

## Creating Equations in Microsoft® Word 2010

This document describes how to create mathematical expressions such as equations, summations and formulas using Word 2010's equation builder.

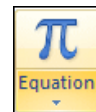
### BEFORE YOU BEGIN

Before you start creating your equations, you need to be aware of the following:

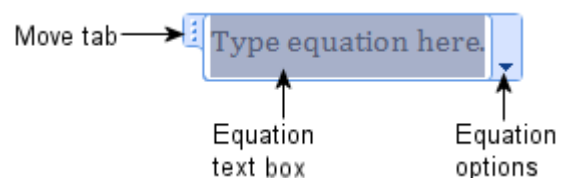
- Equations created using Microsoft Word 2007 and 2010 equation builder are not editable in earlier versions of Word. When a file containing Word 2007 or 2010 equations is converted to an earlier version of Word, any equations are turned into graphics.
- If you want your equations to be editable in an earlier version of Microsoft Word, you should use the previous version of Equation Editor (3.0) which is still available in Word 2007 and 2010. See section on: **Using Equation Editor 3.0**.
- You can edit equations in Word 2007 and 2010 which were produced with Equation Editor 3.0. Simply double-click the equation to open up the earlier version. However, unless you convert the document to Word 2007 or 2010, you will not be able to use the new equation builder.

### STARTING THE WORD EQUATION BUILDER

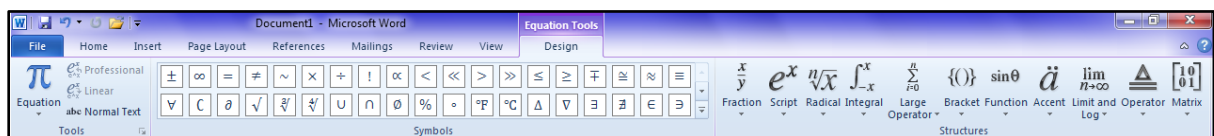
1. Place the insertion point where you want to insert the equation.
2. On the Insert tab, Symbols group, click the **Equation** icon arrow.
3. Choose either a preformatted equation from the gallery (which you can modify accordingly), or click the **Insert New Equation** option at the bottom of the list, to create an equation from scratch.



The Equation Editor box will now be displayed. (If you chose a preformatted equation, this will now appear in the box.)



### THE EQUATION EDITOR TOOLS



1. Observe the different groups on the Equation Tools, Design tab.

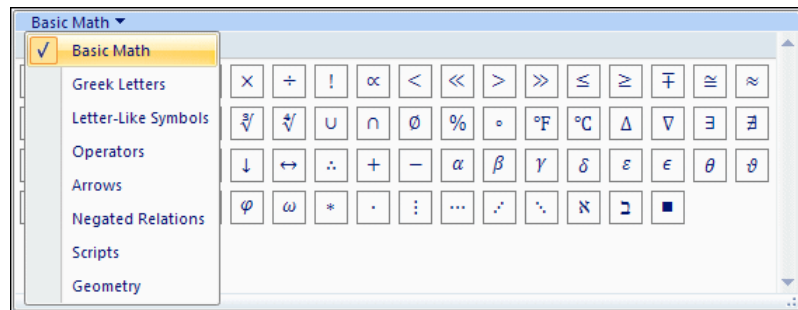
- The Structures group contains templates to create Fractions, Scripts, Radicals, Integrals, Large Operators, Brackets, Functions, Accents, Limit and Logs, Operators and Matrices.

Click the arrow beneath each structure to see the full range.

- The Symbols group contains categories of symbols, sorted by subject area. To see the full range, click the **More** button.

- Click the arrow at the top of the symbols box to expand the list.

Subject areas include: Greek Letters, Letter-Like Symbols, Operators, Arrows, Negated Relations, Scripts and Geometry.



The Tools group allows you to switch between Professional, Linear and Normal Text modes and also gives access to the gallery.

**Professional** displays the equation in a two dimensional format.

Professional format: 
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**Linear** places it on one line.

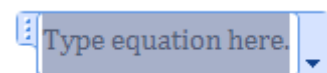
Linear format: 
$$x = (-b \pm \sqrt{(b^2 - 4ac)})/2a$$

**Normal Text** is used for inserting non-mathematical text within the equation.

## BUILDING AN EQUATION FROM SCRATCH

The following instructions demonstrate how to build a quadratic equation in the Professional format.

- If you don't have the equation box displayed, on the Insert tab, Symbols group, click on **Equation**, and choose **Insert New Equation**.



- Start typing the equation. To create the quadratic equation type:

x=

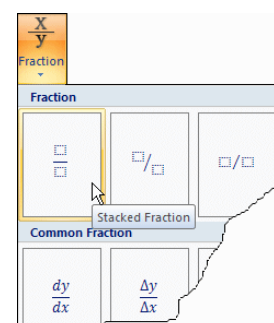
- On the Equation Tools, Design tab, Structures group, click the **Fraction arrow**.

- Click the **Stacked Fraction** option.

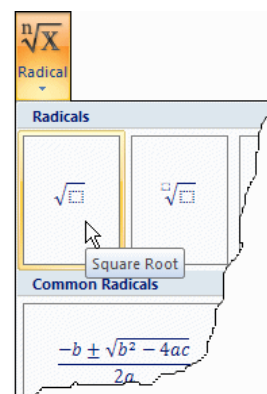
- Click the numerator to select it and then type: -b

- From the Symbols group, click on **Plus Minus**.

- On the Equation Tools, Design tab, Structures group, click the **Radical** arrow.



8. Choose the **Square Root** option.
9. Click in the placeholder and type: b
10. Select the "b", and in the Structures group, click the **Script** arrow and select the **Superscript** option.
11. Select the Superscript placeholder and type: 2
12. To move the cursor below the superscript box, press the right arrow key and type: 4ac
13. Click the denominator and type: 2a
14. Click outside the equation box and save the document.



## USING A PREFORMATTED EQUATION

If you chose one of the preformatted equations, this will now be displayed in the equation text box and you can modify it as you wish.

## MOVING AROUND THE EQUATION

To move the cursor between the placeholders, superscripts, numerators or denominators etc., either click with the mouse, or use the ARROW keys.

## DELETING EQUATIONS

To delete single elements of the equation, press the BACKSPACE key. Alternatively, select the relevant items and press the DELETE key.

## FORMATTING EQUATION ELEMENTS

Many options are available to alter the equation layout, such as modifying the alignment and spacing of a Matrix, and changing fractions from stacked, to linear or skewed. Select the relevant item, and right-click to see a sub-menu of options.

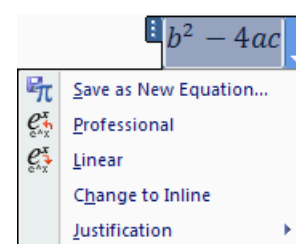
## POSITIONING EQUATIONS

An equation can be positioned in a document in two ways:

- Display - This positions the equation in a paragraph entirely on its own.
- In-line - Whereby it can be placed within the document text.

**Note:** See also section on: **Numbering Equation.**

1. To change the position, click the equation, and then click the **Equation Options** arrow on the right.
2. On the sub-menu click on **Change to Inline**, or **Change to Display** as appropriate.



**Note:** Where equations are in the Display position, their alignment within the paragraph can be changed using the **Justification** options. Be aware that Display equations cannot have any other text on the same line, and any attempt to add it, will change the equation to In-line.

To place an In-line equation within text, click on the move tab and drag into place.

## NUMBERING EQUATIONS

If you wish to number equations (e.g. on the right or left-hand side) the best way is to insert them in a table.

1. On the Insert tab, Table Group click on **Table**.
2. From the grid, select a 3 x 1 table.
3. Select the table, then on the Table Tools, Layout tab, Table group click on **Properties**.
4. In the Size section of the Table tab, select the **Preferred Width** box and change the measurement to 100%.
5. In the same window, select the Column tab and change the measurements for the first and third column to 15% and the middle one to 70%. (These measurements are optional but generally produce a satisfactory layout.)
6. To remove the table borders, select the table, click on the Table Tools, Design tab, and in the Table Styles Group click on **Borders**.
7. Select **No Border**, and if the table gridlines are not displayed, click **View Gridlines**. (These are for guidance and do not print.)
8. You will now have a "template" in which to enter the equation, along with the option to number it on the left, or right.
9. To ensure any text you type in the right or left cell aligns with the equation, click each in turn and on the Table tools, Layout tab, Alignment group, click the **Align Centre Left** button.
10. Now insert your Equation in the middle cell and add any relevant text in the left or right cell as desired.

	$f(x) = a_0 + \sum_{n=1}^{\infty} \left( a_n \cos \frac{n\pi x}{L} + b_n \sin \frac{n\pi x}{L} \right)$	Figure 1
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**Note:** If you are using your own PC, you can save this table layout for future use; however this is not possible on public cluster PCs.

11. Select the blank table and on the Insert tab and click on **Table**.
12. At the bottom of the list, click on **Quick Tables**, then **Save Selection to Quick Tables Gallery**.
13. In the Create New Building Block box, give your table a suitable name (e.g. Equation Layout Table) and then expand the Gallery list and choose **Equations**.

From now on, your ready formatted equation table will appear in the Insert, Equation gallery.

## WRITING EQUATIONS IN LINEAR FORMAT

You can choose to create equations in linear format, using the standard characters on the keyboard—this can be much quicker than using the mouse. Equation editor recognises the following characters and converts them into mathematical symbols:

^	Upper limit
_	Lower limit
/	Fraction
< >	Inequalities
<= >=	Less/greater than, or equal to
[ ] { } ( )	Brackets

The following integral equation is used as an example.

$$\int_0^1 x^2 dx = \frac{1}{3}$$

1. Press **ALT+ =** to bring up the Equation entry box.
2. Using the keyboard, type:

`\int_0^1`

and then press the space bar to create an integral object. (Typing `\int` creates the integral sign; the underscore character determines the position for the lower limit; and the caret the upper limit.)

3. In the integral object, type:

`x^2`

Press the spacebar, and then type the differential:

`dx=1/3`

Press the space bar.

## MATH AUTOCORRECT

When you enter certain strings, the Math Autocorrect feature automatically converts them into the relevant symbol or groups of characters. For example, if you type:

`\alpha`

followed by a space, this produces the Greek alpha character  $\alpha$ .

1. To see the full range of Math AutoCorrect symbols and characters, on the Equation Tools, Design tab, click the dialog box launcher in the **Tools group**.
2. In the Equation Options dialog box, click the **Math AutoCorrect** button.

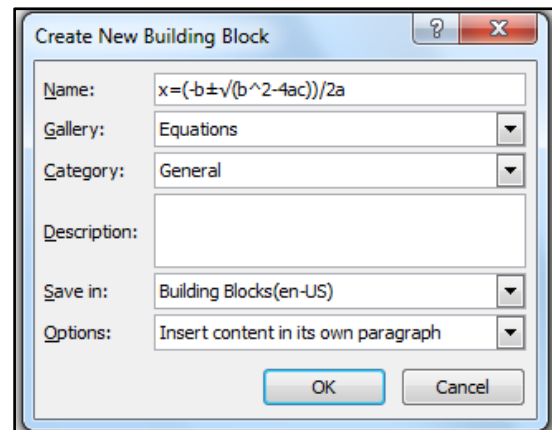
## SAVING A CUSTOM EQUATION FOR FUTURE USE

If you have created your own expression, and you have your own PC, you can save it with Word's other built-in equations.

**Note:** that this is not possible on public cluster PCs.

1. After creating your equation, click the **Equation Options** arrow and select **Save as New Equation**.
2. In the Create New Building Block box, give the equation a name.
3. Click on the Gallery arrow and from the list select **Equations** and the click **OK**.

From now on your customised equation will appear in the gallery along with Word's built-in ones.



## USING EQUATION EDITOR 3.0

This allows equations created in Word 2007 and 2010 to be edited in earlier versions of Word.

1. On the **Insert tab, Text Group**, click on **Object**.
2. In the Object dialog box, select the **Create New** tab.
3. Click on **Microsoft Equation 3.0**.

A small hatched box will be displayed with the cursor flashing in the top left-hand corner. The Equation Editor 3 toolbar and menu bar are also displayed ready for you to create your equation.

