

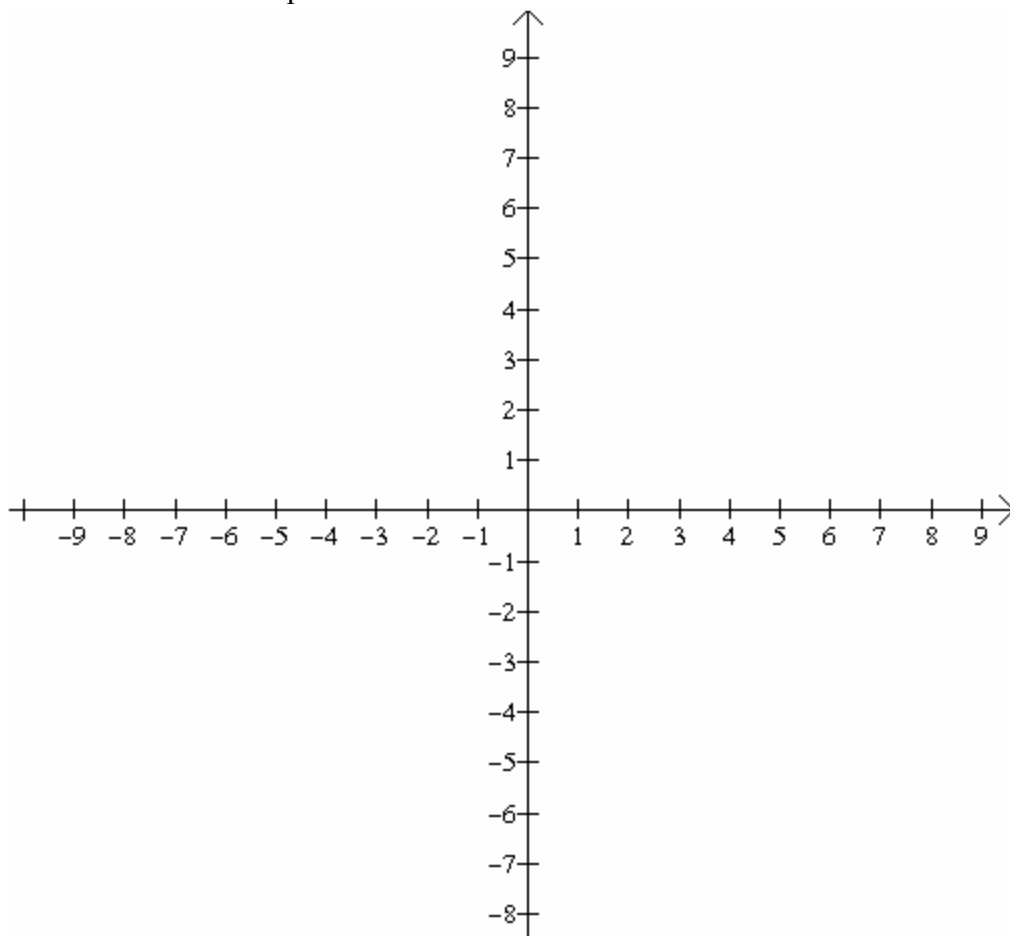
**Math 1313**

**Section 1.2: Graphs of Linear Equations**

In this section, we'll review plotting points, slope of a line and different forms of an equation of a line.

**Graphing Points and Regions**

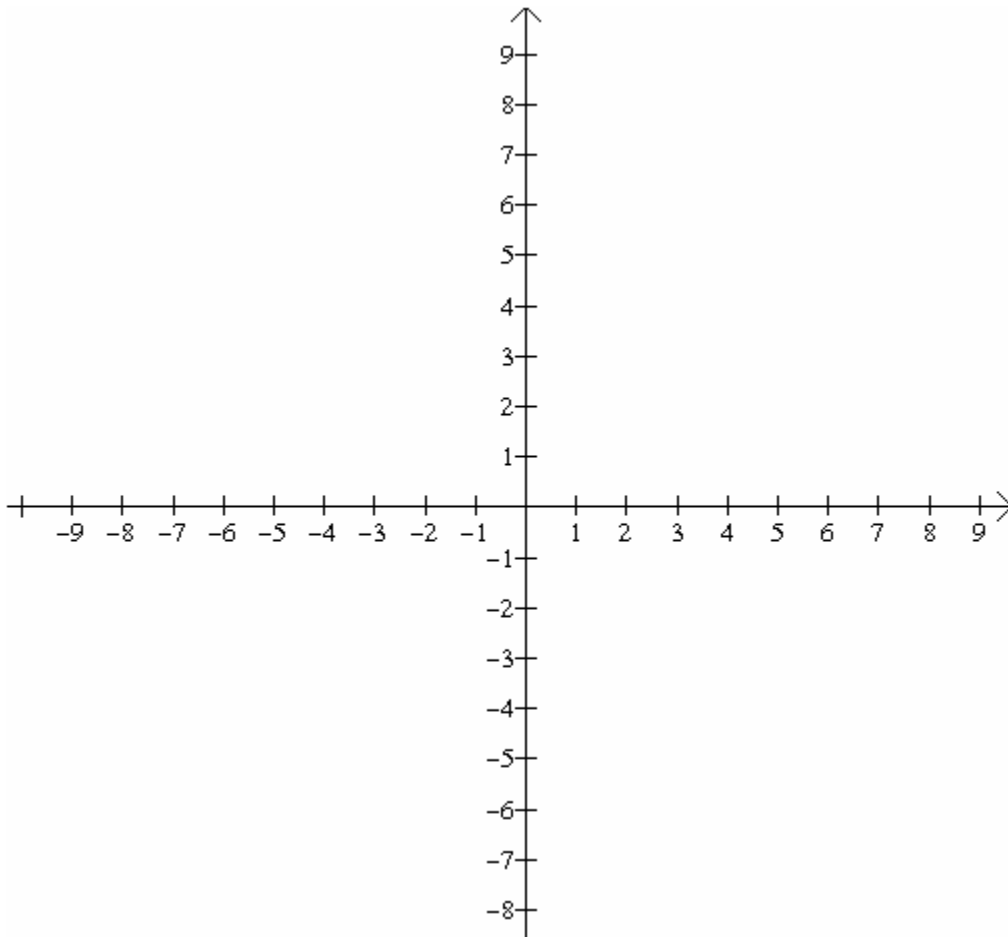
Here's the coordinate plane:



As we see the plane consists of two perpendicular lines, the **x-axis** and the **y-axis**. These two lines separate them into four regions, or **quadrants**. The pair,  $(x, y)$ , is called an **ordered pair**. It corresponds to a single unique point in the coordinate plane. The first number is called the **x coordinate**, and the second number is called the **y coordinate**. The ordered pair  $(0, 0)$  is referred to as the **origin**. The **x coordinate** tells us the horizontal distance a point is from the origin. The **y coordinate** tells us the vertical distance a point is from the origin. You'll move right or up for positive coordinates and left or down for negative coordinates.

**Example 1:** Plot the following points.

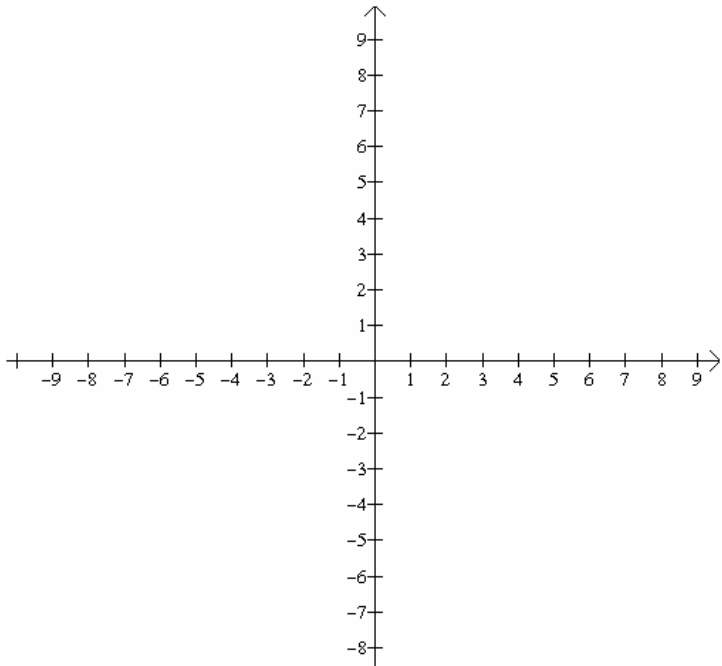
- A.  $(-2,6)$
- B.  $(3,-4)$
- C.  $(5,3)$
- D.  $(-7,-3)$



**Slope of a Line**

If  $(x_1, y_1)$  and  $(x_2, y_2)$  are any two distinct points on a non vertical line  $L$ , then the slope  $m$  of  $L$  is given by

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$



When the  $m = 0$ , you have a **horizontal line**.

When the  $m = \text{undefined}$ , you have a **vertical line**.

**Example 2:** Find the slope between the points.

a.  $(4, -8)$  and  $(-3, 6)$

b.  $(1, 4)$  and  $(-3, 4)$

c.  $(-1, -7)$  and  $(-1, 12)$

### Equations of Lines

Every Straight line in the  $xy$ -plane can be represented by an equation involving the variables  $x$  and  $y$ . The first from we will be looking at **Point -Slope Form**

An equation of the line that has the slope  $m$  and passes through the point  $(x_1, y_1)$  is given by

$$y - y_1 = m(x - x_1)$$

### Slope Intercept Form

When an equation is left in the form of  $y = mx + b$ , where  $m$  is the slope and  $b$  is the  $y$ -intercept of the line.

**General Equation of a Line** is in the form  $Ax + By + C = 0$

**Example 3:** Find the equation of the line that pass through  $(4,7)$  and  $(-4,-9)$

**Example 4:** Write the equation of a line that has slope  $-4/3$  and passes through  $(6, -8/3)$