

## 1. Functions

2. One way to think of a mathematical function is as a calculation box. We put a number into the box, something happens inside the box to compute the answer, which is the output.

The standard practice for mathematical functions is that  $x$  is a typical input to a function and  $y$  is the typical output. The function may be named by a letter or abbreviation. We often associate the function name, like  $f$ , with the equation  $y = f(x)$ .

Here is an example, perhaps  $f$  is the function box that adds 3.  $f$  takes any input and adds 3 to produce the output.

Here is another function, called  $g$ , which squares the input. If we put in 4, we get the answer 16. If we put in -4, we also get the answer 16. It is OK for different inputs to give the same output.

We require our function boxes to be consistent. If the input 2 produces the output -5, we shouldn't have to worry that the next time we put in 2, we get a different answer. For each input, there should be only one output.

Each button on a calculator activates a function box. There is a function called cosine, abbreviated c-o-s. When the value of 0 is the input of the cosine function, the output is 1.

There is a function called the base-10 logarithm or common logarithm, that gives as its output the exponent on 10. For example, if the number 1000 goes into the log function box, the output is 3.