Advanced Techniques for Equation Editor and MathType Users

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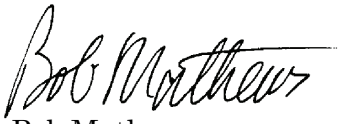
Welcome to *Advanced Techniques for Equation Editor and MathType Users*.

This session is designed to help you get the most out of Equation Editor and MathType by showing you how to use them more effectively with word processors, presentation software, and web page editing software. We will assume you are familiar with using these tools to create basic documents, and our time today will be spent learning some advanced techniques for using these products.

MathType works very well with most word processors, presentation software (such as PowerPoint and Corel Presentations), web page-authoring software (such as FrontPage or Dreamweaver), but during the session today, we will limit the discussion to using MathType with Microsoft products.

Hopefully, many of your needs will be addressed in this session but if you need help in the future, the following sources are available:

- ✓ **Equation Editor Tips & Tricks** -- The MathType web site, http://www.dessci.com, includes *Equation Editor Tips & Tricks* to help get the most out of Equation Editor, but there are several tips appropriate for MathType users as well. Your email address will be your password to access the page immediately.
- ✓ **Help File** – Both products have extensive help files.
- ✓ **User Manual** – MathType comes with a comprehensive User Manual, and many questions can be answered by referring to this manual. Chapter 4 of the MathType User manual includes 18 step-by-step tutorials to get you started.
- ✓ **Technical Support** – We provide lifetime technical support for MathType. For technical support:
  - Phone: 562-432-2920
  - Email: support@dessci.com
  - Web: http://www.dessci.com (click one of the Support links). A collection of "support notices" at the site covers most topics for both Equation Editor and MathType.



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Keyboard Shortcuts

MathType was designed with a "point and click" interface. Find the symbol or template you need, click on it, and it becomes part of your equation. The program also has many keyboard shortcuts, so you can access the commonly-used symbols and templates without having to take your fingers off the keyboard.

The keyboard shortcuts built in to MathType are listed in the Help file. You'll find though, that most of the shortcuts are so intuitive that you can learn them quickly, and be able to use the software even more efficiently to create professional-looking documents.

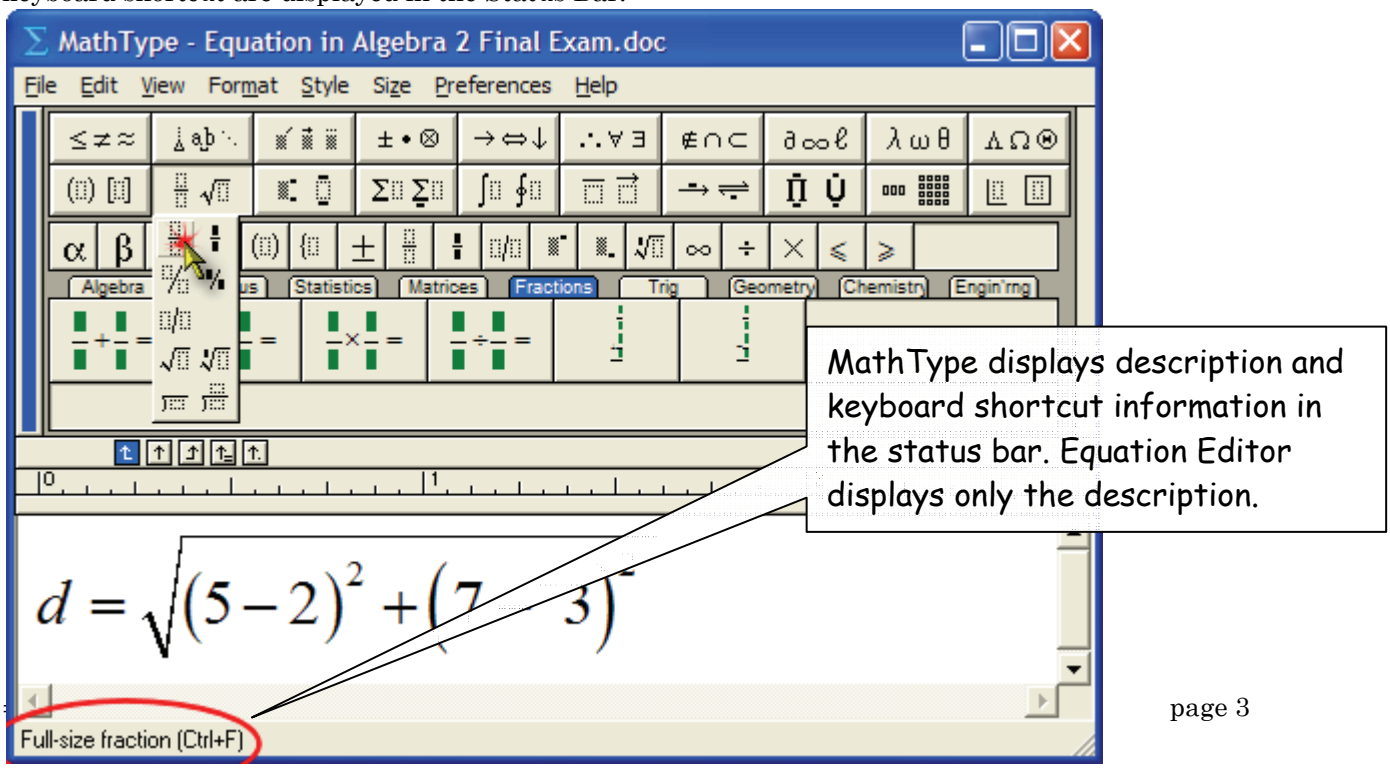
Many of the shortcuts used in MathType are "standard" shortcuts – such as CTRL+S for save, CTRL+C for copy, CTRL+V for paste, etc. (On the Mac, substitute the **COMMAND** key for the **CTRL** key.) Listed here are some of the most commonly-used keyboard shortcuts:

Text mode	CTRL+E
Math mode	CTRL+=
Greek letters	CTRL+G, followed by corresponding letter of the alphabet (a for α, etc.)
"Expanding" parentheses	CTRL+9
Full-sized fraction template	CTRL+F
Radical (square root)	CTRL+R
Superscript (exponent)	CTRL+H ("h" for "high")
Subscript	CTRL+L (" ℓ " for "low")
Thin space	CTRL+SPACE

For more keyboard shortcuts, you can refer to

- "Customize Keyboard" in the MathType Preferences menu
- The MathType Help file under "MathType Reference/Keyboard Shortcuts."
- The Equation Editor Help file: "Reference Information/Keyboard Guide."

Also note that in MathType, when you point to an item with the mouse, the description and keyboard shortcut are displayed in the Status Bar:



Nudging and the MathType Customizable Toolbars

Nudging is a technique that can be accomplished in both Equation Editor and MathType, and is very useful in achieving perfect positioning for your equations.

1. For example, let's say you'd like more space between an integral symbol and the limits of integration. We'll add more space by nudging the limits to the right.

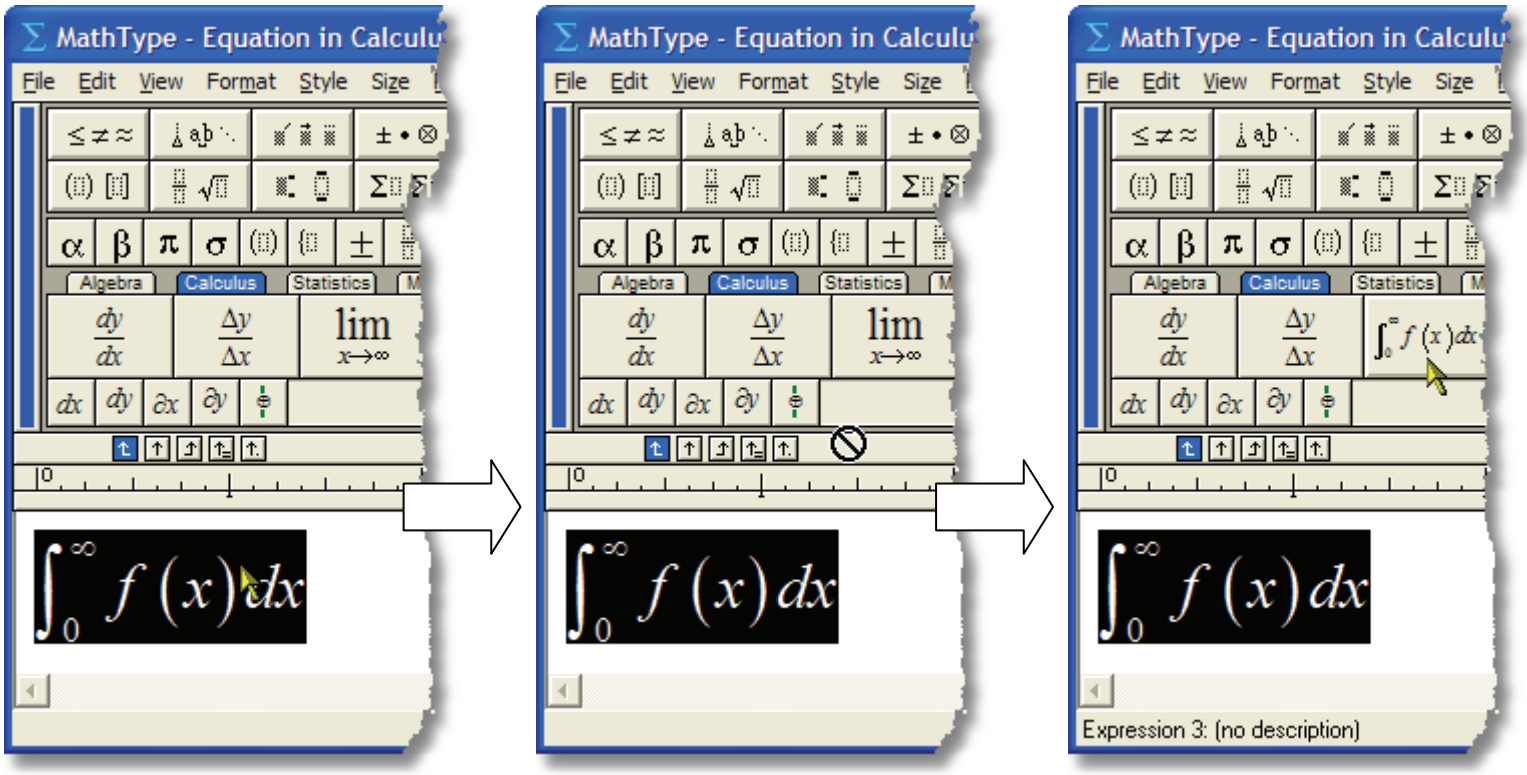
2. Select the upper limit. The most common method to select items is to drag the mouse across the item. For small items though, such as limits, subscripts, etc., it's easier to use the Shift and arrow keys. With the cursor to either the left or right of the item you want to select, hold down the Shift key as you press the either the left or right arrow key, as appropriate. Release the Shift key after you've completed the selection.

3. Hold down the Ctrl key. Use the arrows on the keyboard to move the selected item(s) in the desired direction.

$\int_0^\infty f(x)dx$ before nudging $\qquad$ $\int_0^\infty f(x)dx$ after nudging

Note that not all printers will print the limits as tightly-spaced as the ones in the "before" example. You may have to experiment with nudging a bit in order to find the peoper amount.

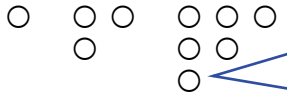
4. If you're using MathType, you can save the newly-nudged expression or equation to the toolbar. That way you don't have to nudge it every time you use it:



Examples of uses you may not have considered for MathType.

Sixth Grade Examples

1. Three drawings are shown. What would the next three look like?



Special symbols may be inserted into a matrix by finding the symbols with the Insert Symbol dialog (on the Edit menu).

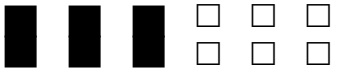
2. Find the value of this expression: $(12-9)\times(6+1)$

3. Compare. Use <, >, or = to complete the statement:

   a. $5-3\times1 \square (5-3)\times1$

   b. $4\frac{15}{20} \square 4\frac{21}{28}$

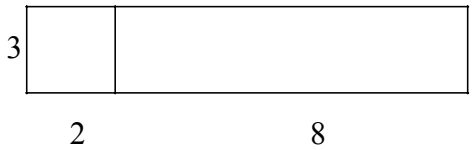
4. Write a variable expression for this model. Squares represent ones; shaded rectangles represent variables:



5. Add or subtract. Use models as needed.

   a. $\begin{array}{r} 7.1 \\ -0.8 \\ \hline \end{array}$ b. $\begin{array}{r} 1.2 \\ +0.91 \\ \hline \end{array}$

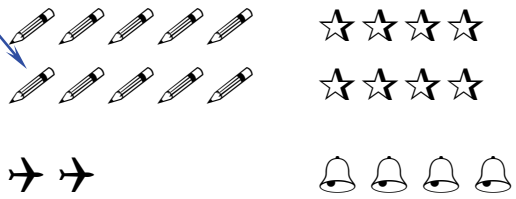
6. Find the areas of the two parts of the rectangle. Then find the total area of the rectangle.



7. Find the quotient: $24\overline{)120.60}$?

8. Find the sum: $\frac{3}{10}+\frac{4}{5}=$ _____

9. Write each ratio as a fraction in simplest form:



   a. pencils : bells
   b. stars : airplanes
   c. bells : stars

10. Stefan and Wanda played a game and completed the table below:

Stefan wins	𝍸 𝍸 𝍸 𝍸 𝍸 |
Wanda wins	𝍸 |
Times played	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||

   a. Find Probability (Stefan wins) and Probability (Wanda wins).

   b. Do you think the game is fair? Explain.

Cross-out templates are available in MathType but not Equation Editor.

Other uses of MathType that go "beyond the basics"…

1. Aligning systems of equations or inequalities.

$$\begin{cases} 5x-3y=6 \\ 2x+7y=2 \end{cases} \qquad \begin{cases} 3x+4y+\ z=17 \\ 2x+3y+2z=15 \\ \ x+\ y\ \ \ \ =\ 4 \end{cases} \qquad \begin{cases} \ x\ \ \ \ \ \ =3 \\ 2x+\ y\ \ \ =3 \\ 3x+2y+z=3 \end{cases} \qquad \begin{cases} x=3 \\ 2x+y=3 \\ 3x+2y+z=3 \end{cases}$$

2. Dimensional analysis.

$$V = \frac{30 \cancel{\text{ mi}}}{\cancel{1 \text{ h}}} \cdot \frac{5280 \text{ ft}}{1 \cancel{\text{ mi}}} \cdot \frac{1 \cancel{\text{ h}}}{60 \cancel{\text{ min}}} \cdot \frac{1 \cancel{\text{ min}}}{60 \text{ sec}}$$
$$= 44 \text{ ft/sec}$$

3. Step-by-step examples with comments.

$$T_f = T_r + (T_0 - T_r)e^{-rt} \qquad T_f = 160;\ T_r = 68°;\ T_0 = 212°;\ \text{and } r = 0.21$$
$$160 = 68 + (212 - 68)e^{-0.21t}$$
$$92 = 144e^{-.021t}$$
$$\frac{92}{212} = e^{-0.21t} \qquad \text{Isolate the exponential expression.}$$
$$\ln 92 - \ln 144 = -0.21t \qquad \text{Take the natural logarithm of both sides.}$$
$$\frac{\ln 92 - \ln 144}{-0.21} = t \qquad \text{Calculation - ready form}$$
$$t = 2.13345106$$

4. Equations for Web pages.

5. Animated graphics for PowerPoint presentations or Web pages.

6. Chemistry notation.

$$\underbrace{Ba(NO_3)_2(aq)}_{\text{Solution}} + \underbrace{2\,NH_4IO_3(aq)}_{\text{Solution}} \rightarrow \underbrace{Ba(IO_3)_2(s)}_{\text{Precipitate}} + \underbrace{2\,NH_4NO_3(aq)}_{\text{Solution}}$$

$$\underset{\text{Acid}}{H_3O^+} \rightleftharpoons \underset{\substack{\text{Conjugate} \\ \text{Base}}}{H_2O} + H^+$$

$${}^{9}Be^{2+} \qquad {}^{24}_{12}Mg \qquad {}^{238}_{92}U$$

What can I do with MathType that I can't do with Equation Editor?

1. MathType includes over 200 symbols and templates that are not included in Equation Editor. Some of these are shown here. (Many of these are currently available only in the Windows version.) Examples: $\ll \gg \sim \approx [\![\;]\!] \odot \nearrow \rightleftharpoons \rightleftarrows \mathbb{R} \dagger \measuredangle \nless \| $

   In addition, MathType Windows includes the ability to include a tilde, hat, arc, or harpoon (vector barb) over more than one character. It also includes cross-out templates for showing cancellation. Examples: $\overset{\frown}{AB}$ ~~inches~~

2. *Color*. MathTypeWindows lets you color all or part of an equation, or use multiple colors in a single equation. This is great for making captivating PowerPoint presentations or for printing color transparencies on an ink jet printer.

3. *Web publishing.* MathType lets you save your equations as GIFs to use in your web documents. The Windows version of MathType will generate MathML – a subset of XML that is the W3C standard for publishing mathematics on the web.

4. *Equation numbering.* Not everyone needs to number equations or include references to equations in the text of a document. If you are a textbook author or write manuscripts for journal publication, you will appreciate the fact that MathType can number and reference your equations automatically when used with Microsoft Word.

5. *Precise formatting ruler.* You get a sophisticated word processor-like ruler for precise formatting. Align columns at operators, decimal points; or set tab stops to make formatting easier and to give your documents a more professional look. This example cannot be duplicated exactly in Equation Editor for two reasons: cross-out templates, and ruler formatting (fractions aligned at right edge with a right-justified tab).

$$3\tfrac{1}{2}\cdot\tfrac{2}{2} = \cancel{3}^{\,2}\tfrac{\cancel{6}^{\,3}}{4}$$
$$\begin{array}{r} -\tfrac{3}{4} \\ \hline 2\tfrac{3}{4} \end{array} \qquad \begin{array}{r} -\tfrac{3}{4} \end{array}$$

6. *New spacing adjustments possible:*
   - Radical "check mark" width adjustment: $\sqrt{2}\ \sqrt{2}\ \sqrt{2}$
   - Subscript and superscript horizontal gap: $x^2\ x^2\ x^2$
   - Slash and diagonal fraction gap: ½ ½ ½
   - Horizontal gap between fence templates (parentheses, brackets, braces, etc.) and their contents: $\left(x^2-4\right)\ \left(x^2-4\right)\ \left(x^2-4\right)$
   - Stroke thickness for box lines, strike-throughs, radical signs, etc:

$$\frac{1}{\cancel{\sqrt{2}}}\cdot\frac{\sqrt{2}}{\cancel{\sqrt{2}}} \qquad \frac{1}{\cancel{\sqrt{2}}}\cdot\frac{\sqrt{2}}{\cancel{\sqrt{2}}} \qquad \frac{1}{\cancel{\sqrt{2}}}\cdot\frac{\sqrt{2}}{\cancel{\sqrt{2}}}$$
$$2 \qquad\qquad 2 \qquad\qquad 2$$

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If you're interested in a school or district license, we offer special pricing. There is an information sheet in this package. You can call the 800 number above for more information, or call your sales manager directly.

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