MathType 101, Lesson 0: Creating the Ctrl-E Hotkeys

Creating the Ctrl-E Hotkeys for Opening and Closing Equations
You should only have to do this ONCE for each computer.
Directions for Office 2010: **http://www.youtube.com/watch?v=dutBZJNn1bA**
Directions for Office 2007: **http://www.youtube.com/watch?v=ozo4FrEhB30**
Directions for Office 2003: **http://www.youtube.com/watch?v=dsLtOoGTZKY**

Note to Mac users: The CMD-E hotkey is reserved in the system, so please use **CTRL-E**.

Creating the Ctrl-E Hotkey to OPEN an equation:

1. Open Microsoft Word 2007 or 2010
2. Click on the **Office button** (upper left-hand corner)
3. Click **Word Options** (lower part of the window)
4. Inside Word Options, choose **Customize** from the left-hand menu options
5. By Keyboard Shortcuts (bottom of panel) click **Customize…** button
6. In the lefthand list, scroll down to where you see **Macros** and choose that
7. Under Macros (on right), scroll down and select **MTCommandInsertInlineEqn**
8. Where it says "Press new shortcut key" click in the box and then type **Ctrl+E**
9. Click the **Assign** button
10. **Close** the Customize Keyboard window, then **Okay** in the Word Options window

Creating the Ctrl-E Hotkey to CLOSE an equation:

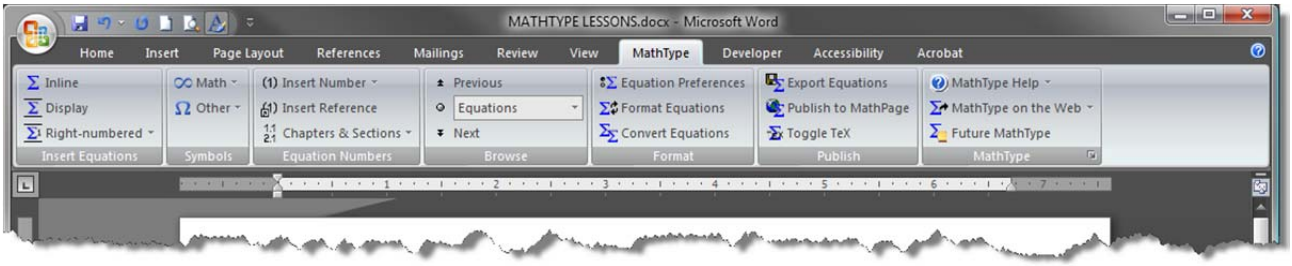
1. In Word 2007 or 2010, use Ctrl-E to open a MathType equation
2. Go to the **Preferences** tab and choose **Customize Keyboard**
3. Open the list of commands for **Menu Commands** (click the +), then **File Menu**
4. Select **Close and Return to**
5. Click in the box called **Enter new shortcut key(s)** and type **Ctrl-E**
6. Click the **Assign** button
7. Exit the Customize Keyboard window

NOW TRY IT!

This would be a good time to go ahead and create the Ctrl+E hotkeys for opening and closing MathType windows. You will only have to do this once, and then the settings will be saved.

MathType 101, Lesson 1: Getting in and out of MathType

After installation, the MathType tab (and ribbon) should appear when you open Microsoft Word 2010. The first time, you may be warned that a third-party macro is trying to use Microsoft Word. **You must choose to ENABLE this macro** for MathType to run in Word.



What is an inline equation? An inline equation inserts right in the line with your other text and moves when that text moves.

To insert an inline equation into a Word document

- click on Inline in the MathType ribbon
- use the built-in hotkey: Ctrl+Alt+Q
- use the Ctrl+E or Cmd+E hotkey (if you have created this macro)

Moving around within the MathType Editor:

- Use the arrow keys (up, down, left, right)
- Use the TAB key (or SHIFT+TAB to go backwards)

To get out of the equation and back to your document

- close the window using the red X in the upper right-hand corner
- use the Ctrl+E or Cmd+E hotkey (if you have created this hotkey)

To get back IN to an equation for editing:

- double-click on the equation
- use Alt+E or Alt+O to open the equation for editing

Newer MathType Built-in Commands:

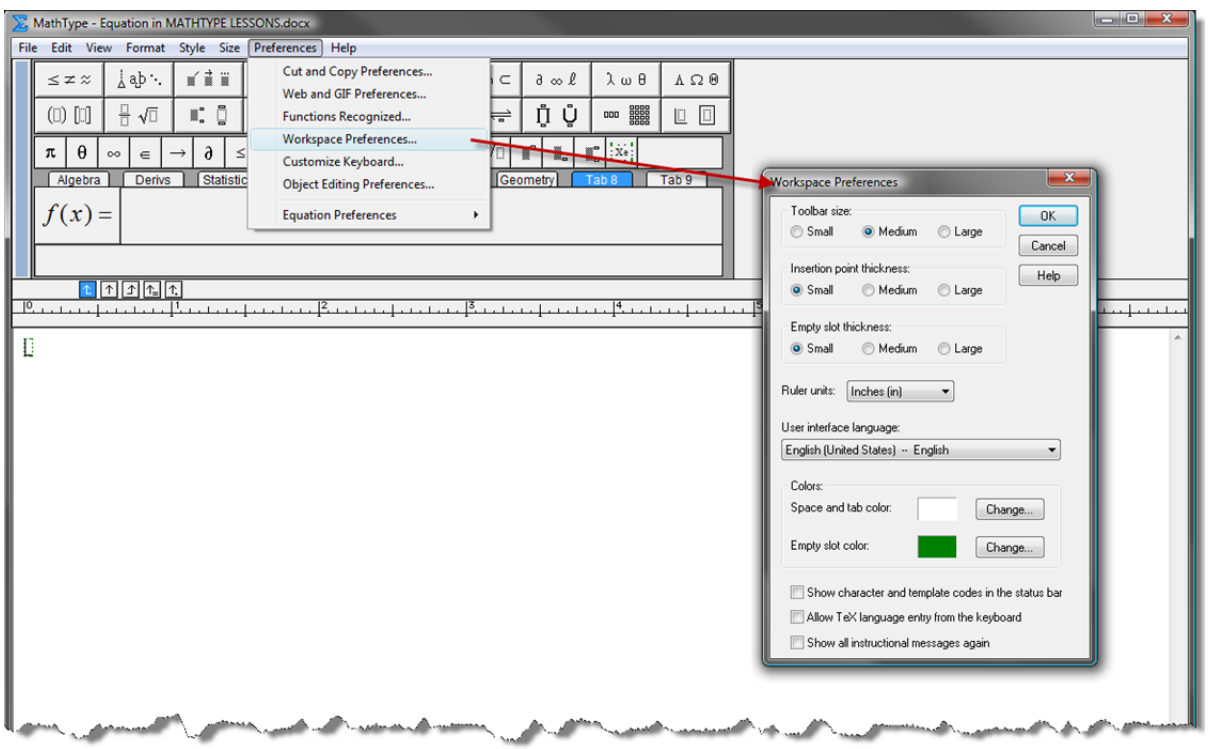
- Open a new inline equation: Ctrl+Alt+Q
- Open a new display equation: Alt+Q
- Open an existing equation for editing within document: Alt+E
- Open an existing equation for editing in a separate Mathtype window: Alt+O

NOTE: If you exit MathType without typing anything, an empty equation box will still be inserted into Word. Just press **Backspace** key twice (PC) or highlight the box and press Delete (Mac).

NOW YOU TRY IT!

1. Open a Word Document.
2. In three **separate** equation windows, create the following lines. The highlighting is to show you which part is actually the MathType equation:
   - Graph $y = \sqrt[3]{x}$ and label your axes.
   - One way to define tangent is as $\tan x = \dfrac{\sin x}{\cos x}$.
   - Use your calculator to verify the *t*-value is $t_{05,10} = 1.812$.
3. Now edit the second example, changing it to:
   - One way to define tangent is using a right triangle: $\tan x = \dfrac{Opposite}{Adjacent}$.

NOTE: To resize the menus or make other changes to your workspace, go to the **Preferences** menu, and select **Workspace Preferences**. Click desired size under **Toolbar Size** (and any other changes). Click on **OK**.



MathType 101, Lesson 2: Navigating with Hotkeys and Customized Menus

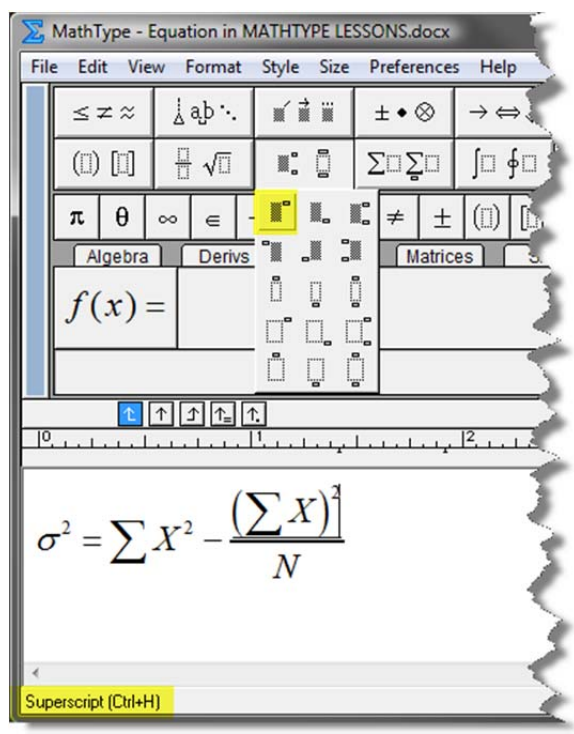
Standard Hotkeys still work here:

	PC	Mac
Undo the last operation	Ctrl+Z	Cmd+Z
Copy selection	Ctrl+C	Cmd+C
Cut selection	Ctrl+X	Cmd+X
Paste selection	Ctrl+V	Cmd+V
Open contextual menus	Right-click	Ctrl-click

Useful MathType Hotkeys

	PC	Mac
Fraction	Ctrl+F	Cmd+F
Subscript (Low script)	Ctrl+L	Cmd+L
Superscript (High script)	Ctrl+H	**Cmd+E**
Both super and sub-script (Joint script)	Ctrl+J	Cmd+J
Radical	Ctrl+R	Cmd+R
Forced space	Ctrl+SPACE	**Ctrl+SPACE**
Resizing Parentheses	Ctrl+(	Cmd+(
Resizing Brackets	Ctrl+[	Cmd+[
Resizing Braces	Ctrl+{	Cmd+{
Any Greek letter	Ctrl+G, letter (cap or lower)	Cmd+G, letter (cap or lower)

NOTE: Any time you press a button in MathType, the hotkey IS displayed (albeit a bit out of your normal field of vision).



NOW YOU TRY IT!

Create the following mathematical sentences (with equations) exactly as shown:

- Simplify: $\frac{1}{2} - \frac{3}{4}$
- Simplify: $\left(\frac{3}{4}x^2 - 4x + 3\right) - \left(\frac{1}{4}x^2 - 5x + 1\right)$
- We define this as $v_1 = \sqrt{t^2 - 1}$
- $\sigma^2 = \sum X^2 - \frac{\left(\sum X\right)^2}{N}$

To create your own hot key from MathType symbols and commands:

1. Get into **MathType** (use Ctrl+E).
2. Use the symbol or command you want (this puts it in the **Recently Used Symbols** menu).
3. Under **Preferences** menu, select **Customize Keyboard**.
4. Click on the desired symbol or, if you have recently used the symbol, you can find it under **Recently Used Symbols and Templates.**
5. Place the cursor in the **press new shortcut key** text box. Hold down the keys you want for the hotkey command. Usually these contain Ctrl or Alt then a letter, symbol, or number. The keys you press should appear in the box.
6. Click on **Assign**. Click on **Close**.

A Possible Shortcut: If the symbol you want is already a separate button on the menu, you can enter shortcut key commands by right clicking on the key, then select **Properties.** This will not work if you often delete and move buttons.

Customizing the MathType Menus and Tabs

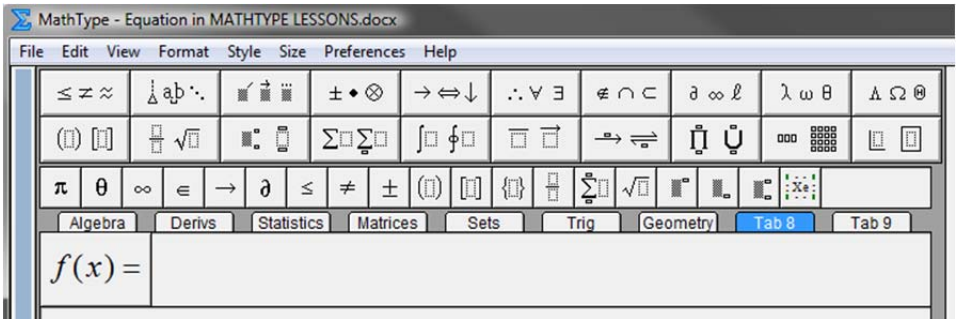
- To create a new button, type the expression in the MathType editor and highlight it. Then drag the expression to the menu bar at the desired location.
- Te delete a menu button, right click on the menu button and click on **Delete**.
- To move menu buttons, while holding down the **Alt** key, click and drag the menu button to the desired location.

NOW YOU TRY IT!

Define the following custom hotkeys.

	PC	Mac
Division symbol: ÷	Ctrl+D	Cmd+D
Less than or equal to: ≤	Ctrl+<	Cmd+<
Greater than or equal to: ≥	Ctrl+>	Cmd+>
Small size fraction: $\frac{2}{3}$	Ctrl+Shift+F	Cmd+Shift+F

Now see if you can make a button in Tab8 of the MathType editor for $\boxed{f(x)=}$, like this:



Bonus points if you can make it into a customized keyboard command too!

MathType 101, Lesson 3: Understanding MathType Styles and Formats

You can see all the MathType styles by looking under the **Format** menu in the MathType editor.

- **Math** style**:** This is the default style. It is a "smart" style that uses appropriate spacing around mathematics symbols, uses italics for variables, and uses standard text for pre-defined mathematics functions. If you need a space in this style, create one using Ctrl+Space.
- **Text** style: If you want to write a phrase or sentence within the MathType editor, choose this style. This is just like using a standard text editor only there is no word wrapping.
- **User 1** or **User 2** style: Define this one yourself. For example, if you define this to be a handwriting font, like **Bradley Hand ITC**, and you can use it to "show" student work.

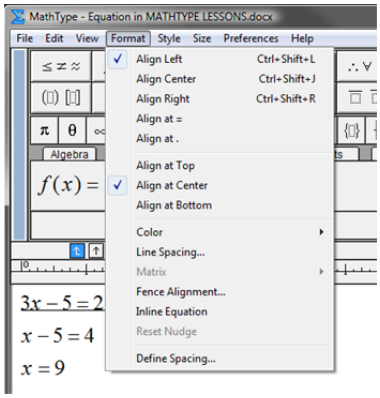
Once you understand the styles in MathType, you should find them easy to use. If you don't understand there are two distinct styles, these will drive you crazy.

Math Style	**Text Style**
$x^2 - 3x + 5$	$\mathrm{x}^2\text{-}3\mathrm{x}+5$
$Solvethisequation.$	Solve this equation.
$\sin^2 x + \cos^2 x = 1$	$\sin^2\mathrm{x}+\cos^2\mathrm{x}=1$

Equation Alignment Options

Align at Center:
$$\begin{aligned} 3x-5&=2x+4\\ x-5&=4\\ x&=9 \end{aligned}$$

Align at Top:
$$\begin{aligned} 3x-5&=2x+4\\ x-5&=4\\ x&=9 \end{aligned}$$



Align Left:
$$\begin{aligned} 3x-5&=2x+4\\ x-5&=4\\ x&=9 \end{aligned}$$

Align Center:
$$\begin{aligned} 3x-5&=2x+4\\ x-5&=4\\ x&=9 \end{aligned}$$

Align Right:
$$\begin{aligned} 3x-5&=2x+4\\ x-5&=4\\ x&=9 \end{aligned}$$

Align at =:
$$\begin{aligned} 3x-5&=2x+4\\ x-5&=4\\ x&=9 \end{aligned}$$

NOW YOU TRY IT! Create the text you see below.

Factor: $x^2 - 5x + 4$

$(x-4)(x-1)$

Solve:
$$\begin{aligned} 2(x+6)&=8\\ 2x+12&=8\\ 2x&=-4\\ x&=-2 \end{aligned}$$

MathType 101, Lesson 4: Changing Fonts and Sizes

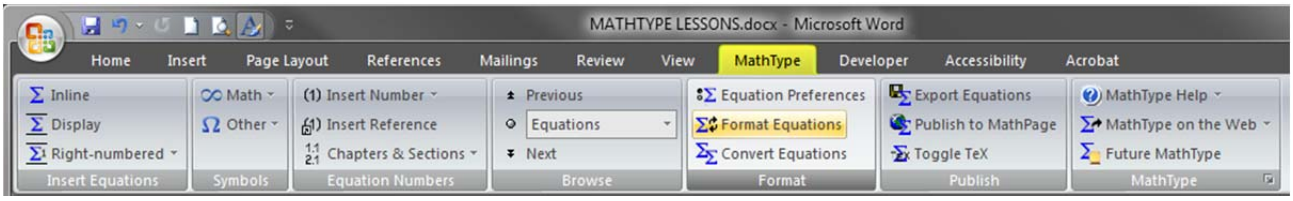
There might be times when you need to change all the fonts in a document or change the size of every equation in a document. To do this, you must first change the font or size in one of the equations and make sure that **Use for new equations** is checked.

- To change the size of an equation, use the **Size** menu.
- To change the font of an equation, use the **Style** menu and then **Define** (bottom of the window).

Now, go back to Word (exit any MathType windows).

- If you only want to change selected equations, select them first.
- If you want to change all the equations, make sure that no equations are selected.

Choose the **MathType** tab in Word. Choose **Format Equations** under this menu and then choose the appropriate option.

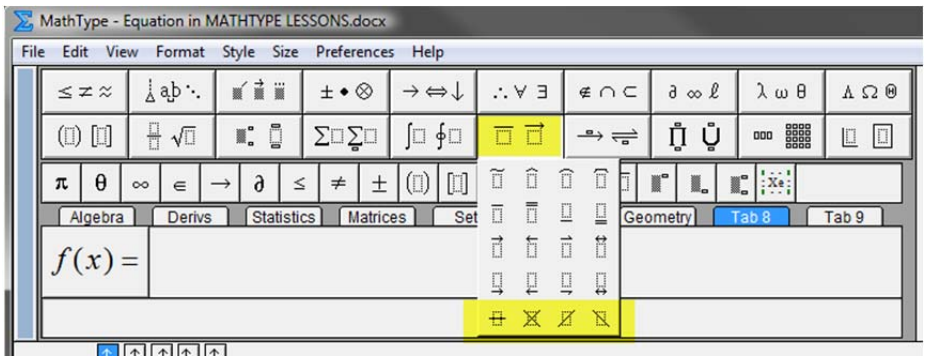


MathType will proceed to convert all the appropriate equations to the selected format.

NOW YOU TRY IT! Open one of the documents containing many equations (EQUATION EXAMPLES), then convert all the equations to a different size or font. Remember you have to change one equation first.

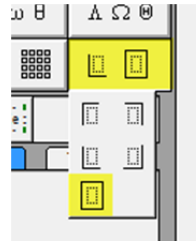
MathType 101, Lesson 5: Tricks and Tips

- **Strikethroughs and Cross-outs:** There are special formats that allow you to cross out or strike through selected text.



For example, $\cancel{5}$ or $\dfrac{(x-3)\cancel{(x-2)}}{\cancel{(x-2)}(x+1)}$. Indicate the 1's by using an exponent: $\dfrac{x\cancel{(x-1)}^{1}}{\cancel{(x-1)}^{1}(x-2)}$

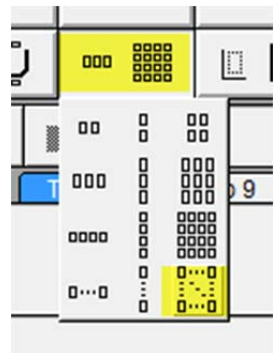
- **Calculator Keys:** These can be imitated by putting a box around selected text, like this: $\boxed{\text{EXP}}$ (see button location in image to right)



- **Nudging:** Highlight the text you want to nudge. In MathType, hold down **Ctrl** with the arrow key that moves the text in the appropriate direction.

- **Resizing Integrals:** This integral sign $\int \frac{\sin x dx}{\cos x}$ looks pretty wimpy. To get the **resizing** integral, hold down SHIFT when you press the integral button: $\int \frac{\sin x dx}{\cos x}$.

- **Tables**: You can create a table with the given size or create your own size by using the last button in the matrix menu. Click between the cells to get the lines. Here are some examples:



x	$f(x)$
0	0
1	1
2	4
3	9

f	multiply by 2, then add 5	$2x+5$
g	square it, then subtract 1	x^2-1
h	take the square root	$\sqrt{x}$

- **Matrices:** Use a combination of [ ] and the matrix options to create a matrix. Again, click between the cells to create lines that divide rows and columns. Clicking multiple times will give you various versions of dashed lines and eventually remove the line.

- **Piecewise Functions:** Use the { option found in the resizing parentheses menu. Within the resizing { , after each line, use enter to resize the brace larger.

NOW YOU TRY IT!

$$\left[\begin{array}{ccc|c} 0 & 4 & -1 & 2 \\ 1 & 5 & \frac{1}{2} & -5 \\ -3 & 4 & 8 & 0 \end{array}\right]$$

x	1	2	3
y	1	4	9

$$\frac{2+\frac{1}{2}}{5}$$ (the 5 is nudged down)

Ratio Test: take $\lim_{n\to\infty} \frac{a_{n+1}}{a_n} \begin{cases} \text{if } <1,\ a_n \text{ converges} \\ \text{if } >1,\ a_n \text{ diverges} \\ \text{if } =1,\ \text{try something else} \end{cases}$

$$\frac{(x-5)\cancel{(x+2)}^{1}}{\cancel{(x+2)}^{1}(x+3)}$$

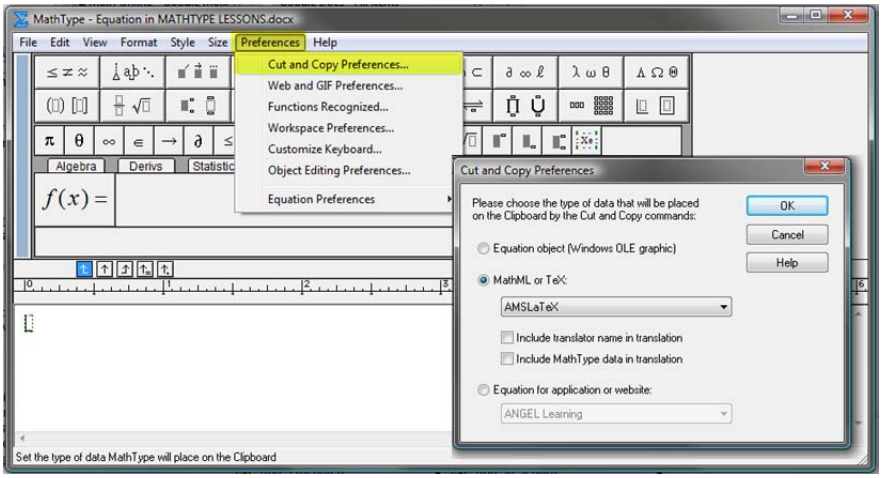
$$\int \frac{\sin x}{\sqrt{\cos x}} dx$$

Enter this calculation by pressing $\boxed{(-)}$ $\boxed{\text{LOG}}$ and then entering 10.

MathType 101, Lesson 6: MathType and Web Applications

MathType has several translators that allow equations to be translated into other computer languages, including TeX and MathML.

Basically the action is a simple Cut/Copy and Paste (sometimes drag & drop works too). You copy the equation in MathType, just the way it normally looks, and when you paste it, you get alternative code for it.



Open the MathType Editor. In the **Preferences** tab, choose **Cut and Copy Preferences**.

Choose the translator you need from the reference list below. You only have to do this once.

Open the equation you'd like to translate and **select the text** you'd like to translate. Copy it.

Then **paste into the application** using the directions below.

Additional application translators can be found at
http://www.dessci.com/en/support/mathtype/works_with.htm

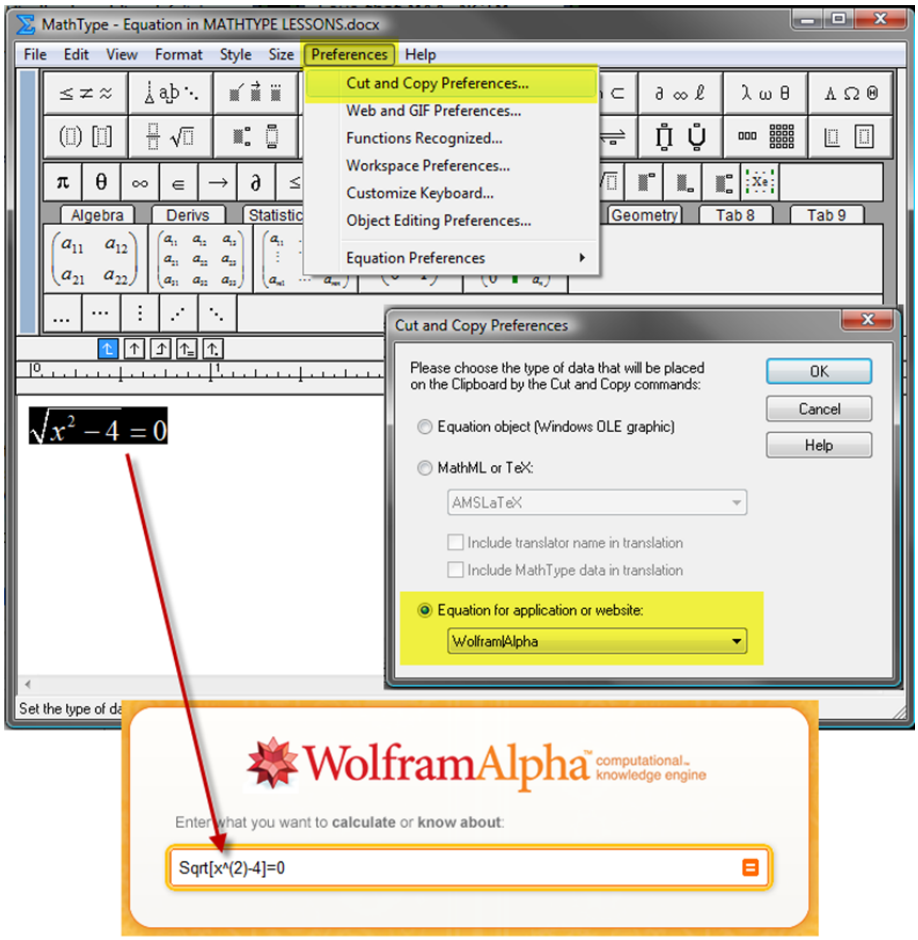
Application	**Translator to use in Cut and Copy Preferences**	**Notes on Paste Action**
ANGEL Learning	Equation for … ANGEL Learning	In ANGEL, click on the Sigma symbol. Paste the MT equation into the equation editor.
Blackboard	Equation for … Blackboard	In Blackboard, click the WebEQ icon $\sqrt{x}$. Paste the MT equation into the Bb Equation editor. Click Submit
Gmail GDocs	Equation for … Google Docs	Paste into your email.
Maple	Equation for … Maple	Paste into a Maple worksheet. When Maple asks if you'd like to convert it into 2D math, answer Yes.
Mathematica	Equation for … Mathematica	Paste into the Mathematica notebook.
Moodle	MathML or TeX TeX – LaTeX 2.0 and later Boxes below this: unchecked	Paste into the Moodle text box.
WebAssign	Equation for … WebAssign	Paste into the WebAssign text field used for editing equations.
WolframAlpha	Equation for … Wolfram|Alpha	Paste into the input bar next to the orange =.

NOW YOU TRY IT!

Type the equation: $\sqrt{x^2-4}=0$ in MathType. Follow the directions to paste the equation into Wolfram|Alpha. (wolframalpha.com)

Execute the command and see if it works!

Try it with $\int_0^5 x\sqrt{x+4}dx$. You'll see it doesn't quite work. See if you can figure out what to remove to make W|A execute properly. (It will still save you time when you're checking answers on your next test.)



You can also translate equations FROM some programs back to MathType (and you don't have to have the proper translator set).

Application	Notes on Paste Action
ANGEL Learning	Select the equation with your mouse. Copy it (don't copy it as an image). Paste it into MT.
Blackboard	Use Firefox. Select the equation, but make sure to pick up one character before and one character after the equation. Copy and then paste into MT.
Gmail GDocs	Select the equation. Copy it. Paste it into MT.
Maple	Select the equation. Right-click (or Ctrl-click) and choose Conversions > MathML. Copy the text string that is then displayed and paste it into MT.
Mathematica	Select the equation. Right-click (or Ctrl-click) and choose Copy as > MathML. Paste into MT.
WebAssign	Provided the equation was created using LaTeX, copy it and paste it into MT.