve for y: 4x - 5y = 15
2. Solve for x in this inequality:

$$-3(4x+6) > -2-10x$$



① $4x - 5y = 15$

$-4x \qquad -4x$

$-5y = 15 - 4x$

$\frac{-5y}{-5} = \frac{15 - 4x}{-5}$

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

$y = mx + b$

slope, y-intercept

$y = \frac{4}{5}x - 3$

Slope $(m) = \frac{4}{5}$

y-intercept $(b) = -3$

② $-3(4x + 6) > -2 - 10x$

$-12x - 18 > -2 - 10x$

$+10x \qquad +10x$

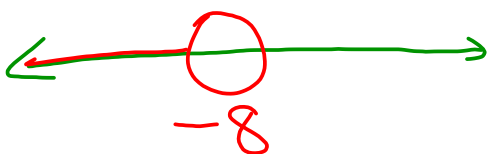
$-2x - 18 > -2$

$+18 \qquad +18$

$-2x > 16$

$\frac{-2x}{-2} > \frac{16}{-2}$

$x < -8$



A few things.....

1. Blog
2. www.deltamath.com: 760933
3. Remind
4. Edpuzzle.com
5. Syllabus, Late Work Policy
6. Ascendmath.com
7. Use your government names to join these sites! Nothing like "Boii Jungle"

Essential Question 2/1/21

How can I graph linear equations and systems of equations?

Learning Target

Graphing Systems of Equations

Day 1

Graphing a Line in Slope-Intercept Form

Standard(s):

MGSE9-12.A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.
MGSE9-12.A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

Graphing a Line in Slope-Intercept Form

When we write an equation of a line, we use **slope intercept form** which is ***y = mx + b***, where **m** represents the **slope** and **b** represents the **y-intercept**.

Slope Intercept Form

$y = mx + b$

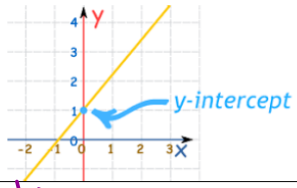
m: slope b: y=intercept

Slope can be described in several ways:

- Steepness of a line
- Rate of change – rate of increase or decrease
- $\frac{\text{Rise}}{\text{Run}}$
- Change (difference) in y over change (difference) in x

Y-intercept

- The point where the graph crosses the y-axis
- Its coordinate will always be the point (0, b)



- Starting point or initial value

Steps to Graphing Linear Functions

Graphing Linear Functions

When you graph equations, you must be able to identify the slope and y-intercept from the equation.

Step 1: Solve for y (if necessary)

Step 2. Plot the y-intercept 6

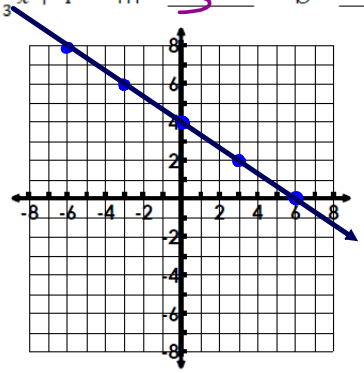
Step 3: From the y-intercept, use the slope to calculate another point on the graph.

Step 4: Connect the points with a ruler or straightedge.

$$\text{Slope} = \frac{\textit{change in } y}{\textit{change in } x} = \frac{+\uparrow \quad -\downarrow}{+\rightarrow \quad -\leftarrow}$$

Ex. Graph the following lines:

A. $y = -\frac{2}{3}x + 4$ m = $\frac{-2}{3}$ b = 4

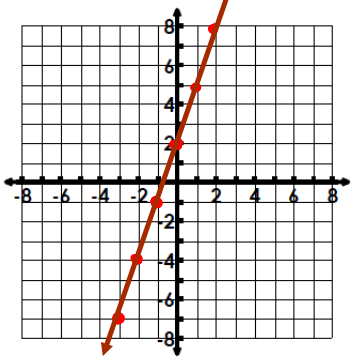


$-3x + y = 2$

$+3x \quad +3x$

$y = 3x + 2$

-3x + y = 2 m = $\frac{3}{1}$ b = 2

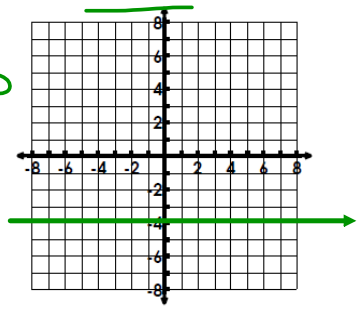


Graphing Horizontal & Vertical Lines

Graphing Horizontal and Vertical Lines

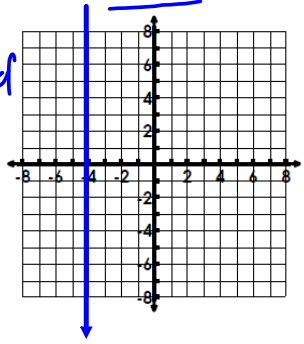
Horizontal
- slope = 0
- y = #

Ex. y = -4



Vertical
- Undefined
- x = #

Ex. x = -4



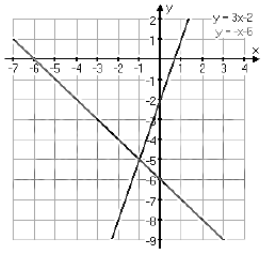
x = 5 – V

y = -5 – H

Solving Systems of Equations by Graphing

Solving Systems of Equations by Graphing

Two or more linear equations in the same variable form a **system of equations**.
Example:



Solution to a System of Equations

- An ordered pair (x, y) that makes each equation in the system a true statement
- The point where the two equations cross each other on a graph.

Examples: Check whether the ordered pair is a solution of the system of linear equations.

Ex. (1, 1) — a solution

x, y

$2x + y = 3$ ✓

$x - 2y = -1$ ✓

① $2(1) + 1 = 3$

$2 + 1 = 3$

$3 = 3$

② $1 - 2(1) = -1$

$1 - 2 = -1$

$-1 = -1$

Ex. (-2, 4)

x y

$4x + y = -4$ ✓

$-x - y = 1$ ✗

not a solution

① $4(-2) + 4 = -4$

$-8 + 4 = -4$

$-4 = -4$

② $-(-2) - 4 = 1$

$2 - 4 = 1$

$-2 = 1$ ✗

Identify Solutions to a System from a Table

Identify Solutions to a System from a Table

The solution to a system of equations is where the two lines intersect each other.

The solution is where the x-value (input) produces the same y-value (output) for both equations.

Using the tables below, identify the solution.

a.

x	$y = -x$ ①	$y = x - 6$ ②
0	0	−6
3	−3	−3
6	−6	0
9	−9	3

Solution: (3, −3)

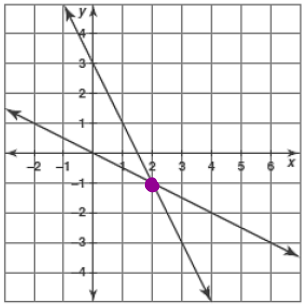
b.

x	$y = 2x + 4$ ①	$y = 4x + 2$ ②
−2	0	−6
−1	2	−2
0	4	2
1	6	6

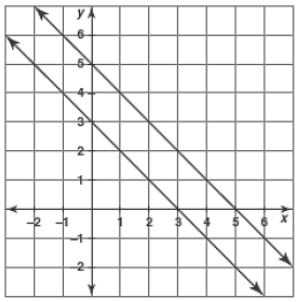
Solution: (1, 6)

Practice - How many Solutions?

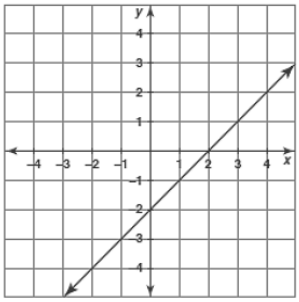
Practice: Tell how many solutions the systems of equations has. If it has one solution, name the solution.



1 Solution
(2, −1)



No Solution



Infinitely Many Solutions

I do - We do

Solving a Linear System by Graphing

Step 1: Write each equation in slope intercept form (y = mx + b).
Step 2: Graph both equations in the same coordinate plane.
Step 3: Estimate the coordinates of the point of intersection.
Step 4: Check whether the coordinates give a true solution by substituting them into each equation of the original linear system.

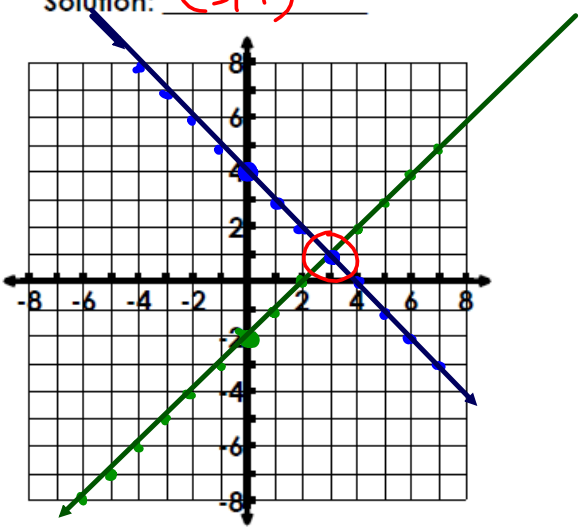
Example: Use the graph and check method to solve the linear equations.

A. ① $y = x - 2$ ② $y = -x + 4$

m= 1 m= -1

b = -2 b = 4

Solution: (3, 1)

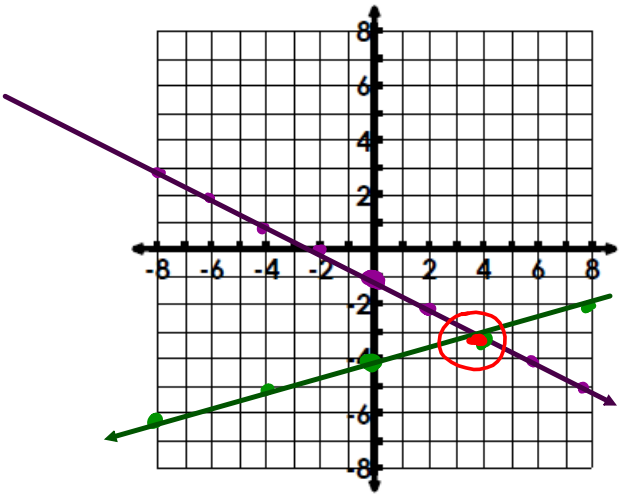


B. ① $y = -\frac{1}{2}x - 1$ ② $y = \frac{1}{4}x - 4$

m= $-\frac{1}{2}$ m= $\frac{1}{4}$

b = -1 b = -4

Solution: (4, -3)



Practice - You Try

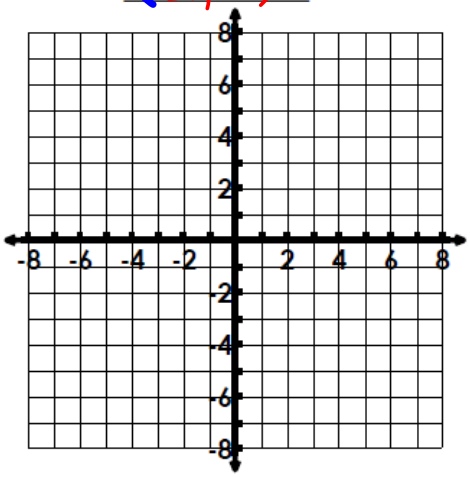
C. $3x + y = 6$ $-x + y = -2$

$y = -3x + 6$ $y = x - 2$

m= _____ m= _____

b = _____ b = _____

Solution: (2, 0)



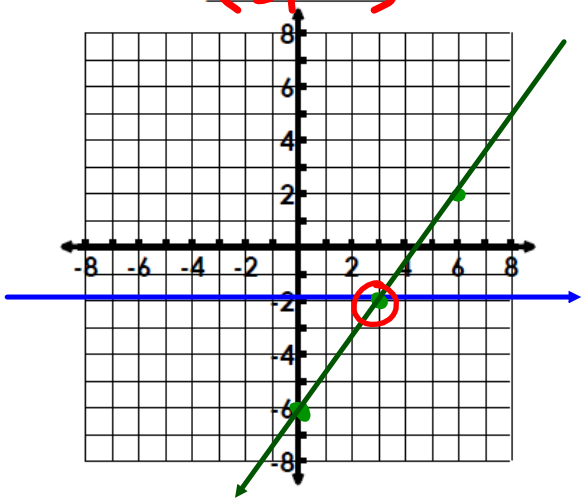
D. $y = -2$ $4x - 3y = 18$

$y = \frac{4}{3}x - 6$

m= 0 m= $\frac{4}{3}$

b = −2 b = −6

Solution: (3, −2)



$4x - 3y = 18$

$-4x \quad -4x$

$-3y = -4x + 18$

$\frac{-3y}{-3} = \frac{-4x + 18}{-3}$

$y = \frac{4}{3}x - 6$

© $3x + y = 6$

$-3x \quad -3x$

$y = -3x + 6$

$-x + y = -2$

$+x \quad +x$

$y = x - 2$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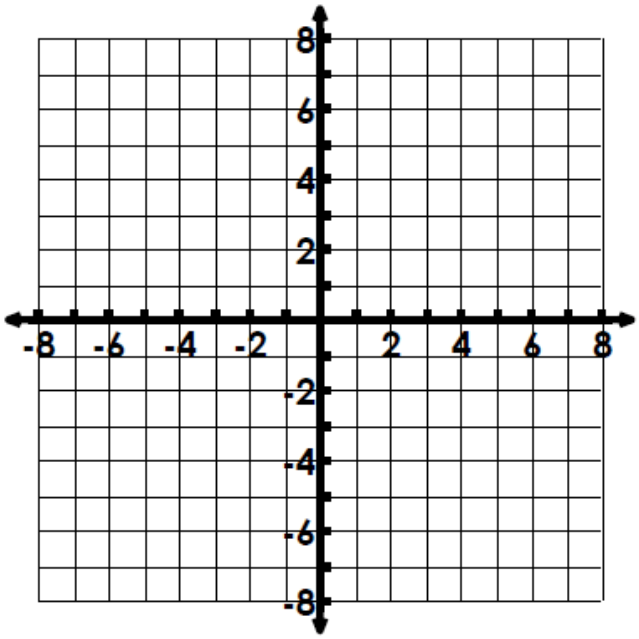
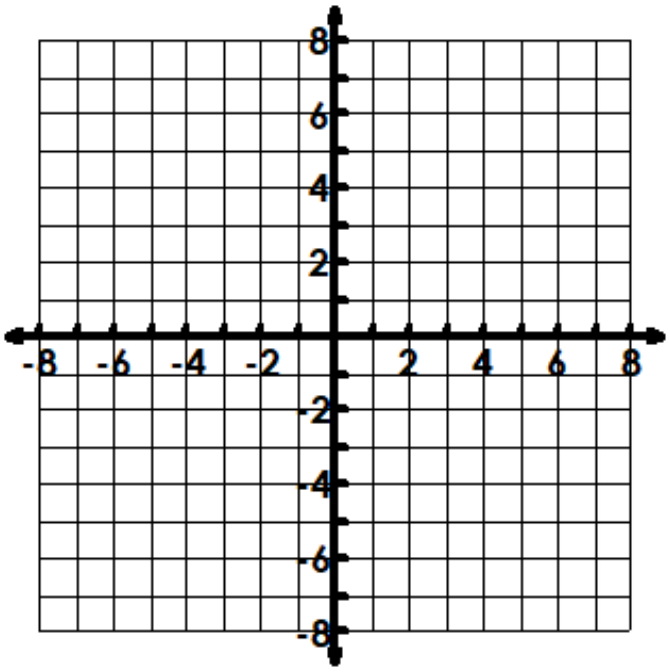
Class Work: Graphing Systems

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

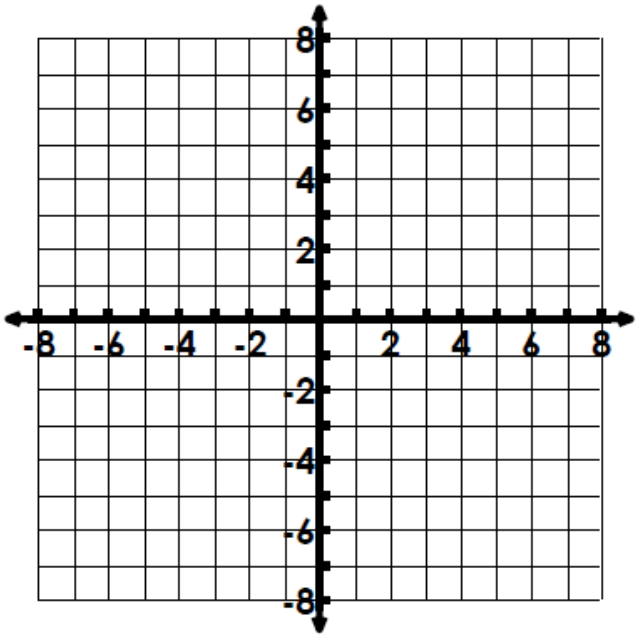


2) $\begin{cases} y = x + 2 \\ y = 4x - 1 \end{cases}$

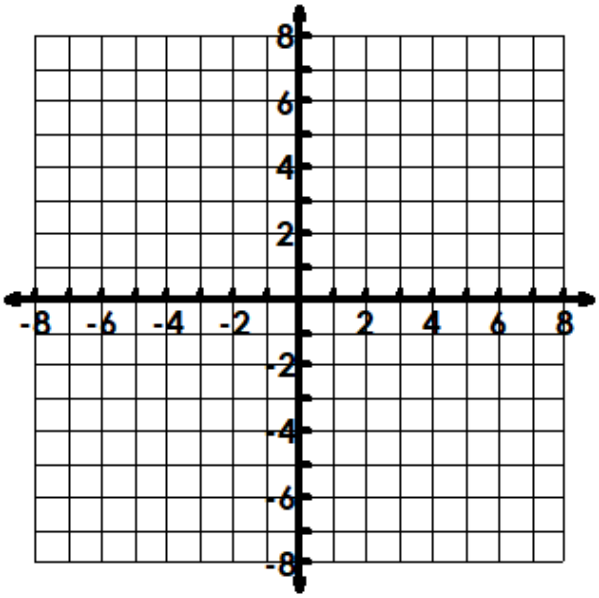


Solution:

3) $\begin{cases} 3x + y = -6 \\ -2x + y = -1 \end{cases}$

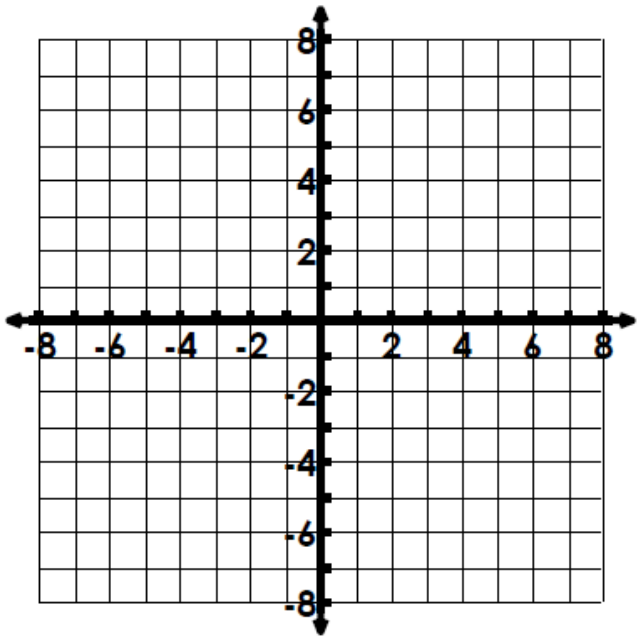


4) $\begin{cases} y = 2x + 8 \\ -2x + 3y = 12 \end{cases}$



Solution:

5) $\begin{cases} x = 5 \\ y = 2 \end{cases}$



Complete the table. Then determine the solution to the system of equations.

6)

x	$y = x + 3$	$y = 2x$
1		
2		
3		
4		

Solution:

Closing:

Write a summary of what you learned today on Nearpod.com.

HW: Graphing Systems of Linear Equation Video on Edpuzzle.com

Due on Wednesday 2/3/21