Name: KEY

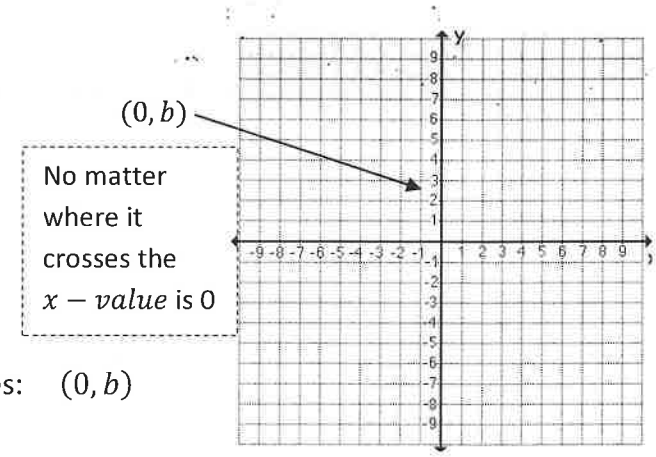
Final Exam Practice Pack – Section 7

SLOPE-INTERCEPT FORM: $\boldsymbol{y = mx + b}$

- The variables in this equation are very important
  - The $\boldsymbol{m}$: Is the **SLOPE** of the line, represented $\frac{RISE}{RUN}$
  - $\frac{RISE}{RUN}$ $also$ $\frac{CHANGE\ IN\ HEIGHT}{CHANGE\ IN\ LENGTH}$
  - The **Slope** is the **same** from any point on the line to another
  - The **SLOPE** stays **constant**
  - The $\boldsymbol{b}$: Is the $\boldsymbol{y - intercept}$, where the line crosses the $y - axis$
  - Why b and not y then?
  - You will soon find out…
  - Lastly, the $x\ and\ y$.
  - They represent the $(\boldsymbol{x}, \boldsymbol{y})$ **coordinates** of **every possible point** on the line

So, why b for the $y - int$?

- Have a look at the grid
- No matter where you cross the $y - axis$, what is the $x - value$?
- It is always, 0
- So every $y - intercept$, has the coordinates: $(0, b)$



The $\boldsymbol{b}$, is wherever **it crosses** the $\boldsymbol{y - axis}$.

STANDARD FORM: $\boldsymbol{Ax + By = C}$

Example:

Let's graph this: $x + y = 4$

x	y
0	**4**
4	0
−4	**8**

- Set yourself up a **Table of Values**
- It reads, when $x\ is$ ... $y\ is$ ...

i) $When\ x\ is\ 0$

$0 + y = 4$
$\boldsymbol{y = 4}$

ii) $When\ y\ is\ 0$
$x + 0 = 4$
$\boldsymbol{x = 4}$

iii) When $\boldsymbol{x\ is - 4}$

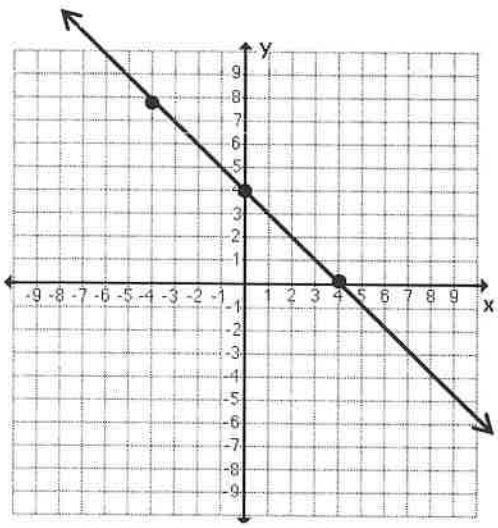
$-4 + y = 4$
$y = 4 + 4$
$\boldsymbol{y = 8}$

- For the **third point** you can **pick anything**
- I highly suggest you take the **value that you got** when you solved **for x**, and **flip the sign**
- If it was positive use the negative of it, and vice versa
- In this case we will take -4

- So with the completed table of values we can graph it now
- We have three points:

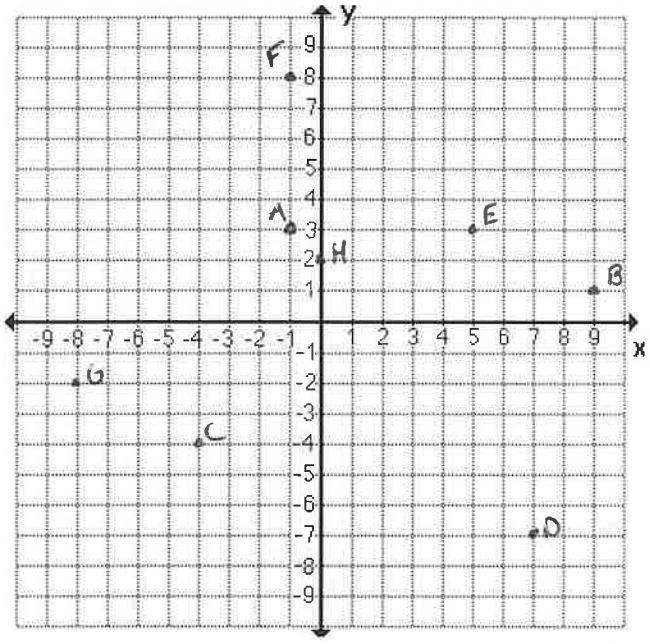
$(0, 4), (4, 0), and\ (-4, 8)$

x	y
0	**4**
4	0
−4	**8**

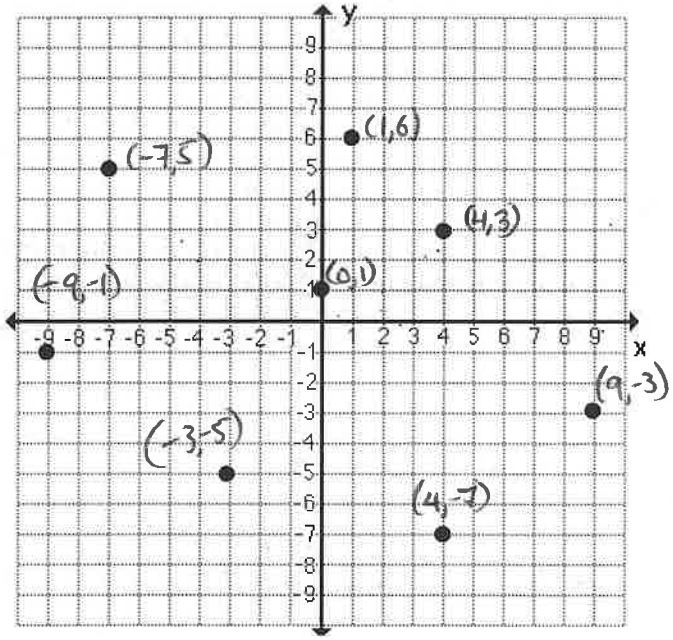


1. Map the following Coordinate (x, y) on the 2-D plane (GRID)

$A(-1,3)$ $B(9,1)$
$C(-4,-4)$ $D(7,-7)$
$E(5,3)$ $F(-1,8)$
$G(-8,-2)$ $H(0,2)$



2. Identify the Coordinates of the given points



3. What does it mean to be a solution to an equation with respect to coordinates of a point?

If you plug the (x,y) of a point into the x,y in y=mx+b the equation should stay balanced

4. What is the $y - intercept$? What is the **x-coordinate** of every $y - intercept\ point$? Example?

where the graph crosses the y-axis ; x coordinate is 0

Example: (0,4)

5. What is the $x - intercept$? What is the **y-coordinate** of every $x - intercept\ point$? Example?

where the graph crosses the x-axis ; y-coordinat is 0

Example: (6,0)

6. For the sake of our Math Vocabulary then:

$$SLOPE = \frac{\text{RISE}}{\text{RUN}}$$

7. Are the following points solutions to the given equations? Are they POINTS on the given LINE?

A) $(1, -6)$ $y = -2x + 4$

$-6 = -2(1) + 4$

$-6 = -2 + 4$

$-6 = 2$ $\boxed{\text{NO}}$

B) $(0, -5)$ $y = \frac{2}{3}x - 5$

$-5 = \frac{2}{3}(0) - 5$

$-5 = -5$ $\boxed{\text{YES}}$

C) $(-2,\ 1)$ $y = -\frac{3}{2}x + 4$

$1 = -\frac{3}{2}(-2) + 4$

$1 = 3 + 4$ $1 = 7$ $\boxed{\text{NO}}$

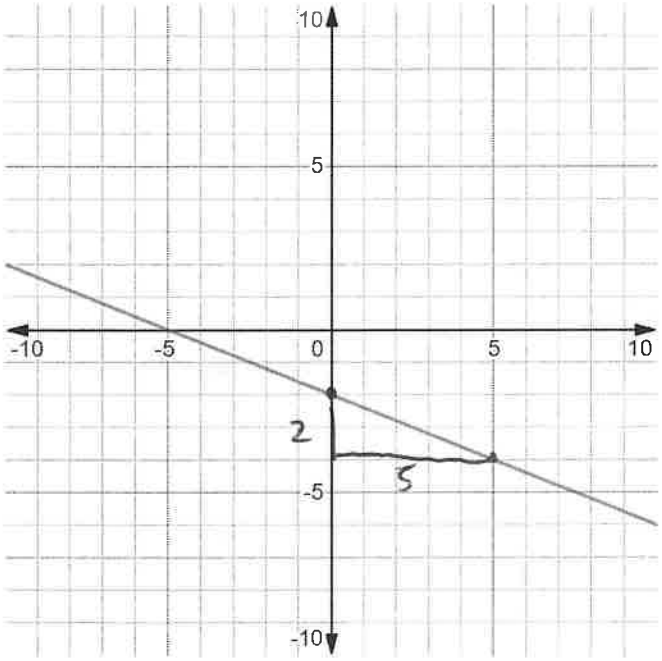
D) $(8, -2)$ $y = -\frac{1}{8}x + 1$

$-2 = -\frac{1}{8}(8) + 1$

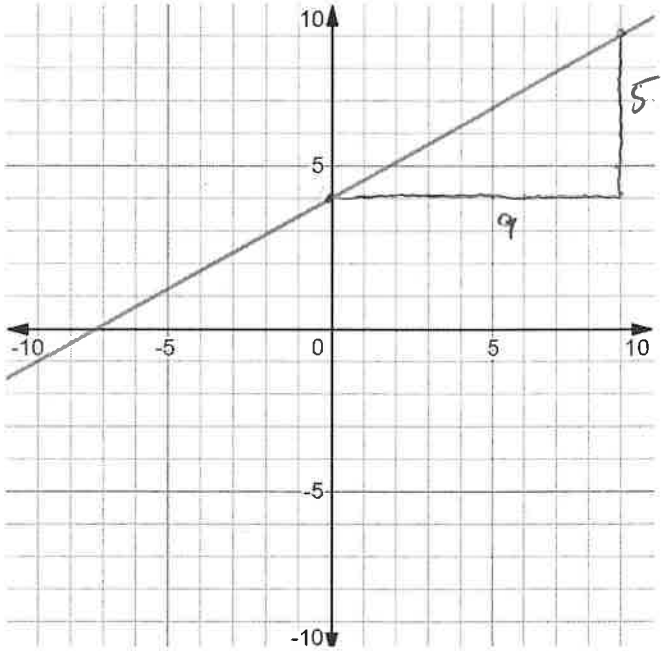
$-2 = -1 + 1$

$-2 = 0$ $\boxed{\text{NO}}$

8. What is the **SLOPE** and **Y-INTERCEPT** of the following lines?



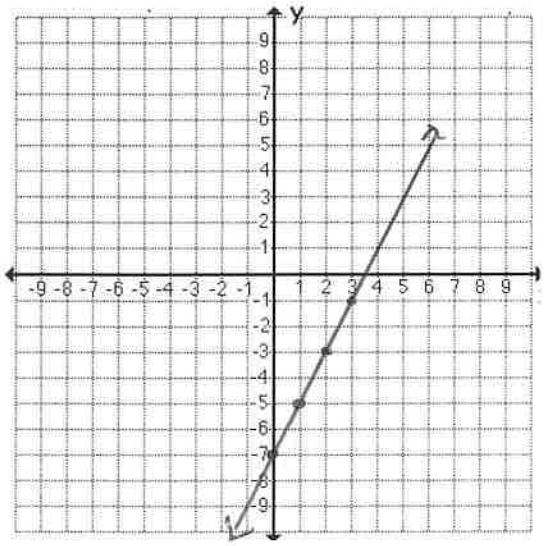
$Slope = -2/5$
$y - int = (0,-2)$



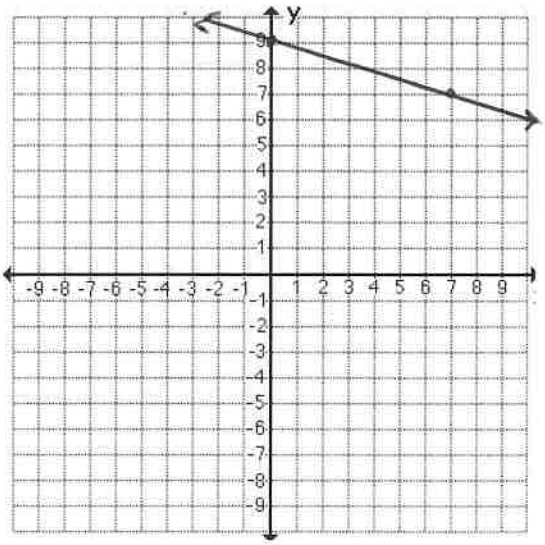
$Slope = 5/9$
$y - int = (0,4)$

9. Graph the following lines.

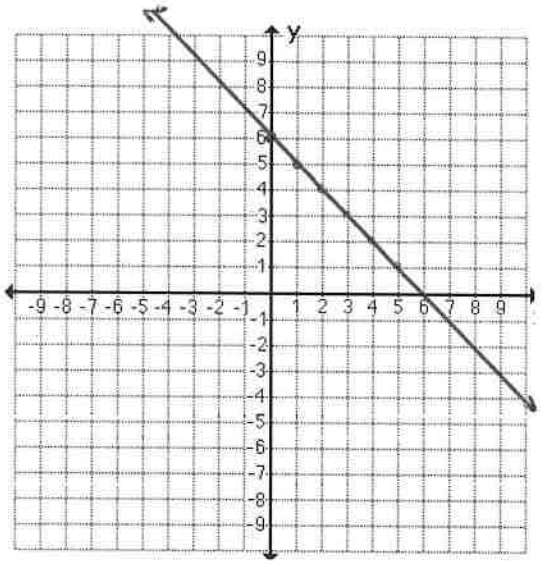
a) $y = 2x - 7$



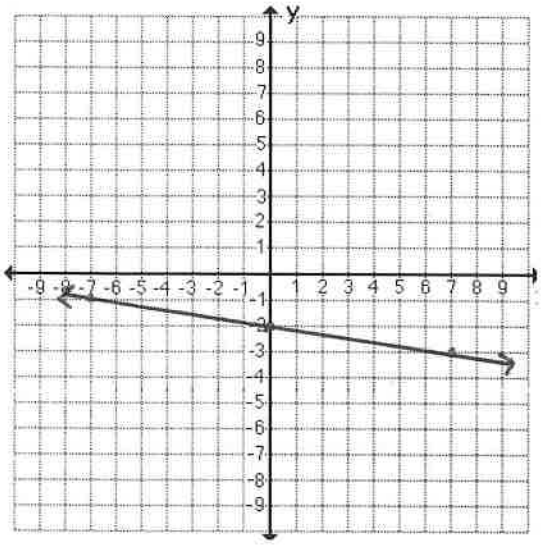
b) $y = -\frac{3}{7}x + 9$



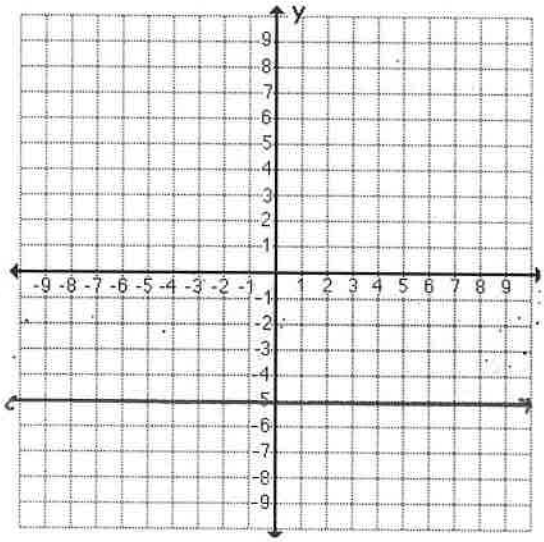
c) $y = -x + 6$



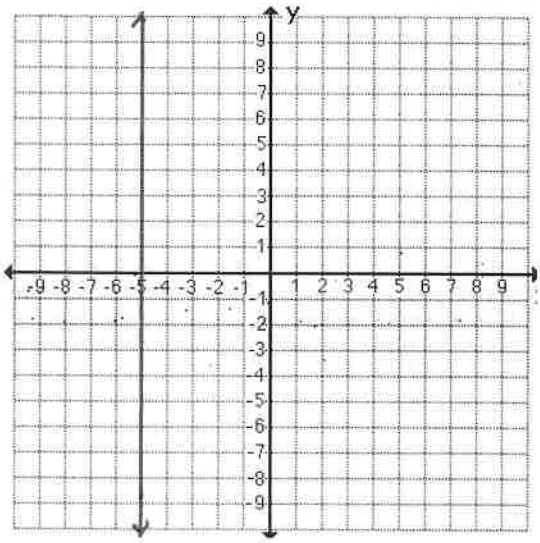
d) $y = -\frac{1}{7}x - 2$



e) $y = -5$



f) $x = -5$



10. Are the following points solutions to the given equations? Are they POINTS on the given LINE?

a) $(-2, 4)$ $2x + 3y = 8$

$2(-2) + 3(4) = 8$ $-4 + 12 = 8$ $8 = 8$ $\boxed{\text{YES}}$

b) $(-6, 1)$ $\frac{1}{6}x + 13y = 14$

$\frac{1}{6}(-6) + 13(1) = 14$ $-1 + 13 = 14$ $12 = 14$ $\boxed{\text{NO}}$

c) $(8, -2)$ $2x - y = 12$

$2(8) - (-2) = 12$ $16 + 2 = 12$ $18 = 12$ $\boxed{\text{NO}}$

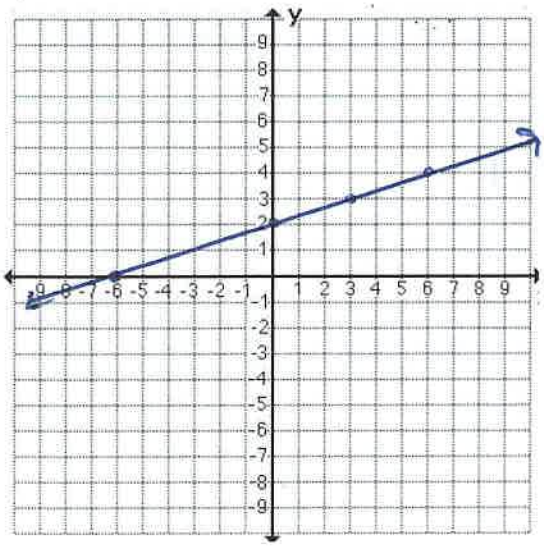
d) $(-3, -4)$ $-4x - 2y = 4$

$-4(-3) - 2(-4) = 4$ $12 + 8 = 4$ $20 = 4$ $\boxed{\text{NO}}$

11. Graph the following equations, use the table of values to organize your coordinates.

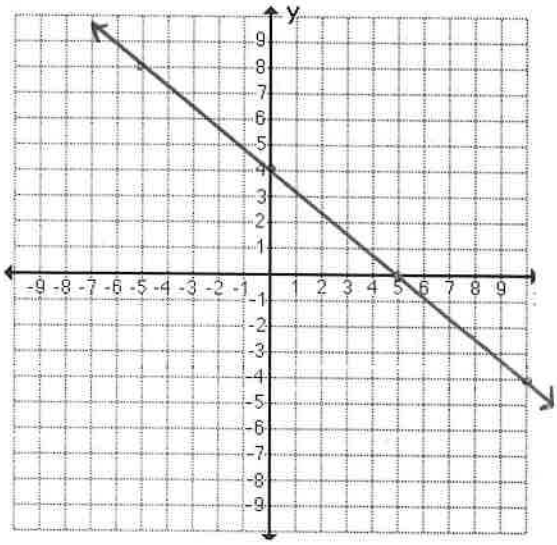
i)

$x - 3y = -6$



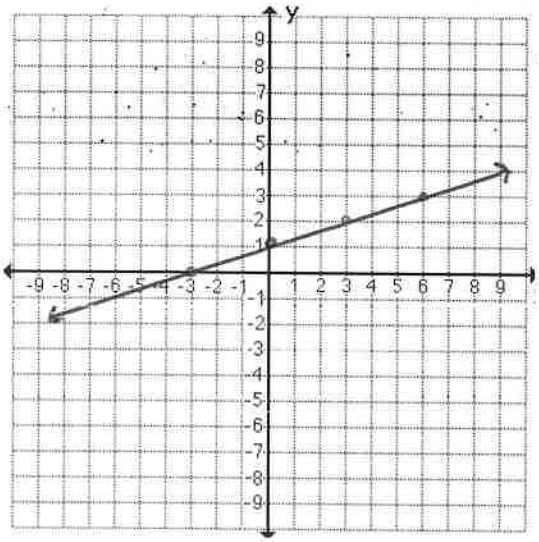
x	y
0	2
-6	0
6	4
3	3

ii) $4x + 5y = 20$



x	y
0	4
5	0
-5	8
10	-4

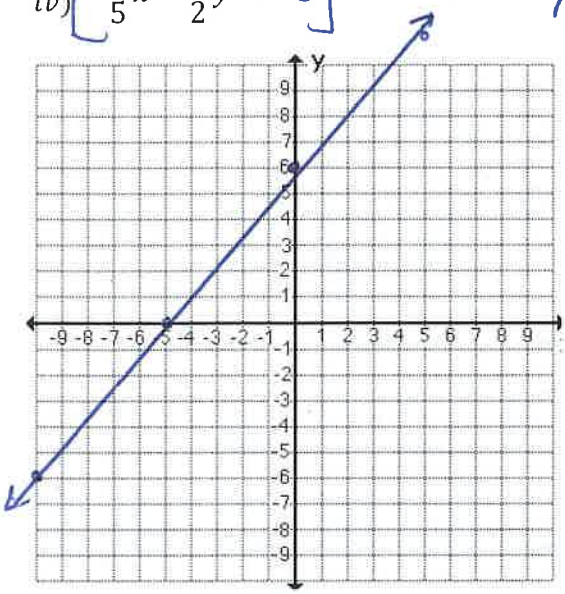
iii) $\left[\frac{2}{3}x - 2y = -2\right]^{3} \rightarrow 2x - 6y = -6$



x	y
0	+1
-3	0
3	2
6	3

10

iv) $\left[\frac{3}{5}x - \frac{1}{2}y = -3\right] \rightarrow 6x - 5y = -30$



x	y
0	6
-5	0
5	12
-10	-6

12. Using your algebraic logic, manipulate the STANDARD FORM equations in to SLOPE-INTERCEPT equations and graph them.

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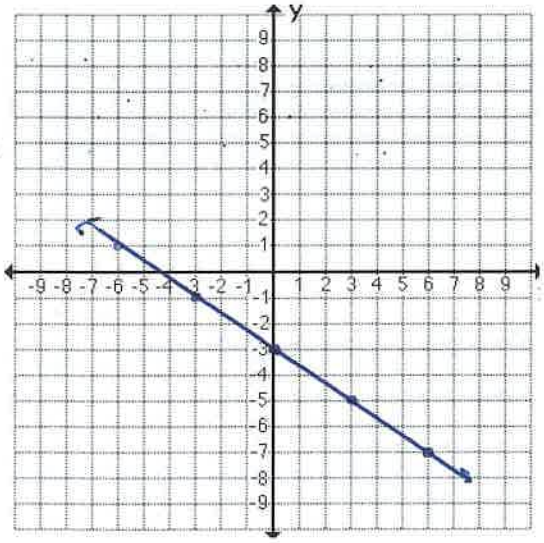
a) $2x + 3y = -9$ ~~$3x + 2y = -9$~~



~~$3x + 2y = -9$~~
$-3x \qquad -3x$

~~$2y = -3x - 9$~~

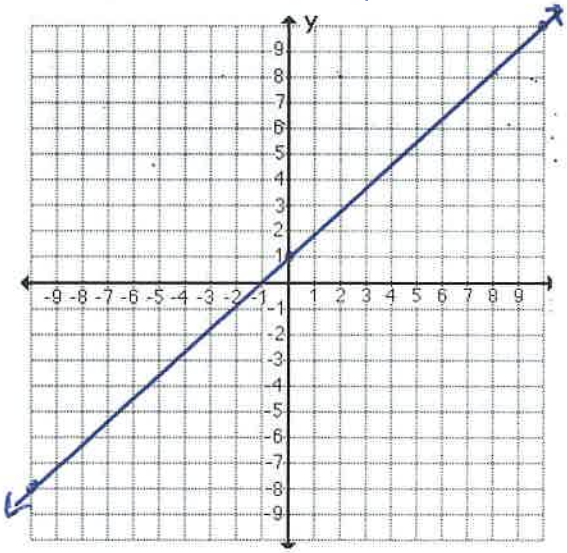
~~$y = \frac{-3x}{2}$~~

$2x + 3y = -9$

$3y = -2x - 9$

$y = -\frac{2}{3}x - 3$

b) $\left[-\frac{3}{5}x + \frac{2}{3}y = \frac{2}{3}\right]$ $-9x + 10y = 10$



$-9x + 10y = 10$

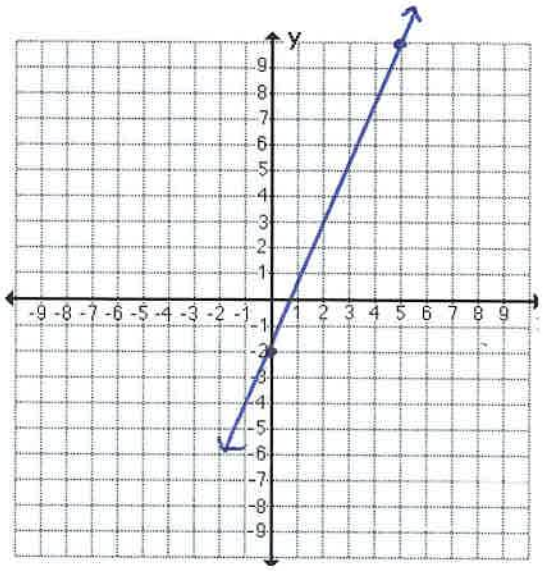
$10y = 9x + 10$

$y = \frac{9}{10}x + 1$

c) $-12x + 5y = -10$

$5y = 12x - 10$

$y = \frac{12}{5}x - 2$

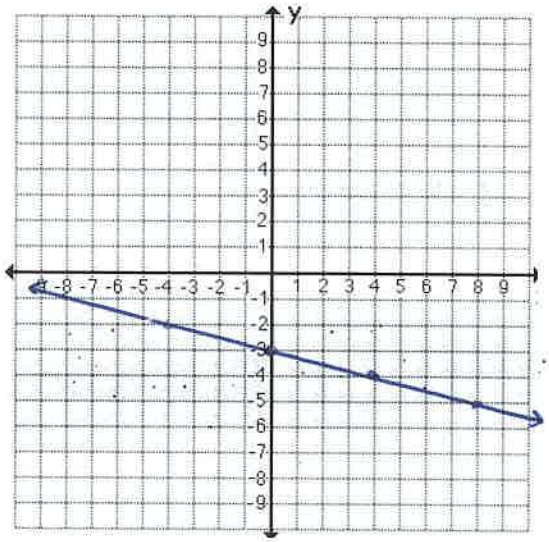


d) $\frac{1}{6}x + \frac{2}{3}y = -2$

$\frac{2}{3}y = -\frac{1}{6}x - 2$

$y = \frac{3}{2} \cdot -\frac{1}{6}x - 2\left(\frac{3}{2}\right)$

$y = -\frac{1}{4}x - 3$



13. Using your algebraic logic, manipulate the SLOPE-INTERCEPT to STANDARD FORM, remember that $Ax + By = C$ has NO FRACTIONS and $A > 0$

a) $y = -\frac{2}{5}x - 6$

$+\frac{2}{5}x \quad +\frac{2}{5}x$

$\left[\frac{2}{5}x + y = -6\right]^5$

$\boxed{2x + 5y = -30}$

b) $y = -3x + 5$

$+3x \quad +3x$

$\boxed{3x + y = 5}$

c) $y = -5x - \frac{4}{3}$

$+5x \quad +5x$

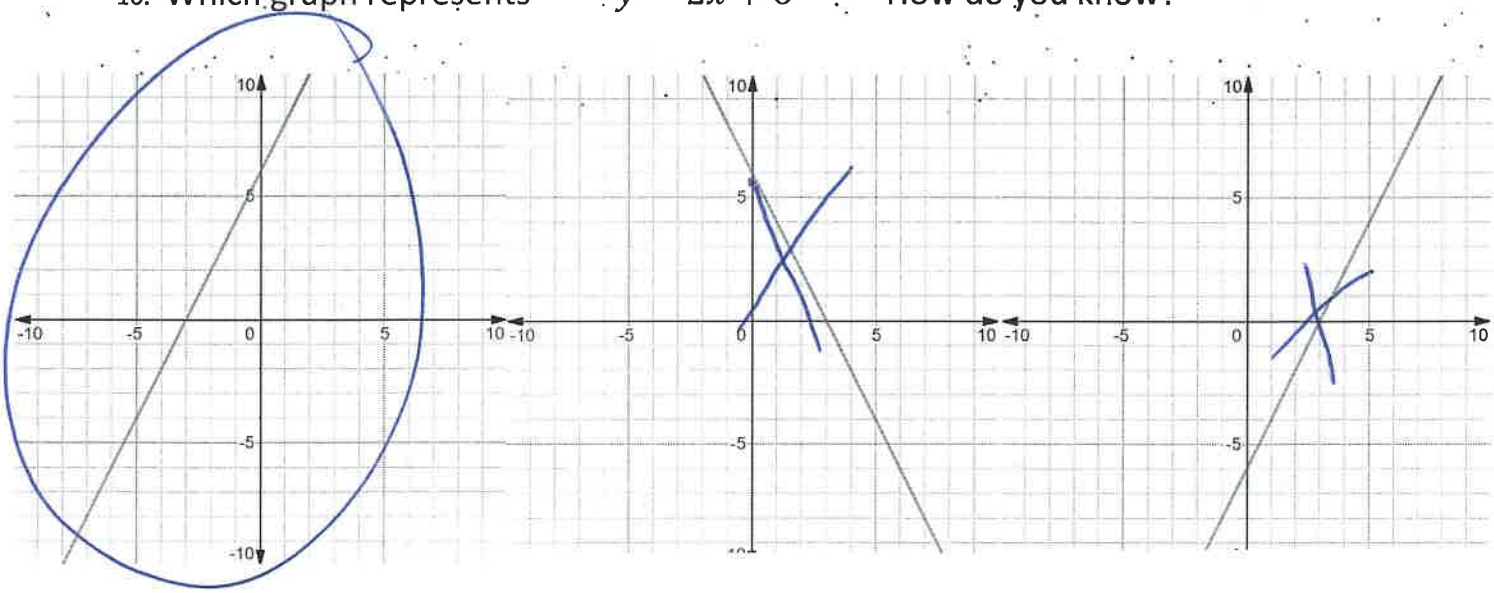
$\left[5x + y = -\frac{4}{3}\right]^{\times 3} \rightarrow \boxed{15x + 3y = -4}$

d) $7 - 3x = y$

$+3x \quad +3x$

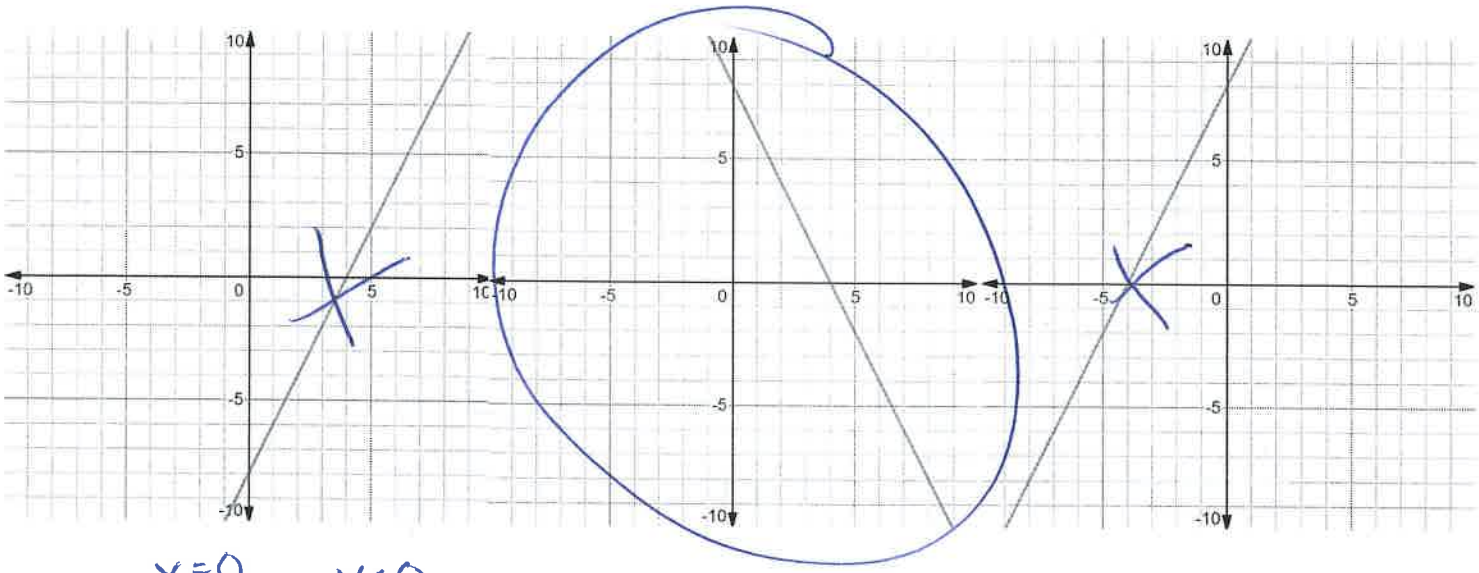
$\boxed{3x + y = 7}$

16. Which graph represents $y = 2x + 6$. How do you know?



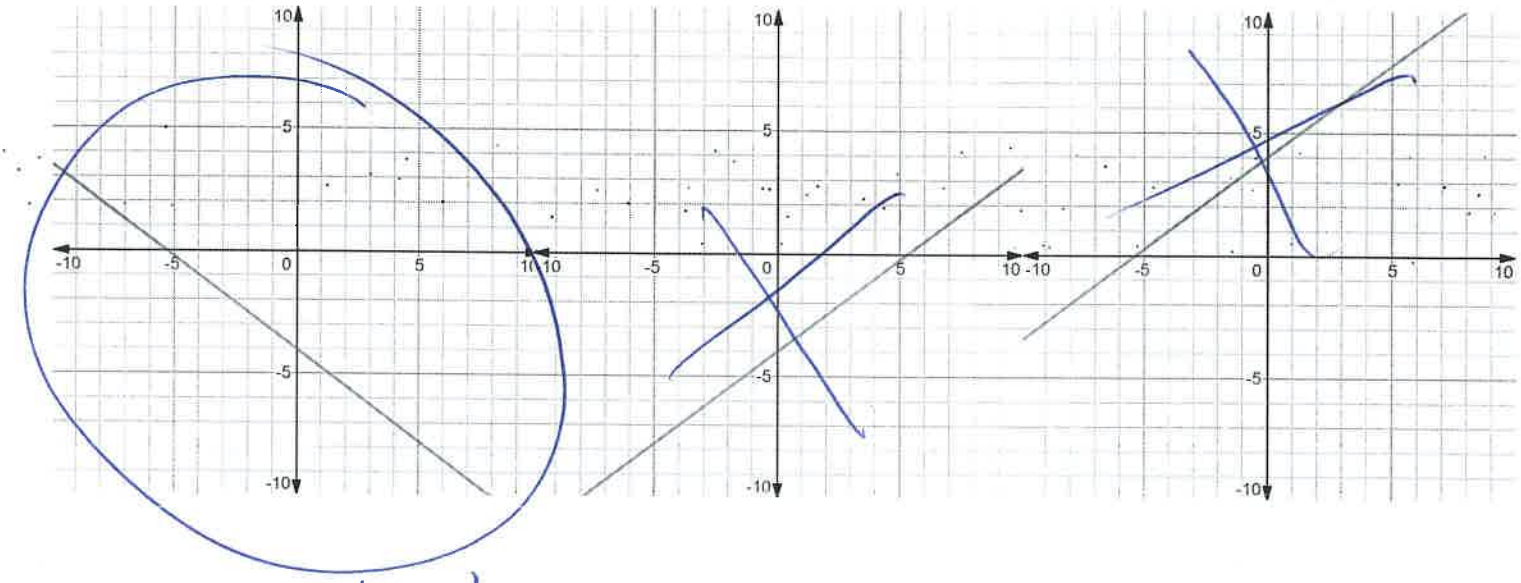
Positive Slope, y-int of 6

17. Which graph represents $2x + y = 8$ How do you know?



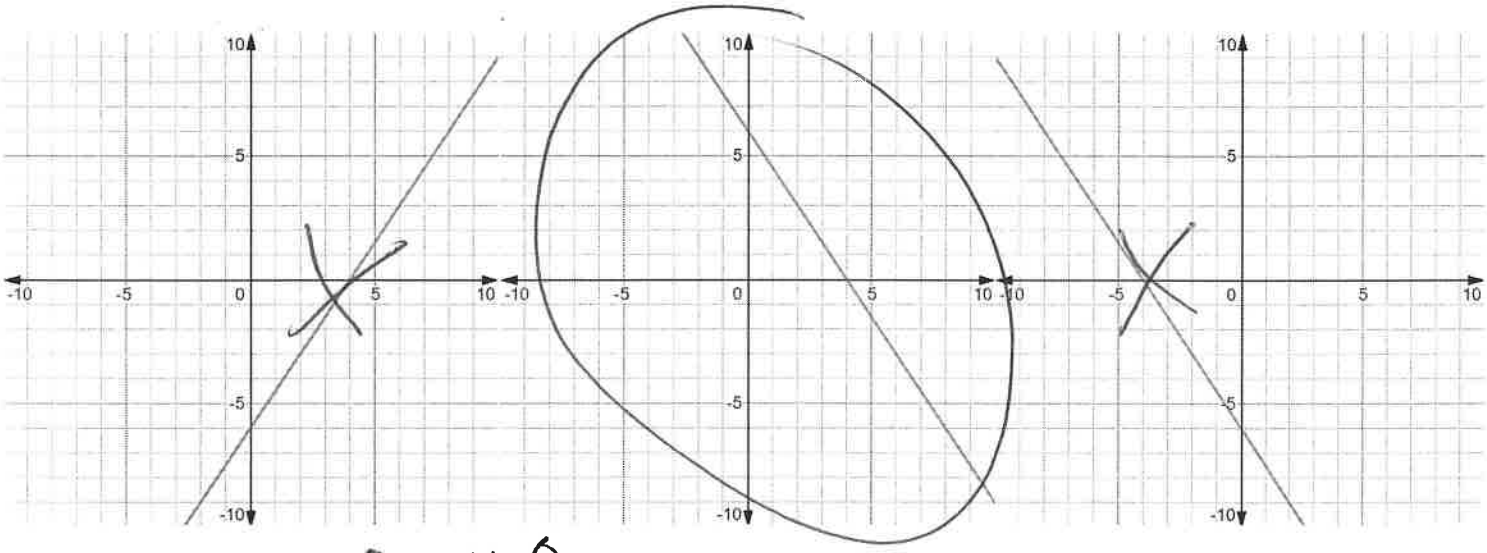
$x=0$ $y=0$
$y=8$ $x=4$

18. Which graph represents $y = -\frac{3}{4}x - 4$ How do you know?



Negative slope

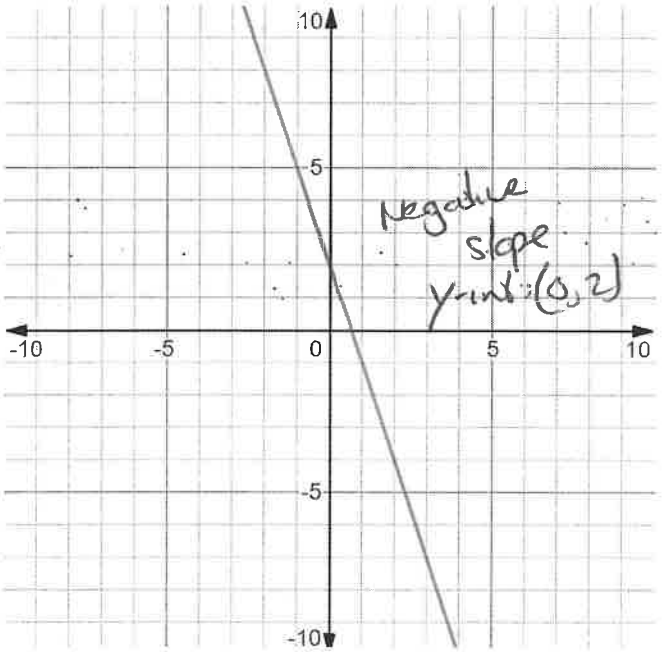
19. Which graph represents $3x + 2y = 12$ How do you know?



$x = 0$ $y = 6$
$y = 6$ $x = 4$

20. Which equation matches the graph below:

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



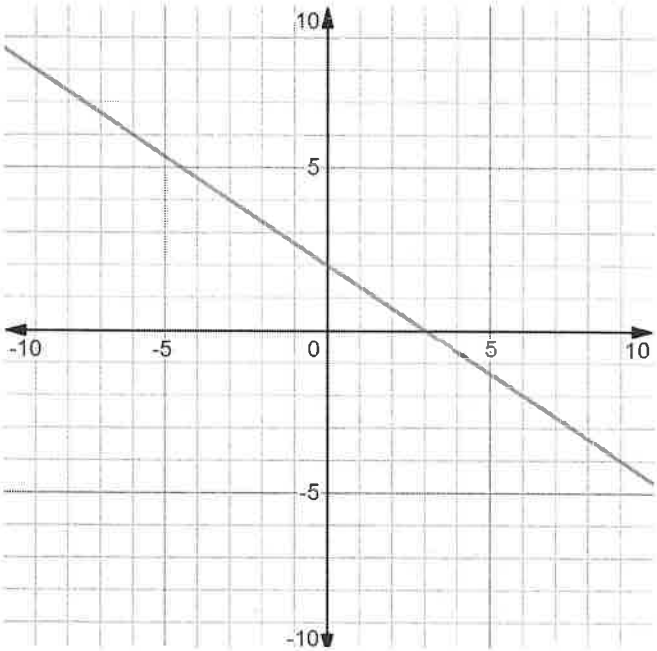
21. Which equation matches the graph below:

✓ $2x + 3y = 6$

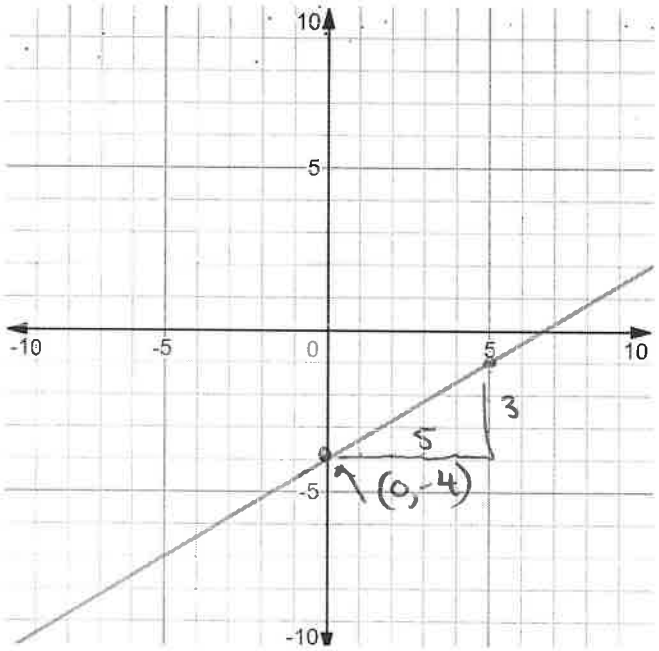
~~$-2x - 3y = 6$~~

✓ ~~$2x - 3y = -6$~~

$x = 0$ $y = 0$
$y = 2$ $x = 3$



22. Write the equation of the following graph in SLOPE-INTERCEPT form, then manipulate it to STANDARD FORM



$\left[y = \frac{3}{5}x - 4 \right] \times 5$

$5y = 3x - 20$

$\boxed{3x - 5y = 20}$