

Section 6.1: Solving Equations with Two

Tuesday, April 2, 2019 1:49 PM

Variables: Graphing

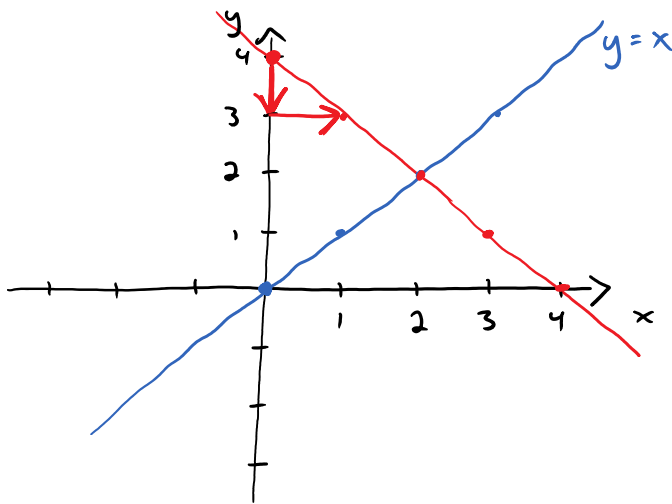
a system of equations is a collection of two or more equations

(we will only look at systems of two equations)

example:

$$\begin{cases} y = x \\ y = -x + 4 \end{cases}$$

let's graph this system and see what it looks like:



$$\begin{aligned} y &= 1x + 0 \\ y &= mx + b \end{aligned}$$

$$m = 1 \quad b = 0$$

$$\begin{aligned} y &= -x + 4 \\ y &= mx + b \end{aligned}$$

these two lines cross at a single point (2,2)

- this point makes both equations true AT THE SAME TIME

- this point is called the solution to the System

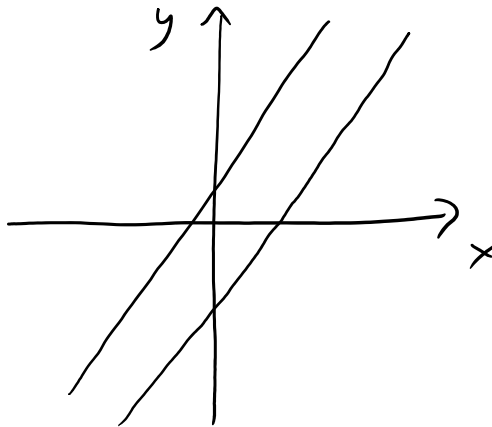
check:
$$\begin{cases} y = x \\ y = -x + 4 \end{cases}$$

does (2,2) work?

$$\begin{aligned} y &= x \\ 2 &= 2 \quad \checkmark \end{aligned}$$

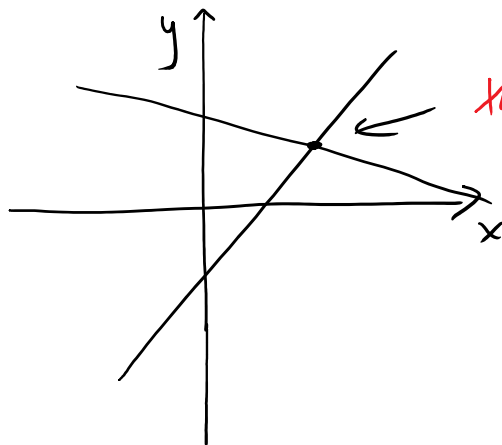
$$\begin{aligned} y &= -x + 4 \\ 2 &= -2 + 4 \\ 2 &= 2 \quad \checkmark \end{aligned}$$

what happens in the following cases?



two parallel lines (same slope)

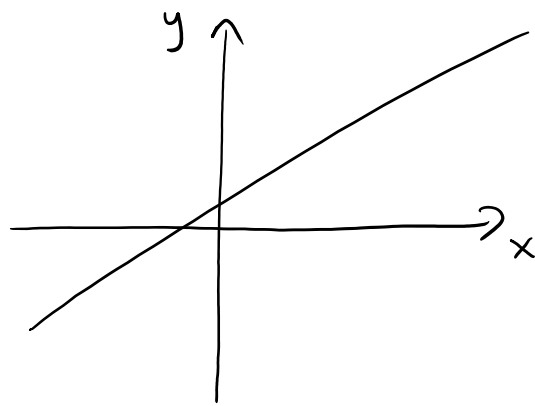
- there is no solution because these lines never cross



the solution is the intersection of these two lines

y ↑

← the two equations are actually the same line



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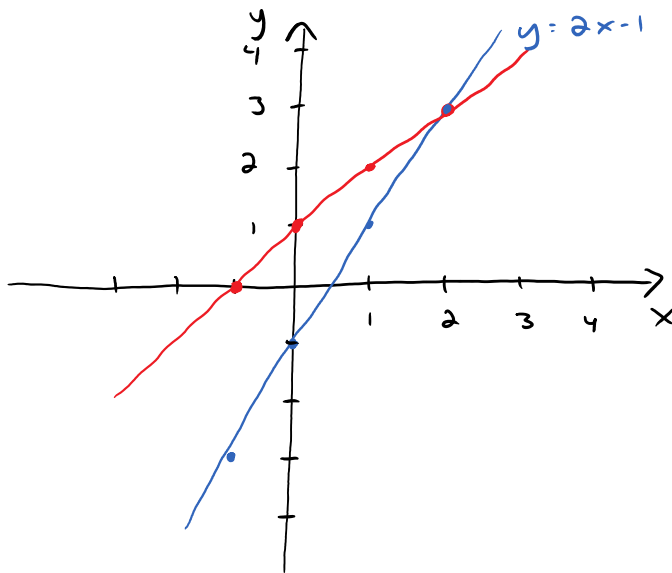
$$\begin{cases} y = x \\ x - y = 0 \end{cases}$$

the solution is any point on that line
(infinitely many solutions)

example:

solve

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



$$y = 2x - 1$$

x	y
-1	-3
0	-1
1	1
2	3

$$y = x + 1$$

x	y
-1	0
0	1
1	2
2	3

the solution is

$$\boxed{(2, 3)}$$

or $x = 2, y = 3$