Microsoft Word Equation Editor

Last Revised: June 22, 2021

Introduction

Microsoft Word has a built-in equation editor. To use it, you need to be use the desktop application, not the online version and not on a mobile device like an iPad.

Although this is called the *equation editor*, it is really a *mathematical editor*. You do not have to have equations that contain an equal sign in order to use the editor.

When to Use

You should use the equation editor when you have mathematical content to create. Do not use symbols, subscripts, or superscripts from the keyboard when it is part of mathematical content; use an equation object instead.

You should not use it for normal text. If you need text between objects, then create separate objects, but do not place normal text inside them. If you have just a variable (single letter), this can typically be typed without creating an object.

When you have a mathematical expression, place the entire expression in a math equation object. Place all of $A = P(1 + i)^n$ into one object. Do not type A=P(1+i)^n with just the superscript inside an object.

Inserting an Equation

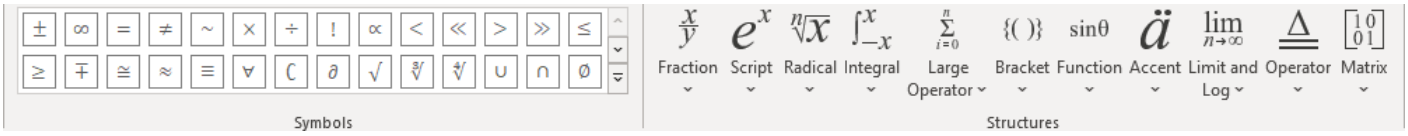
To insert an equation, do one of the following.

1. Go to **Insert / Equation**. If Equation does not show, then choose the symbol menu to find it.
2. Hold down the Alt key and press =

A box will appear where you can enter mathematical content.

Toolbar

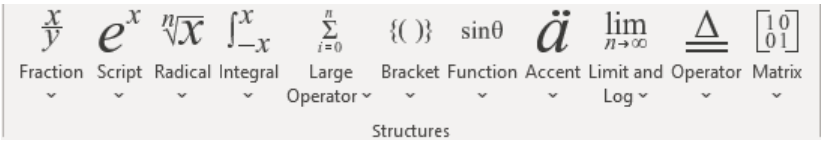
This is what the toolbar looks like when you are in equation mode.



It has two parts. On the left is a symbols palette that contains individual symbols that can be inserted. On the right are structures, which act as templates.

Structures

Structures are often templates that contain placeholders where you type content. There are some structures that contain commonly used expressions such as $\frac{-b \pm \sqrt{b^2-4ac}}{2a}$ from the quadratic formula.



For most structures, you need to create the structure and then add the content. You may be able to have text selected when you create the structure to have it become part of the template.

Some of the common structures have keyboard shortcuts that you can type and then hit the spacebar to activate. The keyboard shortcuts use LaTeX commands, but you do not have to know LaTeX to use them.

Fraction

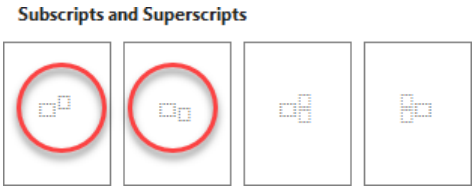
The **fraction** structure allows you to create fractions.

Most of the time, you will want to use the first template, which is a vertical fraction.

For simple fractions, you can use a slash / to get a fraction. To get $\frac{3}{4}$, type `3/4` and press `space`.

Script

The **script** structure allows you to create superscripts (exponents) and subscripts.



The two templates you will use are the superscript (first template) and subscript (second template).

You can use a caret ^ to get a superscript. To get x^2, type `x^2` and press `space`.

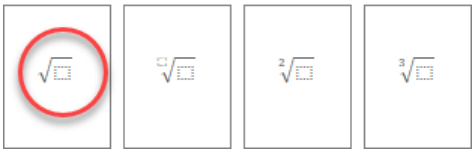
You can use an underscore _ to get a subscript. To get x_1, type `x_1` and press `space`.

The notation for combinations and permutations can be written as ${}_nC_r$ and ${}_nP_r$ respectively. This is difficult to enter in the equation editor, but one way to fake it is to use the left subscript-superscript template (last one). Then type the `n` as the subscript and the `C` or `P` as the full-height character. Then select the C or P and choose a regular subscript to put the `r` into. For that second step, you can also type `C_r` followed by `space`.

Radical

The **radical** structure allows you to get roots, including square roots.

Radicals



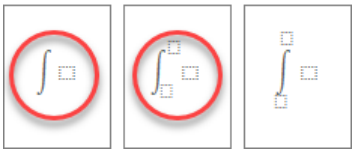
The square root is the first template.

You can get a square root symbol by typing \sqrt. To get $\sqrt{x-3}$, type `\sqrt(x-3)`, then press `space`.

Integral

The **integral** structure is used in calculus courses.

Integrals



The first template gives you an indefinite integral. The second gives a definite integral with limits.

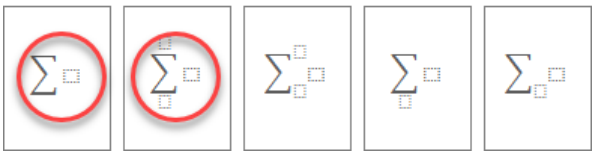
You can get an indefinite integral with `\int`. To get $\int f(x)\,dx$, type `\int` and press `space`. Then type the `f(x)dx`.

You can also get a definite integral with `\int`. To get $\int_a^b f(x)\,dx$, type `\int_a^b` and press `space`. Then type the `f(x)dx`.

Large Operator

The **large operator** structures are mostly used in Calculus, although they may appear a few times in other courses for the summation symbol.

Summations



The first template gives a summation without limits while the second template gives a summation with limits.

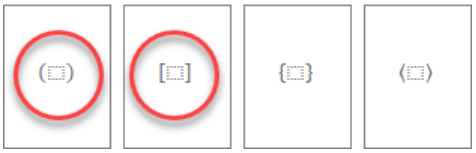
Although there is a LaTeX shortcut for summation, you won't use this enough to mess with it. Just use the templates.

There are other items under the Large Operator structure including unions and intersections. However, you really want the union or intersection symbol instead.

Bracket

The **bracket** structure is the one that you will use the most. It contains balanced parentheses and brackets.

Brackets

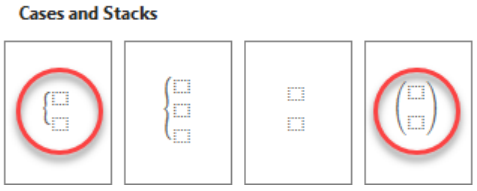


The first template is matching parentheses ( ) and the second template are square brackets [ ].

You can type (and) on the keyboard, but it is imperative that you press the space afterwards to turn them into matching parentheses. Matching parentheses grow with the content inside of them.

If you type the (1/3) and do not press space afterwards, you get $(\frac{1}{3})$. If you press the space or use the matching parentheses from the template, then you will get $\left(\frac{1}{3}\right)$. That may not look very different for an inline equation, but when you are in professional mode and the equation object is on a line by itself, then the fractions are full size and it looks like $(\frac{1}{3})$ vs $\left(\frac{1}{3}\right)$.

The cases and stacks templates are useful for creating a system of equations with an opening brace or a binomial notation for combinations such as $\binom{5}{3}$.



Function

The **function** structure provides common trigonmetric functions that are used in trigonometry, calculus, and differential equations. These are pretty self-explanatory if you need them.

If you want to avoid the menu, you can just type the name of the trigometric function and press the space bar. To get $\sin x$, type sin , press the space , and then type the x . If you do not press the space after the trigonometric function, then you will get *sinx* instead of $\sin x$.

Accent

The **accent** structure is for adding marks like dots, hats, bars, or arrows above a single character. It also includes overlines that can be used for multiple characters.

Which accent you use will depend on the course.

The most common is the bar, which often means mean or average. This is found in the third row of templates. It can be typed directly, but it is messy. If you type \bar and then put in certain symbols such as left

parentheses, left brace, caret, underscore, or period then it will apply the template and insert the symbol aftewards. However, if you press the `space`, then it will give you the bar without the ability to put anything under it. If you want to type $\bar{x}$, then you could type `x\bar.` and then delete the `.` to remove the extra period.

The hat symbol is used in statistics to represent the estimated value and in calculus to represent a unit vector. It is found at the end of the first row of the templates. From the keyboard, it works similarly to the bar except that you use `\hat` instead of `\bar`.

The dots (single, double, and triple) are used in differential equations for Newton's form of derivatives with respect to time.

The vector symbol is a ray over the character and is used in calculus. When typing, it is common to just make a vector bold rather than put the symbol over it. That is, you would use $3\mathbf{u}+4\mathbf{v}$ instead of $3\vec{u}+4\vec{v}$.

Limit and Log

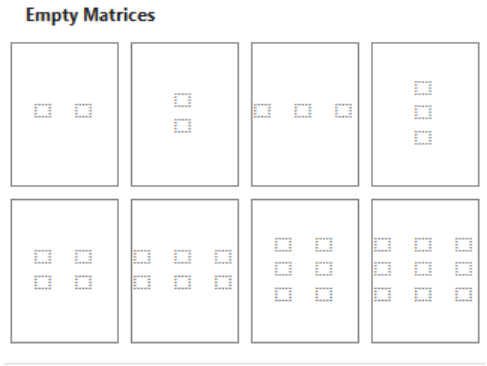
The **limit and log** structure will not get used very often. It has the basic limit template and logarithms for both common logs, natural logs, and logs with a different base.

Operator

The **operator** structure is mostly a waste of space for undergraduate mathematics. It does contain the bigger (than the accents) arrow templates.

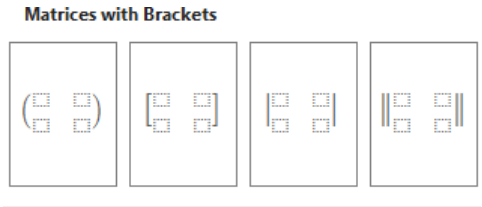
Matrix

The **matrix** structure is used in college algebra, finite mathematics (a lot), calculus, and differential equations. It can also be used as a structure to align systems of equations so they look nice.



The empty matrices are the basic structure of a matrix. It contains common sizes, but it may not contain the size that you want.

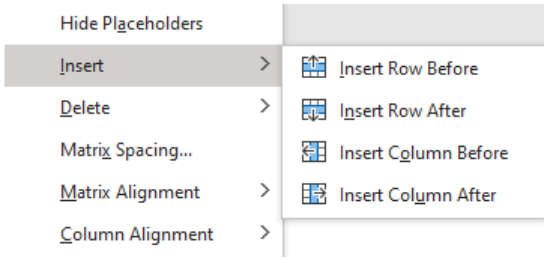
There are also templates that include the symbols around the outside. These are limited to 2×2 matrices, which makes them not as useful as the empty matrix.



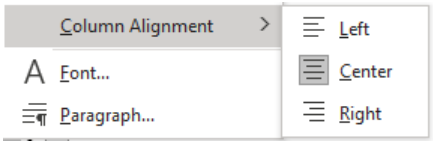
There is a high likelihood that you will need to do something to a matrix because the provided templates do not meet your needs.

You can click in a cell in the matrix and then click the right mouse button to get a context-sensitive menu.

The insert menu will allow you to add rows or columns to a matrix. You will often start off with a smaller matrix and then insert rows or columns to get the size that you need.



The column alignment menu will allow you to change the right-align columns so all of the numbers look correct. The default is to center-align the columns, where double digit numbers don't line up with single digit numbers. This alignment must be repeated for each column that you want to change. If you select more than one column and try to change the alignment, it doesn't work even though it says it does when you look at the alignment.



Let's say that we want to create 2×3 augmented matrix: $\left[\begin{array}{cc|c} 3 & 2 & 5 \\ 4 & 17 & 35 \end{array}\right]$

Thankfully, there is a keyboard shortcut for creating an augmented matrix.

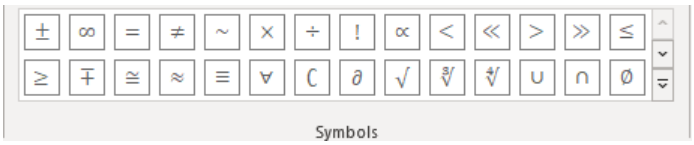
1. Type `[|]` and press `space`.
2. Click in the placeholder on the left and then go to the matrix structure and insert the size of the matrix you need for the left of the augmentation line.
3. Click in the placeholder on the right and then go to the matrix sturucture and choose the size of the matrix you need on the right of the augmentation line.
4. If needed, right click in each column and change the alignment.
5. If needed, put extra spaces before or after the augmentation line for padding.

Adding a horizontal augmentation line, such as $\left[\begin{array}{cc|c} 3 & 2 & 5 \\ \hline 4 & 17 & 35 \end{array}\right]$ is a different matter.

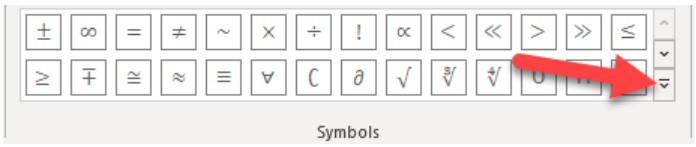
There is not a way to find a horizontal augmentation line using Microsoft Word's editor. It used to be possible in the pre-2007 version of Word, but not since then. Some students hack it by drawing a horizontal line with the drawing tools, but that does not live within the equation editor and will create problem when you move items around on the page.

Symbols

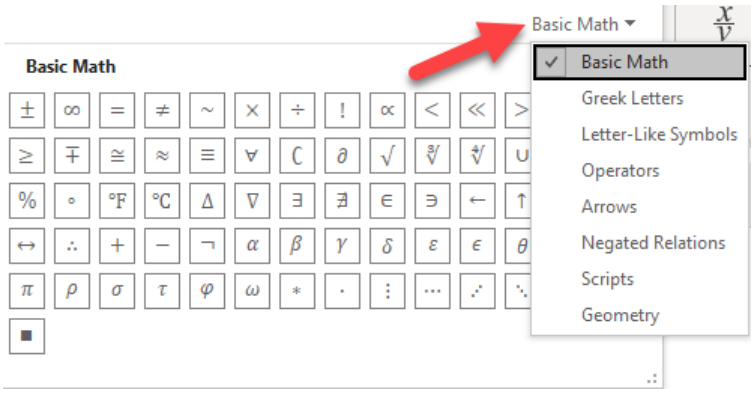
Symbols are special characters such as μ, $\pm$, or $\neq$.



To expand the symbols palette, click the down arrow with a line over it in the bottom corner. This will show you all of the symbols for that palette and let you change the palette.



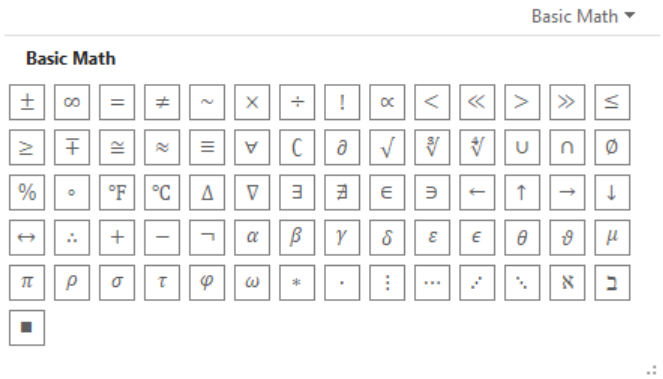
Once you have expanded a palette, the top top right corner has a drop down list that lets you change the palette. The types of palettes are basic math, Greek letters, letter-like symbols, operators, arrows, negated relations, scripts, and geometry.



Basic Math

The **basic math** palette contains frequently used symbols.

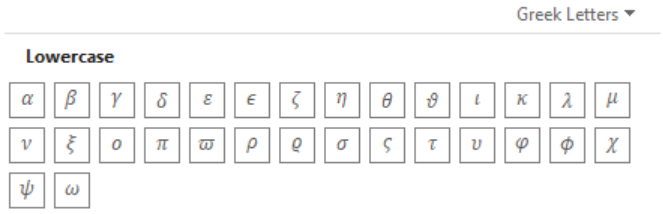
It contains common items from the other palettes and should be the first place that you look for a symbol.

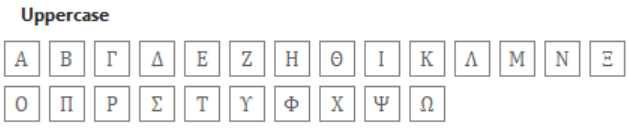


Greek Letters

The **Greek letters** palette contains lowercase and uppercase Greek letters.

Some of the more commonly used ones are on the basic math palette.

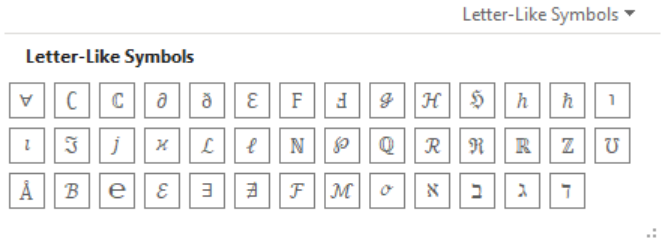




Letter-Like Symbols

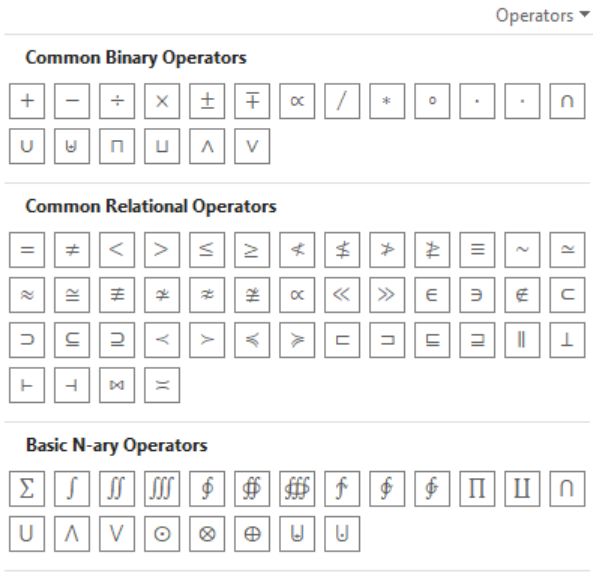
The **letter-like symbols** palette contains some special characters and sets. Most of these will not be used at a community college.

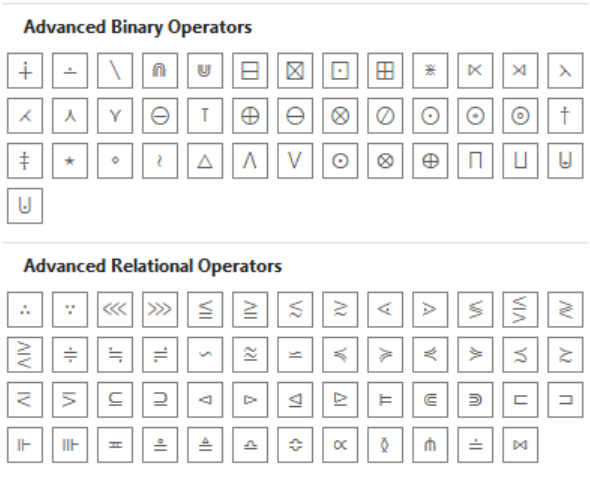
Some that are used, which are not on the basic math palette, are the $\mathbb{R}$ real numbers, $\mathbb{Z}$ integers, and $\mathscr{L}$ Laplace transform. Unfortunately, Word doesn't support the fancy script L for Laplace transform, so you have use the script L instead.



Operators

The **operators** palette offers a lot of flexibility in operators, but most of the commonly used ones can be found on the basic math palette.





Arrows

The **arrows** palette gives you a lot of arrows.

The single line arrows are on the basic math palette, but if you need any double arrows, this is the place to find them.

Note that the most common arrow, $\rightarrow$ can by typed added by typing `\to` and pressing `space`.

Negated Relations

The **negated relations** palette contains symbols with a slash through them to indicate not that relation.

The most common is $\neq$ not equal to, which can also be found on the basic math palette. It can be typed directly, without going to the symbols, by typing `\ne` and pressing `space`.

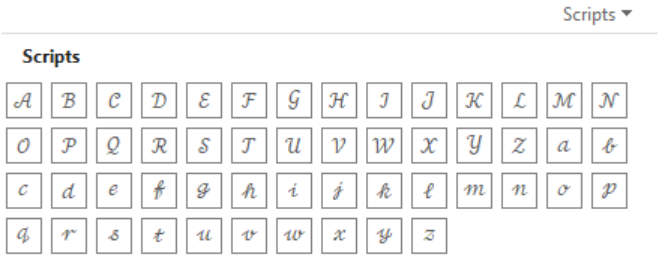
Scripts

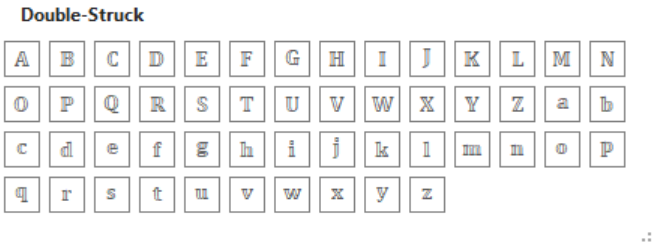
The **scripts** palette contains various versions of the letters of the alphabet. The commonly used letter scripts can be found on the letter-like symbols palette.

The scripts sub-palette contain math calligraphy, but they are restricted by the fonts available in Word.

The double-struck symbols are often used to represent sets such as $\mathbb{R}$ real numbers, and $\mathbb{Z}$ integers.

We will not use the frakturs palette.





Geometry

The **geometry** palette contains common symbols from geometry, but these are infrequently used elsewhere.