

5. Superscripts, Subscripts, and Formatting.

The ^ and _ keys are used to insert superscripts and subscripts. Grouping is important because it distinguishes between F_n^2 and F_n^2 . Terms can be grouped by enclosing them in parentheses, where the parentheses themselves do not print.

For	Type	For	Type	For	Type	Comments
$x_i \times y^n$	<code>x_i\times y^n</code>	$y = x + 4$	<code>\rect(y=x+4)</code>	$y = x + 4$	<code>\box(y=x+4)</code>	Invisible box for formatting purposes.
x^{i+1}	<code>x^(i+1)</code>	$\underbrace{F}_{\text{force}}$	<code>\underbrace F_{}''force"</code>	$\overbrace{F}^{\text{force}}$	<code>\overbrace F^{}''force''</code>	
F_n^{k+1}	<code>F_n^(k+1)</code>	$\overline{a+b}$	<code>\underparen(a+b)</code>	$\overline{a+b}$	<code>\overparen(a+b)</code>	
$F_{n^{k+1}}$	<code>F_(n^(k+1))</code>	$\underline{a+b}$	<code>\underbar(a+b)</code>	$\overline{a+b}$	<code>\overbar(a+b)</code>	Also possible <code>\overline{a+b}</code> .
9_0H	<code>(_0^9)H</code>			$\overline{a+b}$	<code>\overshell(a+b)</code>	

6. Brackets.

The brackets are grouped to easier work. Be sure to make space following each closed bracket. The `\begin` and `\end` brackets are used for "invisible" grouping, as in last parameter in the nary operators (sum, product, etc.). Sometimes you need unbalanced brackets, use `\open` and `\close` to balance them. The last column vertical bars can be used as middle separators inside the brackets and balanced with them. Use `/middle` before some symbol if you want to make it separator.

For	(	[	{			<	<	⌊	⌈	⌋	⌊	⌈	For	
Type	(	[	{	, \vert	\norm, \Vert	\bra, \langle	\bra, \langle	\lbrack	\lceil	\lfloor	\begin	\open	Type	\mid
For	)	]	}			>	>	⌋	⌉	⌋	⌋	⌉	For	
Type	)	]	}	, \vert	\norm, \Vert	\ket, \rangle	\Rangle	\Rbrack	\rceil	\rfloor	\end	\close	Type	\wbar

The equation editor causes brackets (such as [], {} and ()) to grow to the size of the expression within them. However, parentheses are the grouping character and will not display when used as such. To force parentheses to display, you must double them. To prevent brackets from being reformatted, precede them by the " character. Bug: Never try to select with a mouse the {} brackets.

For	Type	Comments
$\left[\frac{a}{b}\right]$ or $\left\{\frac{a}{b}\right\}$ or $\left(\frac{a}{b}\right)$	<code>[a/b] or {a/b} or (a/b)</code>	Parentheses display.
$\frac{a}{b+1}$	<code>a/(b+1)</code>	Parentheses used for grouping do not display.
$\left\{^a_b y\right\}$	<code>{a\atop b y\close</code>	
$\left \frac{a b f}{c+d}\right $	<code> (a b f)/(c+d) </code>	The parentheses are, again, used for grouping.
$ a b\left \frac{f}{c+d}\right $	<code> a b f/(c+d) </code>	
$y = \left[\frac{a}{b}\right]$	<code>y=[a/b \]</code>	Backslashes prevent [and] from growing.
$ $	<code> \zwsp\close\close</code>	
$\{x \in \mathbb{N} \mid x < 100\}$	<code>{x\in\doubleN\mid x<100}</code>	
$\{x \in \mathbb{N} * x < 100\}$	<code>{x\in\doubleN\middle*x<100}</code>	The * will be the separator.
He said: "Hello".	<code>"He said: "\zwnj\pprime "Hello"\zwnj\pprime.</code>	Make quotes visible.

The keywords `phantom` and `smash` can be used to force brackets or parentheses to have a specific size. The symbols below are invisible.

For	↑	↓	↔	↑	↔	◇	⋈
Type	<code>\asmash</code>	<code>\dsmash</code>	<code>\hsmash</code>	<code>\smash</code>	<code>\hphantom</code>	<code>\phantom</code>	<code>\vphantom</code>

For example:

For	Type	Comments
$\left[\right]$	<code>\phantom (a\atop b)]<sp></code>	The <code>\phantom</code> command creates an object as large as the expression in parentheses, but does not print it, so you can create, for example, large empty brackets.
$\left[\quad \right]$	<code>\hphantom((a+b)/c)]</code>	The <code>\hphantom</code> command creates an object with the width of the expression in parentheses, but zero height.
$\left[\quad \right]$	<code>\vphantom((a+b)/c)]</code>	The <code>\vphantom</code> command creates an object with the height of the expression in parentheses, but zero width.
$\left[\sum_{l=0}^5 l * 2 \right]$	<code>\smash(\sum_(l=0)^5of\begin l*2\end)\close</code>	The <code>\smash</code> creates the object, but makes its size zero so that the enclosing bracket does not grow. Bug: Looks different on printing.

Used and fixed in this paper: <http://www.iun.edu/~mathiho/useful/Equation%20Editor%20Shortcut%20Commands.pdf>.

7. Division and Matrices.

For	Type	Comments
a/b	<code>a\b</code>	
$\frac{a}{b}$	<code>a/b</code>	
a/b	<code>a\sdiv b</code>	
$\frac{a+b}{c+d}$	<code>(a+b)/(c+d)</code>	
$\frac{(a+b)}{c+d}$	<code>((a+b))/(c+d)</code>	The double parentheses force the single parentheses to print in the numerator.
$\frac{a+b}{c+d} + n$ $\frac{f(x) + e^{1/2}}{f(x) + e^{1/2}}$	<code>((a+b)/(c+d) + n)/(f(x)+e^(1/2))</code>	The “/” is preceded by “\” in the exponential to provide a horizontal fraction (1/2 instead of $\frac{1}{2}$).
$\frac{a}{b}$	<code>a\atop b</code>	
$\frac{a+b}{c+d}$	<code>(a+b)\atop(c+d)</code>	
$\begin{matrix} x_{11} & x_{12} & x_{13} \\ x_{21} & x_{22} & x_{23} \\ x_{31} & x_{32} & x_{33} \end{matrix}$	<code>\matrix(x_11&x_12&x_13@ x_21&x_22&x23@x_31&x_32&x_33)</code>	The matrix must be enclosed in ()'s. The & character separates columns of the matrix. The @ separates rows.
$\begin{pmatrix} x_{11} & x_{12} & x_{13} \\ x_{21} & x_{22} & x_{23} \\ x_{31} & x_{32} & x_{33} \end{pmatrix}$	<code>\pmatrix(x_11&x_12&x_13@ x_21&x_22&x23@x_31&x_32&x_33)</code>	
$\begin{vmatrix} x_{11} & x_{12} & x_{13} \\ x_{21} & x_{22} & x_{23} \\ x_{31} & x_{32} & x_{33} \end{vmatrix}$	<code>\Vmatrix(x_11&x_12&x_13@ x_21&x_22&x23@x_31&x_32&x_33)</code>	
$\begin{bmatrix} x_{11} & x_{12} & x_{13} \\ x_{21} & x_{22} & x_{23} \\ x_{31} & x_{32} & x_{33} \end{bmatrix}$	<code>[\matrix(x_11&x_12&x_13@ x_21&x_22&x23@x_31&x_32&x_33)]</code>	
$\begin{matrix} x_{11}x_{12}x_{13} \\ x_{21}x_{22}x_{23} \\ x_{31}x_{32}x_{33} \end{matrix}$	<code>\eqarray(x_11&x_12&x_13@ x_21&x_22&x23@x_31&x_32&x_33)</code>	
$\begin{cases} x := 5, x < 3 \\ x := 8, x \geq 3 \end{cases}$	<code>\cases(x:=5,x<3@x:=8,x>=3)</code>	
$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$	<code>\identitymatrix</code>	

8. Roots.

For	Type	Comments
$\sqrt{x}$	<code>\sqrt x</code>	
$\sqrt{x+1}$	<code>\sqrt(x+1)</code>	
$\sqrt[3]{x+1}$	<code>\cbrt(x+1)</code>	
$\sqrt[4]{x+1}$	<code>\qdrtr(x+1)</code>	
$\sqrt[n]{x}$	<code>\sqrt(n&x)</code>	The & separates the root order from the argument
$\sqrt[n+1]{a+b}$	<code>\root n+1\of(a+b)</code>	
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	<code>\quadratic</code>	

9. Negation.

Some math symbols can be negated. To create one, use / before it. Bug: But there is an annoying bug in the Word. Be careful with the cursor position after the negation. You are even recommended to have an extra empty page at the document end (using Ctrl-Enter) to avoid problems.

Negate	For	Type	Not	Negate	For	Type	Negate	For	Type	Not	Negate	For	Type
=	≠	<code>/=</code>		⊂	⊄	<code>\subset</code>	∃	∄	<code>\exists</code>		≡	≢	<code>\equiv</code>
<	≠	<code>/<</code>		⊃	⊄	<code>\superset</code>	∈	∉	<code>\in</code>		<	≠	<code>\prec</code>
>	≠	<code>/></code>		⊆	⊄	<code>\subsest</code>	∃	∄	<code>\notcontain</code>	∖ni	≡	≢	<code>\preceq</code>
≤	≠	<code>\le</code>	<code>/<=</code>	⊇	⊄	<code>\superseteq</code>	≡	≠	<code>/\sim</code>		>	≠	<code>\succ</code>
≥	≠	<code>\ge</code>	<code>/>=</code>	⊆	⊄	<code>\sqsubset</code>	≈	≠	<code>\simeq</code>		≡	≢	<code>\succeq</code>
≈	≠	<code>\approx</code>		⊇	⊄	<code>\sqsuperseteq</code>	~	≠	<code>\sim</code>	<code>/\sim</code>	≡	≢	<code>\asymp</code>

10. Products, Sums and Integrals.

There are a variety of aggregation symbols in the editor. Use subscripts and superscripts to insert the limits. Use the `\of` (or `\naryand`) for the content. Add spaces to finish the form after all the changes, if needed, and if you see the blue area for some argument, try move right to exit it.

For	Type	For	Type	For	Type	For	Type	For	Type
$\sum$	<code>\sum</code>	$\cup$	<code>\bigcup</code>	$\odot$	<code>\bigodot</code>	$\int$	<code>\int</code>	$\oint$	<code>\oint</code>
$\prod$	<code>\prod</code>	$\cap$	<code>\bigcap</code>	$\oplus$	<code>\bigoplus</code>	$\iint$	<code>\iint</code>	$\oiint$	<code>\oiint</code>
$\amalg$	<code>\amalg</code>	$\sqcup$	<code>\bigsqcup</code>	$\otimes$	<code>\bigotimes</code>	$\iiint$	<code>\iiint</code>	$\oiint$	<code>\oiint</code>
$\bigwedge$	<code>\bigwedge</code>	$\uplus$	<code>\biguplus</code>			$\iiint$	<code>\iiint</code>	$\oint$	<code>\oint</code>
$\bigvee$	<code>\bigvee</code>							$\oint$	<code>\oint</code>

For example:

For	Type
$\bigwedge_i x_{1,i} \vee x_{2,i}$	<code>\bigwedge_i\ofbegin x_(1,i)\vee x_(2,i) \end</code>
$\sum_{n=0}^N x^n$	<code>\sum_(n=0)^N x^n</code>
$\int_{-\infty}^{\infty} f(t)e^{-i\omega t} dt$	<code>\int_{-\infty}^{\infty} f(t)e^{-i\omega t} dt</code>
$\iiint f(x) dx$	<code>\iiint f(x) dx</code>
$\oint f(x,y) dl$	<code>\oint f(x,y) dl</code>
$(a+b)^n = \sum_{k=0}^n \binom{n}{k} a^k b^{n-k}$	<code>\binomial</code>
$\frac{1}{2\pi} \int_0^{2\pi} \frac{d\theta}{a+b \sin \theta} = \frac{1}{\sqrt{a^2-b^2}}$	<code>\integral</code>

11. Functions.

The equation editor switches between “variable style” or “function style”, depending on whether it interprets part of an equation as a variable or a function (compare the two styles in the equation $y = \sin(x)$, which would not look right if it were displayed as $y = \sin(x)$). You must type a space after the function name to allow the editor to interpret it as a function. If a function is not recognized, you can force the editor to treat it as a function if you follow it with the `\funcapply` keyword. For example, `sinc` is not recognized as a function, but the sequence `sinc\funcapply` and double space will produce $\text{sinc } x$ (as opposed to the less attractive $\text{sinc } x$). Be sure to move right to exit argument blue area.

For	Type	Comments
$\lim_{x \rightarrow 0} f(x)$	<code>\lim_(x->0) f(x)</code>	
$\lim_{x \rightarrow 0} f(x)$	<code>\lim^(x->0) f(x)</code>	
$\lim_{n \rightarrow \infty} \left(1 + \frac{1}{n}\right)^n = e$	<code>\limit</code>	Choose from the start to the equal sign, not including, pick professional mode, put a cursor between "l" and "i", move one left, add a space.
$\text{mylim}_x x^2$	<code>mylim\funcapply _x x^2</code>	
$\text{mylim}_x x^2$	<code>mylim\funcapply \below x x^2</code>	
$\text{mylim}_x x^2$	<code>mylim\funcapply \above x x^2</code>	

The recognized functions are:

sin	sec	asin	asec	arcsin	arcsec	sinh	sech	asinh	asech	arcsinh	arcsech	arg	det	exp	inf	lim	min
cos	csc	acos	acsc	arccos	arccsc	cosh	csch	acosh	acsch	arccosh	arccsch	def	dim	gcd	ker	log	Pr
tan	cot	atan	acot	arctan	arccot	tanh	coth	atanh	acoth	arctanh	arccoth	deg	erf	hom	lg, ln	max	sup

1.	Letters.....	1
2.	Symbols.....	1
3.	Accent.....	1
4.	Spaces.....	1
5.	Superscripts, Subscripts, and Formatting.....	2
6.	Brackets.....	2
7.	Division and Matrices.....	3
8.	Roots.....	3
9.	Negation.....	3
10.	Products, Sums and Integrals.....	4
11.	Functions.....	4