

Set up Cornell Notes

Topic: Solving System of Equations Graphically

EQ: What is a system of equations and how do you solve it using graphs?



What is a system of equations?

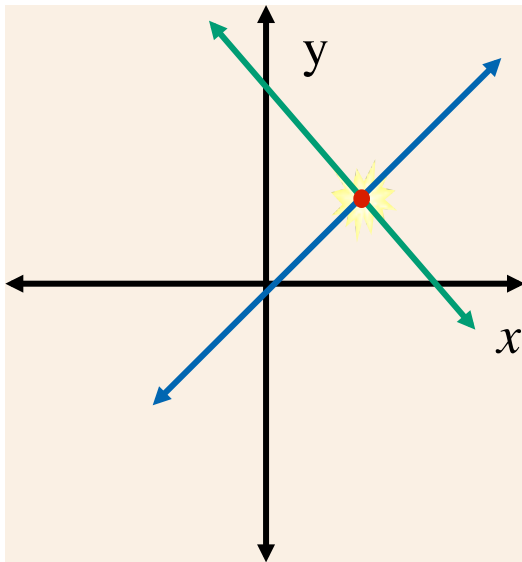
- A system of equations is when you have two or more equations involving the same variables.
- The solution to the system is the point that satisfies ALL of the equations. This point will be an ordered pair.
- When graphing, you will encounter three possible solutions (see next slide).

What are the three types of solutions?



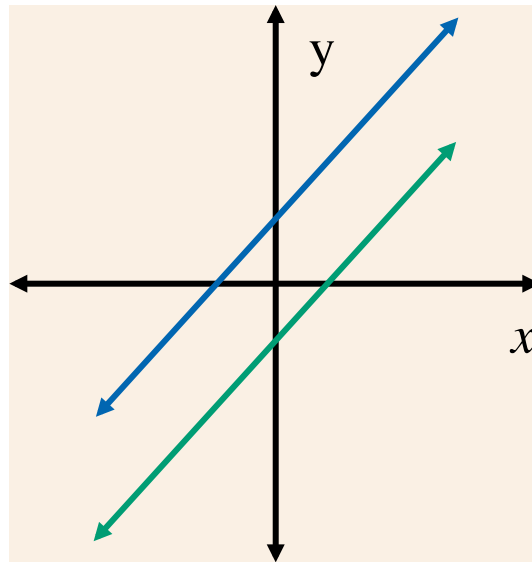
NUMBER OF SOLUTIONS OF A LINEAR SYSTEM

consistent



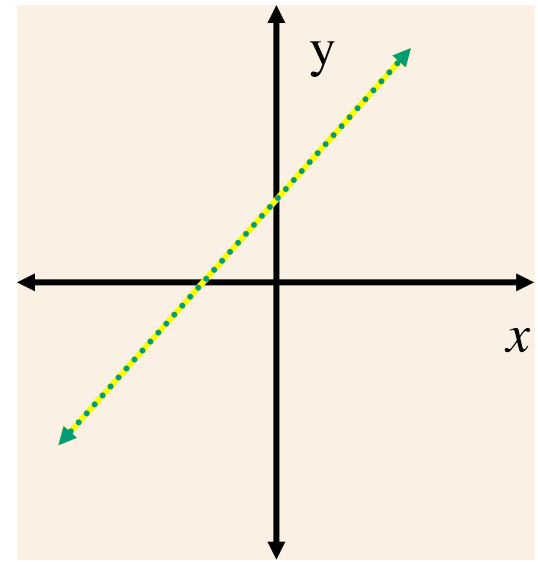
Lines intersect
one solution

inconsistent



Lines are parallel
no solution

dependent

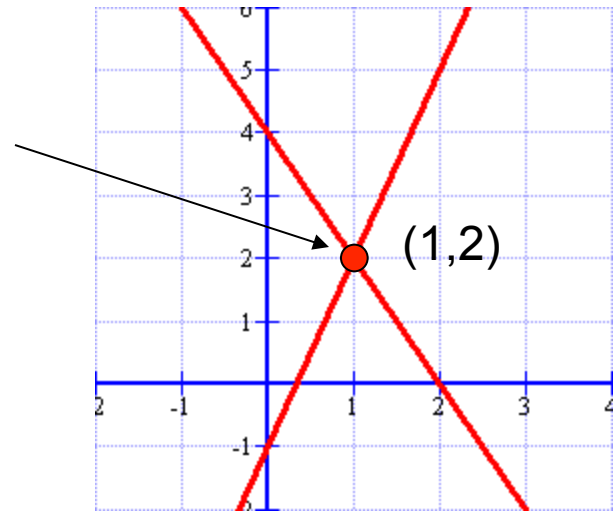


Lines coincide
infinitely many solutions

How do you identify the solution for intersecting lines?



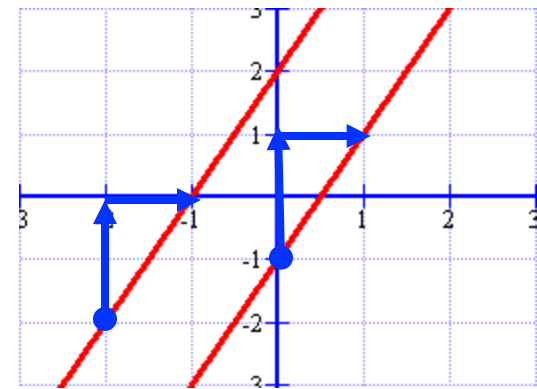
- The point where the lines **intersect** is your solution.
- The solution of this graph is $(1, 2)$





How do you identify the solution for parallel lines?

- These lines never intersect!
- Since the lines never cross, there is **NO SOLUTION!**
- Parallel lines have the same slope with different y-intercepts.



$$\text{Slope} = \frac{2}{1} = 2$$

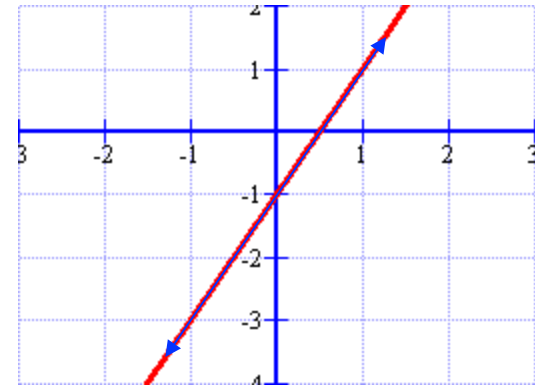
$$\text{y-intercept} = 2$$

$$\text{y-intercept} = -1$$

How do you identify the solution for coinciding lines?



- These lines are the same!
- Since the lines are on top of each other, there are **INFINITELY MANY SOLUTIONS!**
- Coinciding lines have the same slope and y-intercepts.



$$\text{Slope} = \frac{2}{1} = 2$$

$$\text{y-intercept} = -1$$

How do you solve a system of equations graphically?



There are **3 steps** to solving a system using a graph.

Step 1: Graph both equations.

Graph both lines

Step 2: Do the graphs intersect?

One solution (lines intersect)
No solution (parallel lines)
Infinite solution (same line)

Step 3: Check your solution.

Substitute the x and y values into both equations to verify the point is a solution to both equations.

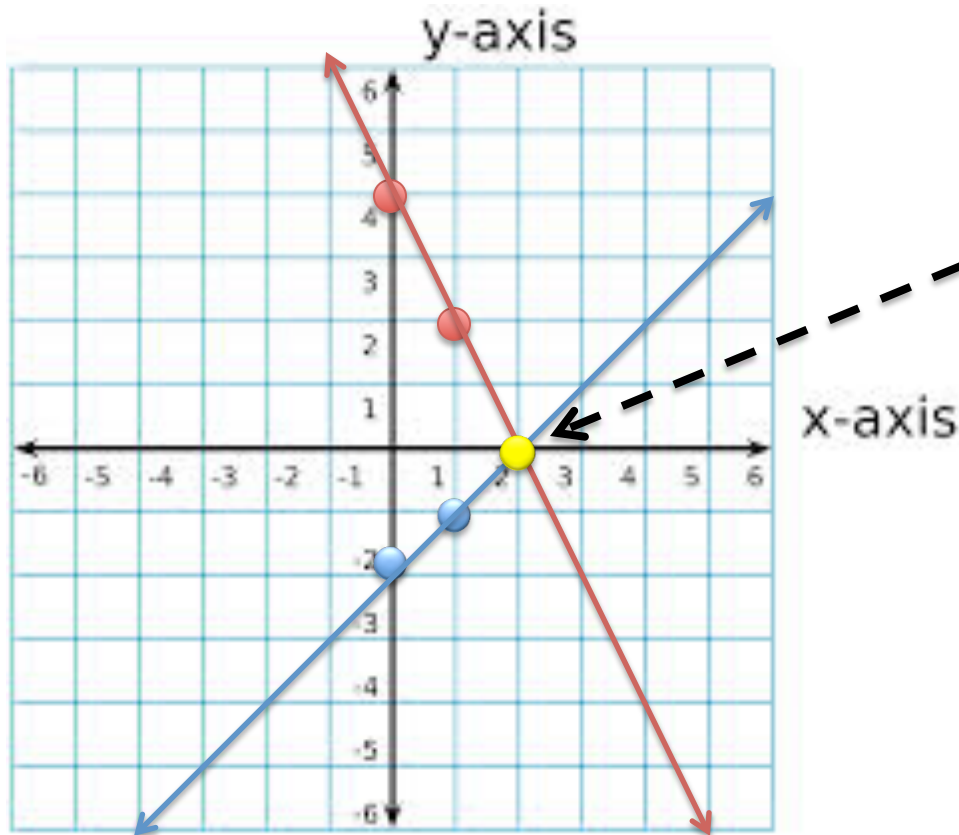
Determine the solution to the following system:



$$y = -2x + 4$$

$$y = x - 2$$

Solution:
Where do the
lines intersect?



Solution: (2, 0)

**Be sure to check your
answer! (See next slide)**

Check your answer!



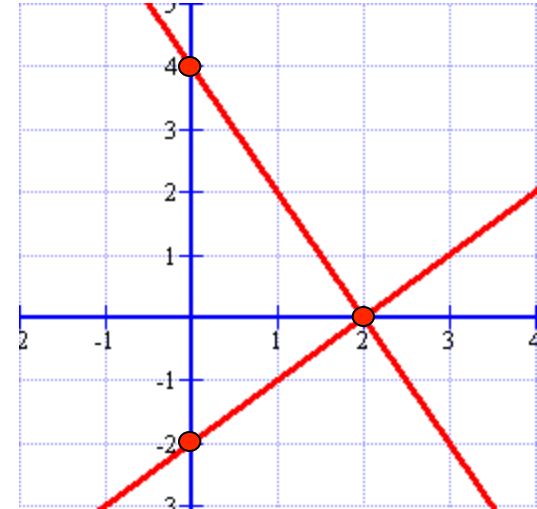
To check your answer, plug the point $(2, 0)$ back into BOTH equations.

$$y = -2x + 4$$

$$0 = -2(2) + 4 \quad \checkmark$$

$$x - y = 2$$

$$(2) - (0) = 2 \quad \checkmark$$



Nice job...let's try another!