

BE-Algebra 2 | Monday 9-13-10

NOTE: Registration for Oct. 23 ACT is due Fri. 9-17.

① On the same graph (make it neat, $\sim \frac{1}{2}$ page),
graph paper is best

graph these two lines:

$$\begin{cases} \textcircled{A} & y = 2x + 9 \\ \textcircled{B} & x + y = 3 \end{cases}$$

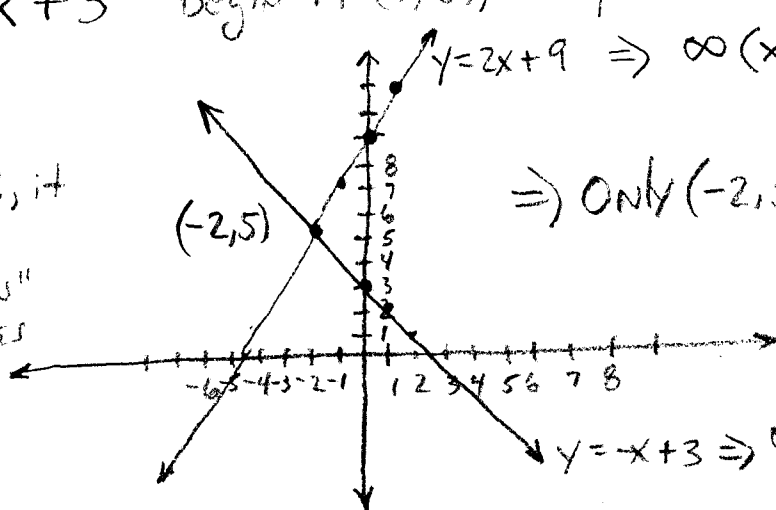
? PUT $\textcircled{B}$ in $y = mx + b$ form

② Where do these lines cross? i.e., (x, y) ?

FYI { LATIN id est "that is" }

$$y = 2x + 9 \quad \text{begin at } (0, 9), m = \frac{2}{1}$$
$$y = -x + 3 \quad \text{begin at } (0, 3), m = -\frac{1}{1}$$

When $x = -2$, it
is the only
 x that "serves"
to both lines



$y = 2x + 9 \Rightarrow \infty (x, y)$ pairs $f(x) = 2x + 9$
 $f(-2) = 2(-2) + 9 = 5$
 $\Rightarrow$ ONLY $(-2, 5)$ is "on" both lines

$y = -x + 3 \Rightarrow \infty (x, y)$ pairs
 $f(x) = -x + 3$
 $f(-2) = -(-2) + 3 = 5$

1.
Can we solve a system of linear equations using Algebra? Graphing is slow, not accurate.

Must use both equations, must eliminate x or y .

EBS $\Rightarrow$ Elimination By Substitution

EBA $\Rightarrow$ Elimination by Addition

EX EBS

$$\begin{cases} y = 2x + 9 \\ x + y = 3 \end{cases}$$

$$y = \boxed{2x + 9}$$

$$x + (2x + 9) = 3$$

$$x + 2x + 9 = 3$$

$$\begin{array}{r} \diagdown \quad \diagup \\ 3x = -6 \end{array}$$

$$\boxed{x = -2}$$

$$y = 2x + 9$$

$$y = 2(-2) + 9$$

$$\boxed{y = 5}$$

STEP

① Get one of four x or y 's by itself.
Great, a y is already by itself

② EBS, take $(2x + 9)$ and substitute for y

③. Solve, in this case for x

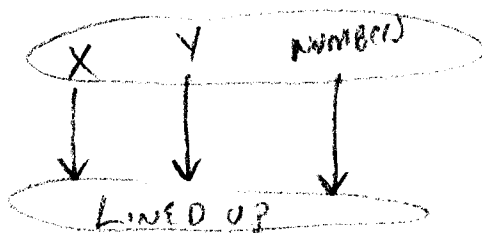
④ Use either equation to find y
I chose $y = 2x + 9$

$(-2, 5)$ $\leftarrow$ Answer

Ex

EBA

$$\begin{cases} y = 2x + 9 \\ x + y = 3 \end{cases}$$



$$2x - y = -9$$

$$x + y = 3$$

+

$$3x = -6$$

11

$$x = -2$$

$$y = 2(-2) + 9$$

$$y = 5$$

Step

① Get X and Y's lined up. Standard Form is convenient, but get X, Y, and numbers lined up. I put 1st equation into standard form

② Get equal and opposite coefficient for X or Y, already done for Y!

③ Add Both Equations, Like to Like. Note: Y is eliminated

④ Solve for X

⑤ Use either original equation to solve for Y

$$y: y = 2x + 9$$

$$(-2, 5)$$

Answer

Substitution is easiest to grasp, you know how to get one of the x or y 's by itself if it is not done already. But what about EBA if you don't have equal and opposite coefficients?

$$\textcircled{\text{Ex}} \quad \begin{array}{l} 4x - 2y = 22 \xrightarrow{(9)} 36x - 18y = 198 \\ 6x + 9y = -3 \xrightarrow{(2)} 12x + 18y = -6 \end{array}$$

$$48x = 192$$

$$\textcircled{x = 4}$$

$$\therefore 9y = -3 - 24$$

$$\textcircled{y = 3}$$

$$\boxed{(4, -3)}$$

$$\textcircled{\text{Ex}} \quad x + \frac{1}{2}y = 5 \Rightarrow 2x + y = 10$$

$$3y - 2x = 6 \quad -2x + 3y = 6$$

$$4y = 16$$

$$\textcircled{y = 4}$$

$$\textcircled{x = 3}$$

$$\boxed{(3, 4)}$$

• Homework: Pg 120 # 13, 14, 19, 20, 25, 26, 27

SYSTEMS OF LINEAR EQUATIONS - 2 SPECIAL CASES

CASE 1 $\Rightarrow$ LINES PARALLEL $\Rightarrow$ NO SOLUTION

$$\textcircled{\text{EX}} \begin{cases} y = 2x - 6 \xrightarrow{(-1)} -y = -2x + 6 \\ y = 2x + 8 \xrightarrow{+} y = 2x + 8 \end{cases}$$

$$0 = 14 \quad \boxed{\text{FALSE}}$$

$\boxed{\text{NO SOLUTION}}$

CASE 2 $\Rightarrow$ SAME LINE $\Rightarrow$ INFINITE SOLUTIONS ∞

$$\textcircled{\text{EX}} \begin{cases} y = 2x + 3 \xrightarrow{(-1)} -y = -2x - 3 \\ y = 2x + 3 \xrightarrow{+} y = 2x + 3 \end{cases}$$

$$0 = 0 \quad \boxed{\text{TRUE}}$$

$\boxed{\infty \text{ SOLUTIONS}}$