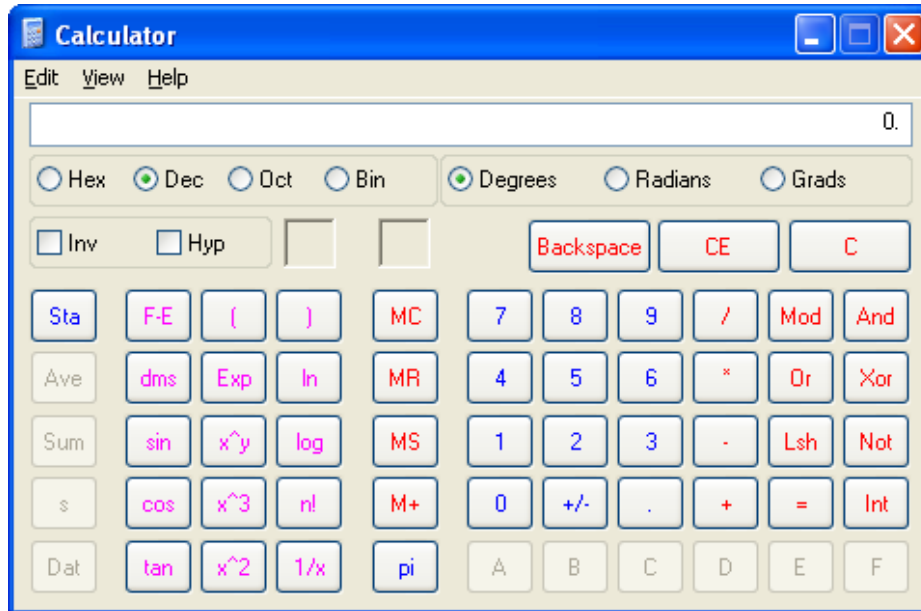



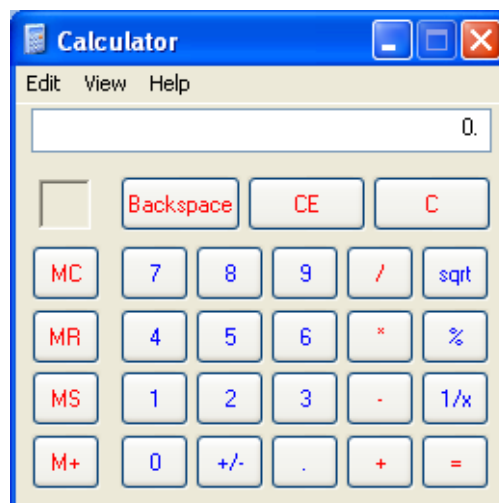
Standard Mathematical Functions: Windows Scientific Calculator

The standard mathematical functions are the set of functions that are typically available on scientific calculators, spreadsheets, and within computer programming languages. For example the Windows scientific calculator below has a set of standard functions, with inverse functions being available via the Inv box and hyperbolic functions available via the Hyp box.




Finding the Windows Scientific Calculator

From the  button, key then then . The following screen pops up




If we then click on and switch to then the Scientific Calculator is reached.

Reciprocal

The reciprocal of a number x is $1/x$ and it can be found using the  button.




For example if we key   the result is 0.5.



Factorial¹



The factorial of a number can be found using the  button.




For example if we key   the result is 120.






Powers and Roots²

Powers and roots of numbers can be found with the keys ,  and .

For example to find the square of seven:   gives 49.

For example to find the cube of three:   gives 27.

To find a higher power, for example 2^5 :    gives 32.

To find a square-root, for example $\sqrt{9}$:      gives 3.

¹ [Factorial](#)

² [Powers and Roots](#)

Trigonometric functions³

The trigonometric functions - sine, cosine and tangent – are available on scientific calculators. The functions are also available on the Windows calculator. Also the inverse functions, arcsin (\sin^{-1}), arccos (\cos^{-1}) and arctan (\tan^{-1}) can be found by checking the Inv box and then keying the relevant function: , or .

Working in degrees (Degrees)::

$\sin(30^\circ)$ can be found by keying with result 0.5.

$\cos(30^\circ)$ can be found by keying with result 0.8660254.

$\tan(30^\circ)$ can be found by keying with result 0.577350.

Typical inverse trigonometric function values can be found – with the result in degrees (Degrees) - as follows:

$\sin^{-1}(0.5)$ can be found by keying Inv with result 30.

We can also work in radians by checking Radians . In the examples above $30^\circ = \pi/6$

$\sin(\pi/6)$ can be found by keying with result 0.5.

$\sin^{-1}(0.5)$ can be found by keying Inv with result 0.523599.

Logarithm and Exponential Functions⁴

The exponentials are simply powers (see page 2) , so for example 10^3 can be computed using the keys to give the result 1000.

³ [Trigonometric Functions](#)

⁴ [Logarithm and Exponential Functions](#)

The inverse function to the exponential is the logarithm. For example the log of 1000 in base 10 is three, and this can be verified by keying the following:



The exponential is the inverse of a logarithm and hence we can find 10^3 by

keying giving the result 1000.

The natural or Napierian (base e) logarithms are also available on standard calculators. This function is abbreviated as \log_e or ln.

For example giving the result 6.907755.

The antilogarithm of 5 is given by gives the result 148.413159, which is also e^5 .

Hyperbolic Functions⁵

The hyperbolic functions sinh, cosh and tanh can be obtained by first checking

the box and then keying , or .

For example $\sinh(1)$ can be evaluated by keying , , giving the result 1.175201.

The inverse hyperbolic functions can be obtained by checking both the and boxes and then keying , or .

For example $\cosh^{-1}(10)$ can be obtained by keying , , , , , giving the result 2.993223.

⁵ [Hyperbolic Functions](#)