Name _____   Date _____

Two Linear Equations in Two Variables - Step-by-Step Lesson

Line A and B has the following points:

Line A: (4,5) and (-4,2)

Line B: (5,8) and (-5, -5)

Find the point where the two lines intersect.

Explanation:

What we can do is find the equation of both lines. If we then set them equal to each other, we can find the x value of where they both meet. We can then plug that x value into either equation to find the y value of where they meet.

Step 1: Find the equation of each line.

Line A :   (4,5) (-4,2)   Y = mx + b

Where m= slope Solving for m:

$m = \frac{y2-y1}{x2-x1}$ $= \frac{(2-5)}{(-4-4)}$ $= \frac{-3}{-8} = \frac{3}{8}$

Solve for b:

$Y = \frac{3}{8}x + b$ $=$ $5 = \frac{3}{8} \times 4 + b$ $=$ $5 = \frac{12}{8} + b$ $=$ $b = \frac{7}{2}$

The equation for line A is: $y = \frac{3}{8} x + \frac{7}{2}$

Line B: (5,8) (-5,-5) y = mx +b

$M = \frac{y2-y1}{x2-x1}$ $= \frac{(-5-8)}{(-5-5)}$ $= \frac{-13}{-10} = \frac{13}{10}$

Solve for b:

$y = \dfrac{13}{10}x + b \quad = 8 = \dfrac{13}{10} \times 5 + b \quad = 8 = \dfrac{65}{10} + b = \quad b = \dfrac{3}{2}$

The equation for line b is : $y = \dfrac{13}{10} x + \dfrac{3}{2}$

(A) : $y = \dfrac{3}{8} x + \dfrac{7}{2}$

(B) $y = \dfrac{13}{10} x + \dfrac{3}{2}$

Step 2) Set them equal to one another and solve for x.

$\dfrac{3}{8} x + \dfrac{7}{2} = \dfrac{13}{10} x + \dfrac{3}{2}$

$2 = \dfrac{37}{40} x$

$= \dfrac{15x + 140 = 52x + 60}{40} = \dfrac{80}{37} = 2.16$ (This is the x value.)

Step 3) Plug the x value into either of the equations to determine the y value of the intersection.

$y = \dfrac{3}{8} \times 2.16 + \dfrac{7}{2} \quad = .81 + 3.5 = 4.31$ (The y value)

The point where both lines intersect would be (2.16, 4.31).