

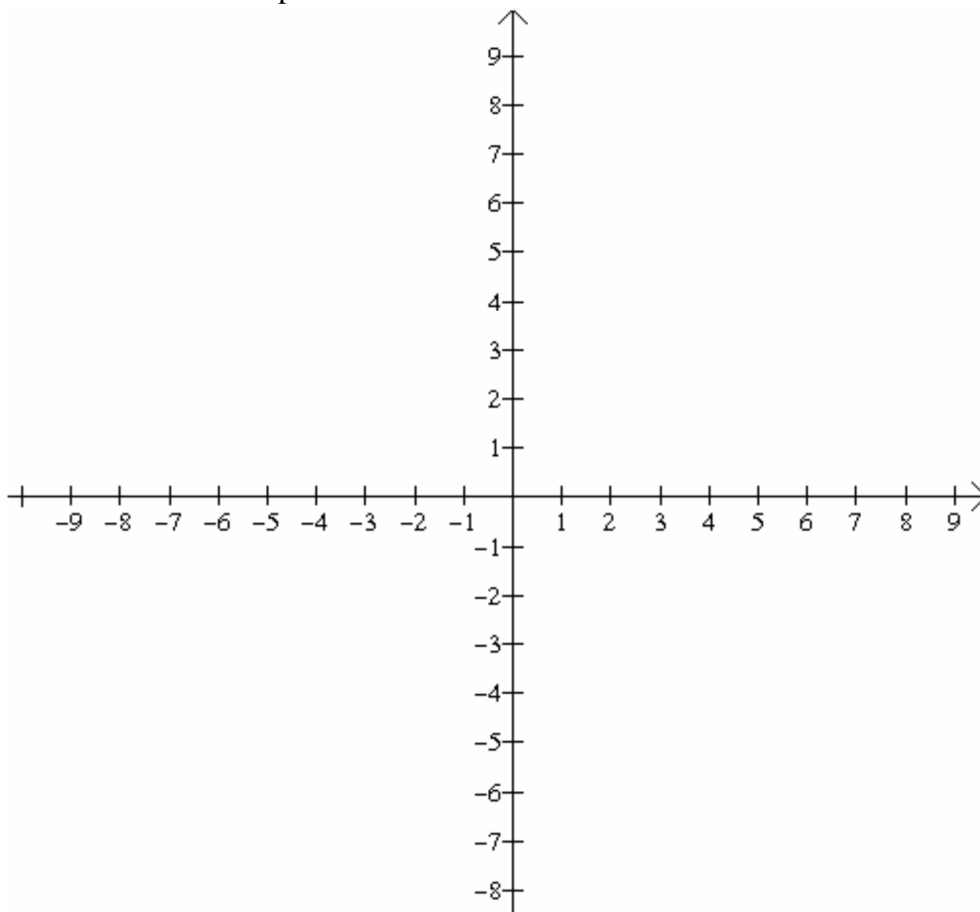
Math 1313

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

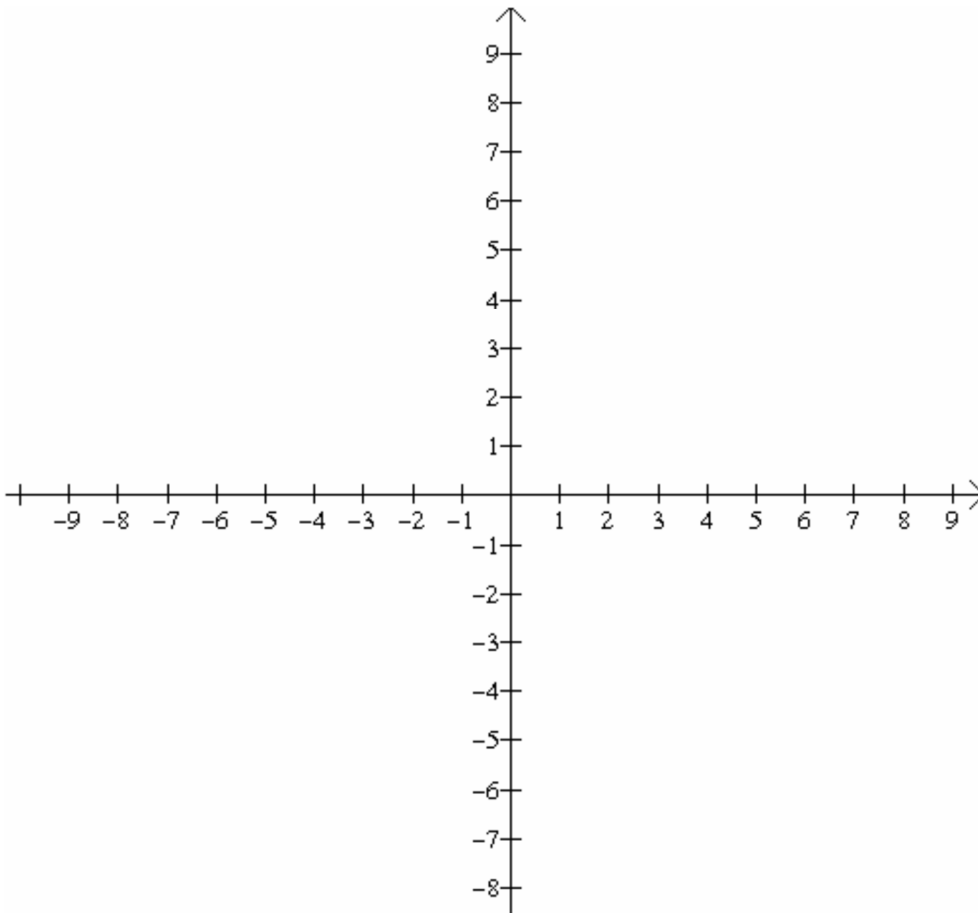
Here's the coordinate plane:



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.

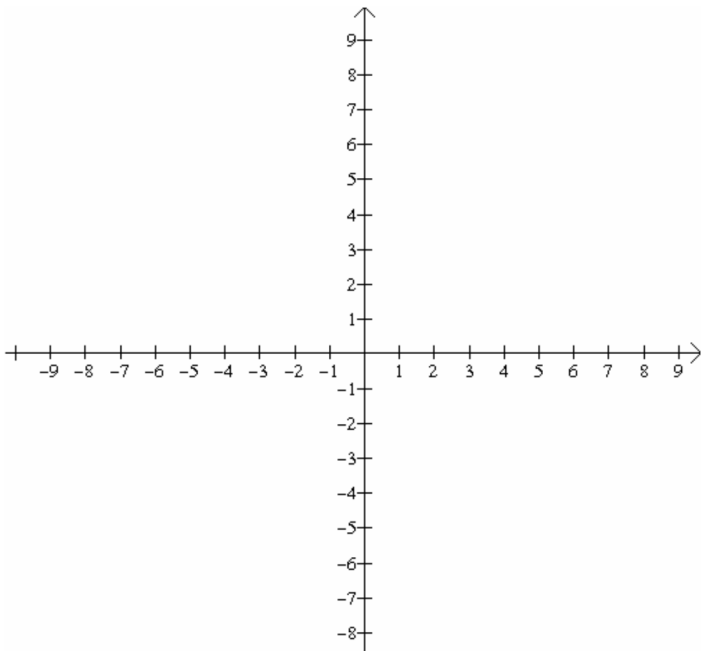
- A. $(-2,6)$
- B. $(3,-4)$
- C. $(5,3)$
- D. $(-7,-3)$



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 $(-3, 4)$

Math1313 Section 1.2

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 $(6, -8/3)$