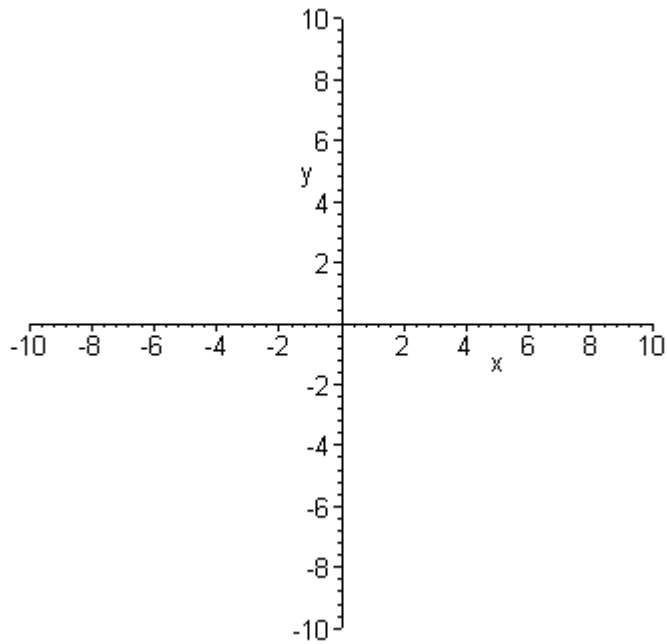


## Section 2.1 The Cartesian Coordinate System

Find the following on the rectangular coordinate system below: Origin,  $x$ -axis,  $y$ -axis, Quadrant I, Quadrant II, Quadrant III, Quadrant IV



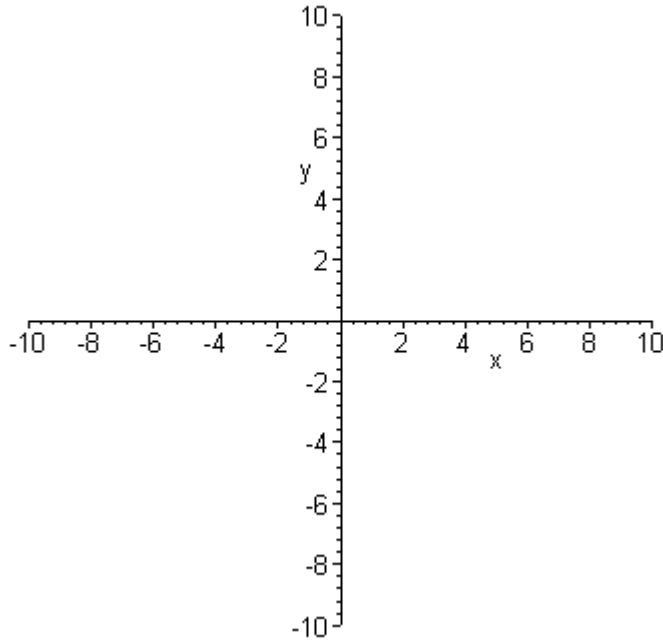
What does it mean to solve the equation below?

$$2x + y = 5$$

How would you show all of the solutions to the equation

$$2x + y = 5$$

Draw the graph of the equation  $2x + y = 5$  to model all of the solutions to the equation.



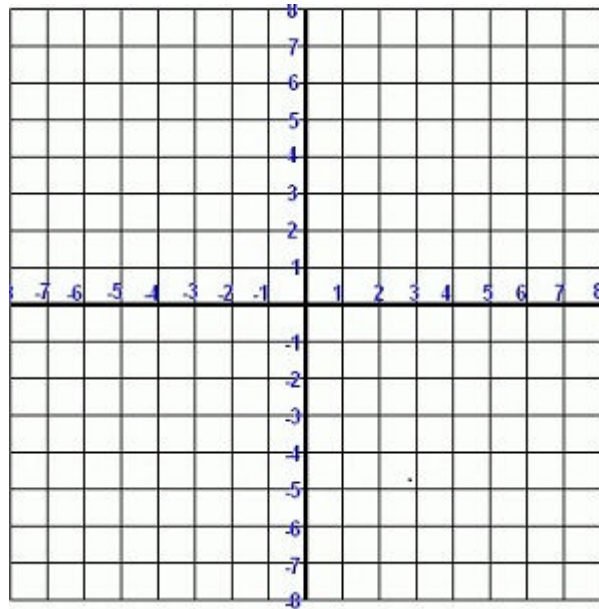
### **Big Idea!!**

**The graph of any equation is the set of solutions to the equation.**

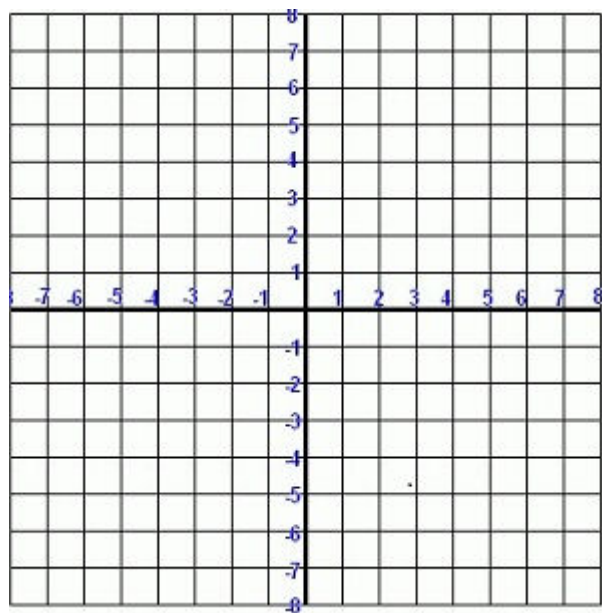
*-When you are asked to graph an equation then you are being asked to give a visual representation of the solutions to the equation.*

*-When you view a graph of an equation you are viewing the solutions to the equation.*

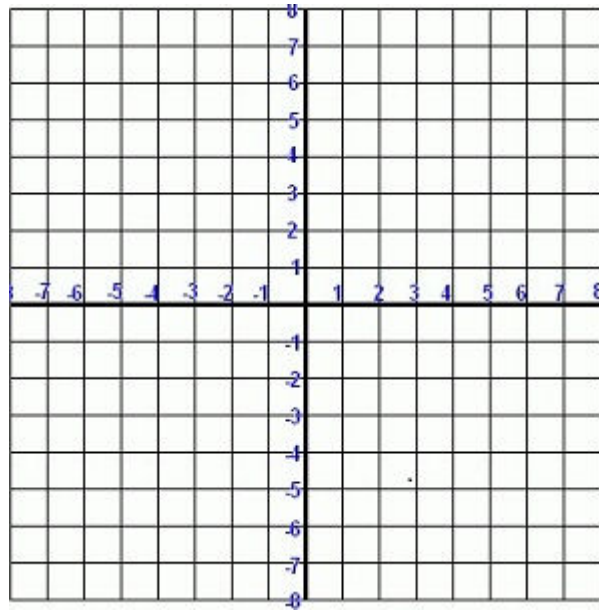
Draw a rough sketch of the graph of the equation  
 $\frac{1}{2}x^2 - x - y = 0$



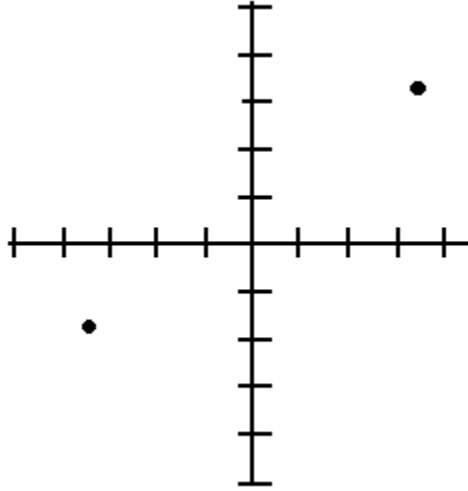
Draw a rough sketch of the graph of the equation  
 $x^2 + y^2 - 10y = 0$



Draw a rough sketch of the graph of the equation  
 $x = 3$



Find the distance between the two given points:



Distance Formula:

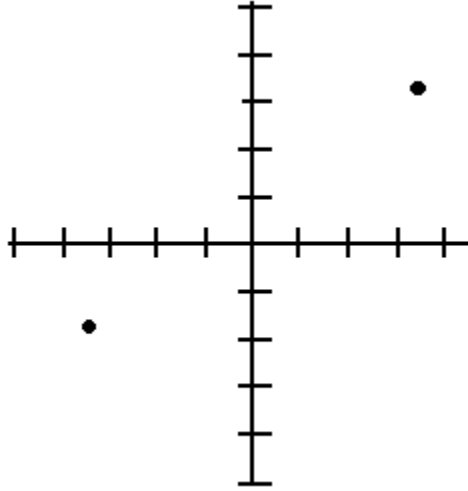
If point  $A$  has Cartesian coordinates  $(x_1, y_1)$  and point  $B$  has Cartesian coordinates  $(x_2, y_2)$  then the distance between point  $A$  and  $B$  is given by:

$$\text{distance} = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

Example:

Find the distance between the points whose Cartesian coordinates are  $(3, -1)$  and  $(2, \frac{5}{2})$ .

Find the midpoint of two given points:



Midpoint Formula:

If point  $A$  has Cartesian coordinates  $(x_1, y_1)$  and point  $B$  has Cartesian coordinates  $(x_2, y_2)$  then the midpoint is given by:

$$\text{Midpoint} \left( \frac{x_1+x_2}{2}, \frac{y_1+y_2}{2} \right)$$

Example:

Find the midpoint of  $(3, -1)$  and  $(2, \frac{5}{2})$ .