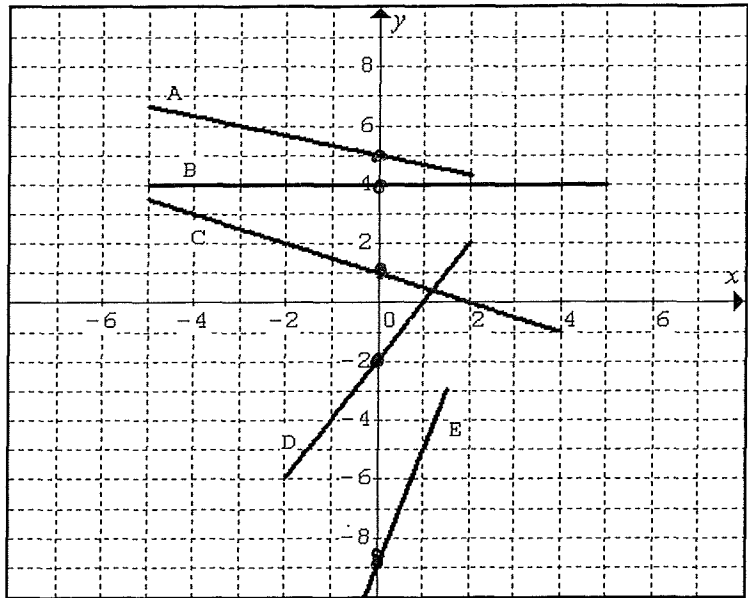DEFINITION: The y-intercept is the point on the y-axis where your line crosses or meets the y-axis. It is also the coordinate that has an x-value of ZERO. (0, y)

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 )
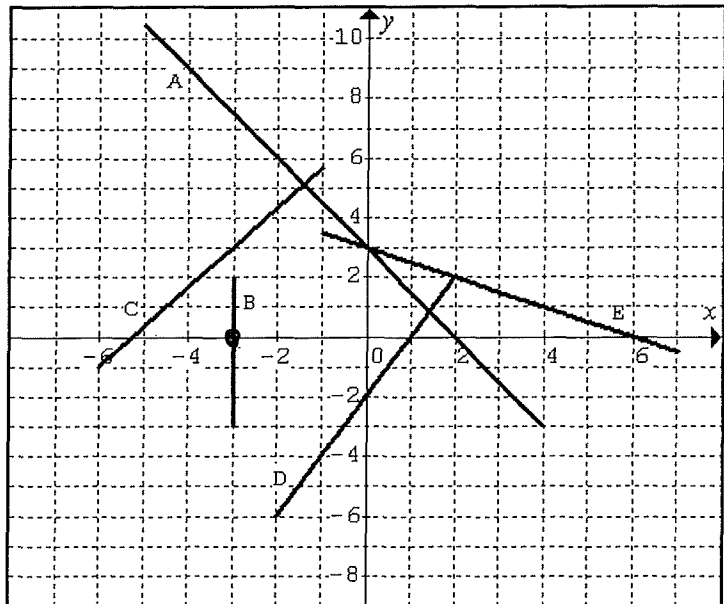
E) ( 0 , -9 )

What do all these points have in common?

x-coordinate is 0.

To find y-intercept, set x=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-coordinate is 0

To find x-intercept, set y=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.
1. Substitute x=0
2. Solve the equation for y

$$3(0) + 4y = 12$$
$$4y = 12$$
$$y = 3$$

The y-intercept is 3
As a point (0, 3)

To find the x-intercept, the y-value must be 0.
1. Substitute y=0
2. Solve the equation for y
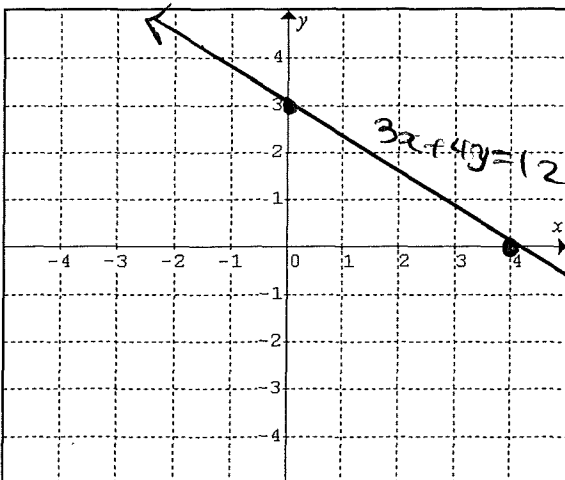
$$3x + 4(0) = 12$$
$$3x = 12$$
$$x = 4$$

The x-intercept is 4. As a point
(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.
1. Substitute x=0
2. Solve the equation for y

$$-6(0) + 10y - 24 = 0$$
$$10y = 24$$
$$y = 2.4$$

The y-intercept is ( 0 , 2.4 )

To find the x-intercept, the y-value must be 0.
1. Substitute y=0
2. Solve the equation for y
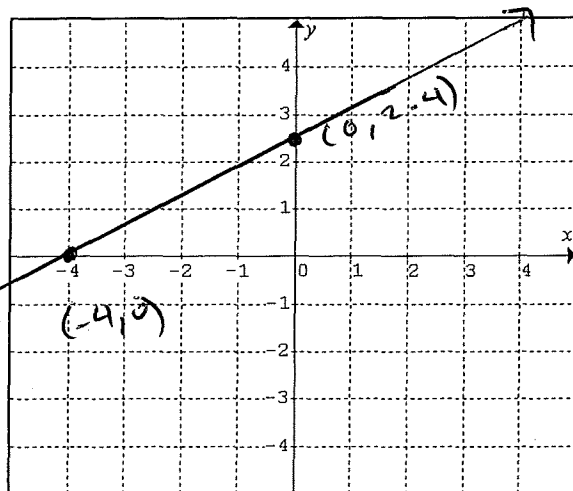
$$-6x - 24 = 0$$
$$\frac{-6x}{-6} = \frac{24}{-6} \Rightarrow x = -4$$

The x-intercept is ( , 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
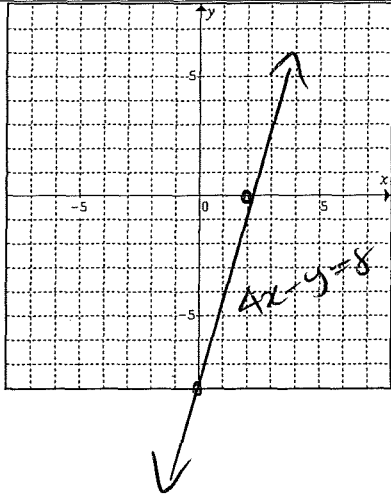
**a.** $4x - y = 8$

x-intercept:

$4x = 8$

$x = 2$

( __2__ , __0__ )

y-intercept:

$-y = 8$

$y = -8$

( __0__ , __-8__ )

**b.** $7x - 9y = 63$

x-intercept:

$7x = 63$

$x = 9$

( __9__ , __0__ )

y-intercept:

$-9y = 63$

$y = -7$

( __0__ , __-7__ )
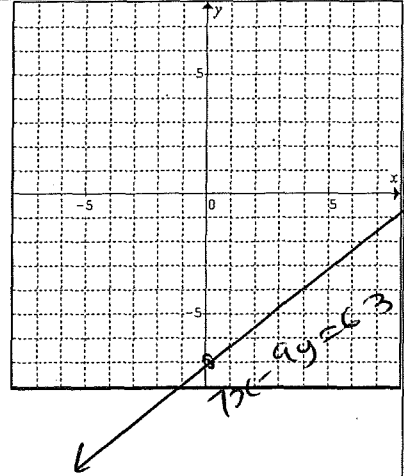
**c.** $x + 2y = 5$

x-intercept:

$x = 5$

( __5__ , __0__ )

y-intercept:

Set $x = 0$

$2y = 5$

$y = 2.5$

( __0__ , __2.5__ )
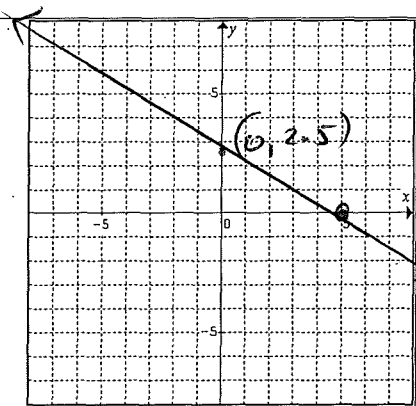
**d.** $2x - 5y = -4$

x-intercept:

$2x = -4$

$x = -2$

( __-2__ , __0__ )

y-intercept: Set $x = 0$

$-5y = -4$

$y = 0.8$

( __0__ , __0.8__ )
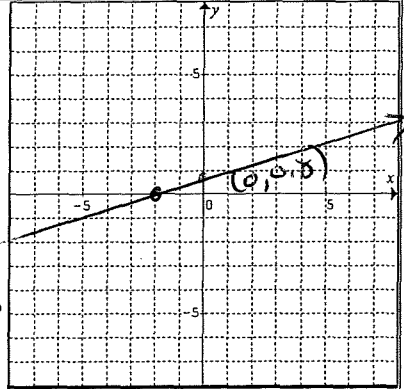
**e.** $3x + 4y - 8 = 0$

x-intercept:

$3x = 8$

$x = 8/3 \doteq 2.7$

( __2.7__ , __0__ )

y-intercept:

$4y = 8$

$y = 2$

( __0__ , __2__ )
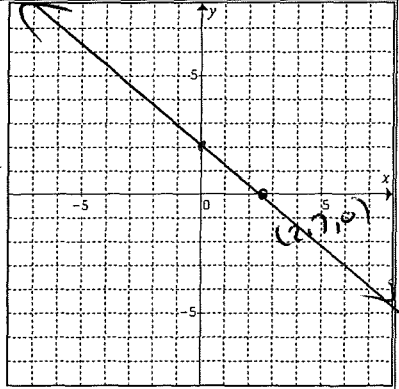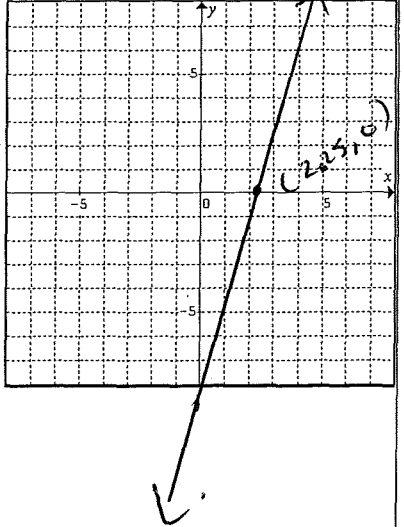
**f.** $4x - y = 9$

x-intercept:

$4x = 9$

$x = 9/4 = 2.25$

( __2.25__ , __0__ )

y-intercept:
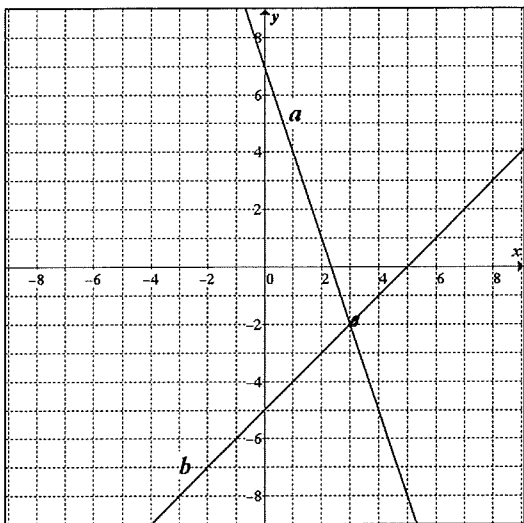
$-y = 9$

$y = -9$

( __0__ , __-9__ )

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)

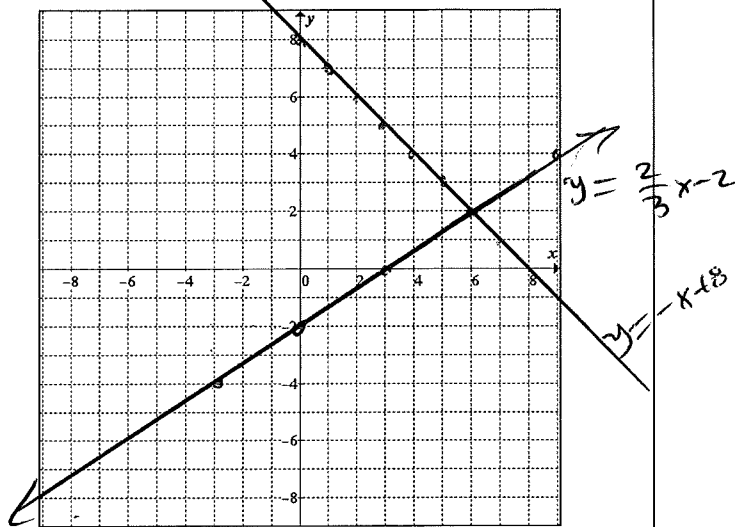Complete: Textbook p.319 # 1, 3aceg, 6, 11

1. Give:

   a) equation of line *a*: $y = -3x + 7$

   b) equation of line *b*: $y = x - 5$

   c) coordinates of their point of intersection: $(3, -2)$



2. Graph the lines $y = \frac{2}{3}x - 2$ and $y = -x + 8$.

   State the coordinates of their point of intersection: $(6, 2)$

   Check your answer in your notebook using proper **LS=** and **RS=** form.



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

$y = -x + 8$

3. Complete the tables of values for:

   $2x + 5y = 10$ and $2x + y + 6 = 0$,

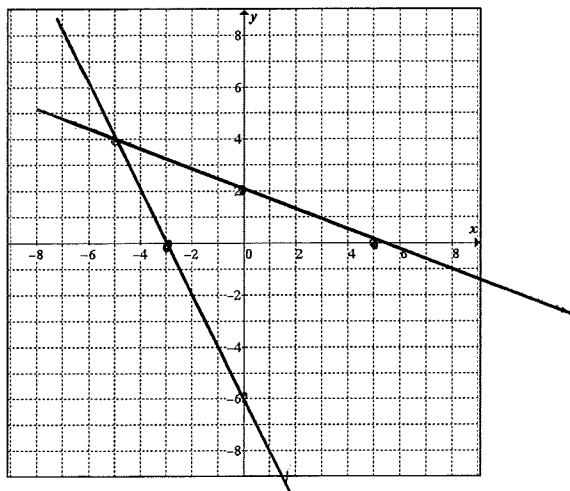| $x$ | $y$ |
|-----|-----|
| 0   | 2   |
| 5   | 0   |

| $x$ | $y$ |
|-----|-----|
| 0   | -6  |
| -3  | 0   |

$2(0) + 5y = 10$
$5y = 10$
$y = 2$

$2x = 10$
$x = 5$

$2(0) + y + 6 = 0$
$y + 6 = 0$
$y = -6$

then graph the lines and state the point of intersection: $(-5, 4)$

Check your answer in your notebook using proper **LS=** and **RS=** form.



4. Complete the tables of values for:

   $y = -3x - 6$ and $y = -2x - 2$,

| $x$ | $y$ |
|-----|-----|
| -2  | 0   |
| -1  | -3  |
| 0   | -6  |

| $x$ | $y$ |
|-----|-----|
| -2  | 2   |
| 0   | -2  |
| 3   | -8  |

then graph the lines and state the point of intersection: $(-4, 6)$



*a*    *b*