Graphing Straight Lines.

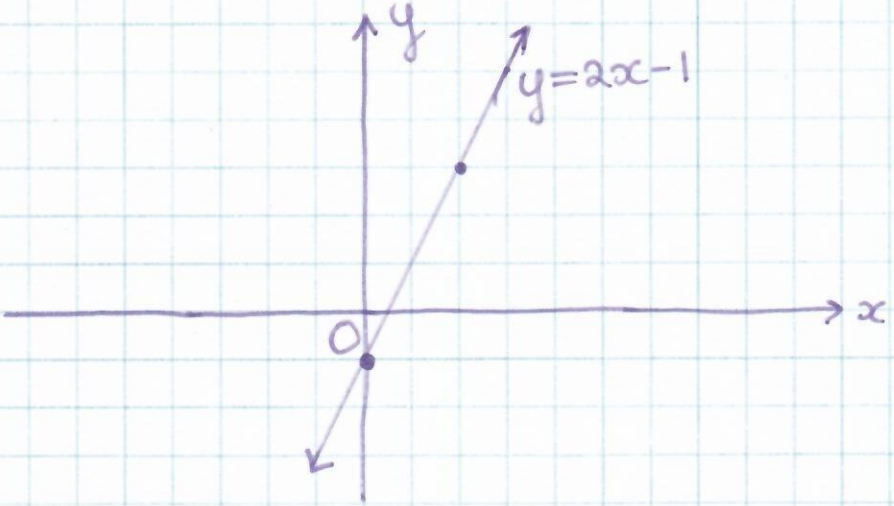
method 1: Using Points / TOV

we need <u>two</u> points to create a unique line.

$y = 2x - 1$

A(0, -1), B(2, 3)

x	y
0	-1
2	3

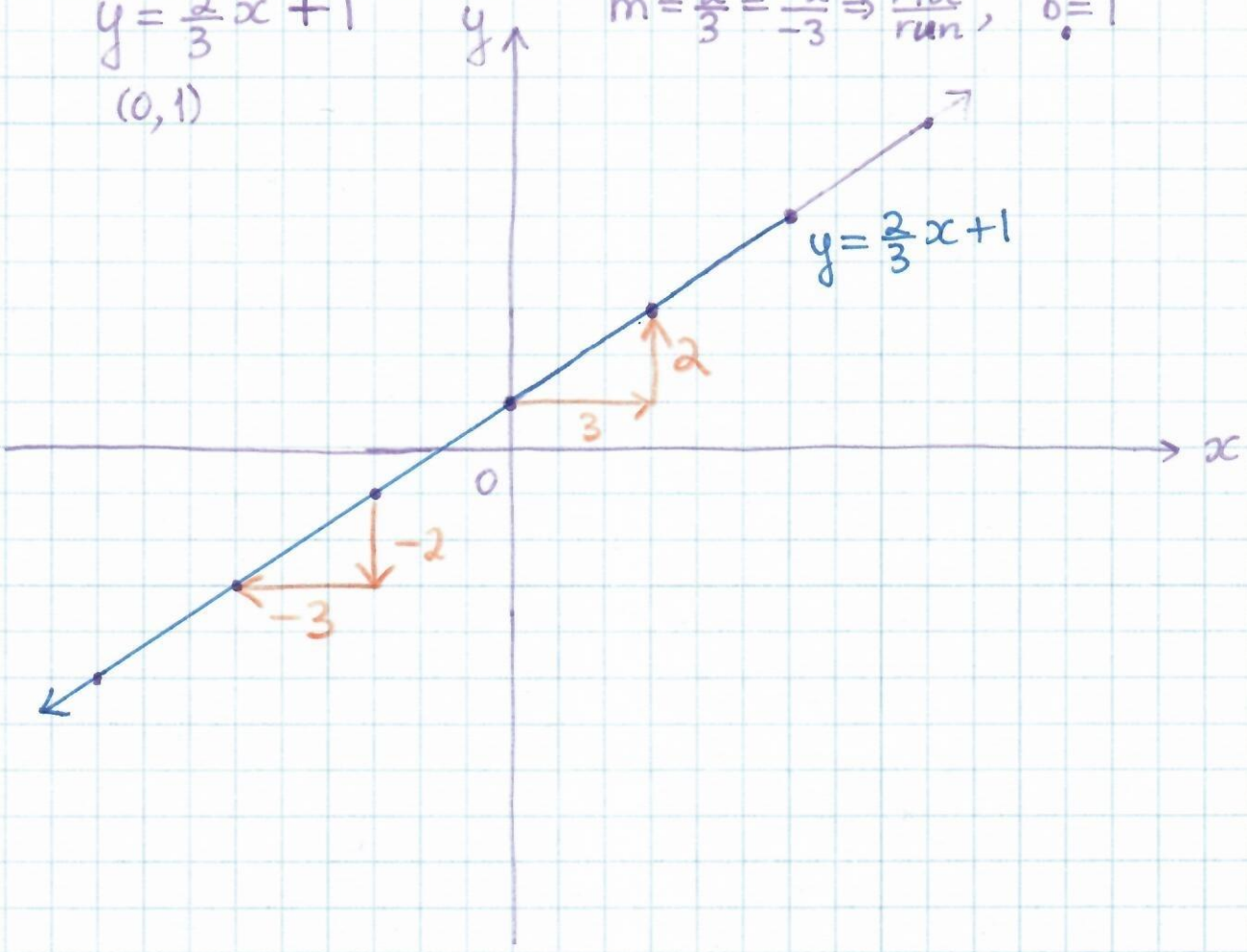


method 2: Using Slope and Yintercept.

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

(0, 1)

$m = \frac{2}{3} = \frac{-2}{-3} \Rightarrow \frac{\text{rise}}{\text{run}}$; $b = 1$



Intro to Linear Systems.

A linear system is a group of two (or more) linear equations considered true at the same time. (simultaneously!)

Linear System! LS

$$\begin{cases} y = m_1 x + b_1 & ① \\ y = m_2 x + b_2 & ② \end{cases}$$

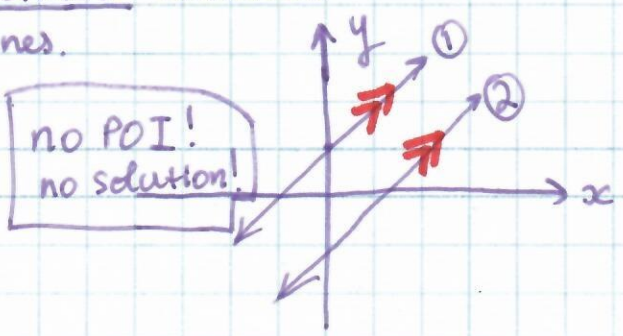
To solve a LS means to find a point of intersection (POI) of two (or more) lines

Remark: Lines don't always intersect – the LS may not have a solution.

Case 1! Two Parallel (Distinct = different) Lines.

$m_1 = m_2$, $b_1 \neq b_2$

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



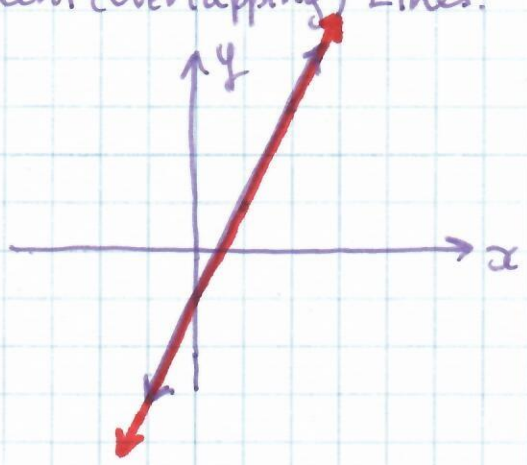
Case 2! Two Parallel Coincident (Overlapping) Lines.

$m_1 = m_2$, $b_1 = b_2$

Two diff forms of the same equation

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

Infinitely many POIs.
∞-ly many solutions.



Case 3! Two Non-Parallel Lines

One POI: one solution.

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