# MS Word Equation Editor

Need a powerful mathematical computation program? Microsoft Word (ver. 2007+) might be the answer with its new equation editor. When the equation editor is coupled with the downloadable "Mathematics Add-In" tool, Word is transformed from a word processor into a powerful *Computer Algebra System (CAS)* with algebraic capabilities similar *Maple* or *Mathematica* (just not as extensive as these math programs).

Getting Started

Equations can be entered two ways: clicking on icons in the menus, or entering commands from the keyboard. By clicking on icons in the equation menu (locate [π Equation] in the Insert menu), you can make professional looking equations quite easily, but not always quickly. Using keyboard shortcut commands, you can make the same equations very quickly while typing on the fly. Even complicated equations can be entered entirely from the keyboard, but often it is useful to use a combination of keyboard commands and clicking menu items.

There are two types of equations (which can be changed by right-clicking on an equation):

- Linear - an equation that just looks like typing. For example:
$$1/2 = \sqrt(3x + 4)$$
- Professional - an equation that looks like it would in a textbook with fractions stacked vertically and special characters displayed as they would be written
$$\frac{1}{2} = \sqrt{3x + 4}$$

Basic Shortcuts

Here are some basic keyboard shortcuts. The brackets [] indicate a key on the keyboard.

- [Alt] and [+] – this will switch to equation mode. Hit the right arrow to get out of equation mode.
- [Space Bar] – when you have typed a linear equation (or expression), hit the space bar and Word will translate it into a professional equation.
- [^] – The "carrot" key will give you an exponent. (after typing "x^2", hit the space bar)
- [_] – the underscore will make a subscritpt (e.g. type "x_1" for x_1)
- [/] – the forward slash will automatically create fractions when the space bar is hit after typing the fraction. If you want expressions in the numerator or denominator, use parenthesis. e.g. (2x+3)/(3x^2+5) will become $\frac{2x+3}{3x^2+5}$.

Advanced Shortcuts

Here are some more advanced keyboard shortcuts. Most of these shortcut commands are based on LaTeX (pronounced "Lay-tech"), which is an advanced typesetting tool used for mathematical publications. When you type the given command with the backslash, then press the space bar, it will be translated into the given symbol.

Command	Result		Command	Result
\int	$\int$		log_2 32	$\log_2 32$
\infty	∞		\pi	π
\cdot	$\cdot$		\theta	θ
\Delta	Δ		\sum	$\sum$
<=	$\leq$		\times	$\times$
+-	$\pm$		\div	$\div$
lim_ [spacebar]	$\lim_{x\to\infty}\left(\dfrac{1}{2}\right)^x$		\rightarrow	$\to$
[\matrix(&&@&&@&&)]	$\begin{bmatrix} \blacksquare & \blacksquare & \blacksquare \\ \blacksquare & \blacksquare & \blacksquare \\ \blacksquare & \blacksquare & \blacksquare \end{bmatrix}$		\sqrt(x)	$\sqrt{x}$
\above *Use this to add accents above*	$\perp$		\below *Use this to add accents below*	$\top$

For more LaTeX shortcut, see Appendix.

Mathematics Add-In

The power of MS Word 2007 Equation editor is multiplied by the use of the downloadable Mathematics Add-in. When using the Mathematics Add-in, MS word turns from a word processor into a powerful CAS (computer algebraic system) program. With the Mathematics Add-in you can create graphs, solve equations, compute integrals and derivatives, factor expressions, and many other algebraic functions.

To get the Mathematics Add-in, search for "MS Word 2007 Mathematics Add-In" and download the file from Microsoft. Then install it on your computer and you're ready to go.

To use the Mathematics functions, type an expression or equation into the equation editor as described above. Then right-click on the expression of equation to choose "compute" options. For example, type the following factored expression

$$(x+3)(x-5)(x+7)$$

Then right click and choose "Compute", "Algebra", and "Expand" to get the simplified expression

$$x^3 + 5x^2 - 29x - 105.$$

This is a useful feature for quickly creating tests and quizzes. If you want something to factor easily, start with the factored version, simplify it, and delete the original factors (you may want to print an "answer key" before you delete the factored versions.)

You can also graph equations by typing a function in the form $y =$ such as

$$y = 3x^3 - 12x^2 + \frac{1}{2}x - 3$$

When you right click and choose graph, you will get a graph which you can manipulate to get the image below
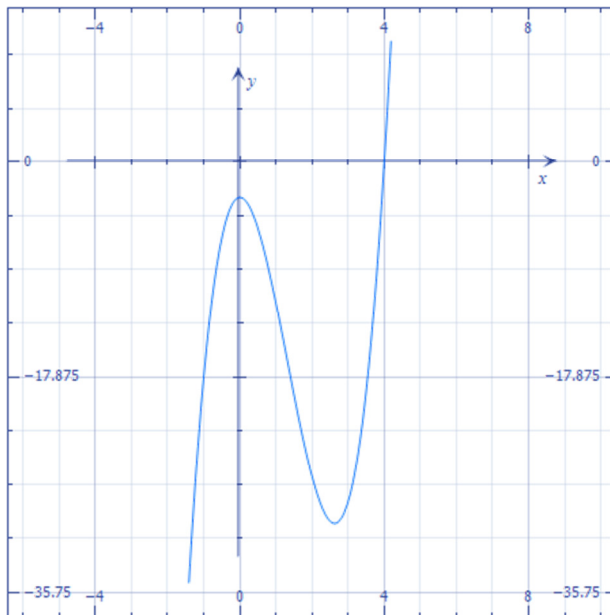
These are just a few ideas of how to use the Add-in. Experiment with it and you will find many more.

Troubleshooting Equation Printing Problems

Sometimes MS Word equations will not print even though you see them on your screen. This is a bug that has several work-arounds. Here is one solution that can help:

1. Select Start button, and then select the Run option.
2. In that blank space enter intl.cpl, and then select OK button.
3. Select the Languages tab choice which comes occurs.
4. Then beneath the Supplemental language support, check to select the Install files for complex script and right-to-left languages check box.
5. After you will receive a message, then select on OK.
6. Again select the OK to come out of the Regional and Language Options box.

Many of these commands (not all) will produce the desired symbol in MSWord 2007 equation editor. To use them, type the command with backslash in the Equation Editor and press the space bar.

Source: The American Physical Society (https://authors.aps.org/latex/ltxcrib.pdf)

Binary operations (math mode)

±	\pm	∩	\cap	
∓	\mp	∪	\cup	
\	\setminus	⊎	\uplus	
·	\cdot	⊓	\sqcap	
×	\times	⊔	\sqcup	
∗	\ast	◁	\triangleleft	
⋆	\star	▷	\triangleright	
◇	\diamond	≀	\wr	
○	\circ	◯	\bigcirc	
●	\bullet	△	\bigtriangleup	
÷	\div	▽	\bigtriangledown	
◁	\lhd	▷	\rhd	
∨	\vee	⊙	\odot	
∧	\wedge	†	\dagger	
⊕	\oplus	‡	\ddagger	
⊖	\ominus	Ⅱ	\amalg	
⊗	\otimes	⊴	\unlhd	
⊘	\oslash	⊵	\unrhd	

Arrows (math mode)

←	\leftarrow	⟵	\longleftarrow
⇐	\Leftarrow	⟸	\Longleftarrow
→	\rightarrow	⟶	\longrightarrow
⇒	\Rightarrow	⟹	\Longrightarrow
↔	\leftrightarrow	⟷	\longleftrightarrow
⇔	\Leftrightarrow	⟺	\Longleftrightarrow
↦	\mapsto	⟼	\longmapsto
↩	\hookleftarrow	↪	\hookrightarrow
↼	\leftharpoonup	⇀	\rightharpoonup
↽	\leftharpoondown	⇁	\rightharpoondown
⇌	\rightleftharpoons	⇝	\leadsto
↑	\uparrow	⇕	\Updownarrow
⇑	\Uparrow	↗	\nearrow
↓	\downarrow	↘	\searrow
⇓	\Downarrow	↙	\swarrow
↕	\updownarrow	↖	\nwarrow

Variable-sized symbols (math mode)

Σ	\sum	∩	\bigcap
Π	\prod	∪	\bigcup
Ⅱ	\coprod	⊔	\bigsqcup
∫	\int	∨	\bigvee
∮	\oint	∧	\bigwedge
⊙	\bigodot	⊗	\bigotimes
⊕	\bigoplus	⊎	\biguplus

Greek letters (math mode)

α	\alpha	ν	\nu
β	\beta	ξ	\xi
γ	\gamma	o	o
δ	\delta	π	\pi
ε	\epsilon	ρ	\rho
ζ	\zeta	σ	\sigma
η	\eta	τ	\tau
θ	\theta	υ	\upsilon
ι	\iota	φ	\phi
κ	\kappa	χ	\chi
λ	\lambda	ψ	\psi
μ	\mu	ω	\omega
ε	\varepsilon	ς	\varsigma
ϑ	\vartheta	φ	\varphi
ϱ	\varrho		
Γ	\Gamma	Σ	\Sigma
Δ	\Delta	Υ	\Upsilon
Θ	\Theta	Φ	\Phi
Λ	\Lambda	Ψ	\Psi
Ξ	\Xi	Ω	\Omega
Π	\Pi		

Miscellaneous symbols (math mode)

ℵ	\aleph	′	\prime
ℏ	\hbar	∅	\emptyset
ı	\imath	∇	\nabla
ȷ	\jmath	√	\surd
ℓ	\ell	⊤	\top
℘	\wp	⊥	\bot
ℜ	\Re	‖	|
ℑ	\Im	∠	\angle
∂	\partial	△	\triangle
∞	\infty	\	\backslash
□	\Box	◇	\Diamond
∀	\forall	♯	\sharp
∃	\exists	♣	\clubsuit
¬	\neg	♦	\diamondsuit
♭	\flat	♡	\heartsuit
♮	\natural	♠	\spadesuit
℧	\mho		