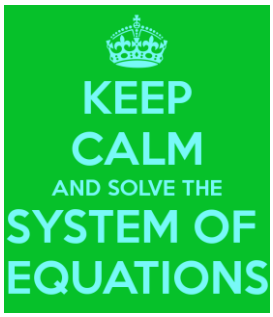
Name: _____ **Date:** _____ **Period:** _____



Exploring Systems of Linear Equations, Part 1

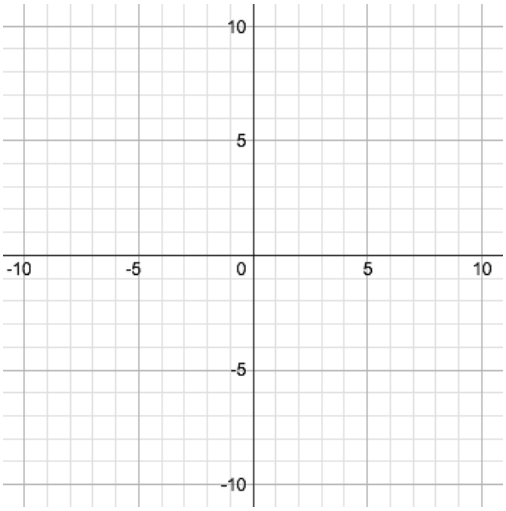
Learning Goals

- Define a system of linear equations and a solution to a system of linear equations.
- Identify whether a system of linear equations has one solution, no solution, or infinitely many solutions based on the graph or equations.
- Create a rule that relates the slope two lines and the number of solutions in the system.

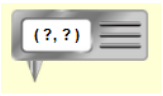
1. **Explore** the slope-intercept screen for 5 minutes and write down 1–3 discoveries you have made or remembered about using the simulation.

2. **Create** a line and use the Save Line button to preserve it. **Create** a second line that **intersects** the first.

3. **Sketch** both lines below (make it fun—use **two colors**!) and **write** their equations in slope-intercept form.



Line 1	y = _____x + _____
Line 2	y = _____x + _____
Point of intersection	(,)



4. Use the **point locator** to help you determine the *exact* point of intersection and complete the table above. What do you think it means when the two graphs intersect?

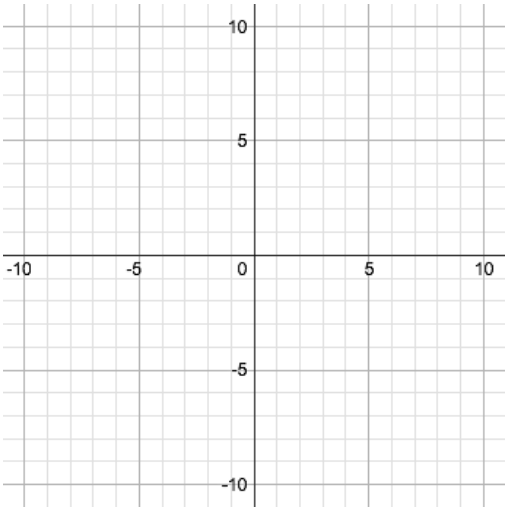
5. 

With a **partner, discuss and summarize** your ideas about the following questions**:**

Do you think these two lines will ever cross again? Why do you think that?

6. **Erase** both lines in the system of equations to create a new one.
7. **Create** a line and use the Save Line button to preserve it. **Create** a second line that will **NEVER intersect** the first.

8. **Sketch** both lines in the system of equations below (make it fun—use **two colors**!) and **write** their equations in slope-intercept form.



Line 1	y = _____x + _____
Line 2	y = _____x + _____
Point of intersection	Remember—these lines should NEVER intersect.

9. 

With a **partner, discuss and summarize** your ideas about the following questions:

Why do you think these lines will not intersect? If the coordinate plane expanded (if your graph were bigger), would the lines intersect later? What do you notice about their equations?

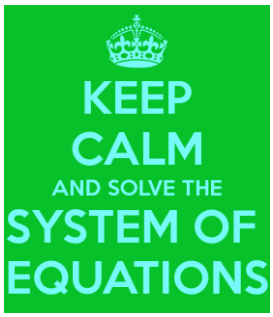
10. **Erase** both lines in the system of equations to create a new one.

11. **Create** a line and use the Save Line button to preserve it. **Create** a second line that will **completely OVERLAPS** the first. What do you think has to be true about the equations of the two lines in order for them to completely overlap?

12. 

You're doing great! Wait here for class discussion before moving on!

Name: _____ **Date:** _____ **Period:** _____

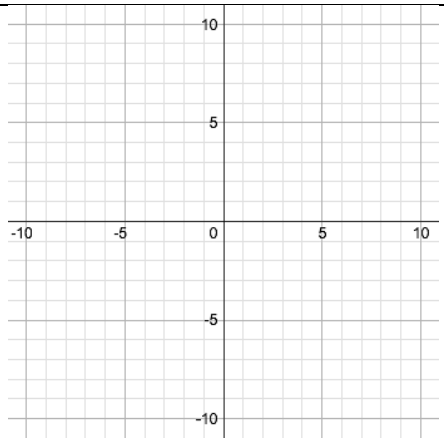
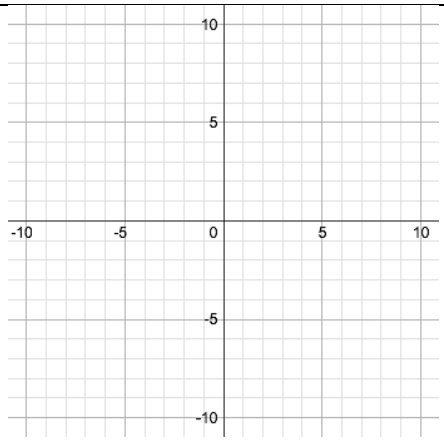
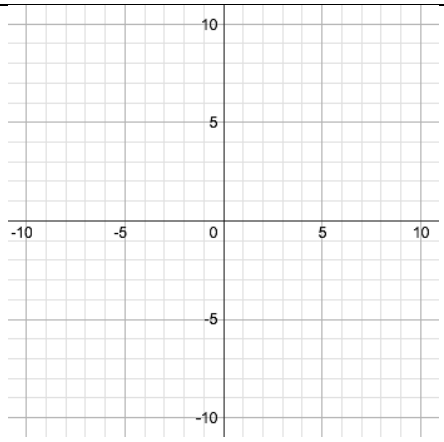


Exploring Systems of Linear Equations, Part 2

Learning Goals

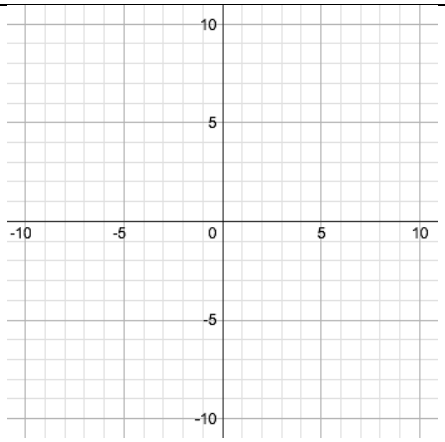
- Define a system of linear equations and a solution to a system of linear equations.
- Identify whether a system of linear equations has one solution, no solution, or infinitely many solutions based on the graph or equations.
- Create a rule that relates the slope two lines and the number of solutions in the system.

1. For each row of the table, **graph** the system of equations on a clean coordinate plane.

System	Graph	Solutions
$y = \frac{2}{3}x + 3$ $y = \frac{4}{6}x - 5$		☐ One solution (,) ☐ No solutions Ø ☐ Infinitely many solutions
$y = x + 2$ $y = -2x - 1$		☐ One solution (,) ☐ No solutions Ø ☐ Infinitely many solutions
$y = \frac{1}{2}x + 3$ $y = \frac{-3}{-6}x + \frac{18}{6}$ *Hint: can you simplify the second equation first?		☐ One solution (,) ☐ No solutions Ø ☐ Infinitely many solutions

$y = \frac{4}{5}x + 2$ $y = \frac{4}{5}x - 6$	Try this without graphing. How do you know how many solutions will there be?	☐ One solution (,) ☐ No solutions Ø ☐ Infinitely many solutions
$y = \frac{1}{4}x + 2$ $y = \frac{2}{8}x - (-2)$	Try this without graphing. How do you know how many solutions will there be?	☐ One solution (,) ☐ No solutions Ø ☐ Infinitely many solutions
$y = \frac{2}{5}x + 2$ $y = \frac{4}{3}x + 1$	Try this without graphing. How do you know how many solutions will there be?	☐ One solution (,) ☐ No solutions Ø ☐ Infinitely many solutions

2. Look back to the warm up…. Athletic Awesomeness charges $4 to enter, and $2 per game played. Sports Stars charges $3 per game, but only costs $1 to enter. **Complete the chart below for this system of equations.**

Equations in the system	Graph	Solutions
$y = \_\_\_x + \_\_\_\_$ $y = \_\_\_x + \_\_\_\_$		☐ One solution (,) ☐ No solutions Ø ☐ Infinitely many solutions What does the solution mean in this situation? _____ _____ _____ _____

3. Answer the following questions on an index card with your **name** on it.

a) **Describe** a system of linear equations and its solution.

b) How can you **determine** whether a system of linear equations has one solution, no solution, or infinitely many solutions by looking at the **graph**?

c) How can you **determine** whether a system of linear equations has one solution, no solution, or infinitely many solutions by looking at the **equation**?

Systems of Linear Equations Graphic Organizer

Solutions of a System of Linear Equations

If the system of linear equations has…	Sample system of equations	What is true about the slopes and y-intercepts in the equations?	What do the graphs look like?
One solution			
No solutions ∅			
Infinitely many solutions			

Solve the system image: http://www.keepcalm-o-matic.co.uk/p/keep-calm-and-solve-the-system-of-equations/
Talk it out image: https://www.pinterest.com/pin/187462403213195267/
Exit ticket image: http://www.keepcalm-o-matic.co.uk/p/keep-calm-and-write-your-exit-ticket/