



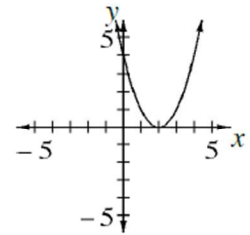
# METHODS AND MEANINGS

## Functions

A relationship between inputs and outputs is a **function** if there is no more than one output for each input. Functions are often written as  $y =$  some expression involving  $x$ , where  $x$  is the input and  $y$  is the output. The following is an example of a function.

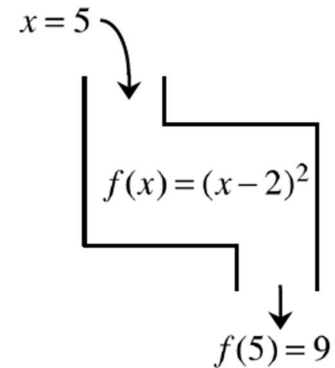
$$y = (x - 2)^2$$

$x$	-2	-1	0	1	2	3	4	5
$y$	16	9	4	1	0	1	4	9



In the example above the value of  $y$  depends on  $x$ , so  $y$  is also called the **dependent variable** and  $x$  is called the **independent variable**.

Another way to write a function is with the notation " $f(x) =$ " instead of " $y =$ ". The function named " $f$ " has output  $f(x)$ . The input is  $x$ .



In the example at right,  $f(5) = 9$ . The input is 5 and the output is 9. You read this as, "f of 5 equals 9."

The set of all inputs for which there is an output is called the **domain**. The set of all possible outputs is called the **range**. In the example above, notice that you can input any  $x$ -value into the equation and get an output. The domain of this function is "all real numbers" because any number can be an input. The outputs are all greater than or equal to zero, so the range is  $y \geq 0$ .

$x^2 + y^2 = 1$  is not a function because there are two  $y$ -values (outputs) for some  $x$ -values, as shown below.

$$x^2 + y^2 = 1$$

$x$	-1	0	0	1
$y$	0	-1	1	0

