

The Mathematica Book

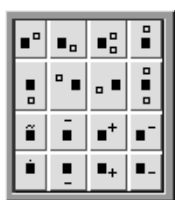
A Practical Introduction to Mathematica

■ Input and Output in Notebooks

- 1.10.1 Entering Greek Letters
- 1.10.2 Entering Two-Dimensional Input
- 1.10.3 Editing and Evaluating Two-Dimensional Expressions
- 1.10.4 Entering Formulas
- 1.10.5 Entering Tables and Matrices
- 1.10.6 Subscripts, Bars and Other Modifiers
- 1.10.7 Special Topic: Non-English Characters and Keyboards
- 1.10.8 Other Mathematical Notation
- 1.10.9 Forms of Input and Output
- 1.10.10 Mixing Text and Formulas
- 1.10.11 Displaying and Printing *Mathematica* Notebooks
- 1.10.12 Creating Your Own Palettes
- 1.10.13 Setting Up Hyperlinks
- 1.10.14 Automatic Numbering
- 1.10.15 Exposition in *Mathematica* Notebooks

■ 1.10.6 Subscripts, Bars and Other Modifiers

Here is a typical palette of modifiers.



Mathematica allows you to use any expression as a subscript.

Expand [$(1 + x_{1+n})^4$]

$$1 + 4 x_{1+n} + 6 x_{1+n}^2 + 4 x_{1+n}^3 + x_{1+n}^4$$

Unless you specifically tell it otherwise, *Mathematica* will interpret a superscript as a power.

Factor [$x_n^4 - 1$]

$$(-1 + x_n) (1 + x_n) (1 + x_n^2)$$

$\text{CTRL}[_]$ or $\text{CTRL}[-]$	go to the position for a subscript
$\text{CTRL}[+]$ or $\text{CTRL}[=]$	go to the position underneath
$\text{CTRL}[\wedge]$ or $\text{CTRL}[6]$	go to the position for a superscript
$\text{CTRL}[\&]$ or $\text{CTRL}[7]$	go to the position on top
$\text{CTRL}[_]$	return from a special position (Control-Space)

Special input forms based on control characters. The second forms given should work on any keyboard.

This enters a subscript using control keys.

Expand[(1 + x $\text{CTRL}[_]$ 1+n $\text{CTRL}[_]$)^4]

$$1 + 4 x_{1+n} + 6 x_{1+n}^2 + 4 x_{1+n}^3 + x_{1+n}^4$$

Just as $\text{CTRL}[\wedge]$ and $\text{CTRL}[_]$ go to superscript and subscript positions, so also $\text{CTRL}[\&]$ and $\text{CTRL}[=]$ can be used to go to positions directly above and below. With the layout of a standard English-language keyboard $\text{CTRL}[\&]$ is directly to the right of $\text{CTRL}[\wedge]$ while $\text{CTRL}[=]$ is directly to the right of $\text{CTRL}[_]$.

key sequence	displayed form	expression form
x $\text{CTRL}[\&]$	$\bar{x}$	OverBar[x]
x $\text{CTRL}[\&]$ vec	$\vec{x}$	OverVector[x]
x $\text{CTRL}[\&]$ ~	$\tilde{x}$	OverTilde[x]
x $\text{CTRL}[\&]$ ^	$\hat{x}$	OverHat[x]
x $\text{CTRL}[\&]$.	$\dot{x}$	OverDot[x]
x $\text{CTRL}[=]$	$\underline{x}$	UnderBar[x]

Ways to enter some common modifiers using control keys.

Here is $\bar{x}$.

x $\text{CTRL}[\&]$ $\text{CTRL}[_]$

x

You can use $\bar{x}$ as a variable.

Solve[a^2 == %, a]

$$\{ \{ a \rightarrow -\sqrt{\bar{x}} \}, \{ a \rightarrow \sqrt{\bar{x}} \} \}$$

<i>key sequence</i>	<i>displayed form</i>	<i>expression form</i>
$x _ y$	x_y	<code>Subscript[x, y]</code>
$x _ + y$	$\overset{+}{x}$	<code>Underscript[x, y]</code>
$x \^ y$	x^y	<code>Superscript[x, y]</code> (interpreted as <code>Power[x, y]</code>)
$x \& y$	$\overset{y}{x}$	<code>Overscript[x, y]</code>
$x \& _$	$\overline{x}$	<code>OverBar[x]</code>
$x \& \backslash [\text{RightVector}]$	$\vec{x}$	<code>OverVector[x]</code>
$x \& \sim$	$\tilde{x}$	<code>OverTilde[x]</code>
$x \& \wedge$	$\hat{x}$	<code>OverHat[x]</code>
$x \& \cdot$	$\dot{x}$	<code>OverDot[x]</code>
$x _ + _$	$\underline{x}$	<code>UnderBar[x]</code>

Ways to enter modifiers without control keys. All these forms can be used only inside `\! \ ( ... \ )`.