

BE-Alg. 1 Monday 11-09-09

① ON the SAME GRAPH (large, at least $\frac{1}{2}$ page), graph the following two lines:

Ⓐ $y = -2x + 5$

Ⓑ $y = 4x - 1$

② Is $(2, 1)$ on either line?

③ Is $(-1, -5)$ on either line?

④ Is $(0, 0)$ on either line?

⑤ Is $(1, 3)$ on either line?

② $(2, 1)$ is an (x, y) pair on $y = -2x + 5$

↓ pick $x = 2$, $y = -2(2) + 5 = 1$

③ $(-1, -5)$ is on $4x - 1$

④ $(0, 0)$ is on neither line.

⑤ $(1, 3)$ is on BOTH LINES!

Every (X, Y) pair on a line is
 A SOLUTION TO its linear equation
 since substituting the (X, Y) pair
 into the linear equation (in ANY
 form such as $y = mx + b$ or $Ax + By = C$
 or others) MAKES A TRUE expression.

Two lines on the same graph, or
 two lines "taken together" form a
 "SYSTEM OF LINEAR EQUATIONS."

NORMAL ALGEBRA $\Rightarrow$ use braces

(EX)
$$\begin{cases} y = -2x + 5 \\ y = 4x - 1 \end{cases}$$

(*) The (X, Y) pair where the two lines
 cross is the solution to the ~~system~~
 of linear equations.

You CAN solve a system of linear equations by graphing... why is this NOT a good way to do so?

* NOT Accurate

• SLOW

How can you solve $\begin{cases} y = 2x + 5 \\ y = 4x - 1 \end{cases}$

using Algebra?

Two ways, both use (they must) both equations, and both start out by ELIMINATING one of the variables.

- Elimination By Substitution (EBS)
- Elimination By Addition (EBA)

Elimination By Substitution

- Solve one of the equations for x or y (4 choices) and then SUBSTITUTE into the other.

Ex $\begin{cases} y = -2x + 5 \\ y = 4x - 1 \end{cases}$ ← Already solved for y , how convenient!

$$-2x + 5 = 4x - 1$$

$$+2x \quad +2x$$

$$\begin{array}{r} 5 = 6x - 1 \\ +1 \quad +1 \end{array}$$

$$\frac{6}{6} = \frac{6x}{6}$$

$$\boxed{1 = x}$$

$$y = 4(1) - 1 = \boxed{3 = y}$$

Look, the y has been eliminated, you CAN solve this!!!

Use EITHER Eq. TO Find y , they both must work $\boxed{(1, 3)}$

Elimination By Addition

- Get the x , y , and numbers lined up (if they are not already) then multiply one equation to get equal and opposite x terms or y terms (usually only 2 choices, usually one is better)

Ex

$$y = -2x + 5 \xrightarrow{(2)} 2y = -4x + 10$$

$$y = 4x - 1 \xrightarrow{+} y = 4x - 1$$

When you add these, the x is eliminated! You can solve this!!

$$\begin{array}{r} 3y = 9 \\ \hline 3 \quad 3 \end{array}$$

$$y = 3$$

USE EITHER EQUATION TO FIND x

$$\begin{array}{r} 3 = 4x - 1 \\ +1 \quad +1 \end{array}$$

$$\frac{4}{4} = \frac{4x}{4}$$

$$\therefore x = 1$$

$$\boxed{(1, 3)} \checkmark$$

Both EBS and EBA will work for ANY SYSTEM OF LINEAR equations, usually one way will be easier.

TIP: if a variable is already "by itself" use EBS, if the x, y, and numbers are already lined up (in the same order), use EBA.

Many options exist:

$$y = -2x + 5 \xrightarrow{(-1)} -y = 2x - 5$$

$$y = 4x - 1 \rightarrow \textcircled{+} y = 4x - 1$$

$$\begin{array}{r} 0 = 6x - 6 \\ + 6 \qquad + 6 \end{array}$$

$$\frac{6}{6} = \frac{6x}{6}$$

$$\textcircled{1 = x} \therefore \textcircled{y = 3}$$

Determine best method to solve, then solve using both methods. ^{6.}

$$2x - y = 6 \xrightarrow{(4)} 8x - 4y = 24$$

$$3x + 4y = -2 \longrightarrow 3x + 4y = -2$$

$$11x = 22$$

$$\boxed{x = 2}$$

$$\therefore 2(2) - y = 6$$

$$4 - y = 6$$

$$-6 + y \quad -6 + y$$

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

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

$$2x - y = 6 \longrightarrow y = \boxed{2x - 6}$$

$$3x + 4y = -2$$

$$3x + 4(2x - 6) = -2$$

$$3x + 8x - 24 = -2$$

$$\begin{array}{r} 11x \\ = 22 \end{array}$$

$$\boxed{x = 2}$$

$$\therefore \boxed{y = -2}$$

Look over Ch. 7-1 to 7-4

Homework: Pg. 390 # 5 and 6

Solve using BOTH EBF and EBA
