

L^AT_EX is a very powerful typesetting language for mathematical text. In a very short amount of time, one can learn to use L^AT_EX to make competent-looking documents. With a few more tips, one can make documents that look above amateurish. At that point, one can study L^AT_EX for years to make it more versatile and professional-looking. The goal of this sheet is to facilitate the second step by providing tips so that your documents do not look like those of an amateur.

Tip 1: Math Mode

All math content must be put in math mode in order to look right. For example, consider the following:

<u>Not in Math Mode</u>	<u>In Math Mode</u>
x=2	$x = 2$
sin(x)	$\sin(x)$

Notice that in math mode, all variables are italicized and spacing is increased.

To put a block of text in math mode, there are several options. The easiest is to enclose the text inside a pair of dollar signs. For example:

If $f(x) = 6x^4$, then $f'(x) = 24x^3$.

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When a block of text is enclosed in a pair of dollar signs, it is rendered in math mode and displayed in-line. Another option for math mode is to enclose text in a pair of doubled dollar signs. This option will render the text in math mode but will display that text centered in its own line. For example:

If $f(x) = 6x^4$, then $f'(x) = 24x^3$.

If

$$f(x) = 6x^4,$$

then

$$f'(x) = 24x^3.$$

Also note that *plain text must not be put in math mode*, otherwise you will be in this situation like the following example:

$\text{\$The Chain Rule is the Mother of all Rules\$}$.

TheChainRuleistheMotherofallRules.

Tip 2: Left and Right Delimiters

Delimiters are grouping symbols like parentheses (\cdot), curly brackets $\{\cdot\}$, square brackets $[\cdot]$, floors symbols $\lfloor\cdot\rfloor$, ceiling symbols $\lceil\cdot\rceil$, and pipes $|\cdot|$. These all work fine except when the thing they are enclosing is large, like a fraction. Consider the following example:

`$$\frac{x+1}{4}^2$$`

$$\left(\frac{x+1}{4}\right)^2$$

Here, the parentheses are too small to properly contain the fraction. To fix this, use `\left` and `\right` to size your delimiters.

`$$\left(\frac{x+1}{4}\right)^2$$`

$$\left(\frac{x+1}{4}\right)^2$$

Tip 3: Function Names

The names of common mathematical functions are their own L^AT_EX commands. Consider the example of $\ln x$: is this the natural logarithm of x , or the product of the three variables l , n , and x ? To fix this, one can use the L^AT_EX command `\ln`, so `\ln x` becomes $\ln x$. Other commands are as follows:

Command	<code>\sin x</code>	<code>\cos x</code>	<code>\tan x</code>	<code>\ln x</code>	<code>\arcsin x</code>	<code>\arccos x</code>	<code>\sinh x</code>	<code>\cosh x</code>
Output	$\sin x$	$\cos x$	$\tan x$	$\ln x$	$\arcsin x$	$\arccos x$	$\sinh x$	$\cosh x$

Tip 4: Multiplication

There are three ways to produce multiplication in L^AT_EX other than juxtaposition. The first, which looks odd, is to use `*` (as in $8 * 4$). Better ways include `\times` (as in 8×4) and a centered dot `\cdot` (as in $8 \cdot 4$).

Tip 5: Quotation Marks

The quotation marks `'` and `"` are always rendered as right-quotation marks. To make left-quotation marks, use `‘` and `‘`:

`‘The student was like, ‘Whoa! That looks so much better!’”`

“The student was like, ‘Whoa! That looks so much better!’”

Tip 6: Display Style

Sometimes mathematical symbols get too scrunched, especially when displayed in-line. For example, the fraction $\frac{x^2+1}{x-3}$ (produced by `\frac{x^2+1}{x-3}` inside a pair of single dollar signs) is hard to read. To make it larger, type `\displaystyle` before the fraction to get $\frac{x^2+1}{x-3}$. The same idea applies with summations and integrals: $\sum_{k=1}^n \ln(k) \approx \int_1^n \ln(x) dx$ is easier to read when preceded by `\displaystyle`, which results in $\sum_{k=1}^n \ln(k) \approx \int_1^n \ln(x) dx$.

Tip 7: Spacing

Spacing in L^AT_EX is not produced the same way it is in WYSIWYG markup systems like Microsoft Word, in which horizontal spaces are created with spaces and tabs and vertical spaces are produced with returns. Spaces, tabs, and returns are all deemed whitespace by L^AT_EX, and so there is no difference between putting a single space between words or ten spaces.

There are several commands to produce a small amount of horizontal space, like `\,`, `\quad`, and `\qquad`:

A\, B\quad C\qquad D

A B C D

One could also manually create however much horizontal space is desired using the `\hspace` command.

A\hspace{0.5in} B\hspace{1in} C\hspace{2in} D

A B C D

The similar command `\vspace` can be used to manually create vertical space, so `\vspace{Xin}` will produce a vertical space of X inches. The difference is that you must end lines using the line-break command `\\` before L^AT_EX will insert space.

A\\ \vspace{0.1in} B\\ \vspace{.25in} C\\ \vspace{.5in} D

A

B

C

D