Typing Math Content with Word's Equation Tool

Written by Jennifer Marsala, University of Houston Department of Mathematics

Contents

Click on any of the links below to navigate to that portion of the document.

Introduction

This document has been written to help both visually impaired and sighted users to type math content within Microsoft Word without needing to search for symbols and functions within Word's equation toolbar. The math content created with this tool can be read aloud with the JAWS screen reader.

Opening Microsoft Word's native equation tool

Microsoft Word's equation tool can be accessed within a Word document by selecting the Insert menu and then selecting Equation, or alternatively by pressing ALT + EQUALS.

Typing math content using the toolbar (sighted users)

After selecting Insert and Equation or the shortcut ALT + EQUALS, an equation box appears within Word so that the student can type in the content. An equation toolbar also appears at the top of the screen, as shown below.
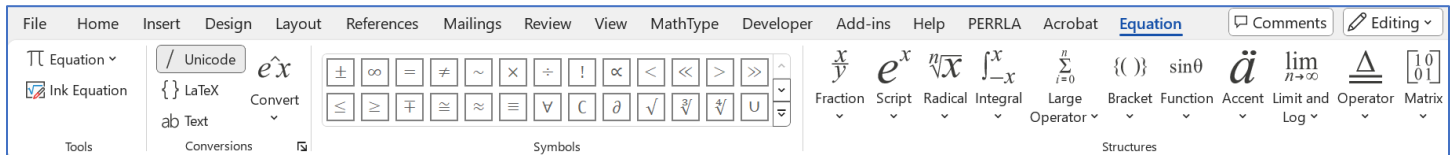
Sighted students can use a combination of regular keystrokes (numbers, letters, the plus symbol, etc.) along with additional mathematical symbols found in this equation toolbar. Alternative keystrokes are described later in this document for visually impaired users or for sighted users who would prefer to type commands rather than to navigate to the toolbar. (See "Keystrokes for common math symbols and functions.")

Exiting the equation tool

If you are typing math content on a line by itself using the equation tool and are finished typing content for that line, simply press enter to go to the next line. By default, Word will no longer be in equation mode. If you want to type another equation on the next line, press ALT + EQUALS or Insert + Equation again.

If you are done typing inline math content within a sentence and wish to type normal text after the math content, press the right arrow to exit the math content and to be in text mode again. Then press the spacebar key to create a space between the math content and your next word, and type the rest of your sentence as usual.

Keystrokes for common math symbols and functions (Jump to list of keystrokes.)

Microsoft Word's equation toolbar contains so many pulldowns and symbol choices that it is unfortunately difficult to navigate with a screen reader. Below are some common symbols and functions, in alphabetical order, that can be utilized by those who are sighted or visually impaired instead of navigating the equation toolbar. All of the commands below are used AFTER pressing ALT + EQUALS, which opens Word's equation tool and creates a box to enter the mathematical input. (Make sure that you also read the instructions above on how to exit the equation tool to resume typing regular text.) The list below is not exhaustive; to find additional commands, see the section entitled, "Discovering other equation tool commands." If the commands below are not working for you, see the "Troubleshooting" section at the end of the document.

List of keystrokes and commands, in alphabetical order

A

Angle symbol: \angle followed by spacebar.

alpha (lowercase): \alpha followed by spacebar

B

beta (lowercase): \beta followed by spacebar

C

chi (lowercase): \chi followed by spacebar

Composition of functions (small circular symbol): type \circ followed by spacebar. (Note that the JAWS screen reader reads this symbol as "ring operator.")

Congruence symbol: \cong followed by spacebar

Cosecant function: csc followed by spacebar, followed by the content you want to type within the function (remember parentheses if needed), followed by the right arrow to exit the cosecant function to type more math content.

Cosine function: cos followed by spacebar, followed by the content you want to type within the function (remember parentheses if needed), followed by the right arrow to exit the cosine function to type more math content.

Cotangent function: cot followed by spacebar, followed by the content you want to type within the function (remember parentheses if needed), followed by the right arrow to exit the cotangent function to type more math content.

Cube root: \cbrt followed by spacebar, followed by the content that you want included inside the cube root, followed by spacebar.

- To obtain $\sqrt[3]{x}$, type \cbrt followed by spacebar followed by x.
- To obtain $\sqrt[3]{x+5}$, where you want the x + 5 inside the cube root, you must use parentheses: Type \cbrt followed by spacebar, followed by (x+5), followed by spacebar.
- To obtain $\sqrt[3]{x+5}+3$, where you want the x and the 5 inside the cube root and the + 3 outside the cube root: Type \cbrt followed by spacebar, followed by (x+5), followed by spacebar, followed by +3.

D

Degree symbol: \degree followed by spacebar
Note that no superscript command is necessary. Type 30\degree then spacebar to produce the output 30°.

delta (lowercase): \delta followed by spacebar, produces the output δ.

Delta (uppercase): \Delta followed by spacebar, produces the output Δ.

Division symbol: To create a division symbol that looks like a horizontal line with a dot above and below, type \div followed by spacebar (see Fractions to create a fraction).

E

Element of: \elementof followed by spacebar

Empty set: \emptyset followed by spacebar

epsilon (lowercase): \varepsilon followed by spacebar, or \epsilon followed by spacebar. These commands produce the output ε and ϵ, respectively.

Equals sign: Use the keyboard equals sign, =.

Exponents/Superscripts: Use the caret key followed by the desired exponent followed by spacebar. (Remember parentheses in the exponent if it contains more than one term.)

- $3x^2 + 1$ is typed as: 3x^2, then spacebar, then +1.
- 2^{x+1} is typed as: 2^(x+1) then spacebar.

F

Fourth root: \qdrt followed by spacebar, followed by the content that you want included inside the fourth root, followed by spacebar.

- To obtain $\sqrt[4]{x}$, type \qdrt followed by spacebar followed by x.
- To obtain $\sqrt[4]{x+5}$, where you want the x + 5 inside the fourth root, you must use parentheses: Type \qdrt followed by spacebar, followed by (x+5), followed by spacebar.
- To obtain $\sqrt[4]{x+5} + 3$, where you want the x and the 5 inside the fourth root and the +3 outside the fourth root: Type \qdrt followed by spacebar, followed by (x+5), followed by spacebar, followed by +3.

Fractions: To create a fraction, use the forward slash key, and press the spacebar key when you are done typing the denominator.

- The fraction ¼ can be typed with 1, then /, then 4, then press spacebar.
- To type $\frac{x+1}{x+3}$, you must type parentheses around the numerator and denominator, i.e., (x + 1), then /, then (x+3), then spacebar.
- To type $\frac{3}{5y}$, type 3, then /, then 5y, then spacebar. (You can type parentheses around the denominator, 5y, which results in the same output.)
- To type $\frac{3}{5}y$, type 3, then /, then 5, then spacebar, then y.

G

gamma (lowercase): \gamma followed by the spacebar

Greater than or equal to symbol: \ge or \geq followed by the spacebar. Alternatively, simply press the > key followed by the = key. (Note: To type a greater than symbol, simply use the > key on the keyboard.)

H

Hyperbolic trigonometric functions: Hyperbolic sine, hyperbolic cosine, and hyperbolic tangent can be written as sinh, cosh, and tanh. Hyperbolic secant, cosecant and cotangent are written as sech, csch, and coth. Each of these commands sholud be followed by the spacebar, followed by the content within the function (remember parentheses), followed by the right arrow to exit the hyperbolic function in order to type more math content.

I

Infinity: \infty followed by spacebar
Note: To type negative infinity, type a dash before the infinity command, i.e. -\infty followed by spacebar

Integers symbol: See "Set of integers symbol."

Integrals:
For indefinite integrals (integrals without lower and upper limits), type \int followed by spacebar, followed by the content that you want included inside the integral. Example: $\int (x^2 + 1)dx$ is typed as \int followed by spacebar followed by (x^2+1)dx.

For definite integrals (integrals with lower and upper limits), type \int followed by an underscore symbol followed by the lower limit, then followed by the caret key along with the upper limit. Example: $\int_3^7 (x^2 + 1)dx$ is typed as \int_3^7 (x^2+1)dx. If you type the math content on its own separate line, the integral symbol will be larger as shown below:

$$\int_3^7 (x^2 + 1)dx$$

Intersection symbol: \cap followed by spacebar

Inverse Trigonometric Functions:
To obtain the inverse sine, inverse cosine, or inverse tangent functions, type arcsin, arccos, or arctan – where each one should be followed by a spacebar.
To obtain the inverse cosecant, inverse secant, or inverse cotangent functions, type arccsc, arcsec, or arccot – where each one should be followed by a spacebar.

K

kappa (lowercase): \kappa followed by spacebar

L

lambda (lowercase): \lambda followed by spacebar

Less than or equal to symbol: \le or \leq followed by the spacebar. Alternatively, simply press the < key followed by the = key. (Note: To type a less than symbol, simply use the < key on the keyboard.)

Limits: You can type the word lim with an appropriate subscript as shown with the example below; pay attention to the spaces as they are necessary for proper display and reading with the JAWS screen reader. To obtain $\lim_{n\to\infty} (n^2 + 1)$, type lim_(n \rightarrow \infty) (n^2 +1)

Logarithms:
To type the common logarithm (base 10), type log followed by spacebar, followed by the content you want to type within the function (use parentheses if needed), followed by the right arrow to exit the logarithm function to type more math content.

To type the natural logarithm, type ln followed by spacebar.

To type logarithms with other bases, type log followed by the underscore key, followed by the value representing the base, followed by spacebar, followed by other content. For example, $\log_3(x+1)+4$ can be obtained by typing log_3 (x+1), then the right arrow, then +4.

M

Minus symbol: use keyboard dash/minus sign, -

mu (lowercase): \mu followed by spacebar

Multiplication symbol: To create a multiplication symbol that looks like an x (and is read by the JAWS screen reader as "times", type the backslash symbol followed by the word times, i.e. \times followed by spacebar. If you want a dot multiplication symbol, you can type \cdot, but note that JAWS screen reader will read it as "dot operator" instead of "times."

N

Natural numbers symbol: See "Set of natural numbers symbol."

Not equal to: \ne or \neq followed by spacebar

O

omega (lowercase): \omega followed by spacebar, produces the output ω.

Omega (uppercase): \Omega followed by spacebar, produces the output Ω.

P

Parallel symbol: \parallel followed by spacebar

Perpendicular symbol: \perp followed by spacebar

phi (lowercase): \varphi or \phi – each of which is followed by spacebar, produces the output φ and ϕ, respectively.

pi (lowercase): \pi followed by spacebar

Plus symbol: use keyboard plus sign, +

Plus or minus symbol: Simply press +-, or alternatively type \pm followed by spacebar.

Prime symbol: Press the apostrophe (single quote) key followed by spacebar, or type \prime followed by spacebar.

R

Rational numbers symbol: See "Set of rational numbers symbol."

Real numbers symbol: See "Set of real numbers symbol."

rho (lowercase): \rho followed by spacebar

Right Arrow: \rightarrow followed by spacebar, or \to followed by spacebar, or simply type -> (a dash followed by the greater than symbol).

Roots: See Square roots, Cube roots, Fourth roots for details on those functions. Roots other than square roots, cube roots, and fourth roots cannot be typed manually into Word's equation tool. (You can alternatively select Insert + Equation, then choose the "Radical with Degree" option from the Radical pulldown). If typing roots manually, remember that $\sqrt[5]{x+1}$ can instead be written as $(x+1)^{\frac{1}{5}}$, etc.

S

Secant function: sec followed by spacebar, followed by the content you want to type within the function (remember parentheses if needed), followed by the right arrow to exit the secant function to type more math content.

Set of integers symbol: \doubleZ, where the Z within the command is a capital letter.

Set of natural numbers symbol: \doubleN, where the N within the command is a capital letter.

Set of rational numbers symbol: \doubleQ, where the Q within the command is a capital letter.

Set of real numbers symbol: \doubleR, where the R within the command is a capital letter.

sigma (lowercase): \sigma followed by spacebar, produces the output σ.

Sigma (uppercase): \Sigma followed by spacebar, produces the output Σ. If you want to use the summation symbol, see Summation.

Similarity symbol: \sim followed by spacebar

Sine function: sin followed by spacebar, followed by the content you want to type within the function (remember parentheses if needed), followed by the right arrow to exit the sine function to type more math content.

Square root: type \sqrt followed by spacebar, followed by the content that you want included inside the square root, followed by spacebar.

- To obtain $\sqrt{x}$, type \sqrt followed by spacebar followed by x.
- To obtain $\sqrt{x+5}$, where you want the x + 5 inside the square root, you must use parentheses. Type \sqrt followed by spacebar, followed by (x+5), followed by spacebar.
- To obtain $\sqrt{x+5}+3$, where you want the x and the 5 inside the square root and the + 3 outside the square root: type \sqrt followed by spacebar, followed by (x+5), followed by spacebar, followed by +3.

Subscripts: Use the underscore key, followed by the desired subscript, so x_1 is typed as x_1, followed by either the spacebar or additional math content, and 3_{n+1} is typed as 3_(n+1), followed by either the spacebar or additional math content.

Summation (capital Sigma): To type $\sum_{n=1}^{5}(n^2+1)$, type \sum_(n=1)^5 (n^2 +1). If you type the math content on a line by itself it will appear larger, as shown below:

$$\sum_{n=1}^{5}(n^2+1)$$

Superscripts: See Exponents

T

Tangent function: tan followed by spacebar, followed by the content you want to type within the function (remember parentheses if needed), followed by the right arrow to exit the tangent function to type more math content.

Therefore symbol: \therefore followed by spacebar

theta (lowercase): \theta followed by spacebar

Triangle symbol: The triangle symbol is not easily

U

Union symbol: \cup followed by spacebar

Discovering other equation tool commands

The list above is not exhaustive. Here are two methods you can use to discover additional keystroke commands for Word's equation tool. (The second method will be much easier for sighted users.)

1. Many of the commands in the list are the same as those that would be typed when using a mathematical typesetting system known as LaTeX. If there is a symbol that you want to create which is not included on this list, do an online search for the word LaTeX and the name of that symbol, and then try that LaTeX command or the backslash symbol followed by that command within Word's equation tool. (This does not work for every command but works for many of them.) Also realize that many math commands require you to press spacebar after the command for the symbol/function to show up properly and to be read properly by JAWS screen reader.

2. If you are able to navigate Word's equation toolbar, go to the Symbols menu and hover over any one of the symbols. When you do so, you will notice that a box appears with the name of the symbol – and if manual keystrokes can be used to replicate that symbol, they are listed in parentheses after the symbol name. The screenshot below shows that if you hover over the cube root symbol, a box appears which says, "Cube root (\cbrt)." This means that if you want the cube root symbol to appear with manual keystrokes, you should type \cbrt; remember to follow this command with the spacebar.
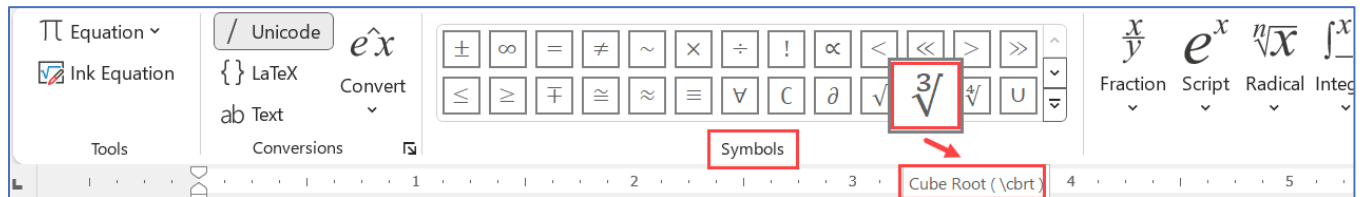
Also notice that on the right side of the Symbols menu, there is a downward arrow which serves as a pulldown to find additional math symbols.

==Just below that downward arrow, there is a double downward arrow which allows you to access addtitionl categories of symols. . Th e==

Type equation here.

Troubleshooting

If the commands in this document are not working for you, try each of the steps below (one at a time) to see if the problem is resolved.

1. Go to the File menu, select Options, then Proofing, then navigate to the button that says AutoCorrect Options, then choose the tab that says Math AutoCorrect. Make sure that the checkbox "Replace text as you type" is checked. (This checkbox should be checked by default and would likely only be disabled if you chose to disable it.)

2. Navigate to the Insert Menu, choose Equation, navigate to the Conversions group and make sure that the Inline checkbox is chosen (rather than LaTeX or Text).

Adding Content to this List

The above list is intended to cover common symbols and functions needed for mathematics and science courses. Contact Jennifer Marsala at jmarsala@central.uh.edu to request additional content to be added to this list.