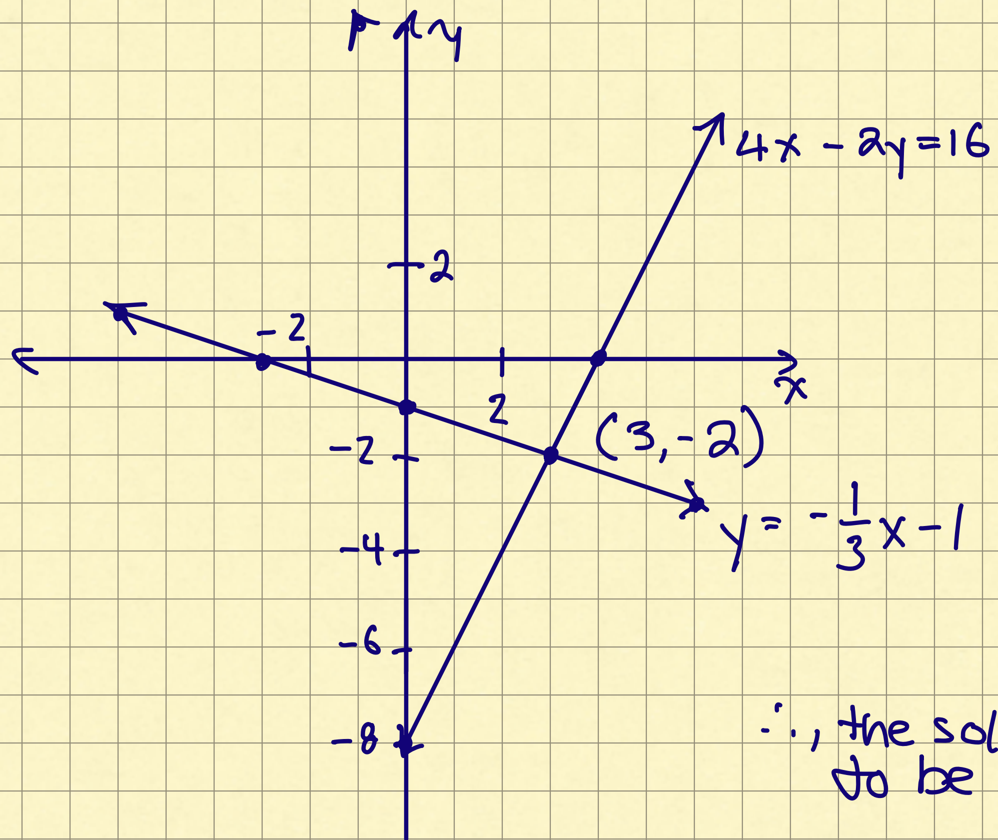
Thread 3, Mini-Test 1

1.



∴, the solution appears to be (3, -2).

2.

$x - 2y = 3$ (A)

$3x - 4y = 11$ (B)

From (A):

$x - 2y = 3$

$+2y \quad +2y$

$x = 2y + 3$

Sub into (B):

$3x - 4y = 11$

$3(2y+3) - 4y = 11$

$6y + 9 - 4y = 11$

$2y + 9 = 11$

$-9 \quad -9$

$\frac{2y}{2} = \frac{2}{2}$

$y = 1$

Sub into (A):

$x - 2y = 3$

$x - 2(1) = 3$

$x - 2 = 3$

$+2 \quad +2$

$x = 5$

∴, the solution appears to be (5, 1).

3. $3x + 2y = 8$ (A)
$5x - 3y = 7$ (B)

$9x + 6y = 24$ (A) ×3
(+) $10x - 6y = 14$ (B) ×2

$19x = 38$

$\frac{19x}{19} = \frac{38}{19}$

$x = 2$

Sub into (A):

$3x + 2y = 8$

$3(2) + 2y = 8$

$6 + 2y = 8$
$-6 \quad\quad -6$

$\frac{2y}{2} = \frac{2}{2}$

$y = 1$

∴, the solution appears to be (2,1).

4. I am choosing to check my answer to question 2.
Is (5,1) the correct solution?

(A) $x - 2y = 3$

LS = $x - 2y$ RS = 3
$= 5 - 2(1)$
$= 5 - 2$
$= 3$

LS = RS

∴ (5,1) is a point on line (A).

(B) $3x - 4y = 11$

LS = $3x - 4y$ RS = 11
$= 3(5) - 4(1)$
$= 15 - 4$
$= 11$

LS = RS

∴, (5,1) is a point on line (B).

∵ the point lays on both lines, it must be the point of intersection.

5. (A) $6x + 8y = 24$ Re-arrange to $y = mx + b$ form.

$$6x + 8y - 6x = 24 - 6x$$

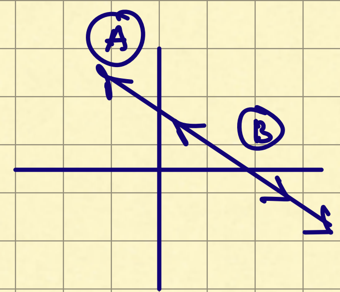
$$\frac{8y}{8} = \frac{-6x + 24}{8}$$

$$y = -\frac{3}{4}x + 3$$

(B) $y = -\frac{3}{4}x + 3$

After re-arranging eq. (A), we see the two equations have the same slope and the same y-intercept.

eg.



∴ the lines are co-incident which means there are an infinite number of solutions.

6. Let x be the number of fish Mr. McGowan has.

Let y be the number of fish Mr. Gordon has.

$$x + y = 31$$ ← total # of fish

$$x = y + 5$$ ← "five more than"

x ↑ Mr. McGowan's fish

y ↑ Mr. Gordon's fish

7. Let x be the number of four-person tables.
Let y be the number of two-person tables.

$$x + y = 23 \quad \leftarrow \text{\# of tables overall}$$
$$4x + 2y = 76 \quad \leftarrow \text{\# of people seated}$$

8. Let x be the mass of the box, in grams.
Let y be the mass of one bolt, in grams.

$$x + 20y = 340 \quad \leftarrow \text{first scenario}$$
$$x + 48y = 760 \quad \leftarrow \text{second scenario}$$

BONUS QUESTION

If $(\overset{x}{3}, \overset{y}{-4})$ is to be the solution, that is, where the two lines cross, then we know x and y for each equation.

$3x - 5y = a$	$7x + y = b$
$3(3) - 5(-4) = a$	$7(3) + (-4) = b$
$9 + 20 = a$	$21 - 4 = b$
$29 = a$	$17 = b$

$\therefore$ the two equations would need to be

$$3x - 5y = 29$$
$$7x + y = 17$$