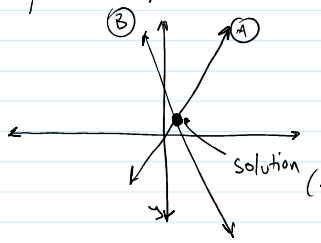
Review Systems of eqns

January 8, 2018 11:00 AM

I. Recall that equations with 2 variables can only be solved when 2 equations are given. The solution represents the point of intersection of the two graphs:



(not accurate!)

(A) $y = 2x - 1$

(B) $y = -3x + 4$

To solve algebraically we can use substitution or elimination:

Substitution

① ① $5x - 7y = -2$
② $x - 4y = -3$

Solve for X in eqn ②

$x - 4y = -3$

$x = 4y - 3$

NOW WE SUBSTITUTE IN EQN ①

① $5x - 7y = -2$

$5(4y - 3) - 7y = -2$

solve for y

$20y - 15 - 7y = -2$

$13y = 13$

$y = 1$

$(1, 1)$ ← solution

SUB AGAIN WITH THE y

② $x - 4y = -3$

$x - 4(1) = -3$

$x - 4 = -3$

$x = 1$

Elimination

② ① $-3x - 2y = -23$ • Multiply to get equal coefficients for 1 variable.
② $6x - 12y = 13$

① $(-3x - 2y = -23)^{x2}$ • MULTIPLY BY 2

$-6x - 4y = -46$

NOW WE CAN ADD OR SUBTRACT THE TWO EQNS

① $-6x - 4y = -46$
② $6x - 12y = 13$ opp signs +/- so ADD

$0 - 16y = -33$

$y = \frac{-33}{-16}$

or $y = 33/16$

TO GET x YOU SUBSTITUTE ② OR ① IN EQN

② $6x - 12y = 13$

$6x - 12\left(\frac{33}{16}\right) = 13$

$6x - \frac{99}{4} = 13$

$6x = 13 + \frac{99}{4}$

$6x = \frac{52}{4} + \frac{99}{4}$

$6x = \frac{151}{4}$

$x = \frac{151}{4} \times \frac{1}{6}$

$x = \frac{151}{24}$ or $6\frac{7}{24}$

$\left(\frac{151}{24}, \frac{33}{16}\right)$

II. Remember NO SOLUTION : Lines don't cross ie. PARALLEL LINES

Parallel lines have same slope

III. Infinite Solutions: The two equations are actually the same line!

e.g. ① $y = \frac{1}{3}x + 2$ → eliminate $6y = 2x + 12$

② $6y = 2x + 12$ sub $6y = 2x + 12$

$0 = 0$

always true

infinite solutions