BE - PRECALC | TUESDAY 9-8-09

① ON THE SAME graph, graph the LINEAR EQUATIONS $y = 3x - 8$ AND $2x + y = 12$

② At what point do these lines cross?

ACT KMJ 6/09

③ $-3|-6+8| = ?$

④ $6(x+2) > 7(x-5)$ SOLVE.

ANSWERS

③ $-3|2|$

$-3(2) = \boxed{-6}$

NOTE: ABSOLUTE VALUE IS ANOTHER GROUPING SYMBOL IN ADDITION TO MEANING "distance from zero"

④ $6(x+2) > 7(x-5)$

$6x + 12 > 7x - 35$

$-6x \quad\quad -6x$

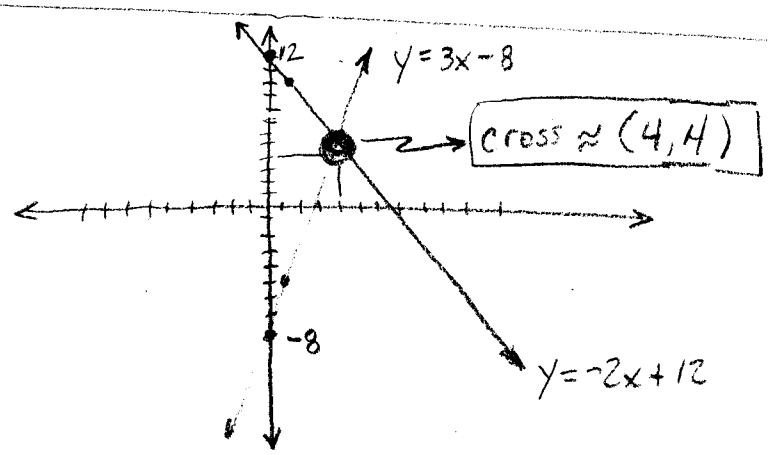
$12 > x - 35$

$47 > x$

$\boxed{x < 47}$

$y = 3x - 8$

$y = -2x + 12$



In the Bell Exercise $y = f(x) = 3x - 8$
and $y = f(x) = -2x + 12$
are both linear functions. The domain and range of both are {ALL REAL NUMBERS}.

There are an ∞ set of (x, y) pairs that are "on" each line "pick an x, find the y"

Example:

x	$y = 3x - 8$	$y = -2x + 12$
-10	-38	+32
-1	-11	+14
0	-8	12
1	-5	10
2	-2	8
10	22	-8
	$\approx$	$\approx$
4	4	4

There is one (x, y) and only one, that is true for both functions, that is the (x, y) where the lines cross! $(4, 4)$ is the solution of the system of linear equations $\begin{cases} y = 3x - 8 \\ 2x + y = 12 \end{cases}$

Problems with solving systems of LE by graphing ⇒ slow, very inaccurate.

Want to use Algebra to solve...

but... since each equations has X, Y, and numbers, if you solve for X you have X = Y + numbers

or Y you have Y = X + numbers

What to do? Ch. 2-1 Solving Systems of Equations in Two Variables

We will use Both Equations and will use Algebra to Eliminate one variable (either X or Y whichever is easier), and find the value for X or Y.

After knowing X or Y use either original equation to find the other half of the (X, Y) pair — A detail.

Two methods of elimination, either will always work, some problems are much easier for one method.

Elimination By Substitution & **Elimination By Addition**

- 4 ways to start get x_1, y_1, x_2, or y_2 by itself
- Eliminate by substitution to solve for x or y
- Go to original for other half

- 9 ways to start, line up, multiply none, one, or both equations to get equal and opposite coefficients of x or y
- ADD TO ELIMINATE by addition
- Go to original for other half.

$$\begin{cases} y = 3x - 8 \\ 2x + y = 12 \end{cases}$$

$2x + (3x - 8) = 12$

$2x + 3x - 8 = 12$

$5x = 20$

EITHER $\boxed{x = 4}$

$y = 3(4) - 8$

$\boxed{y = 4}$

$\boxed{(4, 4)}$

$$\begin{cases} y = 3x - 8 \\ 2x + y = 12 \end{cases}$$ LINE UP

$3x - y = 8$

$\oplus\ 2x + y = 12$

Coefficient of y's are = & opposite

$5x = 20$

$\boxed{x = 4}$

$y = 3(4) - 8$

$\boxed{y = 4}$

$\boxed{(4, 4)}$ ← solution

2 special cases, just like solving equations:

CASE 1 ⇒ variable goes away, true statement left

⇒ {All (x, y) pairs} on either line are a solution ⇒ ∞ number of solutions.

How can this be?

The lines are really the same!

They are on top of each other

Ex) $\begin{cases} x + y = 3 \\ 2x + 2y = 6 \end{cases}$

CASE 2 ⇒ variable goes away, false statement left

⇒ {NO (x, y) pairs are shared}

⇒ NO SOLUTION.

How can 2 lines not share a point?

They are // parallel — they never cross!

Ex) $\begin{cases} y = 2x + 6 \\ y = 2x + 8 \end{cases}$

When would you pick EBS or EBA?

⇒ • if x or y already "by itself" ⇒ EBS
• if x, y, numbers already "lined up" ⇒ EBA
or if x, y already have equal and opposite coefficients

PRACTICE: ① $5x - y = 16$
② $2x + 3y = 3$

EBS ⇒ go after y in ①

$y = 5x - 16$

$2x + 3(y) = 3$

$2x + 3(5x - 16) = 3$

$2x + 15x - 48 = 3$

$17x = 51$

$x = 3$

$\therefore y = 5(3) - 16$

$y = -1$

$(3, -1)$

EBA ⇒ MULT. TOP BY −2, BOTTOM BY +5 } ELIM x
EASIER TO MULT. TOP BY +3 } ELIM y

$5x - y = 16 \xrightarrow{(3)} 15x - 3y = 48$

$2x + 3y = 3 \xrightarrow{(+)} 2x + 3y = 3$

$17x = 51$

$x = 3$

$\therefore y = 5(3) - 16$

$y = -1$

$(3, -1)$

Homework: Pg 71 # 15, 16, 18, 19, 22, 25, 26

(CH. 2-1)