~~Friday, February 21, 2020~~ Mon. Feb 24

1.7 Exploring Linear Systems

When you are solving linear systems, there are three possible ways that the lines will interact with one another.

1) The Lines Cross at Exactly One Point

In most cases, two lines will meet at one point, resulting in one unique solution for the system of equations.

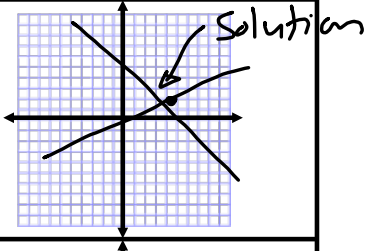
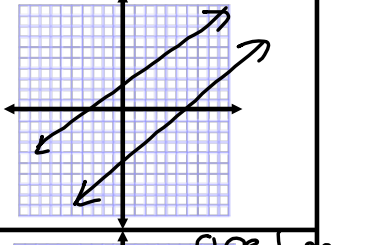
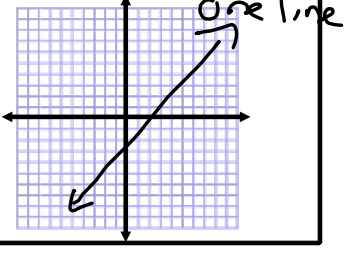
2) The Lines Never Cross

The lines are parallel to one another, so they will never meet.

3) The Lines Cross at Every Point

The lines have the same slope and y - intercept, resulting in an **inifinte number of solutions**.

What to Look For:

Number of Solutions	Given Equations	Given a Graph
One Unique Solution	Use sub, elim, or a graph to find POI	
No Solutions	· same slope · different y-int 0 = #	
An Infinite Number of Solutions	0 = 0 · Same slope · Same y-int.	

When you are asked to determine the number of solutions that a system of equations has, you just need to find the slope and y - intercept for each line. This is enough information for you to be able to decide if there is one, none, or an infinite number of solutions for a linear system.

What will happen if you solve algebraically and a system has no solutions?

Solve using substitution.

$y = 2x - 5$ ①

$y = 2x + 4$ ②

Sub ① into ②

$2x - 5 = 2x + 4$

$2x - 2x = 4 + 5$

$0 = 9$ "

Never true, never meet.

What will happen if you solve algebraically and a system has an infinite number of solutions?

Solve using elimination.

$-x + y = -3$

$+ \quad x - y = 3$

$0 = 0$

Always true, meet at every point

Practice Problems:

1) Determine the number of solutions for the given linear system.

$y = -2x + 4$

$2x + 3y = 5$

↳ don't need to solve. Different slopes / 1 solution

↳ rearrange to $y = mx + b$.

Slope of -2, y-int is 4

$3y = -2x + 5$

$y = -\frac{2}{3}x + \frac{5}{3}$

slope $= -\frac{2}{3}$, y-int $= \frac{5}{3}$

2) Write a linear system of equations that has no solution.

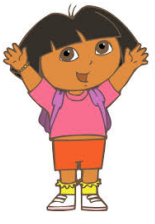
- same slope
- diff y-int

$y = 2x + 3$

$y = 2x - 6$

(Lots of right answers)

3) Use the graph provided to determine the equations for the linear system.



$y = 8$ ①

$y = -2x$ ②