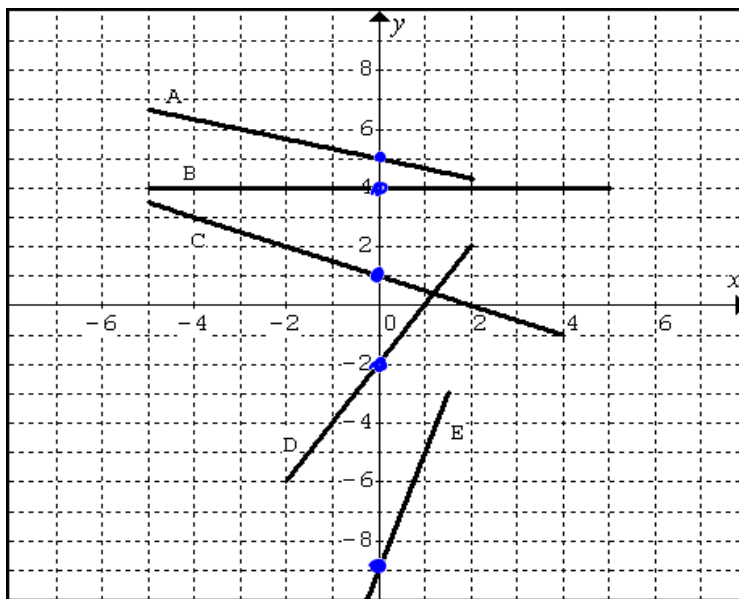


DEFINITION: The y-intercept is the point on the y-axis where your line crosses or meets the y-axis. It is also the coordinate that has an x-value of ZERO. (0, y)

For each line on the grid to the right, state the COORDINATE of the y-intercept. Line A is done for you.

- A) (0 , 5)
- B) (0 , 4)
- C) (0 , 1)
- D) (0 , -2)
- E) (0 , -9)



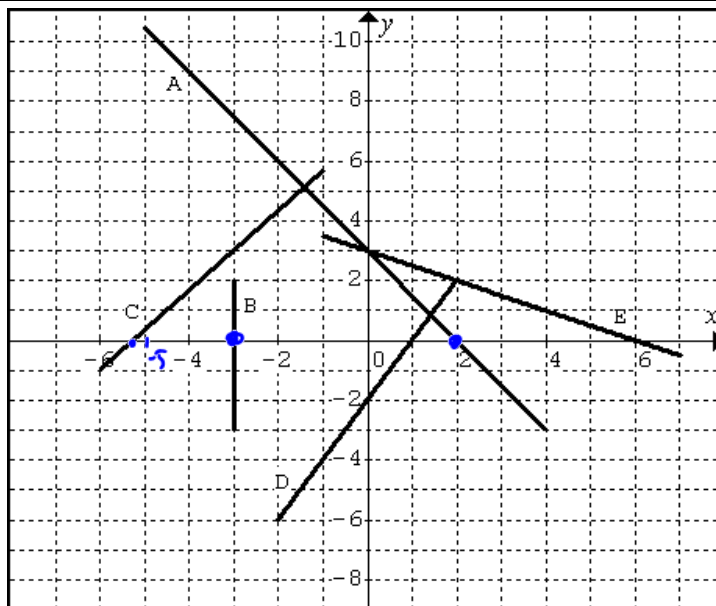
What do all these points have in common?

x-values are "0"

DEFINITION: The x-intercept is the point on the x-axis where your line crosses or meets the x-axis. It is also the coordinate that has a y-value of ZERO. (x, 0)

For each line on the grid to the right, state the COORDINATE of the x-intercept. Line A is done for you. *

- A) (2 , 0)
- B) (-3 , 0)
- C) (-5.2 , 0)
- D) (1 , 0)
- E) (6 , 0)



What do all these points have in common?

y values equal "0"

Lesson: Graphing with x-Intercepts and y-Intercepts

- Note problems where you are asked to find both the intercepts, the line is usually not in $y=mx+b$ form, rather a different form (possibly standard form $Ax + By + C = 0$).

QUESTION 1: PART A

Given the equation $3x + 4y = 12$ what are the intercepts of this line.

SOLUTION

To find the y-intercept, the x-value must be 0.

- Substitute $x=0$
- Solve the equation for y

$$\begin{aligned} 3(0) + 4y &= 12 \\ 4y &= 12 \\ \frac{4y}{4} &= \frac{12}{4} \\ \boxed{x=0} \quad \boxed{y=3} \end{aligned}$$

The y-intercept is (0 , 3)

To find the x-intercept, the y-value must be 0.

- Substitute $y=0$
- Solve the equation for x

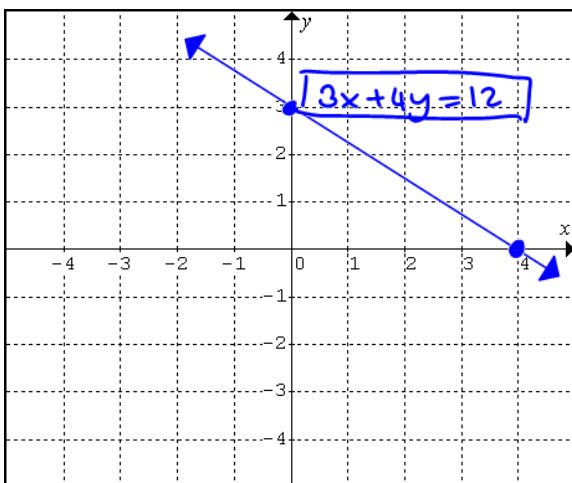
$$\begin{aligned} 3x + 4(0) &= 12 \\ 3x &= 12 \\ \frac{3x}{3} &= \frac{12}{3} \\ \boxed{x=4} \quad \boxed{y=0} \end{aligned}$$

The x-intercept is (4 , 0)

QUESTION 1: PART B

Graph the line $3x + 4y = 12$ using the intercepts.

Plot the coordinates of each intercept and connect the two points to create your line.

**QUESTION 2: PART A**

Given the equation $-6x + 10y - 24 = 0$ what are the intercepts of this line.

SOLUTION

To find the y-intercept, the x-value must be 0.

- Substitute $x=0$
- Solve the equation for y

$$\begin{aligned} -6(0) + 10y - 24 &= 0 \\ 10y - 24 &= 0 \\ 10y &= 24 \\ \frac{10y}{10} &= \frac{24}{10} \\ \boxed{x=0} \quad \boxed{y=2} \end{aligned}$$

The y-intercept is (0 , 2)

To find the x-intercept, the y-value must be 0.

- Substitute $y=0$
- Solve the equation for x

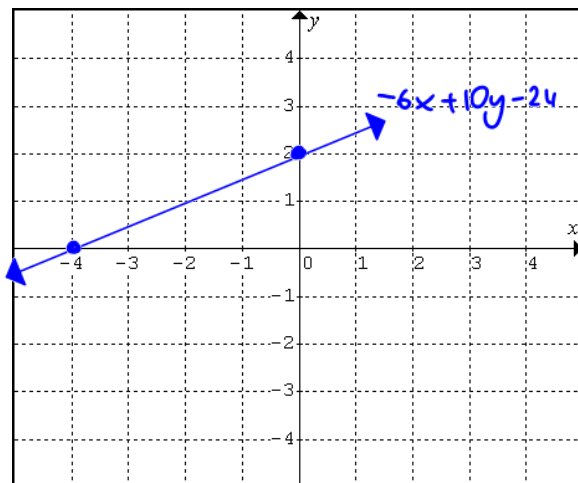
$$\begin{aligned} -6x + 10(0) - 24 &= 0 \\ -6x - 24 &= 0 \\ -6x &= 24 \\ \frac{-6x}{-6} &= \frac{24}{-6} \\ \boxed{x=-4} \end{aligned}$$

The x-intercept is (-4 , 0)

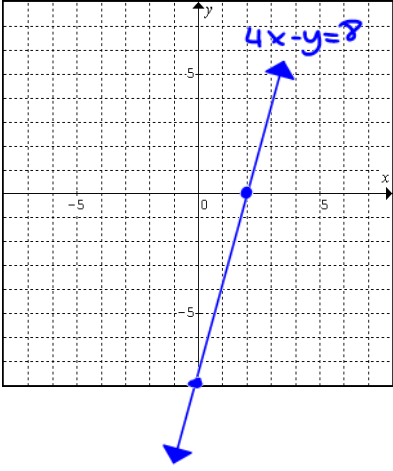
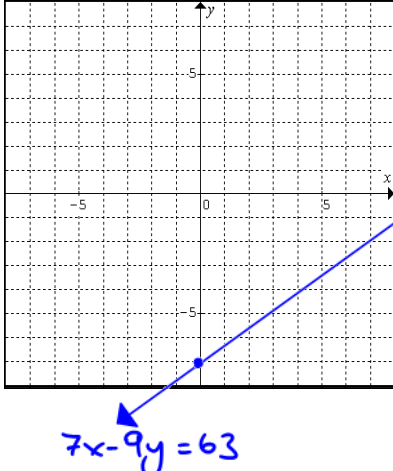
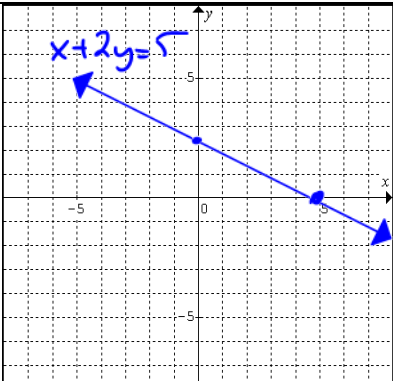
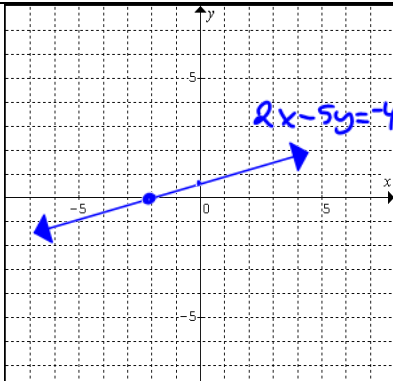
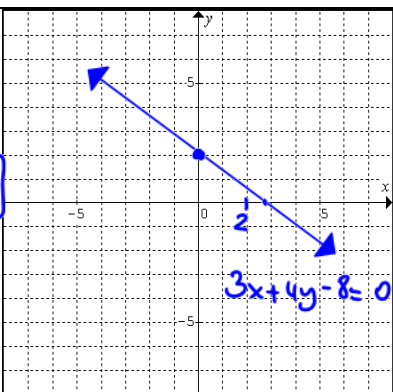
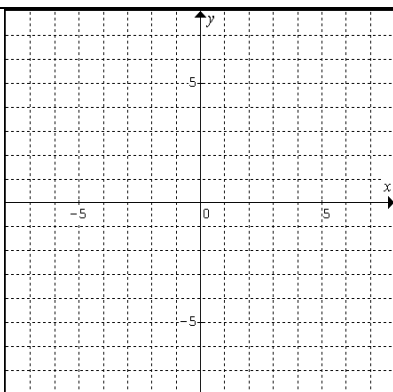
QUESTION 2: PART B

Graph the line $-6x + 10y - 24 = 0$ using the intercepts.

Plot the coordinates of each intercept and connect the two points to create your line.



Practice: Graphing with x-Intercepts and y-Intercepts

<p>a. $4x - y = 8$</p> <p>x-intercept: $y=0$ $4x = 8$ $x = 2$</p> <p>(<u>2</u>, <u>0</u>)</p> <p>y-intercept: $x=0$ $4(0) - y = 8$ $y = -8$</p> <p>(<u>0</u>, <u>-8</u>)</p>	
<p>b. $7x - 9y = 63$</p> <p>x-intercept: $y=0$ $7x - 9(0) = 63$ $x = 9$</p> <p>(<u>9</u>, <u>0</u>)</p> <p>y-intercept: $x=0$ $7(0) - 9y = 63$ $y = -7$</p> <p>(<u>0</u>, <u>-7</u>)</p>	
<p>c. $x + 2y = 5$</p> <p>x-intercept: $y=0$ $x + 0 = 5$ $x = 5$</p> <p>(<u>5</u>, <u>0</u>)</p> <p>y-intercept: $x=0$ $0 + 2y = 5$ $y = 2.5$</p> <p>(<u>0</u>, <u>2.5</u>)</p>	
<p>d. $2x - 5y = -4$</p> <p>x-intercept: $y=0$ $2x = -4$ $x = -2$</p> <p>(<u>-2</u>, <u>0</u>)</p> <p>y-intercept: $x=0$ $-5y = -4$ $y = 0.8$</p> <p>(<u>0</u>, <u>0.8</u>)</p>	
<p>e. $3x + 4y - 8 = 0$</p> <p>x-intercept: $y=0$ $3x - 8 = 0$ $\frac{3x}{3} = \frac{8}{3} \Rightarrow x = \frac{8}{3}$</p> <p>(<u>$\frac{8}{3}$</u>, <u>0</u>) $\approx 2\frac{2}{3}$</p> <p>y-intercept: $x=0$ $4y = 8$ $y = 2$</p> <p>(<u>0</u>, <u>2</u>)</p>	
<p>f. $4x - y = 9$</p> <p>x-intercept: $y=0$ $4x = 9$ $x = \frac{9}{4}$</p> <p>(<u>$\frac{9}{4}$</u>, <u>0</u>)</p> <p>y-intercept: $x=0$ $y = -9$</p> <p>(_____, <u>-9</u>)</p>	

ANSWERS: a. (2, 0) (0, -8) b. (9, 0), (0, -7) c. (5, 0), (0, 2.5) d. (-2, 0), (0, 0.8), e. ($\frac{8}{3}$, 0) (0, 2) f. ($\frac{9}{4}$, 0) (0, -9)