What is a function (/ˈfaŋkʃən/) ?

A function f from S to T, where S and T are non-empty sets, is a rule that associates with each element of S (the domain) a unique element of T (the codomain). Thus is is the same thing as a mapping. The word 'function' tends to be used when the domain S is the set $\mathbb{R}$ of real numbers, or some subset of $\mathbb{R}$, and the codomain T is $\mathbb{R}$ (see Real function). The notation $f : S \to T$, read as "f: from S to T", is used. If $x \in S$, then $f(x)$ is the image of x under f. The subset of T consisting of those elements that are images of elements of S under f, that is, the set $\{y \mid y = f(x), for\ some\ x\ in\ S\}$, is the range of f. If $f(x) = y$, it is said that f maps x to y, written $f : x \to y$. If the graph of f is taken to be $y = f(x)$, it may be said that y is a function of x. When $x = a$, $f(a)$ is the corresponding value of the function.

Domain: the set of all possible inputs(arguments) -- also called the set of **pre-images**
Range: The set of all possible outputs(values) or the set of **images.   T is also called the range.**

Example :

$f(x) = \frac{x}{2}$ ("f of x is x divided by 2") is a function, because for every value of "x" you get another value "$x \div 2$" so :

$f(2) = 1$
$f(16) = 8$
$f(-10) = -5$

English Corner

100 Definition : A function is a process from a set of values called the domain to a set of values called the range.
Each number x in the domain is called the input. Each number y in the range is called the output or the image of x.

1. Function defined by a table of values
Sketch a graph of the function defined by the following table of values. Have all pupils the same graph ? Why ?
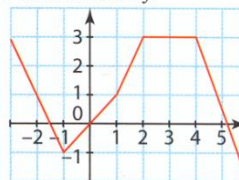
x	−4	−1,5	0	1	2,6	6
$f(x)$	7	−1	−1	3	5,5	−3,1

2. Function defined by a graph
The diagram shows the graph of a function f.
What is the domain of f? What is the image of $x = -2$?
Find values of x when $f(x) = 1$; when $f(x) = 3$.

3. Function defined by an algebraic formulae
$f(x) = \dfrac{x}{x-1}$. Give the output when $x = 0$; $x = \dfrac{1}{2}$; $x = -1$; $x = \sqrt{2}$.