

Creating Equations in Microsoft® Word 2003

This document describes how to produce mathematical equations in Word 2003.

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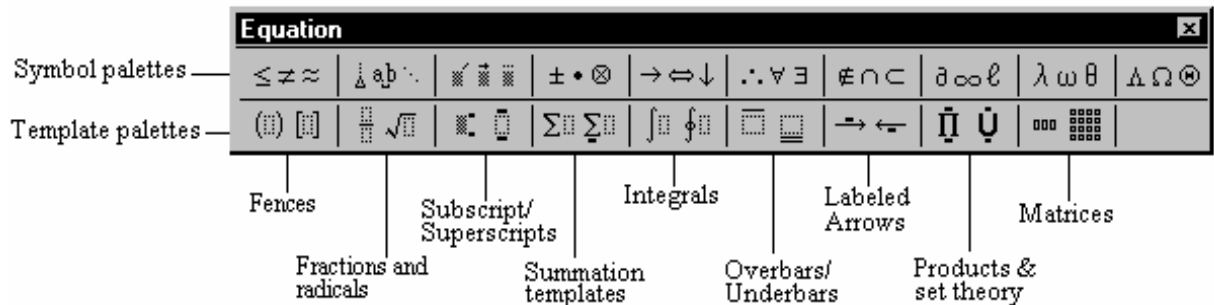
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Creating Equations in Microsoft® Word 2003

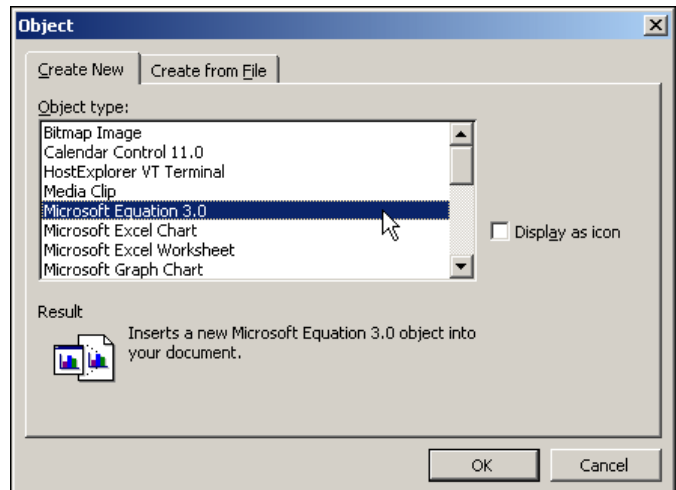
This document describes how to create a simple expression, a formula containing the solution to quadratic equations and a simple matrix equation in Microsoft Word 2003.

Equations are built by entering symbols, operators and templates into slots in a special box within the Word document window. The Equation toolbar, shown below, displays the symbol and template palettes from which equations are constructed. All the palettes are expanded in more detail at the end of this document.

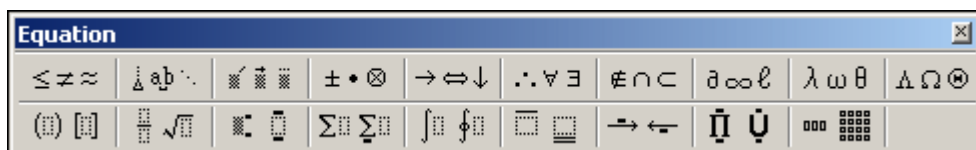


RUNNING THE EQUATION EDITOR

1. Position the insertion point at the place where the equation is to be inserted.
2. On the menu bar, click on **Insert**, and choose **Object**.
3. Ensure the **Create New** tab is selected.
4. In the **Object type:** box, select **Microsoft Equation 3.0** - it may be necessary to scroll down the list.
5. Click on **OK**.



A small hatched box appears in the Word 2003 window, with the cursor flashing in the top left hand corner. The Equation Editor toolbar and menu bar are also displayed.




- If the toolbar overlaps any part of the box or menu bar, point to an empty area on the toolbar, hold down the left mouse button, and then drag it clear.

Note: It is important not to click the mouse anywhere in the Word document window while creating or editing equations, otherwise the equation editor box and toolbar disappear. If this does happen, repeat the procedures for running the equation editor on the previous page.

CREATING THE SIMPLE EXPRESSION:

$$b^2 - 4ac$$

- Type in the letter: **b**.
- On the Equation toolbar, click the left mouse button on the **Subscript and superscript templates** icon (located third from the left on the bottom row).
- Select the **superscript** icon, which is located at the top of the left hand column. Release the mouse button.
- Type in the number: **2** then press the tab  key to leave the superscript field. The expression **b²** will then be displayed.
- Type in the characters: **-4ac**. The expression **b² - 4ac** will be displayed.
- Click outside the box to insert the equation into your document.



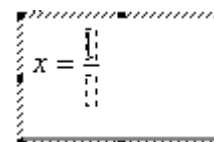
CREATING THE MORE COMPLEX EQUATION:

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

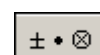
- Select the **Object...** option from the **Insert** menu and choose **Microsoft Equation 3.0**.
- Type the characters: **x=**
- Click the mouse on the **Fraction and radical templates** (located second from the left on the bottom row of the Equation toolbar).
- Keeping the mouse button pressed, move the pointer to the fraction symbol, located at the top of the left hand column. Then release the mouse button.



This inserts a fraction template as shown opposite, with the insertion point flashing in the box above the division sign.




- Type in: **-b** and then click on the fourth icon on the top row of the Equation toolbar.



6. Move the mouse pointer to the \pm symbol, located at the top of the left hand column and click once. The screen should look as shown opposite.

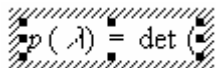
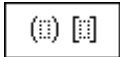
7. Select the icon containing the **Fraction and radical** templates and choose the square root symbol near the bottom of the palette of icons, on the left hand side.
8. Now create the expression **b²-4ac** as described on page 2.



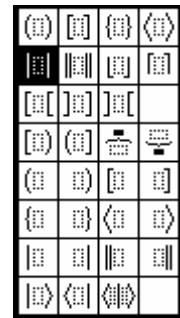
9. Press the tab  key twice to move the insertion point to the box beneath the division sign and type the characters: **2a**. The screen should now look as follows.

10. Click outside the box to insert the equation into your document.

CREATING THE SIMPLE MATRIX:

1. Invoke the Equation Editor in the normal way and type the text: **p (**
2. Select the **Greek** option from the **Style** menu and then press the letter **I**. The Greek symbol λ will be displayed on the screen. Then select the **Math** option from the **Style** menu to switch out of Greek and revert to inputting mathematical symbols.
3. Type the characters: **)=det (**
The screen should now look as follows.
 
4. Press the **<Ctrl + G>** keys followed by the **I** character. (This is a shortcut method for producing the λ character - a full list of short cut keys is given on page 7.) After inserting the character, Equation Editor reverts to the previous character style.
5. Select the **Matrix-Vector** option from the **Style** menu and then press the letter **I**. Then select the **Math** option from the **Style** menu to revert to mathematical symbols and press the **-** key.
6. Press the **<Ctrl + B>** keys (the short cut method for Matrix-Vector style) followed by the **A** character.
7. Type the **) =** characters and then choose the **Fences** templates icon which is located on the bottom left hand side of the Equation toolbar.
 

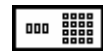
- Click on the icon containing the two vertical bars (located second from the top on the left hand column).



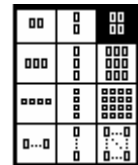
The screen display should now look as follows.

$$p(\lambda) = \det(\lambda \mathbf{I} - \mathbf{A}) = \begin{vmatrix} & \\ & \end{vmatrix}$$

- Choose the **Matrices** icon, which is located on the right hand side of the bottom row of icons.



- From the template displayed, select the icon containing the 2 x 2 matrix (located at the top of the right hand column).



- Press the <Ctrl +G> keys followed by the letter **l** key and type **-a**. Then press <Ctrl + L> followed by the numbers **11**. (Ctrl + L are the shortcut keys for inserting the subscript template.) You have now completed the first entry in the matrix.
- Highlight the first matrix element by positioning the pointer over the first element and double click the left mouse button. Then select the **Copy** option from the **Edit** menu. Move the insertion point to the next matrix element and click the left mouse button. Select the **Paste** option from the **Edit** menu. Repeat for the remaining fields.

- Edit the matrix elements until the equation looks as shown.

$$p(\lambda) = \det(\lambda \mathbf{I} - \mathbf{A}) = \begin{vmatrix} \lambda - a_{11} & -a_{12} \\ -a_{21} & \lambda - a_{22} \end{vmatrix}$$

- Click outside the box to insert the equation into your document.

RE-SIZING EQUATIONS

Once the equation has been inserted in the document, it can easily be re-sized. Click the equation once to select it, and then drag the handle in the lower right corner of the box until the desired proportions are reached. The fonts on screen may not be scaled properly, but they should print out satisfactorily.

EDITING EQUATIONS

1. To edit an equation, place the mouse pointer on it and double click the left mouse button. The equation editor toolbar and menu bar replace the application ones.
2. Make any necessary changes then click outside the box to update the equation in the document.

Alternatively, click once on the equation, and then drop down the **Edit** menu. Choose **Equation Object**, followed by **Open**. The equation now appears in its own window, with the toolbar at the top.

SELECTING ITEMS

1. To select an area of an equation, drag the mouse over the relevant section, or hold down the **Shift** key and use the arrow keys.
2. To select a symbol inside a template, hold down the CTRL key. When the mouse pointer changes to an upward pointing arrow, click the symbol. Double clicking on a slot will select its contents.

DELETING ITEMS

1. To delete characters to the left of the insertion point, press the **Backspace** key. To delete characters to the right, press the **Delete** key. To delete the contents of a slot, first select it, and then press the **Delete** key. Some slots cannot be deleted, however, unless the accompanying template is first selected, then deleted.
2. If an item is deleted by mistake, immediately choose **Undo Typing** from the **Edit** menu, which will reverse the last action.

SPACING AND ALIGNMENT

The Equation editor adjusts most spacing between elements as they are entered. Pressing the spacebar has no effect except when using the Text style.

1. If additional spaces are required, choose the spacing symbols from the Spaces/Ellipses palette.



A facility called nudging enables items to be moved horizontally or vertically in steps of 1 pixel.

2. Select the item to be moved, and then press one of the following key combinations.

To nudge the selection	Press
Left 1 pixel	CTRL + LEFT ARROW
Up 1 pixel	CTRL + UP ARROW
Down 1 pixel	CTRL + DOWN ARROW
Right 1 pixel	CTRL + RIGHT ARROW

The automatic space settings can be changed by choosing **Spacing...** from the **Format** menu. Select the relevant dimension box (click on the arrows to scroll through the list), and then type in a new number or percentage. Click on **Apply** to see how the changes will look (drag the Spacing dialog box out of the way if it obscures your equation). If you are satisfied with the modification, click on **OK**. (To revert to the default settings, click on **Defaults**, followed by **Apply**.)

CHANGING TYPESIZES

To change the size of individual items, first select the character, then choose **Other...** from the **Size** menu and type in the desired point size. To change the default size settings, choose **Define...** from the **Size** menu and type in your desired sizes in the dimension boxes. Click on **Apply** to see how the changes will look (drag the Sizes dialog box out of the way if it obscures your equation). If you are satisfied with the modification, click on **OK**. (To revert to the default settings, click on **Defaults**, followed by **Apply**.)

If you change the default settings, these will only affect the current equation. Any other equations in your document will retain the original default sizes until you move them back into the equation editor, whereupon the new defaults will be applied.

NUMBERING EQUATIONS

There is a simple way to number equations within Word.

1. After selecting the equation, click on the **Insert** menu, select **References** and then **Caption**.
2. From the **Label** box, choose **Equation** (or choose **New Label** if you wish to re-name it) and make a choice from the **Position** box followed by **OK**.

VIEWING EQUATIONS

It may be easier to work on equations by increasing the size of the characters displayed on the screen within Word. From the **View** menu, choose **Zoom...** and click on the **Percent** box arrows to increase the figure.

Sometimes an equation will not display clearly on the screen, particularly after deleting and re-inserting characters. The **Redraw** facility on the **View** menu in the Equation Editor tidies up the fragmented symbols, and re-displays the equation at the current scale.

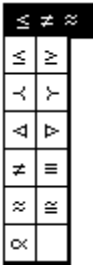
KEYBOARD SHORTCUT KEYS

Math	CTRL + SHIFT + =
Text	CTRL + SHIFT + E
Function	CTRL + SHIFT + F
Variable	CTRL + SHIFT + I
Greek	CTRL + SHIFT + G (Starts Greek style, or applies it to a selection.) CTRL + G (Substitutes appropriate Greek character for next letter typed.)
Matrix-Vector	CTRL + SHIFT + B (Starts Matrix-Vector style, or applies it to a selection.) CTRL + B (Assigns Matrix-Vector style to next character typed.)
Subscript template	CTRL + L
Superscript template	CTRL + H

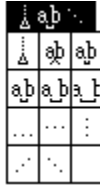
GREEK CHARACTER KEYBOARD EQUIVALENTS

CHARACTER	Greek Symbol	Lower Case	Greek Symbol	Upper Case
alpha	α	a	Α	A
beta	β	b	Β	B
gamma	γ	g	Γ	G
delta	δ	d	Δ	D
epsilon	ε	e	Ε	E
zeta	ζ	z	Ζ	Z
eta	η	h	Η	H
theta	θ	q	Θ	Q
iota	ι	i	Ι	I
kappa	κ	k	Κ	K
lambda	λ	l	Λ	L
mu	μ	m	Μ	M
nu	ν	n	Ν	N
xi	ξ	x	Ξ	X
omicron	ο	o	Ο	O
pi	π	p	Π	P
rho	ρ	r	Ρ	R
sigma	σ	s	Σ	S
tau	τ	t	Τ	T
upsilon	υ	u	Υ	U
phi	φ	f	Φ	F
chi	χ	c	Χ	C
psi	ψ	y	Ψ	Y
omega	ω	w	Ω	W

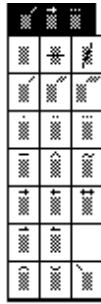
SYMBOL PALETTES



Relational Symbols



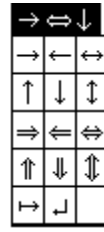
Spaces and Ellipses



Embellishments



Operator Symbols



Arrow Symbols



Logical Symbols



Set Theory Symbols



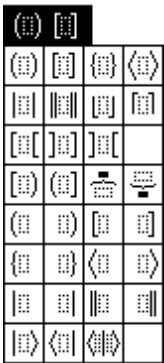
Miscellaneous Symbols



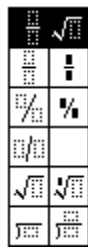
Greek Characters



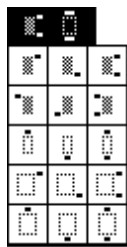
TEMPLATE PALETTES



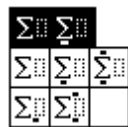
Fences Templates



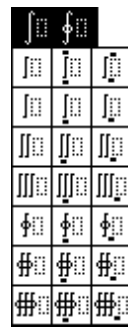
Fractions and Radical Templates



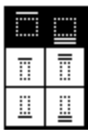
Subscript & Superscript Templates



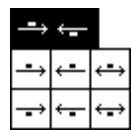
Summation Templates



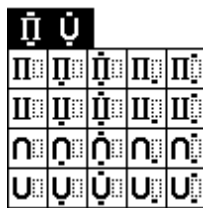
Integral Templates



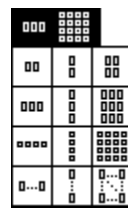
Overbar & Underbar Templates



Labeled Arrow Templates



Products and Set Theory Templates



Matrix Templates