System of Equations

Definition: A **system of equations** is TWO LINEAR FUNCTIONS
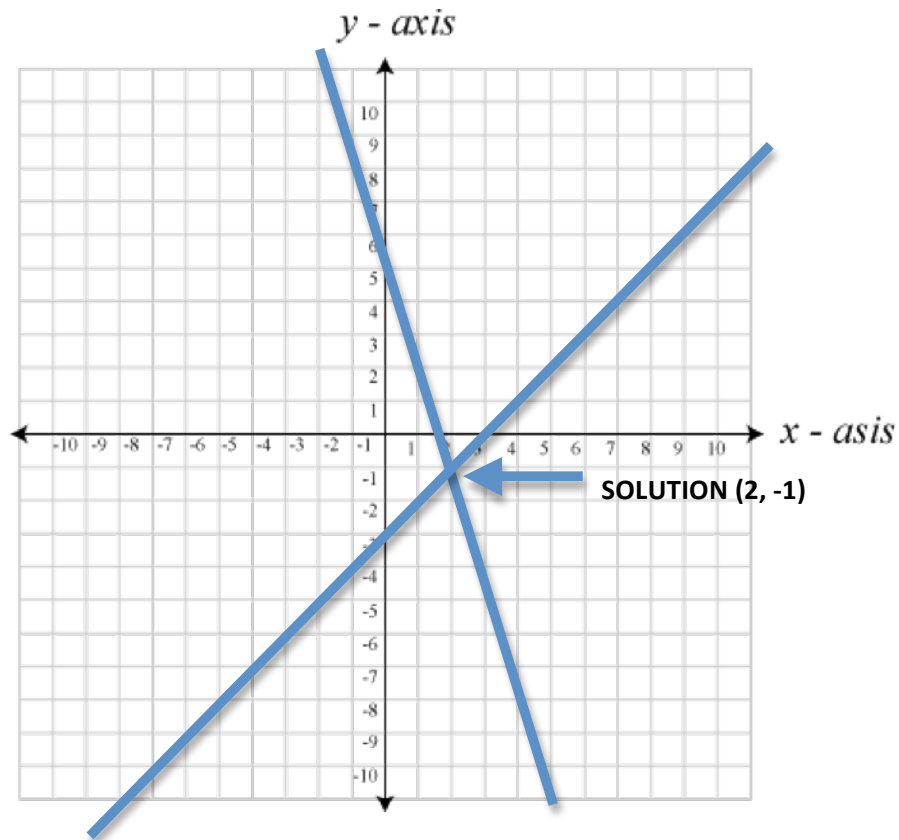
Ex.

Line 1: $y = -3x + 5$ and Line 2: $y = x - 3$

Definition: A **solution** to a system of equations is the point where the two lines intersect

You can also obtain the solution in a table of values

X	0	2	4	6
Y (line 1)	5	-1	-7	-13
Y (line 2)	-3	-1	1	3

(warning: may be time consuming)

Systems of equations can be used to determine…

- when 2 situations become equivalent/the same
- 2 unknown values

You just need to come up with the equations

Examples:

1. Veronica wants to visit a fish farm. On farm A, the admission fee is $10 plus $4 per catch. On farm B, admission is free but it costs $6 per fish caught. How many fish must Veronica catch for the costs to be equal at both fish farms?

2. The sum of two numbers is 56. The difference between the two numbers is two. What are the numbers?

3. For an awards banquet, adult tickets cost $15.00 and student tickets cost $10.00. If 140 tickets were sold, and the total amount collected was $1600, how many adults and how many students attended the banquet?

4. A sports club charges an initiation fee and a monthly fee. At the end of 5 months, Tony had paid a total of $170 and at the end of 10 months he had paid a total of $295. What is the initiation fee and the monthly fee?

Once you have a system, you can find the solution with a graph or a table of values.

Next time: how to find the solution with ALGEBRA!

Comparison Method

Solving a system of equations means... Finding the point / coordinate (x, y) where the two lines intersect.

We will do this using ALGEBRA.

Example:

Y = 2x + 1   Y = -3x + 10

Steps to solve system of equations:

1. Put the equations side by side and equal to each other

$$2x + 1 = -3x + 10$$

2. Put all variables on one side and the numbers on the other

$$2x + 3x = 10 - 1$$

3. Reduce and solve for x

$$5x = 9$$

$$X = 1.8 \text{ or } 9/5$$

4. Plug in the x value you just solved for into one of the equation (doesn't matter which one) and solve for y

$$Y = 2x + 1$$

$$Y = 2(1.8) + 1$$

$$Y = 4.6$$

5. Write your solution in the form of a (x, y) coordinate

$$\text{Solution} = (1.8, 4.6)$$

NOTE: Use this method if you have two equations in functional form

Practice!

a) $y = -x + 10$

$y = 0.5x + 2$

b) $y = 3x - 6$

$y = x - 2$

c) $y = 1.5x + 7$

$y = -x - 3$

d) $x = 2y + 4$

$x = y - 1$

e) $2y = 6x + 10$

$-6x + 2y = -2$