

## **Commands on the File menu (Equation Editor)**

The File menu commands enable you to place or update equations in your document, or to end your Equation Editor session.

These commands are available only if you open the object by choosing the Equation Object command from the Edit menu and then choosing the Open command, or if you edit equations in a separate application window. To edit in a separate window, set the ForceOpen option to 1 in the [General] section of the EQNEDIT.INI file in Windows or the Windows NT Registry in Windows NT. The setting would appear as follows:

[General]

ForceOpen=1

### **Update**

Updates the equation in your document without closing the Equation Editor window.

### **Exit And Return To Document**

Quits and closes all Equation Editor windows and updates the equation in the document if you have made changes.

## **Commands on the Edit menu (Equation Editor)**

The Edit menu contains commands for modifying the equation in various ways. You can use these commands to move or copy portions of the equation from one place to another by placing them on the Clipboard.

### **Undo**

Reverses the last operation you performed. If the last operation was an Undo, choosing this command reinstates the operation you reversed. If Equation Editor cannot undo the last operation, this command will appear dimmed in the menu.

### **Cut**

Transfers the currently selected items to the Clipboard, and deletes them from the equation. The previous contents of the Clipboard are lost, even if you reverse the Cut operation.

### **Copy**

Copies the currently selected items to the Clipboard without deleting them from the equation. The previous contents of the Clipboard are lost, even if you reverse the Copy operation.

### **Paste**

Copies the contents of the Clipboard into the equation at the insertion point, or replaces whatever is selected. If the Clipboard contains something besides an equation, Equation Editor displays an error message.

### **Clear**

Removes the currently selected items from the equation. This command does not affect the contents of the Clipboard.

### **Select All**

Selects the entire equation, including any portions not visible because they are outside the window border. This command is useful for copying the equation to the Clipboard for transfer to a document.

## Commands on the View menu (Equation Editor)

The View menu contains commands which affect the appearance of the Equation Editor window and the way equations are displayed in it.

The magnification commands (100%, 200%, 400%, and Zoom) are available only if you start Equation Editor as a separate application or if you open an equation by choosing the Equation Object command from the Edit menu, and then choose the Open command.

### **100%**

Displays the equation in the current window at its actual size — that is, the same size as it will appear in a document or when printed.

### **200%**

Displays the equation in the current window at twice its normal size. This command does not affect the size of the equation in your document.

### **400%**

Displays the equation in the current window at four times its normal size. This is useful for viewing small characters, or for performing minor adjustments using the Nudge commands. This command does not affect the size of the equation in your document.

### **Zoom**

Controls the display of the equation in the current window. You can enlarge the display to make it easier to edit parts of an equation, or reduce the display to view an entire equation. For more information, see the [Zoom command \(View menu\)](#).

### **Toolbar**

Displays or hides the Equation Editor toolbar.

### **Redraw**

Redisplays the equation in the current window at the current scale. This is useful for cleaning up the display.

### **Show All**

Turns on and off the display of certain special symbols in equations, including tab characters and explicit spaces.

## Commands on the Format menu (Equation Editor)

The Format menu is used to control the positioning of equations or elements of equations. The first five commands control the horizontal alignment (justification) of items in piles and matrices. To apply an alignment command, the current selection or insertion point must be in a pile or matrix. To apply an alignment command to the columns in a matrix, use the Matrix command.

### **Align Left**

Moves lines horizontally to align their left-most characters.

### **Align Center**

Moves lines horizontally to align their centers.

### **Align Right**

Moves lines horizontally to align their right-most characters.

### **Align At =**

Moves lines horizontally to align = signs and other equality and inequality signs with one another.

### **Align At .**

Moves lines horizontally to align decimal points with one another. The decimal points may be periods or commas, depending on your country's mathematical conventions.

### **Matrix**

Allows you to modify a previously created matrix. To use this command, you must either select the matrix you wish to modify, or place the insertion point somewhere within it. Otherwise, the command will be dimmed in the menu, indicating that it is unavailable. The dialog box that appears is the same one you use when initially creating matrices. For more information, see the [Matrix command on the Format menu](#).

### **Spacing**

Allows you to define the position of items in equations. For more information, see the [Spacing command on the Format menu](#).

## Commands on the Style menu (Equation Editor)

Each of the commands in the Style menu is used to assign a specific style or font to a selected group of characters in your equation, or to control how styles and fonts will be assigned to any characters that you subsequently type. You can also directly apply style and font formatting by using the Other command and redefine a built-in style by using the Define command. For more information, see [Change an Equation Editor style](#).

### Math

Assigns the [Math style](#) either to selected characters or to characters that you subsequently type. In most cases, you should use the Math style because it differentiates between functions and variables and then formats the characters accordingly. Use other styles to include special characters.

### Text

Assigns the Text style either to selected characters or to characters that you subsequently type. Choose this option to make it easier to type ordinary text with Equation Editor. This option also disables the automatic spacing function in Equation Editor and activates the SPACEBAR on your keyboard. For more information on using the Text command, see [Enter text in an equation](#).

### Function

Assigns the Function style either to selected characters or to characters that you subsequently type. Use this command to assign the Function style to a sequence of characters that Equation Editor fails to recognize as a function name.

### Variable

Assigns the Variable style either to selected characters or to characters that you subsequently type. Use this command to assign the Variable style to a sequence of characters that Equation Editor incorrectly recognizes as a function name.

### Greek

Assigns one of the two Greek styles either to selected characters or to characters that you subsequently type. Lowercase characters are assigned the L.C. Greek style, and uppercase ones are assigned the U.C. Greek style. For information on entering Greek styles using the keyboard, see [Applying styles to an equation using keys](#).

### Matrix-Vector

Assigns the Matrix-Vector style either to selected characters or to characters that you subsequently type. For information on entering Matrix-Vector styles using the keyboard, see [Applying styles to an equation using keys](#).

### Other

Allows you to assign fonts and character formats directly either to selected characters or to characters that you subsequently type.

### Define

Allows you to define the styles that are used in equations. For more information, see the [Define command on the Style menu](#).

## Commands on the Size menu (Equation Editor)

Each of the commands on the Size menu is used to assign a specific type size either to a selected group of characters or to characters that you type subsequently. For more information, see [Change the definition of a type size in an equation.](#)

### **Full**

Assigns the full size either to selected characters or to characters that you type subsequently in the same slot.

### **Subscript**

Assigns the subscript size either to selected characters or to characters that you type subsequently in the same slot.

### **Sub-Subscript**

Assigns the sub-subscript size either to selected characters or to characters that you type subsequently in the same slot.

### **Symbol**

Assigns the symbol size either to selected characters or to characters that you type subsequently in the same slot.

### **Sub-Symbol**

Assigns the sub-symbol size either to selected characters or to characters that you type subsequently in the same slot.

### **Other**

Allows you to assign an explicit size either to selected characters or to characters that you type subsequently in the same slot.

### **Define**

Allows you to change the definitions of the first five sizes listed on this menu. For more information, see the [Define command on the Size menu.](#)

## **Commands on the Help menu (Equation Editor)**

The Help menu commands give you access to Equation Editor's Help system. You can view the Help index or go to a more specific topic. You can also learn how to use Help, and find out what Equation Editor version you have.

### **Contents**

Displays the contents of the Equation Editor Help system, step-by-step instructions for using Equation Editor, reference information, and an example of Equation Editor features.

As you look through Help, you can return to the Contents screen by clicking the Contents button in the Help window.

### **Search For Help On**

Searches in Help for information related to topics on which you want more information.

To use the Search For Help On command, type the topic or select it from the list in the Search dialog box, and then choose the Show Topics button to see related topics. To display a particular topic from the list of topics, choose the Go To button.

### **About Equation Editor**

Displays the version number of your copy of Equation Editor.

## Define command on the Size menu (Equation Editor)

Displays the Sizes dialog box, where you specify the type sizes assigned to various equation elements, such as the symbol characters used in templates. When you change a type size, all equations in the current Equation Editor window will be redrawn using the new type sizes. Equations saved in documents will not be affected unless you edit them again with Equation Editor.

When you change type sizes, you must be sure that you have fonts available in the sizes you specify. If you have TrueType fonts, this will not be a problem.

### Dialog Box Options

#### Full

Specifies the font size used for ordinary characters within most slots. The default is 12 points.

#### Subscript/Superscript

Specifies the font size used for subscripts and superscripts attached to Full-size characters. Also used in limits in integral, summation, and other templates. The default is 7 points.

#### Sub-Subscript/Superscript

Specifies the font size used for subscripts and superscripts attached to Subscript-size characters or in any other situation that requires a second level of size reduction. Also used for limit slots of templates inside the limits of other templates. For example, the Sub-Subscript size is used for a superscript within a limit of integration. The default is 5 points.

#### Symbol

Specifies the font size used for the oversize symbols that are part of the templates for integrals, summations, products, and so forth. The default is 18 points.

#### Sub-Symbol

Specifies the font size used by templates for symbols subscripted or superscripted relative to other characters. The default is 12 points.

#### Cancel

Allows you to quit the dialog box without making any changes, even if you have used the Apply command.

#### Apply

Lets you preview the effect of your type size changes. After choosing the Apply button, you can choose either the Cancel button or the OK button. If you choose the Cancel button, the new sizes will not be applied. If you choose the OK button, the new sizes will be applied.

#### Defaults

Resets all size definitions to their Equation Editor preset sizes.

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#### See also

[Change the definition of a type size in an equation](#)



## **Matrix command on the Format menu (Equation Editor)**

Displays the Matrix dialog box, where you specify the number of rows and columns in your matrix, and how they are aligned. You can also create tables and boxes around equations. The Matrix dialog box also appears when you choose one of the bottom three templates in the matrix palette.

### **Dialog Box Options**

#### **Column Align**

Entries in each column are positioned horizontally so that they are aligned according to the option you choose. The alignment options are the same as those on the Format menu.

#### **Columns**

Specifies the number of columns in the matrix. You can specify up to 31 columns.

#### **Equal Column Widths**

All column widths in the matrix are set to the same size as the widest column.

#### **Row Align**

Entries in each row are positioned vertically so that their tops, bottoms, or baselines are aligned.

#### **Rows**

Specifies the number of rows in the matrix. You can specify up to 31 rows.

#### **Equal Row Heights**

If you select the Equal Row Heights box, each row will be the height of the tallest row, as determined by the tallest row entry. Otherwise, Equation Editor determines the height of each row individually.

#### **Tables And Boxes**

If you click in the gaps between the matrix cells in the dialog box, you can create various types of lines to partition the matrix. Your first click produces a solid line, clicking it again changes it to a dashed line, a third click makes it dotted, and a fourth click removes it. By clicking around the outside of the matrix cells rather than between them, you can create lines around the edge of the matrix. This allows you to construct tables.

To enclose an equation in a box, create the equation in a  $1 \times 1$  matrix slot. When you format the matrix, click once along each side of the matrix cell to produce solid lines.

## Define command on the Style menu (Equation Editor)


Displays the Styles dialog box, where you specify the font and character formatting for the Equation Editor styles.

### Dialog Box Options

#### Style

Lists the available styles.

#### Font

The entry in the Font column shows the name of the font currently assigned to the style. To choose a different font, click the  next to the font name. The list of fonts shown will depend on the [default printer](#) you have selected and the particular fonts you have installed.

#### Character Format

A check mark under Character Format columns indicates that a style is defined as having bold or italic character format. Selecting an empty box puts an  $\times$  in it, indicating that the format is selected, and clicking an

$\times$  clears it, removing the format.

#### Cancel

Allows you to leave the Define Styles dialog box without altering anything.

#### OK

Updates the style definitions to the new ones you have selected. Any equations in open Equation Editor windows will be reformatted to reflect the changes. Equations saved in documents will not be affected unless you open them again in Equation Editor.

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### See also

[Change the definition of a type size in an equation](#)

[Change an Equation Editor style](#)

[Commands on the Style menu](#)

## **Zoom command on the View menu (Equation Editor)**

Displays the Zoom dialog box, where you control how large or small the equation appears on the screen.

**Note** This command is available only if you start Equation Editor as a separate application or if you open an equation by choosing the Equation Object command from the Edit menu, and then choosing the Open command.

### **Dialog Box Options**

#### **Magnification**

Select how large or small you want the equation to appear as a percentage of the normal size. For example, 200% displays the equation at twice its normal size, and 400% displays the document at four times its normal size.

#### **Custom**

Reduces or enlarges the display of the equation by the percentage you specify. The percentage must be between 25 and 400 percent.

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### **See also**

[Change the display size of an equation](#)

## Spacing command on the Format menu (Equation Editor)

Displays the Spacing dialog box, where you specify the dimensions used by the Equation Editor's automatic spacing and formatting algorithms. When you type in new values for dimensions, you can use the Equation Editor default, which is specified as a percent of Full size (%). You can also use inches (in), centimeters (cm), millimeters (mm), points (pt), or picas (pi). To reset all definitions to the Equation Editor preset sizes, choose the Defaults button.

### Dialog Box Options

#### Line Spacing

Specifies the spacing between text lines in an equation.

#### Matrix Row Spacing

Specifies the spacing between rows in matrix.

#### Matrix Column Spacing

Specifies the spacing between columns in a matrix.

#### Superscript Height

Specifies the amount to raise the baseline of text to create a superscript.

#### Subscript Depth

Specifies the amount to lower the baseline of text to create a subscript.

#### Limit Height

Specifies the amount to raise the baseline of text above a template symbol such as

$\sum$  or  
 $\sqrt{\quad}$ .

#### Limit Depth

Specifies the amount to lower the baseline of text below a template symbol such as  $\sum$  or

$\sqrt{\quad}$ .

#### Limit Line Spacing

Specifies the amount to lower the baseline of additional lines of text below a template symbol such as  $\sum$  or

$\sqrt{\quad}$ .

#### Numerator Height

Specifies the amount to raise the lowest point in the numerator text above the fraction bar.

#### Denominator Depth

Specifies the amount to lower the baseline of denominator text in a fraction below the fraction bar.

#### Fraction Bar Overhang

Defines how far the fraction bar extends before and after the longest numerator or denominator.

#### Fraction Bar Thickness

Specifies the line thickness for fraction and other partition bars.

#### Sub-Fraction Bar Thickness

Specifies the line thickness for sub-fraction bars (fractions within a fraction).

#### Fence Overhang

Defines how far fence symbols, such as brackets ([ ]), extend above and below any text or symbols.

#### Spacing Adjustment

Specifies the spacing between text and symbols (such as +, -, /, etc.) on the same line. This must be a percentage.

#### Minimum Gap

Specifies the minimum spacing allowed between the numerator, denominator, and fraction bar.

#### Radical Gap

Specifies the amount to lower text in a radical.

**Embellishment Gap**

Specifies the amount to raise characters above text to create embellishments. This does not apply to primes; see Prime height.

**Prime Height**

Specifies the amount to raise the prime character above text.

**Cancel**

Allows you to quit the dialog box without making any changes, even if you have used the Apply command.

**Apply**

Lets you preview the effect of your spacing changes. After choosing the Apply button, you can choose either the Cancel button or the OK button. If you choose the Cancel button, the new spacing will not be applied. If you choose the OK button, the new spacing will be applied.

**Defaults**

Resets all spacing definitions to their Equation Editor preset percentages.

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**See also**

[Change a spacing definition in an equation](#)

**pile**

A pile is a vertical stack of equations or items in an equation. You create a pile by pressing ENTER at the end of a slot. A new slot opens beneath the current one. You can fill the new slot, press ENTER again, and so forth, forming a vertical stack. A pile can be created from any equation slot. You can have several piles in an equation, or you can have a pile of equations.

**default printer**

When you install Windows, you can install printer driver software for one or more printers. You install printers using the Windows Control Panel application. A "default" printer is selected from the installed printers. Whenever you print from a Windows application, this default printer is used. Your choice of default printer affects the fonts Equation Editor can use. To change the default printer, you can use the Windows Control Panel, or you can choose the Printer Setup command from the File menu of your document.

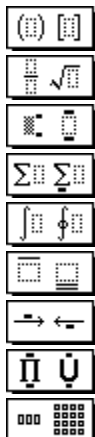
### symbol palettes



The symbol buttons are on the top row of the Equation Editor toolbar. When you click one of the symbol buttons, a palette of symbols is displayed. To insert a symbol from one of the palettes, continue holding the mouse button down and drag the arrow pointer to the symbol you want to insert. When the symbol is highlighted, release the mouse button.



### template palettes



The template buttons are on the bottom row of the Equation Editor toolbar. When you click one of the template buttons, a palette of templates is displayed. To insert a template from one of the palettes, continue holding the mouse button down and drag the arrow pointer to the template you want to insert. When the template is highlighted, release the mouse button.

**Math style**

When the Math style is in effect, Equation Editor applies a function recognition algorithm to selected characters or to characters you type subsequently. If it recognizes a string of characters as a standard abbreviation for a function name, such as sin for the sine function, the characters will be formatted in the Function style. Otherwise, the Variable style will be used.

**ellipsis**

An ellipsis is a series of three dots indicating that items have been left out, usually because they are obvious from the context. Equation Editor provides symbols that enter horizontal, vertical, and diagonal rows of dots to indicate various types of omissions.

**embellishments**

Mathematical variables often have primes, hats, bars, and dots attached. Sometimes known as diacriticals or accents, in Equation Editor they are referred to as character embellishments.

**equation**

A formal statement of the equality or equivalence of mathematical or logical expressions.

**fences**

Fences, or delimiters, provide various ways of enclosing expressions between a matching pair of symbols. These include various brackets, parentheses, braces, and single or double vertical bars.

**matrix**

A matrix is an array or table of elements that is used to build column vectors, determinants, matrices, and other tabular layouts.

**nudging**

Nudging allows you to exercise fine control over the placement of items in an equation. The selected items can be moved horizontally or vertically in steps of 1 pixel at the current display scale. If you use the Nudge commands with the equation displayed at 400%, you can move items in increments of one-fourth of a point.



**operator symbol**

Mathematical operator symbols, such as the plus or minus sign, indicate an operation that acts on one or more elements. Included are symbols for simple arithmetic operations, operations on sets or abstract algebraic entities, and composition of functions.

**palette**

A palette is a grouping of related symbols and templates that appear when you click a button on the Equation Editor toolbar. The symbol palettes can be considered simply an extension of your keyboard. Choosing a symbol inserts it into your equation in the same way that pressing a key inserts a character. The template palettes insert formatted collections of symbols and empty slots. To construct an equation, you simply insert templates and then enter expressions in their slots.

**relational symbol**

A relational symbol expresses a relationship between two quantities, most of them involving equality, inequality, or equivalence.

**symbol**

Symbols are special characters used to build equations. Related symbols are grouped together on palettes that you select by clicking a button on the Equation Editor toolbar. The Symbol palettes can be considered simply an extension of your keyboard. Choosing a symbol inserts it into your equation in the same way that pressing a key inserts a character.

**template**

A template is a formatted collection of symbols and empty slots. You build expressions by inserting templates and then filling in their slots. When you insert a template, the insertion point moves to the slot you are most likely to use first — known as the primary slot. You can insert templates into the slots of other templates to create complex hierarchical formulas.

### Equation Editor, and what it can do

This equation represents a statistical quantity, standard deviation. Click the boxes for information on what Equation Editor can do.

The diagram shows the equation for standard deviation: 
$$s_x = \sqrt{\frac{1}{n-1} \left\{ \sum_{i=1}^n X_i^2 - n\bar{X}^2 \right\}}$$
 Several callout boxes with icons point to different parts of the equation, illustrating the capabilities of the Equation Editor:

- Enlarged view**: Points to the entire equation.
- Redraw**: Points to the top horizontal line of the equation.
- Styles**: Points to the fraction  $\frac{1}{n-1}$ .
- Expanding templates**: Points to the summation symbol  $\sum$ .
- Spacing and alignment**: Points to the variable  $s_x$ .
- Insertion point**: Points to the variable  $X_i$  in the summation.
- Embellishments**: Points to the bar over the  $X$  in  $\bar{X}$ .

**Enlarged view**

As you work, you can choose 100%, 200%, or 400% from the View menu to change the size of the displayed equation, or specify any custom zoom from 25 to 400%. This does not affect the size of the printed equation. To use this view when editing, start Equation Editor as a separate application or open the object by choosing the Equation Object command from the Edit menu, and then choosing the Open command.

**Redraw**

After making large formatting changes, you may need to redraw the screen to remove stray marks such as these. You can redraw the screen immediately by choosing the Redraw command from the View menu or by pressing CTRL+D (for "draw").



## **Styles**


When you work in the default Math style, Equation Editor formats any character it recognizes as a mathematical variable in italic. You can apply other styles with the Style menu. For example, use the Text style when you type words that you don't want interpreted as variables, vectors, matrices, or other mathematical items.

**Expanding templates**

You can insert the square root sign or any other template simply by choosing it from palettes that appear when you click a button on the Equation Editor toolbar. Templates expand automatically as you type more of the equation.

## Spacing and alignment

Equation Editor automatically takes care of spacing; in the default Math style, pressing the SPACEBAR has no effect. To get exactly the look you want, you can:

- Choose one of the  spaces from the Equation Editor toolbar.
- "Nudge" selected items by using CTRL+ARROW key combinations,
- Align a "pile" of equations by choosing an alignment command from the Format menu,

**Insertion point**

You can use the TAB key to cycle forward through an equation's slots, and SHIFT+TAB to cycle backwards. The shape and size of the insertion point changes as it moves from slot to slot. A horizontal bar runs along the base of the slot, and a vertical bar runs from the top to the bottom. In this example, the insertion point is in position for typing another character the same size as the  $X$ .

## Embellishments



You can attach primes, hats, bars, and dots to mathematical variables. Simply position the insertion point to the right of the variable and choose one of the embellishments from the Equation Editor toolbar.



You can attach slots for superscripts and subscripts the same way, using a different palette on the toolbar.

## Positioning the insertion point in an equation using keys

<b>Pressing</b>	<b>Moves the insertion point</b>
TAB	To the end of the slot. If the insertion point is at the end of a slot, it moves to the next logical slot.
SHIFT+TAB	To the end of the previous slot.
RIGHT ARROW	Right one unit within the current slot or template.
LEFT ARROW	Left one unit within the current slot or template.
UP ARROW	Up one line.
DOWN ARROW	Down one line.
HOME	To the beginning of the current slot.
END	To the end of the current slot.

**Note** To insert a tab character in a slot, press CTRL+TAB.

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### See also

[Keyboard Guide](#)

## Changing the display size of an equation using keys

<u>To choose</u>	<u>Press</u>
100%	CTRL+1
200%	CTRL+2
400%	CTRL+4
Redraw	CTRL+D
Show All	CTRL+Y

**Note** These commands are available only if you start Equation Editor as a separate application or open an object by choosing the Equation Object command from the Edit menu, and then choosing the Open command.

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### See also

[Keyboard Guide](#)

## Aligning an equation using keys

<b>To align</b>	<b>Press</b>
Left	CTRL+SHIFT+L
Center	CTRL+SHIFT+C
Right	CTRL+SHIFT+R

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### See also

[Keyboard Guide](#)



## Applying styles to an equation using keys

<b>To choose</b>	<b>Press</b>
Math	CTRL+SHIFT+=
Text	CTRL+SHIFT+E
Function	CTRL+SHIFT+F
Variable	CTRL+SHIFT+I
Greek	CTRL+SHIFT+G
Matrix-Vector	CTRL+SHIFT+B

You can also use keyboard shortcuts to change the style assigned to the next character that you type. When you type the shortcut, the status bar tells you that a special mode is in effect. After you have inserted one character, Equation Editor reverts to the previous style.

<b>To assign</b>	<b>Press</b>
Symbol	CTRL+G
Matrix-Vector	CTRL+B

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### See also

[Keyboard Guide](#)

## Inserting symbols in an equation using keys

Many symbols can be inserted using a CTRL+K, *character* sequence.

**Note** These key combinations are not available with Windows NT.

To insert	Representing	Press CTRL+K,
$\infty$	Infinity	I
$\rightarrow$	Arrow	A
$\partial$	Derivative (partial)	D
$\leq$	Less than or equal to	<
$\geq$	Greater than or equal to	>
	Times	T
$\in$	Element of	E
$\notin$	Not an element of	SHIFT+E
$\subset$	Contained in	C
$\not\subset$	Not contained in	SHIFT+C

All of these symbols are characters from the Symbol font, so they can also be inserted by using their ALT key character codes.

You can insert any symbol on a palette by using the keyboard procedure described in [Insert symbols and templates in an equation.](#)

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




### See also

[Keyboard Guide](#)

## Inserting templates in an equation using keys

Templates can be inserted using a CTRL+*character* combination or a CTRL+T, *character* sequence.

**Note** Some key combinations are not available with Windows NT.

To insert	Template	Press
	Parentheses	CTRL+9 OR CTRL+0
	Brackets	CTRL+[ OR CTRL+]
	Braces	CTRL+{ OR CTRL+}
	Fraction	CTRL+F
	Slash fraction	CTRL+/ 
	Superscript (high)	CTRL+H
	Subscript (low)	CTRL+L
	Joint sub/ superscript	CTRL+J
	Integral	CTRL+I
	Absolute value	CTRL+T, I
	Root	CTRL+R
	<i>n</i> th root	CTRL+T, N
	Summation	CTRL+T, S
	Product	CTRL+T, P
	Matrix template 3X3	CTRL+T, M
	Underscript (limit)	CTRL+T, U

You can insert any template on a palette by using the keyboard procedure described in [Insert symbols and templates in an equation.](#)







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### See also

[Keyboard Guide](#)

## Applying embellishments in an equation using keys

You can attach an embellishment to the character to the left of the insertion point with keyboard shortcuts.

To apply	Description	Press
	Overbar	CTRL+SHIFT+HYPHEN
	Tilde	CTRL+~ (CTRL+" on some keyboards)
	Arrow (vector)	CTRL+ALT+HYPHEN
	Single prime	CTRL+ALT+'
	Double prime	CTRL+" (CTRL+~ on some keyboards)
	Single dot	CTRL+ALT+PERIOD

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### See also

[Keyboard Guide](#)

## Adjusting the spacing between elements in an equation using keys

<b>To nudge</b>	<b>Press</b>
Left by 1 pixel	CTRL+LEFT ARROW
Right by 1 pixel	CTRL+RIGHT ARROW
Down by 1 pixel	CTRL+DOWN ARROW
Up by 1 pixel	CTRL+UP ARROW

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### See also

[Keyboard Guide](#)

## Accessing the Equation Editor toolbar using keys

<b>To</b>	<b>Press</b>
Move to toolbar	F2
Display a palette	UP OR DOWN ARROW
Select a palette item	UP, DOWN, LEFT, OR RIGHT ARROW
Move to the next or previous palette	LEFT OR RIGHT ARROW
Insert selected palette item	ENTER

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### See also

[Keyboard Guide](#)

## **Menu Commands (Equation Editor)**

Choose one of the following topics to get more information on the commands in a particular menu:

[Commands on the File menu](#)

[Commands on the Edit menu](#)

[Commands on the View menu](#)

[Commands on the Format menu](#)

[Commands on the Style menu](#)

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## Definitions (Equation Editor)

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## **Keyboard Guide (Equation Editor)**

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[Accessing the Equation Editor toolbar using keys](#)

## Troubleshoot Equation Editor problems

- » Equation Editor's fonts are not available on the default printer
- » Font & Style (name) not available on the printer; (name) was substituted
- » Equations display incorrectly
- » Spacing is incorrect in equations
-  Equation Editor interprets part of an English word as a function abbreviation
-  Using TrueType fonts with Equation Editor



## Inserting mathematical symbols in an equation

The buttons on the top row of the Equation Editor toolbar are used to insert more than 150 mathematical symbols.



[Inserting relational symbols in an equation](#)



[Inserting spaces and ellipses in an equation](#)



[Applying embellishments in an equation](#)



[Inserting operator symbols in an equation](#)



[Inserting arrow symbols in an equation](#)



[Inserting logical symbols in an equation](#)



[Inserting set theory symbols in an equation](#)



[Inserting miscellaneous symbols in an equation](#)



[Inserting Greek characters in an equation](#)



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### See also

[Insert nonmathematical symbols in an equation](#)

[Insert symbols and templates in an equation](#)

[Inserting symbols in an equation](#)

[Inserting mathematical templates in an equation](#)

## Inserting relational symbols in an equation

$\approx$	$\approx$
$\preceq$	$\preceq$
$\triangleleft$	$\triangleleft$
$\mathbb{N}$	$\equiv$
$\approx$	$\approx$
$\propto$	

The symbols on this palette each express a relationship between two quantities, most of them involving equality, inequality, or equivalence.

- The inequality symbols  $\approx$ ,

$\preceq$ ,  $\mathbb{N}$ , are included. The strict inequality symbols  $<$  (less than) and  $>$  (greater than) can easily be typed and are not included.

- The equality symbol  $=$  can easily be typed and is not included.

- $\preceq$  and

$\preceq$  denote partial order relationships.

- $\triangleleft$  and

$\triangleleft$  often are used to indicate that a group is a normal subgroup of another group.

- $\equiv$ ,

$\approx$ ,

$\approx$  frequently are used to denote equality relationships. The

$\equiv$  symbol usually indicates that two items are identically equal, and

$\approx$  and

$\approx$  often denote approximate equality.

- $\propto$  means "is proportional to" — not to be confused with the Greek letter

$\alpha$  (alpha) or the infinity symbol ( $\infty$ ).



### See also

[Inserting mathematical symbols in an equation](#)

## Inserting spaces and ellipses in an equation



This palette contains the alignment symbol, several spacing symbols, and several types of ellipses.

**Alignment symbol** The  $\triangle$  symbol aligns multiple lines in a pile of equations. Position a

$\triangle$  symbol in each line where you want it to align. Equation Editor shifts the lines to the left or right, aligning the symbols.

Alignment symbols are displayed in the Equation Editor window but not when you add the equation to your document, and the symbols don't print.

**Note** If you want to align equations at their equality symbols, you can quickly do this by selecting the equations and choosing Align At = from the Format menu.

**Spacing symbols** The spacing symbols ( $a_b$ ,



$a_b$ ,

$a_b$ ,

$a_b$ )

insert five sizes of space in an equation. Use them when you want to adjust the automatic Equation Editor spacing. (The SPACEBAR is not active except in Text style.) See [Change spacing in an equation](#).

For example, you might need to adjust the spacing as you enter the equation

$$\int h(r) r dr d\theta = k(x, y) dx dy$$

Equation Editor normally would treat the series of letters as sequences of variables and would not insert any spaces within them. To follow typesetting conventions, you would insert a thin space between the  $r$  and  $dr$ ; between the  $dr$  and  $d\theta$ ; and between the  $dx$  and  $dy$ .

Explicit spaces, like any other characters, can be removed using the Cut and Clear commands and the DELETE and BACKSPACE keys.

**Ellipsis symbols (...)** An ellipsis is a series of three dots indicating that items have been left out, usually because they are obvious from the context. Equation Editor provides symbols that enter horizontal, vertical, and diagonal rows of dots to indicate various types of omission.

These are especially useful in constructing vectors and matrices. For example, you can create the generic matrix

$$\begin{pmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{pmatrix}$$

by entering a 4x4 matrix template within a parentheses fence and then filling its slots with the alignment entries and appropriate ellipsis symbols.

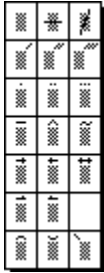
---

### See also


[Inserting mathematical symbols in an equation](#)

[Spacing and alignment in an equation](#)

## Applying embellishments in an equation



Mathematical variables often have primes, hats, bars, and dots attached. Sometimes known as diacriticals or accents, in Equation Editor they are referred to as character embellishments.

To add an embellishment of this type, choose the corresponding symbol. The embellishment is attached to the character to the left of the insertion point. One character can have several embellishments, but only a few of these combinations are useful. Clicking the  symbol removes all embellishments from the character to the left of the insertion point.

To add any of the following embellishments, choose its symbol from the palette, or use a shortcut key combination. See [Applying embellishments in an equation using keys](#).

Some uses of these symbols may not be obvious. For example, you can use the slash embellishments at the end of the first row to construct symbols such as  $\neq$ . When available, built-in negated symbols such as



usually look better than those constructed using the slash embellishment.

To adjust the height of all embellishments, use the Spacing command on the Format menu to change the embellishment gap. If you want to adjust the spacing of an individual embellishment, use the Nudge commands. To select an embellishment for nudging, hold down the CTRL key and click the embellishment. The Nudge commands aren't on a menu; for information about them, see [Make fine adjustments to an equation](#).

---

### See also

[Inserting mathematical symbols in an equation](#)

## Inserting operator symbols in an equation



Each of these symbols represents a mathematical operator of some type.

- $\pm$ ,



$\div$  and


$\cdot$  represent simple arithmetic operations.

- $*$ ,  $\bullet$ ,

$\otimes$ , and

$\oplus$  usually denote operations on sets or abstract algebraic entities.

- $\circ$  is used for composition of functions.

- The angle brackets on this palette ( $\langle$  and  $\rangle$ ) generally are used to denote inner product operations. These angle brackets are a fixed size; to get expanding ones, choose the  template on the Fences palette.

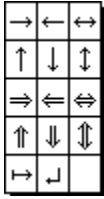
---

### See also

[Inserting mathematical symbols in an equation](#)



## Inserting arrow symbols in an equation



This palette contains 14 arrow symbols, including several styles of arrows.

- The arrows in the first two rows have a variety of applications, often relating to convergence to a limit.
- Those in the third and fourth rows generally denote logical implications.
- $\mapsto$  represents a mapping.
- $\rdownarrow$  often is used to represent a carriage return.

---


### See also

[Inserting mathematical symbols in an equation](#)

## Inserting logical symbols in an equation



Eight commonly used logical symbols are grouped on this palette.

- ∴ and ∵ stand for "therefore" and "since," respectively.
-  means "such that," and ∃ means "there exists."
- ∀ means "for all."
- The final three symbols stand for "not," "and," and "or," respectively.

---

### See also


[Inserting mathematical symbols in an equation](#)

## Inserting set theory symbols in an equation

$\in$	$\notin$
$\cup$	$\cap$
<b><math>\cup</math></b>	<b><math>\cap</math></b>
$\subset$	$\supset$
$\subseteq$	$\supseteq$
$\varnothing$	$\emptyset$

All of these symbols are related to set theory, including symbols for membership, containment, unions and intersections, and the empty set.

Two sets of union and intersection symbols are provided. The lighter symbols in the second row are the ones that standard Symbol fonts provide; the heavier ones in the third row were added to the Symbol font used in Equation Editor. Use the weight that looks best with the expression you're creating. The heavier ones are well suited to summation constructs – for example, the union of all items in a series of sets.

Note that  – the symbol that indicates set membership – is not the same as

$\varepsilon$ , the Greek letter epsilon. Similarly, don't confuse

$\emptyset$  – the symbol for the empty set – with the Scandinavian letter  $\emptyset$  or  $\emptyset$ .

---


### See also

[Inserting mathematical symbols in an equation](#)

## Inserting miscellaneous symbols in an equation

$\partial$	$\nabla$	$\infty$
$\Im$	$\Re$	$\aleph$
$\sphericalangle$	$\perp$	$\diamond$
$\ell$	$\circ$	$\circ$
$\hbar$	$\lambda$	$\int$
$\Sigma$	$\Pi$	$\Pi$

This palette contains various symbols that either are somewhat obscure or do not fit into other categories.

- The first two symbols, from calculus, are the partial derivative symbol  and the gradient operator  $\nabla$ , which is sometimes known as del or nabla.
  - $\Im$  and  $\Re$  represent the real and imaginary parts of complex numbers.
  - $\aleph$  represents the Hebrew letter aleph, which generally represents a transfinite cardinal number.
  - Three geometric symbols are included – the degree symbol  $^\circ$ , the angle symbol  $\sphericalangle$ , and the right-angle or perpendicular symbol  $\perp$ .
  - $\ell$  is a lowercase script l, often requested by typists trying to replicate the symbols in a handwritten manuscript. In a printed document, you should almost always type a normal italic character instead.
  - $\Pi$  often represents Weierstrass elliptic functions, sometimes known as p-functions.
  - $\hbar$  and  $\lambda$  often are used in physics –  $\hbar$  is known as Planck's constant.
- Note** Two other calculus symbols – the italic deltas  $\Delta$  and  $\delta$  – are not included because they are Greek letters, easily inserted using the CTRL+G shortcut; see [Inserting Greek characters in an equation](#).

---

### See also

[Inserting mathematical symbols in an equation](#)

## Inserting Greek characters in an equation

$\alpha$	$\beta$	$\chi$	$\delta$
$\varepsilon$	$\phi$	$\psi$	$\gamma$
$\eta$	$\iota$	$\kappa$	$\lambda$
$\mu$	$\nu$	$\omicron$	$\pi$
$\omega$	$\theta$	$\vartheta$	$\rho$
$\sigma$	$\varsigma$	$\tau$	$\upsilon$
$\omega$	$\xi$	$\psi$	$\zeta$

$\Lambda$	$B$	$X$	$\Delta$
$E$	$\Phi$	$\Gamma$	$H$
$I$	$K$	$\Delta$	$M$
$N$	$O$	$\Pi$	$\Theta$
$P$	$\Sigma$	$T$	$Y$
$\Omega$	$\Xi$	$\Psi$	$Z$

The final two palettes contain symbols for the lowercase and uppercase letters in the Greek alphabet.

You may find it more convenient to insert Greek letters using the keyboard shortcuts instead of choosing the symbols from the palettes. To insert a Greek letter, press CTRL+G, followed by the corresponding English character (use the correct case). For example, to insert  $\beta$ , press CTRL+G, b, or insert

$\Delta$  by pressing CTRL+G, D.

**Note** Because  $\vartheta$  and

$\varsigma$  are lowercase characters, they are included on the lowercase palette even though they correspond to shifted keystrokes in the Windows Symbol font.

---

### See also

[Inserting mathematical symbols in an equations](#)

## **Insert nonmathematical symbols in an equation**

You may occasionally want to insert nonmathematical symbols not available on the symbol palettes.

If you're working in Word, the easiest way to add the symbol to an equation is to first insert the symbol in your Word document and then paste it into the Equation Editor window. Using the Symbol command on the Insert menu in Word, you can view and select symbols from any font that is available on your printer.

You also can type the symbol in the Equation Editor window. Before you begin typing, use the Other command on the Style menu to choose the font that includes the symbol. Then press the correct key code.

## Inserting mathematical templates in an equation

The buttons on the bottom row of the Equation Editor toolbar are used to insert mathematical templates such as fractions, radicals, sums, integrals, products, matrices, and various types of brackets and braces.



[Inserting delimiter templates in an equation](#)



[Inserting fraction and radical templates in an equation](#)



[Creating subscripts and superscripts in an equation](#)



[Creating sums in an equation](#)



[Inserting integrals in an equation](#)



[Creating mathematical expressions with overbars and underbars](#)



[Creating labeled arrows in an equation](#)



[Inserting products and set theory templates in an equation](#)



[Inserting matrix templates in an equation](#)

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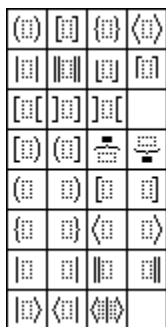
### See also

[Insert symbols and templates in an equation](#)

[Inserting templates in an equation](#)

[Inserting mathematical symbols in an equation](#)

## Inserting delimiter templates in an equation



This palette provides various ways of enclosing expressions between a matching pair of symbols, known by typesetters as fences or delimiters.

The following fence templates, and variations of them, are available.

Template	Inserts
	Parentheses
	Brackets
	Braces
	Angle brackets (inner products and so forth)
	Vertical bars (absolute value, modulus, determinants)
	Double vertical bars (norms)
	Floor brackets
	Ceiling brackets
	Other combinations denoting various intervals
	Brackets used in quantum physics

The fences expand automatically to accommodate whatever they enclose, even if an expression includes several lines. You can change the fence overhang (the distance fences extend above and below the items they enclose) using the Spacing command on the Format menu.

To change the size of an individual fence, use the commands on the Size menu. You must hold down the CTRL key when you select the fence that you want to resize.

These parenthesis and bracket fences are useful for constructing vectors and matrices. Parentheses also can be used to create binomial coefficients, as in

$$\binom{n}{r} = \frac{n!}{r!(n-r)!}$$

Here, the binomial coefficient is a pile consisting of two lines of text enclosed in parentheses. The text was created by typing **n**, pressing ENTER, and then typing **r**.

Shortcut key combinations are assigned to the following three fences.

To insert	Template	Press
	Parentheses	CTRL+9 or CTRL+0
	Brackets	CTRL+[ or CTRL+]
	Braces	CTRL+{ or CTRL+}

A horizontal brace can be positioned under or over an expression using the or template. This has a number of uses. For example, you might write a vector consisting of *m* zeros followed by *n* ones as



$$(0,0,\dots,0,1,1,\dots,1)$$

In this case, you would type the parentheses instead of using the expanding parentheses from the Fences palette, because you do not want them to expand to include the  $m$  and the  $n$ .

One-sided braces are useful for piecewise definitions, as in

$$f(x) = \begin{cases} 0 & \text{if } x < 0 \\ x & \text{if } 0 \leq x \leq 1 \\ 1 & \text{if } x > 1 \end{cases}$$

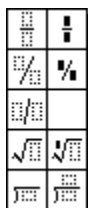
or for other situations involving several alternatives. The preceding layout was created by entering a pile consisting of three lines of text in the slot of a { template.

---


**See also**

[Inserting mathematical templates in an equation](#)

## Inserting fraction and radical templates in an equation




These templates are used for creating fractions, radicals, and long division layouts.


**Fractions** Vertical fractions in normal and reduced sizes are created using the  and


 templates, respectively. In both of these templates, the primary slot is the numerator slot. The

 template can be inserted using the keyboard shortcut CTRL+F.

In a reduced-size fraction (a case fraction), the numerator and denominator normally are subscript size and are closer to the fraction bar than in a full-size fraction. Reduced fractions usually are used when the numerator and denominator are just numbers, especially if the equation will be included within a line of text.


In addition to vertical stacked fractions, Equation Editor provides templates such as  for several types of "slash" fractions.

**Square root and *n*th root radicals** Square root and *n*th root templates are inserted using the  and

 templates. Both of these radicals expand to accommodate the expressions they enclose, and their shapes are adjusted as they grow larger, as shown in the following illustration.

$$\sqrt{\frac{1}{x}} + \sqrt{\frac{1}{x}} + \sqrt{x}$$

You can control the amount of space between radicals and their contents by adjusting the radical gap using the Spacing command on the Format menu.

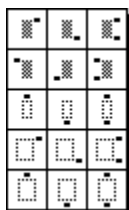
The  template can be inserted from the keyboard by pressing CTRL+R.

---

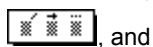
### See also

[Inserting mathematical templates in an equation](#)

## Creating subscripts and superscripts in an equation



This palette provides templates for creating subscripts and superscripts and for positioning expressions above and below each other in various other ways.



and are used to attach subscripts and superscripts to an expression. The templates do not create a slot for the expression to which the subscript or superscript is being attached. To indicate this, the large rectangle in each template is shaded.

By inserting one template inside another, you can create multiple levels of subscripting and/or superscripting.

You can control the default positioning of subscripts and superscripts using the Spacing command on the Format menu. To control the default sizes of subscripts and superscripts, use the Define command on the Size menu. To adjust the sizes of individual subscripts and superscripts, use the Other command on the Size menu.

Shortcut key combinations are assigned to three of the templates.

To insert	Template	Press
	Superscript (high)	CTRL+H
	Subscript (low)	CTRL+L
	Joint sub/superscript	CTRL+J



and are underscript and overscript templates used to position one expression or piece of text over another. The template reduces the size of the lower expression. The template reduces the size of the upper expression.

Of the two, the template is the more common. It is used to create expressions such as

$$\lim_{x \rightarrow 0} h(x)$$

The template sometimes is used to position a character over an equal sign to make a special symbol such as  $\triangleq$ , which indicates two quantities are equal by definition.

- The final two rows of templates are used to attach limits to a large operator such as a summation sign. For example, by inserting a symbol in a

template, you can create a direct sum expression like the following one:

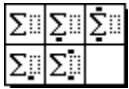
$$\bigoplus_{j=1}^n A_j$$

---

### See also

[Inserting mathematical templates in an equation](#)

## Creating sums in an equation



Use the templates on this palette to create various types of sums.

This illustration shows some of the templates' uses:

$$\sum_{1 \leq r \leq m} a_{r,s}$$
$$\sum_{\substack{1 \leq r \leq m \\ m}} \sum_{\substack{1 \leq s \leq n \\ n}} a_{r,s}$$
$$\sum_{r=1}^m \sum_{s=1}^n a_{r,s}$$
$$\sum_j \sum_i \sum_k a_{ij} b_{jk} c_{ki}$$

To create the second and third expressions – which represent repeated sums – insert a summation template in the summand slot of the previous summation template. (In all of the summation templates, the summand slot is the primary slot.) To create the two-line limit in the first summation, press ENTER after typing the first line.

You can control the default limit height, limit depth, and limit line spacing using the Spacing command on the Format menu. To control the default size of all summation signs, use the Define command on the Size menu.

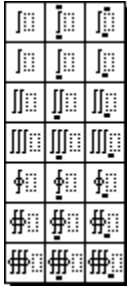
In keeping with the typesetting convention, the size of a summation sign does not change as the summand grows larger. If you want to change the size of an individual summation sign, use the Other command on the Size menu. (Because the summation sign is part of a template, you must hold down the CTRL key to select it.)

---

### See also

[Inserting mathematical templates in an equation](#)

## Inserting integrals in an equation




This palette provides templates for 20 forms of integrals, including single integrals, line integrals, double (surface) integrals, and triple (volume) integrals, all with various combinations of limits.

To create repeated integrals, as in

$$\Phi(\alpha, \beta) = \int_0^\alpha \int_0^\beta e^{-(x^2 + y^2)} dx dy$$

insert a single integral template in the integrand slot of the preceding integral template. (In all integral templates, the primary slot is the integrand slot.)

In most situations, the size of the integral signs does not vary. To get a variable integral sign, hold down the SHIFT key while you choose the template. The integral sign will expand as its integrand gets larger. To insert a (nonexpanding)

 template from the keyboard, press CTRL+I.

---

### See also

[Inserting mathematical templates in an equation](#)

## Creating mathematical expressions with overbars and underbars



These templates are used to create expressions with bars above or beneath them.

The bars can be single or double and can denote complex conjugates or closures of sets, as in

$$\overline{w + z} = \overline{w} + \overline{z}$$

$$\overline{A \cap B} \subset \overline{A} \cap \overline{B}$$

Or they can denote upper and lower limits, such as

$$\limsup_{x \rightarrow 0} h(x)$$

$$\liminf_{x \rightarrow 0} h(x)$$

---

### See also

[Inserting mathematical templates in an equation](#)

## Creating labeled arrows in an equation



Labeled arrows are created using the six templates in this palette.

Use these templates to describe, for example, convergence to a limit or some property of a function, as in

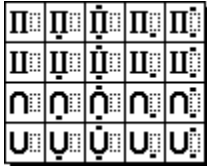
$$f_n(x) \xrightarrow{\text{uniformly}} f(x)$$
$$f: X \xrightarrow{\text{onto}} Y$$

---

### See also

[Inserting mathematical templates in an equation](#)

## Inserting products and set theory templates in an equation



This palette provides templates for products, coproducts, and set-theoretic intersections and unions.

- Templates in the first row are used to create products.
- The corresponding templates in the second row denote coproducts.
- The final two rows of templates are for creating unions and intersections of sequences of sets.

All of these templates behave much like summation templates.

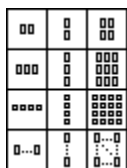
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### See also

[Inserting mathematical templates in an equation](#)



## Inserting matrix templates in an equation



Column vectors, determinants, matrices, and other tabular layouts all are built using templates from this palette.

Usually, you will enclose these templates in expanding parentheses or brackets. Within a matrix template, the entries in all rows are aligned vertically. You can control the default spacing of entries in a row (matrix column spacing) and the spacing between rows (matrix row spacing) using the Spacing command on the Format menu.

Templates in the first three rows give you quick ways to create vectors and matrices of common sizes. The final three are used to create vectors and matrices of arbitrary sizes.

When you choose any of the last three templates, the Matrix dialog box appears so you can specify how many rows and columns your matrix will have. For information on the options in this dialog box, see [Matrix command on the Format menu](#).

You can add various styles of lines to the matrix by clicking between and around the diagram of cells on the left side of the dialog box. This allows you to construct tables such as

Function	Derivative
$x^n$	$nx^{n-1}$
$\log x$	$x^{-1}$
$e^x$	$e^x$

If you need to modify an existing matrix, select the matrix by moving the insertion point into any part of it, and then choose Matrix from the Format menu.

---

### See also

[Inserting mathematical templates in an equation](#)

## **Using TrueType fonts with Equation Editor**

Equation Editor uses TrueType fonts provided with Windows and Windows NT and the TrueType font MT Extra provided with Equation Editor. TrueType and MT Extra are required for Equation Editor. If you do not have the font MT Extra installed, you should reinstall Equation Editor.

TrueType gives you scalable fonts, improves your screen display, and ensures that your screen display closely matches your printed output. It uses a single set of TrueType fonts to display characters on the screen and printer. This means you never have to worry about available font sizes. Also, with TrueType you can print equations on just about any type of printer. If you have Windows or Windows NT, you should use TrueType with Equation Editor.

## Equation Editor basics

### What Is Equation Editor?



Equation Editor, a special version of the MathType equation editor from Design Science, Inc., is customized for use with Microsoft applications.

$$\sum_{i=1}^n X_i^2$$

Using Equation Editor, you can build complex equations by picking symbols from a toolbar and typing variables and numbers. As you build an equation, Equation Editor automatically adjusts font sizes, spacing, and formatting in keeping with mathematical typesetting conventions. You can also adjust formatting as you work and redefine the automatic styles.

### Easy-to-Use Toolbar Symbols and Templates



The top row of the Equation Editor toolbar has buttons for inserting more than 150 mathematical symbols, many of which are not available in the standard Symbol font. To insert a symbol in an equation, click a button on the top row of the toolbar, and then click the specific symbol from the palette that appears under the button.



The bottom row of the Equation Editor toolbar has buttons for inserting templates or frameworks that contain such symbols as fractions, radicals, summations, integrals, products, matrices, and various fences or matching pairs of symbols such as brackets and braces. Many templates contain slots — spaces into which you type text and insert symbols. There are about 120 templates, grouped on palettes. You can nest templates — insert templates in the slots of other templates — to build complex hierarchical formulas.

## Create an equation

You build equations by picking templates and symbols from the toolbar and typing variables and numbers in the slots provided. As you build an equation, Equation Editor automatically adjusts font sizes, spacing, and formatting in keeping with mathematical typesetting conventions. You can also adjust formatting as you work and redefine the automatic styles.

**1** Do any of the following:

- Choose a template from the bottom row of the toolbar and fill in the slots.
- Choose symbols from the top row of the toolbar.
- Type the text you want.

**1** When you have built the equation, click anywhere outside the Equation Editor window to return to your document.

**Tip** To nest a template within a template, select the template you want to nest in the Equation Editor window and then choose a template from the toolbar.

## Edit an equation

Using OLE, you can edit equations in your document. When you double-click an equation, the Equation Editor window opens for you to make changes. If you start Equation Editor as a separate application, you can edit an equation and then update it in your document.

**1** Double-click the equation.

The Equation Editor toolbar appears and its menu bar temporarily replaces the application menu bar.

**2** Make the changes you want.

You can add, delete, or change elements in an equation. You can also apply a different style, size, or formatting to text, or adjust spacing and location of elements.

**3** When you have finished editing, click anywhere outside the Equation Editor object. If you started Equation Editor as a separate application, from the Equation Editor File menu, choose Exit And Return To Document. The equation is updated in the document.

**Note** If you prefer editing equations in a separate application window, you can set the ForceOpen option in the [General] section of the EQNEDIT.INI file in Windows or the Windows NT Registry in Windows NT. The setting would appear as follows:

[General]

ForceOpen=1

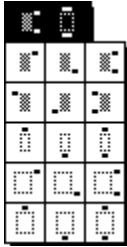
## Insert symbols and templates in an equation

Symbols are single characters such as logic symbols, set theory symbols, and Greek letters. Templates are symbols with one or more empty slots, such as a radical or square root sign. To create such items as fractions, integrals, and summations, insert a template and then fill in its slots.

### To insert a symbol or template using the mouse

- 1 Click a symbol or template button on the Equation Editor toolbar.

A palette of symbols or templates appears below the button.



- 2 Click the symbol or template you want to add to an equation.

### To insert a symbol or template using keys

- 1 To insert a symbol, press CTRL+SHIFT+K.  
To insert a template, press CTRL+SHIFT+T.
- 2 Press the number key corresponding to the palette containing the symbol or template you want. For example, press 3 for the third symbol palette or the third template palette, counting from left to right.
- 3 Press a number key corresponding to the position of the symbol or template on the palette, counting from left to right and top to bottom.

Common symbols and templates are assigned key combinations. For more information, see [Keyboard Guide](#).

## Type text in an equation

- In most cases, Equation Editor automatically adjusts the spacing between numbers, symbols, and variables as you build an equation. You should use the SPACEBAR only when you are using the Text style. You can adjust spacing by using formatting commands or by choosing a spacing character from one of the symbol palettes. When you type text in an equation — for instance, a named variable — you automatically apply the Text style and can use the SPACEBAR to add spaces between words.
- As you type, press ENTER only when you want to create a new slot directly beneath the current one — for example, to create two lines of text or stack equations. To arrange most items, however, insert a template with slots in the appropriate positions.
- Unless you're using Text style, symbols automatically replace some characters as you type. For example, a minus sign with spaces on either side replaces a hyphen. In other cases, you need to choose symbols from the palettes instead of typing characters on the keyboard. For example, if you type brackets and then add to the expression they enclose, the brackets won't expand. If you need brackets that adjust to the size of the expression, insert the appropriate template from the Fences palette.

## Position the insertion point in an equation

The size and shape of the insertion point tell you where the next text you type or symbols you insert will appear. The insertion point's horizontal bar runs along the slot's bottom edge. Its vertical bar runs from the top to the bottom of the slot.

- To position the insertion point, point and click.

**Using the keyboard** You can also use the keyboard to move in increments through an equation; see [Position the insertion point in an equation using keys](#).



## Select items in an equation

You select most items just as you do in other Windows applications. Equation Editor provides additional methods for selecting slots, matrices, and the symbols inserted as part of templates, such as character embellishments, summation signs, and expanding fences.

- Use one of the following mouse or keyboard methods.

<b>To select</b>	<b>Do this</b>
An area of an equation	Click the starting point and drag over the area.  If the expression to be selected is partially outside the window, point to the edge of the window.  You can also hold down the SHIFT key and press any of the arrow keys to extend the selection.
A symbol within a template	Hold down the CTRL key. When the pointer changes to an outline arrow, click the symbol.
A slot's contents	Double-click anywhere in the slot.
A matrix	Drag over the expressions in the matrix to select them.
An entire equation	From the Edit menu, choose Select All. — or — Double-click anywhere in the main (outermost) slot.

## Delete items from an equation

Use the following techniques to delete items from an equation.

### To delete the character or symbol to the left of the insertion point

- Press BACKSPACE.

### To delete the character or symbol to the right of the insertion point

- Press DELETE.

### To delete the contents of a slot

- 1 Select the contents of the slot.
- 2 Press DELETE.

**Note** Some slots can't be deleted without deleting the template that contains them. For example, you can't delete the integrand slot from an integral.

### To delete a slot

- 1 If the slot is not empty, delete the contents of the slot.
- 2 Select the slot.
- 3 From the Edit menu, choose Clear.

### To delete a template

- 1 Select the template symbol and all its slots.
- 2 Press DELETE.

### To delete a selection

Do one of the following:

- Press DELETE.
- From the Edit menu, choose Clear.
- Begin typing to replace the selection with what you type.

### To reverse a deletion

- Immediately after deleting the item, from the Edit menu, choose Undo Typing.

## Change the display size of an equation

If you start Equation Editor as a separate application, or open an equation by choosing the Equation Object command from the Edit menu and then choosing the Open command, you can enlarge or reduce the Equation Editor display to suit your current task. Changing the size of the equation in the Equation Editor window does not affect the size of the equation in the document.

Do one of the following:

- From the View menu, choose 100%, 200%, or 400%.
- From the View menu, choose Zoom. Type a percentage between 25 and 400 in the Custom box and choose OK.

**Note** The 400% size is particularly useful when you nudge items to make fine adjustments to their spacing. For information about nudging, see [Make fine adjustments to an equation.](#)

## Using fonts and styles in an equation

As you build an equation, Equation Editor automatically adjusts font sizes, spacing, and formatting in keeping with mathematical typesetting conventions. For example, characters typed in the Variable style are Times italic.

To change one of the built-in styles, you can apply another built-in style, or directly apply other font and style formatting. To change the default setting for styles, you use the [Define command on the Style menu.](#)

## Apply a different built-in style to text in an equation

The styles that Equation Editor applies automatically give the results you want most of the time. The most common cause of formatting errors is typing a word that includes a function abbreviation.


For example, if you type the word **single**, Equation Editor interprets the text as "the sine of  $g$  times  $l$  times  $e$ ," displaying something like "sin  $g/e$ ". To prevent this type of mistake, choose Text from the Style menu before you begin typing a word.

- 1 Select the text to which you want to apply a style, or position the insertion point where you want the formatting to start as you type.
- 2 Choose the style name from the Style menu, or press one of the following key combinations.

<b>To assign this style</b>	<b>Press</b>
Math	CTRL+SHIFT+=
Text	CTRL+SHIFT+E
Function	CTRL+SHIFT+F
Variable	CTRL+SHIFT+I
Greek	CTRL+SHIFT+G
Matrix-Vector	CTRL+SHIFT+B

**Note** When you choose Greek from the Style menu, Equation Editor applies either the Uppercase Greek or Lowercase Greek style, depending on the case of the typed characters.

## Apply a different style only to the next character in an equation

You can use a keyboard shortcut to apply the Greek or Matrix-Vector style to the next character you type and then return to the current style for the second character. For example, if you want to type a single Greek letter (for instance,  – the Greek lowercase b) and then continue typing in the Math style, press CTRL+G, b.

- Press one of the following key combinations.

<b>To assign</b>	<b>Press</b>
Greek	CTRL+G
Matrix-Vector	CTRL+B

## Apply formatting that isn't assigned to an Equation Editor style

You can apply font and character formatting that isn't assigned to an Equation Editor style by using the Other command on the Style menu.

- 1 Select the text you want to format.
- 2 From the Style menu, choose Other.
- 3 In the Fonts box, select the font that you want to assign.  
To apply italic or bold formatting, select the Italic or Bold check box under Character Style.
- 4 Choose the OK button.

## Change an Equation Editor style

Using the Define command on the Style menu, you can change the font and character formats defined for each built-in style (the Math style has no font and format assignments).

- 1** From the Style menu, choose Define.
- 2** Click the arrow to the right of the style you want to define. A list box shows the fonts available on your default printer.
- 3** Select the name of the font you want to use. You can scroll through the list of fonts.
- 4** To specify a bold or italic character format, select the Bold or Italic check box. Click the check box again to clear the format.

For the Text and Function styles, you probably should use the same font used for text in the document. By convention, the Variable style should be the italic format of the text font, and the Matrix-Vector style should be the bold format of the text font.

When you change the formatting in the Styles dialog box, the changes affect the equation in the open Equation Editor window. Other equations are affected when you edit them.

## Enter text in an equation

To write a brief nonmathematical phrase, such as "for all" in an expression like

$$|x_n - x_0| < \varepsilon \text{ for all } n \geq N$$

use the Text style mode. In Text mode, alphabetic characters are formatted as plain text, and you can use the SPACEBAR to add spaces between words.

- 1 Place the insertion point where you want the text to start.
- 2 Do one of the following:
  - From the Style menu, choose Text.
  - Press CTRL+SHIFT+E.
- 1 Type the text.
- 2 To return to the Math style, do one of the following:
  - From the Style menu, choose Math.
  - Press CTRL+SHIFT+=.



## Type sizes in an equation

In Equation Editor, the size of a character is determined by its function in an equation — for example, whether the character is an exponent or subscript.

Each slot in an equation has an associated size. When you insert characters in a slot, they are assigned the size of that slot. When you insert a template in a slot, the text sizes of the new template's slots are based on the text size of the slot you inserted it in. For example, if you insert an integral template into a subscript-size slot, the new template's integrand slot is subscript size, its integral sign is sub-symbol size, and its limits are in sub-subscript size.

Although templates can be nested within templates, the sizes assigned to slots are never smaller than the sub-subscript size, in keeping with typesetting conventions.

## **Apply type sizes in an equation**

You can change the size of characters by using one of the standard type sizes, or you can assign a point size directly to any character, sequence of characters, or symbol in a template.

### **To apply a standard type size**

- 1** Select the items you want to resize.
- 2** From the Size menu, choose one of the five standard type sizes.

### **To apply a point size directly**

- 1** Select the items you want to resize.
- 2** From the Size menu, choose Other.
- 3** In the Size box, type a number between 2 and 127 to specify a point size. (One inch equals 72 points.)
- 4** Choose the OK button.

When you select any text formatted in a custom size, the Other command is checked on the Size menu, and the point size appears next to the command name.

## Change the definition of a type size in an equation

By changing the definition of a standard type size, you can quickly change the size of all the characters that use that type size. To redefine a type size, use the Define command on the Size menu.

- 1 From the Size menu, choose Define.
- 2 Select the point size in the box next to the type size you want to change. The graphic display in the dialog box shows which characters will be affected by the change.
- 3 Type the new size and choose the OK button.

When you type a number, Equation Editor assumes that you want to specify points. To change the unit of measurement, add one of the following abbreviations.

<u>Unit</u>	<u>Abbreviation</u>
Inches	in
Centimeters	cm
Millimeters	mm
Points	pt
Picas	pi

To see the effect of changes before saving them, click the Apply button. To restore default sizes, choose the Defaults button. When you make changes in the Sizes dialog box, the equation you are editing is redrawn using the new sizes. Equations that are saved in documents will not be affected unless you edit them after changing font sizes.

**Tip** You may want to specify the point size of the standard type sizes as a percentage of the Full size. That way, if you change the Full size, the other standard type sizes stay proportional. For example, if the Full size is 12 points and you set a subscript depth of 25 percent, subscripts are shifted to 3 points below the base line of the text (the bottom of most characters). If you change the Full size to 10 points, subscripts are shifted down only 2.5 points. To specify a percentage, type a number followed by the percent sign (%).

## Spacing and alignment in an equation

Equation Editor follows standard typesetting conventions and automatically adjusts spacing between elements as you build an equation. You can modify the spacing or alignment of some of the elements in an equation either by adding spacing symbols or by nudging. To change the appearance of all of the equations you create, you can modify some of the spacing settings.

### Nudging

Nudging provides precise control over the placement of items in an equation. You can adjust selected items horizontally or vertically in 1-pixel increments at the current display scale. Nudging is especially useful for adjusting items in template slots. For example, you may want to nudge an embellishment to the same height as another nearby item. To select an embellishment for nudging, hold down the CTRL key and click the embellishment. See [Make fine adjustments to an equation](#).

By moving one character on top of another, you can create overstrikes and other special combinations of characters, such as these:



You also can use Nudge commands to adjust the spacing between characters — this type of adjustment is known as kerning. For example, in an expression such as  $Lt$ , the superscript may look better if you move it farther to the left.

### Spacing definitions

If you frequently have to nudge text to get the results you want, you may want to use the Spacing command on the Format menu to modify the spacing that Equation Editor applies automatically.






### Alignment

Five commands on the Format menu are used to align [piles](#) or consecutive equations or expressions in slots. You create piles by pressing ENTER after adding items to slots.

## Change spacing in an equation

Equation Editor automatically adds the appropriate space between elements. Only when you use Text style will you need to use the SPACEBAR. If you want to add space in an equation or close up the space between two elements, use the following methods.

- Position the insertion point where you want to adjust spaces, and then choose one of the following spacing symbols from the Spaces/Ellipses palette, or press the following shortcut keys.

To insert	Description	Press
	Zero space	SHIFT+SPACEBAR
	1-point space	CTRL+ALT+SPACEBAR
	Thin space (one-sixth em)	CTRL+SPACEBAR
	Thick space (one-third em)	CTRL+SHIFT+SPACEBAR
	Em space (quad)	No shortcut key

## Make fine adjustments to an equation

With the Nudge commands, you can make fine adjustments to the layout of an equation. For example, you can move a subscript or a superscript, the limits of a summation, or the bar over an X horizontally or vertically in one-pixel (screen dot) increments.

- 1 Select the part of the equation that you want to reposition. (To select embellishments and items inserted as parts of templates, see [Select items in an equation.](#))
- 2 Nudge the selected items by using the arrow keys.

To move the selected item(s)	Press
To the left by one pixel	CTRL+LEFT ARROW
Up by one pixel	CTRL+UP ARROW
Down by one pixel	CTRL+DOWN ARROW
To the right by one pixel	CTRL+RIGHT ARROW

**Note** If you make large adjustments, you may need to choose the Redraw command from the View menu to update the display.

If you use the Nudge commands with the equation displayed at 400% scale, you can move items in increments of one-fourth of a point. Note that magnification commands are available only if you start Equation Editor as a separate application, or if you open an equation by choosing the Equation Object command from the Edit menu, and then choosing the Open command.

## Change a spacing definition in an equation

Equation Editor automatically applies standard units of spacing, such as subscript depth, numerator height, and fraction bar overhang. You can adjust these settings by using the Spacing command on the Format menu.

**1** From the Format menu, choose Spacing.

**2** Click the text box next to the dimension you want to change.

The dimension is indicated by arrows in the illustration on the right. You can scroll through the list to see all of the settings.

**3** Type a number or a percentage and choose the OK button.

When you type a number, Equation Editor assumes that you want to specify points. To change the unit of measurement, add one of the following abbreviations.

<b>Unit</b>	<b>Abbreviation</b>
Inches	in
Centimeters	cm
Millimeters	mm
Points	pt
Picas	pi


**Tip** You may want to specify the spacing as a percentage of the Full size setting. That way, the spacing stays proportional if you change type sizes. For example, if the Full size is 12 points and you set a subscript depth of 25 percent, subscripts are shifted to 3 points below the base line of the text. If you change the Full size to 10 points, subscripts are shifted only 2.5 points. To specify a percentage, type a number followed by the percent sign (%).

## Align an equation

If the insertion point or selection is anywhere in a pile, all lines in the pile align when you choose a formatting command.

- Position the insertion point anywhere in a pile, and then choose one of the following commands, or press the associated key combination.

<b>Command</b>	<b>Action</b>	<b>Shortcut</b>
Align Left	Left-aligns all lines.	CTRL+SHIFT+L
Align Center	Centers all lines.	CTRL+SHIFT+C
Align Right	Right-aligns all lines.	CTRL+SHIFT+R
Align At =	Aligns all lines at their equality/inequality signs.	No shortcut key
Align At .	Aligns the decimal points in all lines.	No shortcut key

**Tip** To align the lines in a pile another way, insert the alignment symbol  from the Spaces/Ellipses palette in each line at the point where you want it to align. When you insert the symbols, they automatically align. For matrices created using one of the templates on the Matrices palette, you can change the column or row alignment using the Matrix command on the Format menu. For information, see [Inserting matrix templates in an equation](#).

## Format a finished equation

Some types of formatting are best handled using a word processor after you enter the equation in a document. Here are some tips.

### Numbering Equations

Often, you may want to number the equations in a document. The numbers usually are included beside the equations, aligned with the document's left or right margin.

This can be done with Equation Editor by inserting the number in the equation's main slot, adding appropriate spacing, and then carefully positioning the equation in the document. But this technique has its limitations. If you number equations in this way and want to change the document margins or the equation numbers, you have to edit the equation in Equation Editor.

If you are using Word, it's best to position the equation using a center-aligned tab and then use the Sequence field {seq eq} to add numbering. Position the Sequence field using a left-aligned or right-aligned tab.

### Making Slides

If you plan to use equations in slides (viewgraphs, overheads, foils, and so forth), it's best to create a normal-size equation in Equation Editor. You can easily enlarge the equation after adding it to a slide. This method works better than trying to create the equation with oversized characters in Equation Editor.

**Note** When you enlarge or reduce an equation in a document, the fonts may not be scaled properly on the screen. This should not be a problem in the printed equation.



## Defining styles in Equation Editor

You can define the styles in Equation Editor in any way you want, but you probably will want to follow the typesetting conventions for mathematical publications. For many of the styles, you will want to assign the font used for the main body of the text in your document; this font is referred to as your primary font.

### Math

Math style is not defined in terms of a font and character formats. When you work in Math style, Equation Editor applies a function recognition algorithm to all characters, looking for the names of mathematical functions such as sin, log, or exp. Function names are assigned the Function style, and all other letters are given the Variable style.

### Text

Use Text style when you enter words that you don't want interpreted as variables, vectors, matrices, or other mathematical items. In Text style, Equation Editor does not automatically adjust formatting based on mathematical and typesetting conventions. To add spaces in Text style, you can use the SPACEBAR. You probably will want your Text style to match the primary font used in your document, with the same character formatting.

### Function

Function style is used for the abbreviations for standard mathematical functions such as sin and log. You probably will want your Function style to match your document's primary font, with the same character formatting.

### Variable

Variable style is used for letters that represent variables and constants. You probably will want your Variable style to be your primary font with italic format.

### Lowercase Greek

Lowercase Greek style is used for lowercase Greek characters. The Symbol font is used, usually with italic format.

### Uppercase Greek

Uppercase Greek style is used for uppercase Greek characters. Usually, it is defined as the Symbol font.

### Symbol

Symbol style is used for mathematical operators such as + and =, for summation and integral signs, and for other special characters. Equation Editor requires the Symbol style to be assigned the Symbol font.

### Matrix-Vector

Matrix-Vector style is used for characters that represent matrix or vector quantities. The font assigned to the Variable style usually is used, with a bold format. Some people like to use a sans serif font such as Helvetica.

### Number

The Number style is used for the numerals 0 (zero) through 9. The assignment is automatic: you cannot choose the Number style to assign it to a selection. The font assigned to the Variable style usually is used for the Number style, with plain character formatting. If you will be making tables with columns of numbers that should align, your Number font should have numbers that are all the same width. Most Windows fonts, even proportional-width ones such as Times Roman, have this property, but a few do not.

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### See also

[Apply a different built-in style to text in an equation](#)

[Change an Equation Editor style](#)

### **Font & Style (name) not available on the printer; (name) was substituted**

You may get this error message when Equation Editor starts up, after you have changed the default printer with the Windows Control Panel, or after you have installed (or removed) some fonts. It means that Equation Editor cannot find a font used in the definition of one of its styles.

Because your choice of default printer affects what fonts are available, you may just need to change to a default printer that has the fonts you need. Or you can install fonts for the new default printer by re-installing Equation Editor. (Use the setup program for your Microsoft application.)

You can also redefine the style to refer to a different font. Use the Define command on the Style menu to change style definitions.

## **Equation Editor's fonts are not available on the default printer**

You must install Equation Editor's fonts separately for each printer/port combination you want to print equations on. If you get a "fonts not available on default printer" message, Equation Editor's fonts have not been installed for the current default printer. The most likely reason for this is that you installed the default printer after installing Equation Editor. You can use the setup program for your Microsoft application to reinstall Equation Editor. This will install the fonts. Or, you can change the default printer to one that has the appropriate fonts installed.

## Equations display incorrectly

After you insert an equation into a document, it may sometimes be displayed with character fonts, styles, or sizes other than those you used to create it. Some possible causes are:


- You removed screen or printer fonts that are required by the equation. If a screen font is missing, the equation should print properly. If a printer font is missing, you must reinstall it.
- The printer selected when the equation was created is different from the currently selected one, and the fonts used by the equation are not available on the currently selected printer. To fix this, you can either change the default printer, install the fonts for the current printer, or edit the equation and choose different fonts.
- Windows is choosing the wrong screen font. You can't do anything about this, but it will not affect the printing of the document.
- Because of the way Windows screen fonts are designed, the italicized versions of these fonts are offset to the right of where the non-italicized characters would be. When you print italics, there is no offset. Within Equation Editor, the screen italics offset is corrected by special Equation Editor coding. What you see in the Equation Editor window is what the printed equation will look like. However, when you place an equation in a document, you may see the characters shifted. This can be corrected if you use TrueType.

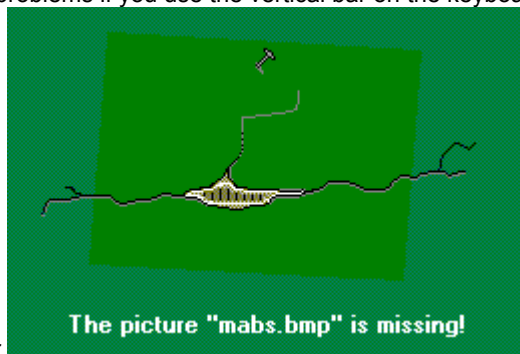
Overall, you will get more consistent display of equations if you use TrueType or another font management scheme.

## Spacing is incorrect in equations

Note the following points when adjusting spacing in an equation:

- Thin spaces should be inserted between differentials and other symbols, as in  $dy dx = r dr dq$ . Equation Editor interprets  $dydx$  as  $d*y*d*x$  and will not insert the thin space.
- You may also have to adjust spacing if you use some keyboard characters instead of choosing symbols from the Equation Editor palettes. For example, if you like to write open intervals in the form  $]a, b[$  or  $[a, b[$  rather than  $(a, b)$  or  $[a, b)$  and you type the brackets, the spacing will be incorrect in a formula such as  $[0, 2[ = [0, 1[ \cup [1, 2[$

- Equation Editor spaces the formula correctly if you use the  template instead of typing the brackets. You will encounter similar problems if you use the vertical bar on the keyboard to represent absolute value



instead of using the Equation Editor

template.

## Equation Editor interprets part of an English word as a function abbreviation

You may encounter formatting problems if you type a word in Math style that includes a function abbreviation. For example, if you type the word **single**, Equation Editor interprets this as the sine of  $g$  times  $l$  times  $e$ , displaying something like "sin  $g/e$ ". To fix this type of mistake, apply the Text style to the text.

## Standard type sizes in equations

Each character initially is assigned one of five standard type sizes.

### Full

Assigned to ordinary characters within most slots.

### Subscript

Used for subscripts and superscripts attached to Full size characters. Also used in limits in integral, summation, and other templates.

### Sub-Subscript

Used for subscripts and superscripts attached to Subscript size characters or in any other situation that requires a second level of size reduction. Also used for limit slots of templates inside the limits of other templates. For example, the Sub-Subscript size is used for a superscript within a limit of integration.

### Symbol

Used for the oversize symbols that are part of the templates for integrals, summations, products, and so forth.

### Sub-Symbol

Used for oversize symbols in Subscript size slots.

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### See also

[Apply type sizes in equations](#)

[Change the definition of a type size in an equation](#)

