

## Factorial

The factorial is a function defined for every non-negative number  $n$  and the factorial of  $n$  is written  $n!$ .

The definition is as follows:

$$n! = n \times (n - 1) \times (n - 2) \times \dots \times 2 \times 1,$$


or in the more compact way

$$n! = \prod_{k=1}^n k.$$

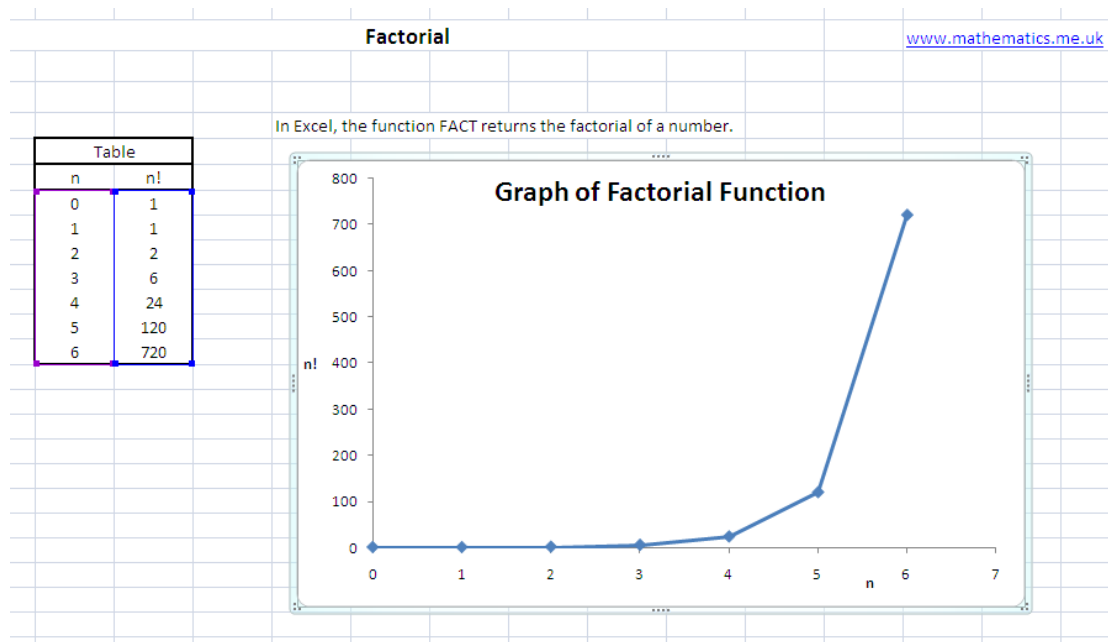
There is also the special case:  $n = 0$ ;  $0! = 1$ .

For example

$$5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$$

Most scientific calculators have a factorial key. For example the Windows scientific calculator has the  key.

A table and graph of the factorial function is given on the accompanying spreadsheet.



The factorial function can also be written as a recurrence relation  $n! = n \times (n - 1)!$ .