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# Typesetting Math in Moodle

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You may already know how to use **MathType** (or **Equation Editor**) to put equations in Moodle. But if you don't have those programs installed on your personal computer, or if you don't feel like switching applications often, this short tutorial is just for you. You will learn the basics of entering Math into test questions on Moodle—by hand!

This tutorial will teach you the basics of *LaTeX* (pronounced *LAH-tech*), which is sort of like a programming language. Learning *LaTeX* may take some time, but it will save you much more time in the long run. Once you are fluent with it, you'll be able to enter math equations without ever having to leave the Moodle page.

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## Introduction: Your First Equation by Hand

To enter a math equation into Moodle, you need to surround the math with double dollar signs on each side. For example, to display  $2x + 3 = 7$ , you would need to type `$$2x+3=7$$` anywhere in the text box on Moodle. Try it for yourself:

Question name\* solve an equation

Question text

Font family Font size Paragraph

**B** *I* U ABC  $x_1$   $x^2$  [List Icons] [Table Icon] [Link Icon] [Image Icon] [Media Icon] [HTML Icon]

Solve the following equation:  $2x+3=7$

Path: p

The reason you need to surround the  $\LaTeX$  code with double dollar signs is that there is a JavaScript program installed on the Moodle server that searches for these signs. When it finds  $\$$ , it knows to convert the code inside into mathematical characters. In fact, the same program is installed on this web page you're reading right now. In order for  $\LaTeX$  to properly typeset, you and your students need to have JavaScript enabled in your browsers.

Notice how  $\LaTeX$  is *space-insensitive*. This means you could enter  $2x+3=7$ , or  $2x + 3 = 7$ , or any variation, and it would still be displayed exactly the same. The spaces aren't counted. To deliberately enter a space, you need to put a *backslash* (not a forward slash) before the space character. For example:  $2\ x$  is displayed as  $2\ x$ . The backslash key is right above the enter key on your keyboard.

All  $\LaTeX$  commands begin with a backslash, and may contain arguments, which are contained in curly braces. We'll see some more commands in the next sections.

## Equation Modes

There are two main modes of showing an equation: Inline Mode and Display Mode. Inline Mode displays an equation inline with text, like this:  $2x + 3 = 7$ . In Display Mode, the equation is displayed on its own line and centered. You might want to use this mode to isolate an equation to show that it's important:

$$2x + 3 = 7$$

In normal typesetting systems that use  $\LaTeX$ , these modes are activated differently, however in Moodle they are both activated the same. This means you don't have to memorize any special codes to activate Inline versus Display mode. In order to show an equation in Display Mode, you'll have to put the equation on its own line and center it yourself (like how you would do in **Word**).

Question name\*






solve an equation













Question text




















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**B** *I* U ABC  $\times$   $\times^2$  



Solve the following equation:

$$2x+3 = 7$$

Path: p

## Placement of Symbols

This short section covers how to place mathematical symbols in semantic ways.

## Superscripts and Subscripts

To enter a superscript for powers or exponents, simply place the exponent in curly braces following a caret symbol:

`$$a^{2} + b^{2} = c^{2}$$` is displayed as  $a^2 + b^2 = c^2$ .

To enter a subscript, place the subscript in curly braces following an underscore:

$a_n = a_{n-1} + d$  is displayed as  $a_n = a_{n-1} + d$ .

## Fraction Bars

This one is a little more complicated. To enter a fraction, you need to start with the command `\frac` (notice the backslash), and then enter the arguments in curly braces. There are two arguments: the numerator and the denominator.

`\frac{-b}{2a}` is displayed as  $\frac{-b}{2a}$ .

## Square Roots

The square root command is almost like the fraction command, but it has one argument instead of two. The command is `\sqrt`, and your argument should go in curly braces. Example:

`$$\sqrt{2}$$` is displayed as  $\sqrt{2}$ .

## Parentheses and other Delimiters

Sometimes, you may want to put parentheses and other delimiters (absolute value, square brackets, curly braces, etc.) around an expression or equation. There are many ways to do this, but we'll just cover the

basics.

## Parentheses

To enter parentheses the easy way, just type them in on your keyboard:

`$$f(y) = 2(y^{2}+1)$$` would show up as  $f(y) = 2(y^2 + 1)$ .

The parentheses aren't terrible, but since the  $y$  hangs down a little bit, and we have a superscript, we might want to make our parentheses a little bit taller so that they'll fit their contents. To do this, we have to use the commands `\left` and `\right` before each parenthesis:

`$$f \left( y \right) = 2 \left( y^{2}+1 \right) $$` is displayed as  $f(y) = 2(y^2 + 1)$ .

It's a little more typing to do, but it makes all the difference. And you will want to use these commands to

go from this:  $(\frac{-b}{2a})^2$  to this:  $(\frac{-b}{2a})^2$ .

## Absolute Value, Square Brackets

Other delimiting symbols work just the same way. You can enter them in on your keyboard directly, or you can precede them with the `\left` and `\right` commands.

For the absolute value symbol, use the bar key above the enter key on your keyboard. (It's shift-backslash.)

<i>TeX</i> Code	Math
<code>\$\$  x+2 ^2+3 \$\$</code>	$ x + 2 ^2 + 3$
<code>\$\$ \left x+2\right ^2+3 \$\$</code>	$ x + 2 ^2 + 3$
<code>\$\$ [x^2+6x+9]-9 \$\$</code>	$[x^2 + 6x + 9] - 9$
<code>\$\$ \left[x^2+6x+9\right]-9 \$\$</code>	$[x^2 + 6x + 9] - 9$

## Curly Braces

Now, curly braces are a different situation. Since the *TeX* language uses these symbols for its command arguments, we can't just type them in like we would normal parentheses. We have to *escape* them with a

backslash. To get  $\{4, 2, 1, \frac{1}{2}, \dots\}$ , for example, we would have to type `$$ \{ 4,2,1,\frac{1}{2},\dots \} $$`. Notice the backslash before each brace.

Again, if we want to stretch the braces to fit their contents, we have to add the `\left` and `\right` commands:

`$$ \left\{ 4,2,1,\frac{1}{2},\dots \right\} $$` is displayed as  $\left\{ 4,2,1,\frac{1}{2},\dots \right\}$ .

# Special Characters

This section covers the common characters we use in everyday high school math. Since they won't always be found on your keyboard, there are *TEX* commands for each of them.

## Values and Variables

Symbol Name	TEX Code	Symbol
pi	<code>\$\$ \pi \$\$</code>	$\pi$
Delta	<code>\$\$ \Delta \$\$</code>	$\Delta$
ellipsis	<code>\$\$ \dots \$\$</code>	$\dots$
imaginary unit	<code>\$\$ \imath \$\$</code>	$\imath$
infinity	<code>\$\$ \infty \$\$</code>	$\infty$

## Binary Operations

Symbol Name	TEX Code	Symbol
plus or minus	<code>\$\$ \pm \$\$</code>	$\pm$
times (dot)	<code>\$\$ \cdot \$\$</code>	$\cdot$
times (cross)	<code>\$\$ \times \$\$</code>	$\times$
divide symbol	<code>\$\$ \div \$\$</code>	$\div$

## Binary Relations

Symbol Name	TEX Code	Symbol
less than (strictly)	<code>\$\$ \lt \$\$</code>	$<$
greater than (strictly)	<code>\$\$ \gt \$\$</code>	$>$

less than or equal to	$\leq$	<code>\le</code>
greater than or equal to	$\geq$	<code>\ge</code>
not less than	$\nless$	<code>\not\lt</code>
not greater than	$\ngtr$	<code>\not\gt</code>
not equal to	$\neq$	<code>\ne</code>
similar	$\sim$	<code>\sim</code>
congruent	$\cong$	<code>\cong</code>
approaches	$\rightarrow$	<code>\to</code>
material implication	$\implies$	<code>\implies</code>
logical implication	$\therefore$	<code>\therefore</code>

For a complete list of Greek letters and variants, [download this PDF](#).

## More Operators

Symbol Name	<i>LaTeX</i> Code	Symbol
sine	$\sin{x}$	$\sin x$
cosine	$\cos{x}$	$\cos x$
tangent	$\tan{x}$	$\tan x$
natural log	$\ln{x}$	$\ln x$
common log	$\log{x}$	$\log x$
log base $b$	$\log_{\{b\}}{x}$	$\log_b x$

derivative      
$$\frac{d}{dx}$$

Below are the three most common “large operators” used in high school math: the limit, the integral, and the summation. The best explanation is by example.

### *LaTeX* Code

### Math

$$\lim_{x \rightarrow -\infty} e^x$$

$$\int_1^e \frac{1}{x} dx$$

$$\sum_{n=1}^{\infty} \frac{1}{n^2}$$

## Conclusion

That's it for now! [Email me](#) if you have any questions or if you want me to add anything you think needs to be here.

## More Information

The program that typesets your *LaTeX* into Math is called [MathJax](#), a third party company that uses JavaScript to communicate between the languages of *LaTeX* and HTML-CSS. Basically, MathJax provides technology that allows you to display math on the web in an accessible, user-friendly way.

What is *LaTeX*? [LaTeX](#) is a language, originally developed by Leslie Lamport, used to typeset and mark up documents. It is a very common (perhaps the most common) system used by authors of professional math journals.