Functions : Basics

In the previous reading we have learnt about relations. In this section we will learn a special type of relation called function. It is one of the most important concepts in mathematics.

We can virtualise a function as a rule which produces new elements out of some given elements. There are many terms such as map or mapping used to denote a function.

Definition :- A relation f from a set A to a set B is said to be a function if every element of set A has one and only one image in set B.

In other words a function f is the relation from a non-empty set A to a non-empty set B such that the domain of f is A and not two distinct order pairs in f have the same first element.

If f is a function from A to B and (a,b) $\in$ f then f (a) = b where b it's called the image of a under f and a is called the pre-image of b under f.

Some functions and their graphs:-

1.   **Identity function** :- let R be the set of real numbers. Define the function f : R $\rightarrow$ R by y = f(x) = c   x$\in$R The graph is a straight line. It passes through the origin.

f(x) = x
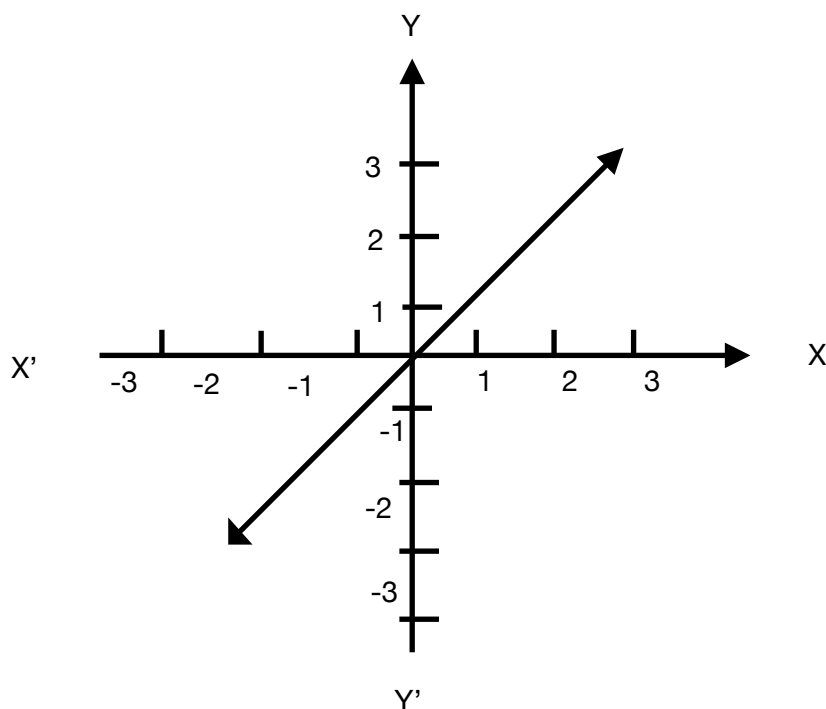
2.   **Constant function** : define the function $f : R \to R$ by $y = f(x) = c$ $x \in R$. Here domain of f is R and range is {c}.

f(x) = 3
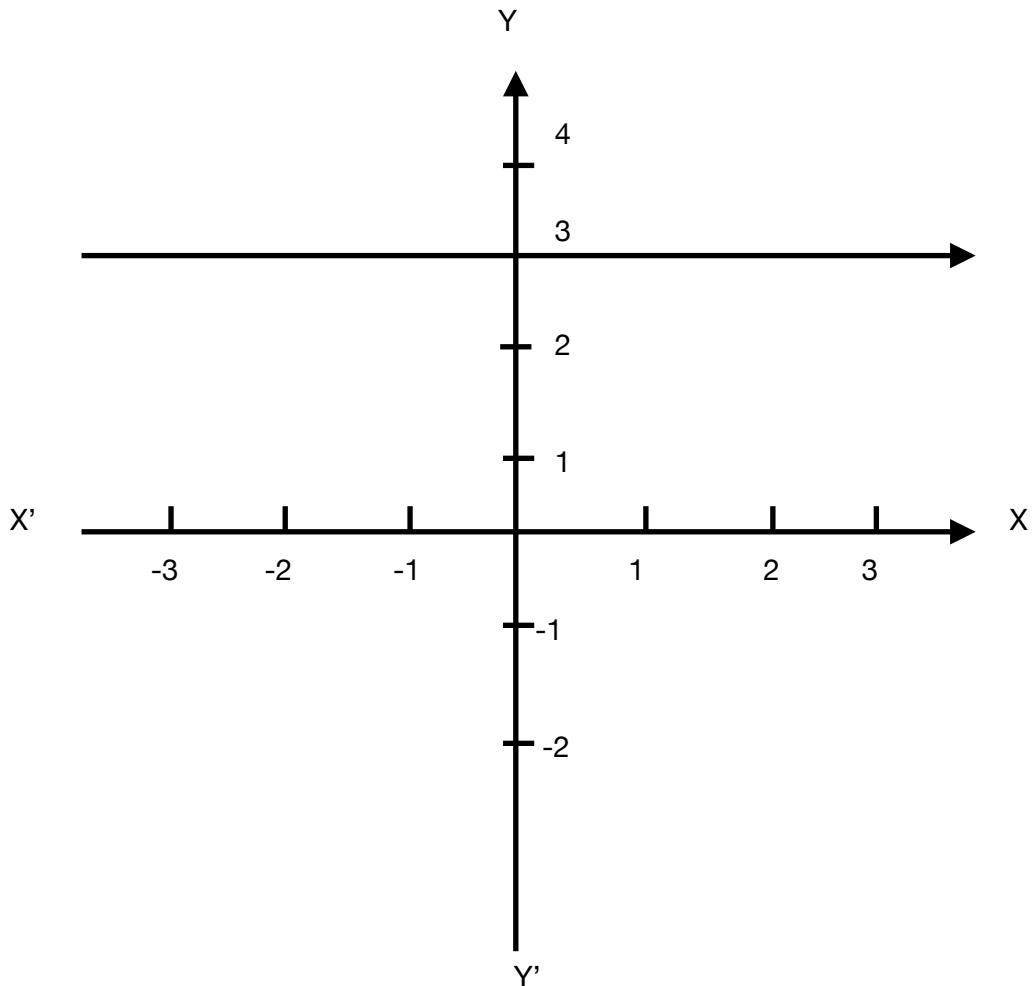
3.   **Polynomial function** :- A function $f : R \to R$ is said to be polynomial function for each x in R, $y = f(x) = a_0 + a_1x + a_2x^2 + \ldots\ldots..+ a_nx^n$ where n is a non- negative integer and $a_0 , a_1, a_2, \ldots\ldots.. a_n \in R$

$f(x) = x^2$

Domain of f = {x : x $\in$ R}
Range of f = {x : x $\geq$ 0 ,x $\in$ R}

The graph of f is given by

$f(x) = x^2$