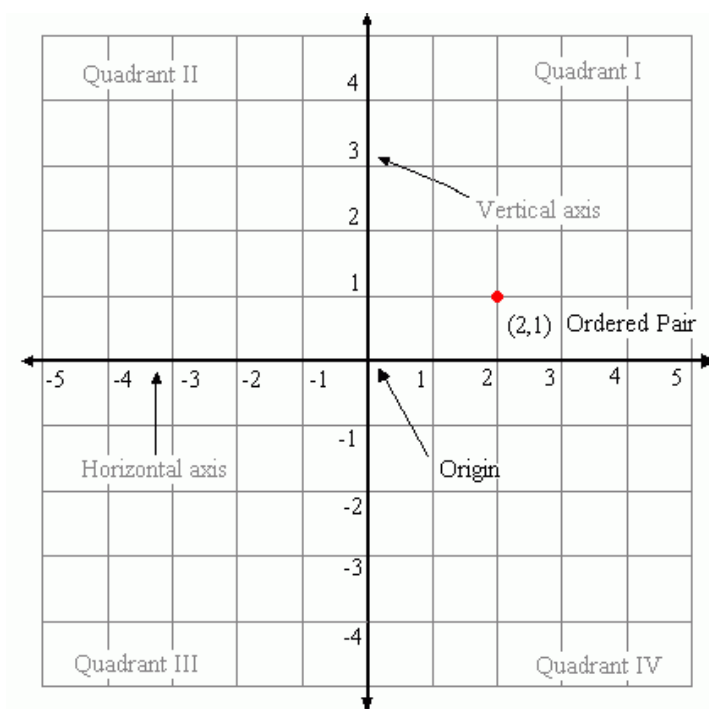


The Rectangular Coordinate System

Objective A -To Graph Points in a Rectangular Coordinate System

A **rectangular coordinate system** is created by two number lines that cross each other. One goes left to right and the other up and down. The place where the two lines intersect is called the **origin**. The two lines are called **coordinate axes**; usually, just called **axes**. The axes form a **plane**, usually a large flat area (a sheet of paper for example). Each of the four areas formed by the intersecting of the two lines are called **quadrants**. A pair of numbers called an **ordered pair** can identify any point on the plane. The first number on the plane, which is part of the left to right part of the number line, is called the **abscissa**. The second number, which is part of the up and down number line, is called the **ordinate**. The two numbers in the ordered pair are the **coordinates** of the point. The abscissa is the **first coordinate**, and the ordinate is the **second coordinate** of the point.



Objective B: To determine ordered-pair solutions of an equation in two variables.

The rectangular coordinate system may also be called the **xy-coordinate** system, because the horizontal axis is often labeled as the **x** axis and the vertical axis is labeled as the **y** axis. This means that points on the system are in the form

$$(x, y).$$

Solutions for equations in two variables may be found by substituting a value for one variable after isolating the other.

EXAMPLE: Is $(-3, 7)$ a solution of $Y = -2x + 1$?

$$Y = -2X + 1$$

$$7 \stackrel{?}{=} -2(-3) + 1 \quad \text{Substitute in the values for } x \text{ and } y$$

$$7 \stackrel{?}{=} 6 + 1$$

$$7 = 7$$

Therefore, $(-3, 7)$ is a solution of $Y = -2X + 1$

There exist many other possible solutions to this problem. When they are graphed they will make a line composed of a series of points.

NOTE: DO NOT “CONNECT THE DOTS” UNLESS YOU ARE TOLD TO CONSIDER ALL OF THE VALUES BETWEEN TWO POINTS !!

EXAMPLE: Graph the ordered pair solutions of $y = -2x + 1$ when $x = -2, -1, 0, 1,$ and 2 .

Substitute the values of x into the equation to generate values of y to create the set of ordered pairs.

x	$y = -2x + 1$	y	(x, y)
-2	$y = -2(-2) + 1$	5	(-2, 5)
-1	$y = -2(-1) + 1$	3	(-1, 3)
0	$y = -2(0) + 1$	1	(0, 1)
1	$y = -2(1) + 1$	-1	(1, -1)
2	$y = -2(2) + 1$	-3	(2, -3)

