Variable types and simple operations

To make the **calculator** or other **toolbars** appear, use the View|Toolbars menu.

$\pi = 3.142$

Type = after a variable name to display a value.

π may be selected from the Greek toolbar or type p, then control g.

$x := 3$

Defines x as 3. Type a colon to get :=.

Note that "define" and "display" are different operations with different operators.
Typing = for an undefined variable will generate := instead.

$\pi = 3.141592653589793$

Use Format|Result from the Format toolbar to change the number of decimal places displayed. The maximum is 15.

$4 \cdot x = 12$

Type * to multiply. This operator is displayed as a dot.

$\dfrac{x}{0.1} = 30$

Type / to divide. This operator creates built-up fraction.

$x := 3 + 3i$

Defines x as a complex number. No character is typed between 3 and i.

$x^2 = 18i$

Type ^ to enter an exponent or use the calculator toolbar.
Here a complex number is displayed.

$j := 0, 1 .. 4$

Defines j as a counting index from 0 to 4. Type a semicolon to obtain the ..

$j := 0 .. 4$

If the increment is 1, it may be omitted.

$x_j := 2^j$

Defines an indexed variable x_j in terms of the index.

$x = \begin{pmatrix} 1 \\ 2 \\ 4 \\ 8 \\ 16 \end{pmatrix}$

A subscripted variable is displayed as a matrix.
The display option used here is "matrix" or "automatic."
To change the display option, click on the variable and then Format|Result|Display Options.

$x =$

	0
0	1
1	2
2	4
3	8
4	16

A subscripted variable is displayed as a table. The display option is "table."
For long tables, a scroll bar appears.
Try it: Change j above to j :=0 (semicolon) 20.
Only elements 0 to 15 of the array will be displayed.
Click the table to scroll down.

$y_j := \left(x_j \right)^2$

Defines the subscripted variable y for each value of x.
If a subscript appears on the right side of an equation, the subscript must also appear on the left side of the equation.
y will be defined for every value of j.

$m_e := 9.11 \cdot 10^{-31}$ To enter a **subscript in a variable name**, type a comma.

$m_e = 0$ Numbers smaller in magntiude than 10^{-15} are displayed as zero by default. Note that Format|Result|Tolerance may be used to globally define the threshold at which zero is shown. To make this change, first highlight an equation containing :=. To check if a value is identically zero, display the log.

$\log(m_e) = -30.04$

$e^2 = 7.389$ To highlight a region, right-click and select properties.

$e := 2$ $e^2 = 4$ It is not recommended to **redefine** the variables e or π.

Moving or disabling equations:

Text or equations can be selected by using the mouse to surround the item with a box. The selected item will appear within a dotted box and can be moved using the mouse.
Several items may be moved at once using this method.

$\log(0) = \blacksquare$ An equation that is not being used or that is creating errors can be turned off by right-clicking and selecting "disable evaluation."

Simple graphs
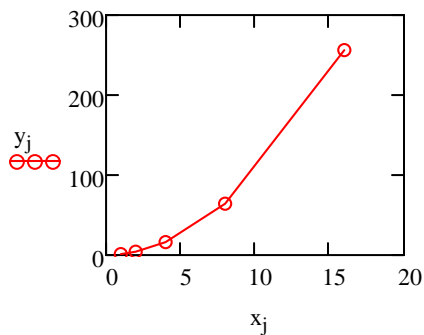
To make a line graph, click on the line graph in the graph toolbar and fill in the placeholders.
Double click on the graph to change the display options.
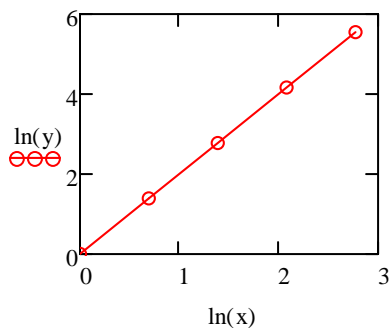
It is not necessary to type the subscripts if both variables are subscripted.
Note that functions of variables may be used in the placeholders as well as simple variables. y was defined above as x^2.