

LINEAR equations in two variables

A Linear equation is an equation of the form

$$Ax + By = C$$

Notice that this equation has 2 variables:
 x and y .

consider the equation

$$2x + y = 5$$

here the A term is 2

the B term is 1

the C term is 5

This equation has an infinite number of solutions and these solutions are expressed as **ORDERED PAIRS** written in the form (x, y) .

Order is very important, hence the name **ORDERED** pairs. The x is **ALWAYS FIRST** and the y is **ALWAYS second**.

To find some solutions to the equation

$$2x + y = 5$$

We make a chart:

x	y
2	

to fill out the "y" column, we substitute 2 for x and solve for y.

If $x=2$, we have

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

$$4 + y = 5$$

$$y = \underline{\quad}$$

So we can fill out the chart:

x	y
2	1

As an ordered pair, we write this solution $(2, 1)$ indicating that when $x=2$, $y=1$.

Consider the equation

$$x + y = 3$$

To find ordered pairs that satisfy this equation we set up a chart:

x	y
2	
1	
0	
-1	

← fill in the corresponding y values

Note: We can choose any value for x and find its corresponding y-value, but it is helpful to choose small, whole numbers to make the calculations a bit easier.

example 1: Find three solutions to the equation

$$2x - y = 4$$

x	y

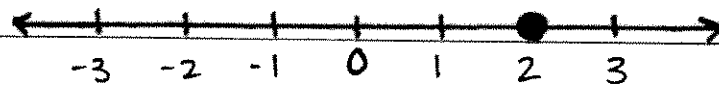
Plotting solutions:

consider the equation

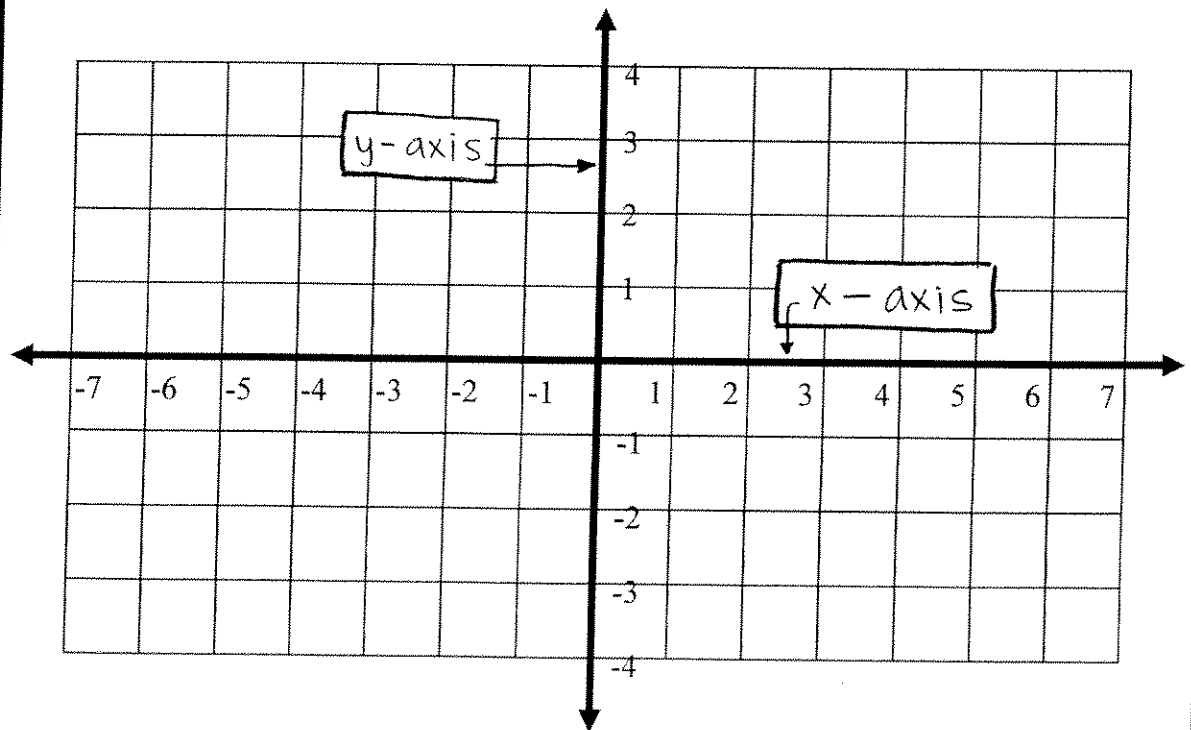
$$x + 3 = 5$$

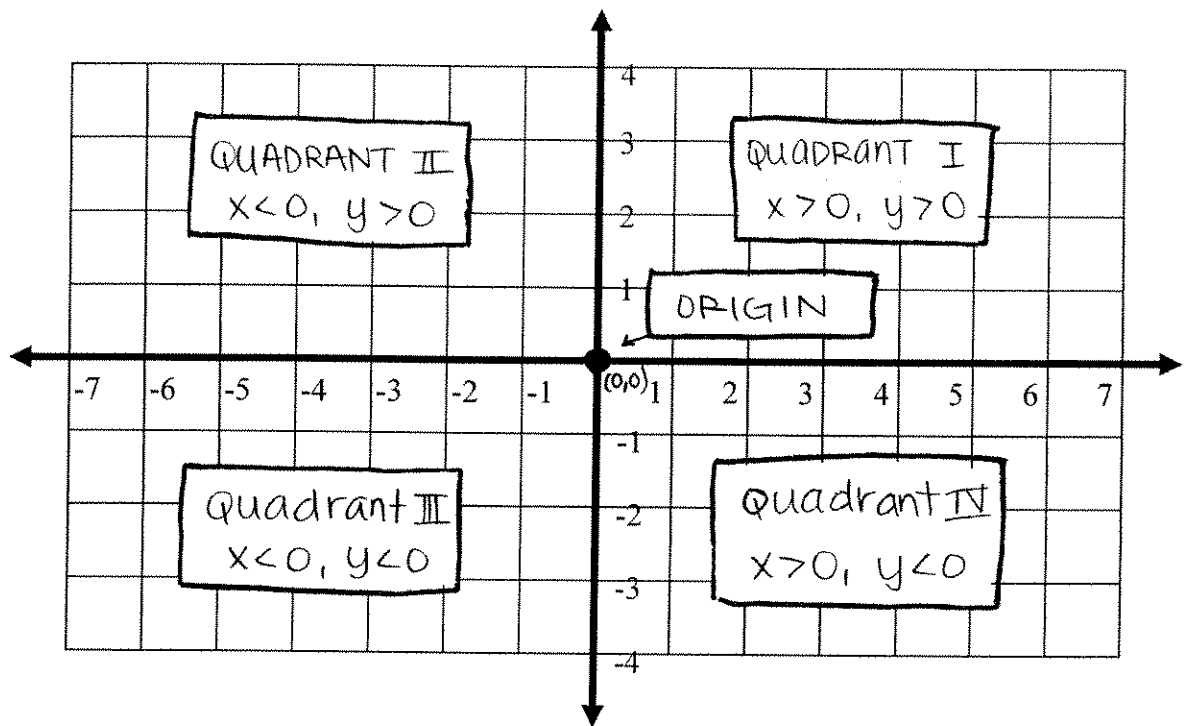
The solution to this **SINGLE** variable equation is $x = 2$.

We can plot this solution on a number line:



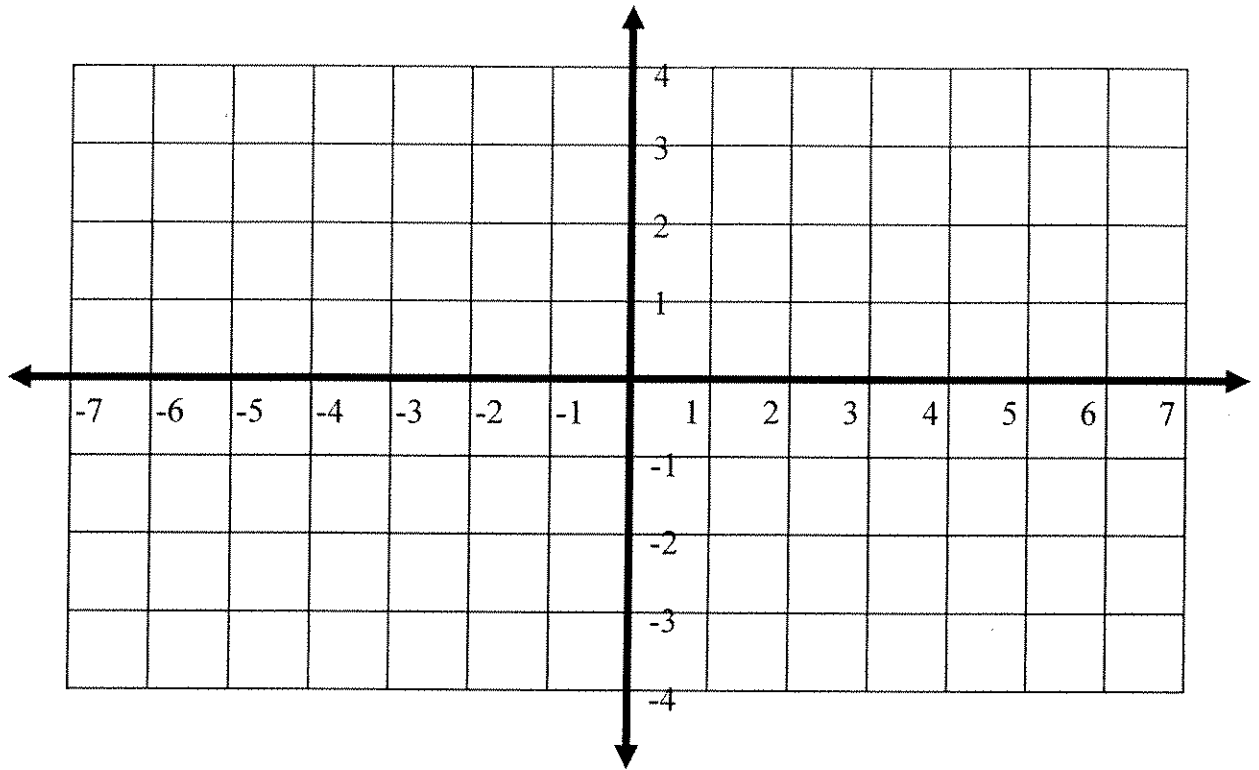
Since **Linear** equations have **TWO** variables, we require **TWO** number lines to plot solution points.





This coordinate system is known as the cartesian coordinate system

- The point $(0, 0)$ is called the **ORIGIN** and denotes the solution $x=0$ when $y=0$.
- The cartesian coordinate system is made up of **4** quadrants labeled above.



EXAMPLE 2:

PLOT the following points
on the graph above:

A) $(3, 2)$

B) $(-2, 1)$

C) $(6, -2)$

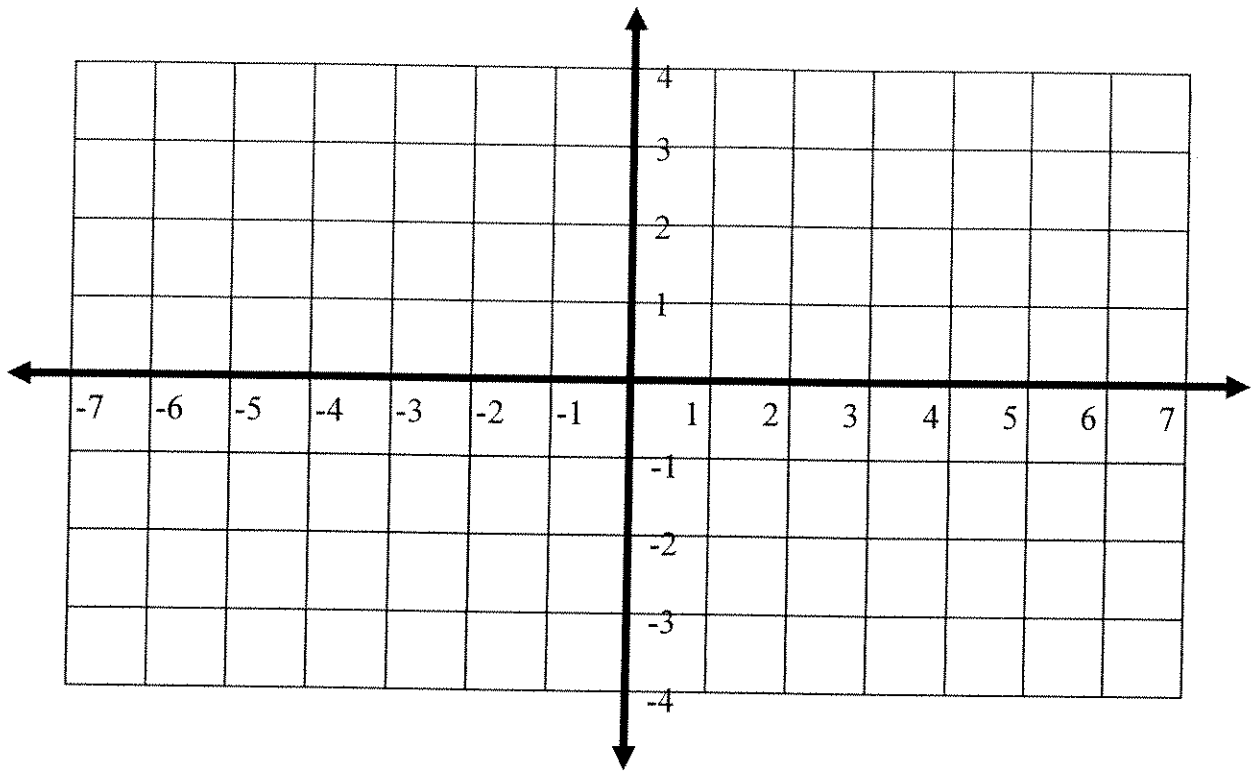
D) $(-4, -3)$

E) $(0, 0)$

F) $(0, 3)$

G) $(-3, 0)$

H) $(6, 0)$



4. Plot the following points on the graph above:

A) $(-1, 1)$

B) $(4, 3)$

C) $(7, -2)$

D) $(-4, -2)$

e) $(0, -2)$

f) $(-3, 0)$