

**MTH 143 Section 1.2 – Functions**

An equation or inequality in two variables defines a relation between the variables.

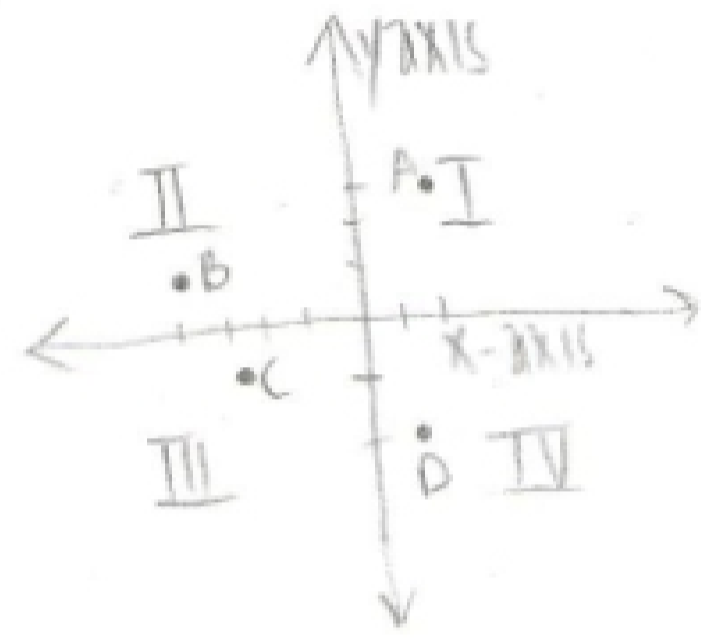
For example:  $y = 2x - 5$

A relation can also be defined as a set of ordered pairs.

For example:  $(1, -3)$   $(2, -1)$   $(7, 9)$

An ordered pair  $(a, b)$  of real numbers represents a point on a rectangular or Cartesian plane, where the 1<sup>st</sup> coordinate,  $a$ , is also called the X-coordinate and the 2<sup>nd</sup> coordinate,  $b$ , is also called the Y-coordinate.

The Cartesian plane is created by the X-axis and the Y-axis. It is broken into four quadrants. The origin is the intersection of the axes and has ordered pair  $(0, 0)$ .



Plot the ordered pairs  $A(2, 3)$   $B(-4, 1)$   $C(-3, -1)$   $D(1, -2)$

The graph of an equation is a picture formed by plotting the solution points of the equation on the Cartesian plane.

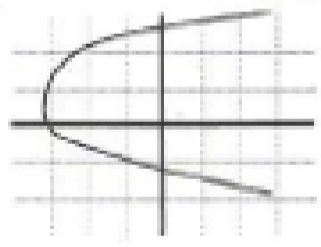
The set of inputs (x-coordinates) is called the domain and the set of outputs (y-coordinates) is called the range.

A function is a relation between two sets such that each element of the domain corresponds to exactly one element of the range.

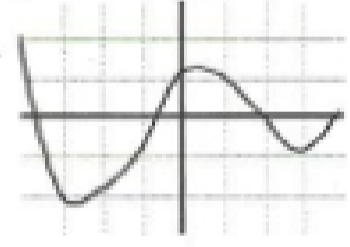
Vertical Line Test (To determine if a graph is the graph of a function.)

If every vertical line intersects the graph of a relation in no more than 1 point, then relation is a function.

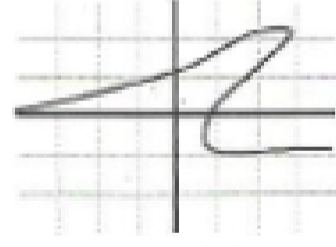
Do the following graphs represent functions?



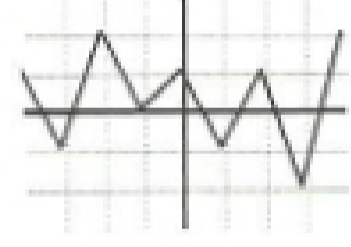
NO



YES



NO



YES

**Function Notation**

$y = f(x)$  is read " $y$  is a function of  $x$ " or simply " $y$  equals  $f$  of  $x$ ". Thus,  $y$  represents the value of the function @  $x$ .

Consider the function  $f(x) = 3x^2 - 2x$

Find  $f(3)$

Thus, 21 is the functional (or  $y$ ) value when  $x$  is 3.