

# L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> Cheat Sheet

## Document classes

book Default is two-sided.  
 report No \part divisions.  
 article No \part or \chapter divisions.  
 letter Letter (?).  
 slides Large sans-serif font.

Used at the very beginning of a document:  
 \documentclass{class}. Use \begin{document} to start contents and \end{document} to end the document.

## Common documentclass options

10pt/11pt/12pt Font size.  
 letterpaper/a4paper Paper size.  
 twocolumn Use two columns.  
 twoside Set margins for two-sided.  
 landscape Landscape orientation. Must use dvips -t landscape.  
 draft Double-space lines.  
 Usage: \documentclass[*opt,opt*]{class}.

## Packages

fullpage Use 1 inch margins.  
 anysize Set margins: \marginwidth{l}{r}{t}{b}.  
 multicol Use *n* columns: \begin{multicols}{*n*}.  
 latexsym Use L<sup>A</sup>T<sub>E</sub>X symbol font.  
 graphicx Show image: \includegraphics[width=*x*]{file}.  
 url Insert URL: \url{http://...}.  
 Use before \begin{document}. Usage: \usepackage{package}

## Title

\author{text} Author of document.  
 \title{text} Title of document.  
 \date{text} Date.  
 These commands go before \begin{document}. The declaration \maketitle goes at the top of the document.

## Miscellaneous

\pagestyle{empty} Empty header, footer and no page numbers.  
 \tableofcontents Add a table of contents here.

## Document structure

\part{title} \subsubsection{title}  
 \chapter{title} \paragraph{title}  
 \section{title} \subparagraph{title}  
 \subsection{title}  
 Use \setcounter{secnumdepth}{*x*} suppresses heading numbers of depth > *x*, where chapter has depth 0. Use a \*, as in \section\*{title}, to not number a particular item—these items will also not appear in the table of contents.

## Text environments

\begin{comment} Comment (not printed). Requires verbatim package.  
 \begin{quote} Indented quotation block.  
 \begin{quotation} Like quote with indented paragraphs.  
 \begin{verse} Quotation block for verse.

## Lists

\begin{enumerate} Numbered list.  
 \begin{itemize} Bulleted list.  
 \begin{description} Description list.  
 \item text Add an item.  
 \item[*x*] text Use *x* instead of normal bullet or number. Required for descriptions.

## References

\label{marker} Set a marker for cross-reference, often of the form \label{sec:item}.  
 \ref{marker} Give section/body number of marker.  
 \pageref{marker} Give page number of marker.  
 \footnote{text} Print footnote at bottom of page.

## Floating bodies

\begin{table}[place] Add numbered table.  
 \begin{figure}[place] Add numbered figure.  
 \begin{equation}[place] Add numbered equation.  
 \caption{text} Caption for the body.  
 The *place* is a list valid placements for the body. t=top, h=here, b=bottom, p=separate page, !=place even if ugly. Captions and label markers should be within the environment.

## Text properties

### Font face

Command	Declaration	Effect
\textrm{text}	{\rmfamily text}	Roman family
\textsf{text}	{\sffamily text}	Sans serif family
\texttt{text}	{\ttfamily text}	Typewriter family
\textmd{text}	{\mdseries text}	Medium series
\textbf{text}	{\bfseries text}	<b>Bold series</b>
\textup{text}	{\upshape text}	Upright shape
\textit{text}	{\itshape text}	<i>Italic shape</i>
\textsl{text}	{\slshape text}	<i>Slanted shape</i>
\textsc{text}	{\scshape text}	SMALL CAPS SHAPE
\emph{text}	{\em text}	<i>Emphasized</i>
\textnormal{text}	{\normalfont text}	Document font
\underline{text}		<u>Underline</u>

The command (tttt) form handles spacing better than the declaration (tttt) form.

### Font size

\tiny	tiny	\Large	Large
\scriptsize	scriptsize	\LARGE	LARGE
\footnotesize	footnotesize	\huge	huge
\small	small	\Huge	Huge
\normalsize	normalsize		
\large	large		

These are declarations and should be used in the form {\small ...}, or without braces to affect the entire document.

## Verbatim text

\begin{verbatim} Verbatim environment.  
 \begin{verbatim\*} Spaces are shown as <sub>⋮</sub>.  
 \verb!text! Text between the delimiting characters (in this case '!') is verbatim.

## Justification

Environment	Declaration
\begin{center}	\centering
\begin{flushleft}	\raggedright
\begin{flushright}	\raggedleft

## Miscellaneous

\linespread{x} changes the line spacing by the multiplier *x*.

## Text-mode symbols

### Symbols

& \&	~ \_	... \ldots	• \textbullet
\$ \%	^ \^{} \~{} \}	\textbar	\ \textbackslash
% \%	~ \~{} \}	# \#	§ \S

### Accents

ò \`o	ó \'o	ô \^o	õ \~o	ō \=o
ö \.o	ö \"o	ø \c o	ö \v o	ő \H o
ç \c c	ç \d o	ø \b o	ö \t oo	œ \oe
Œ \OE	æ \ae	Æ \AE	å \aa	Å \AA
ø \o	Ø \O	ı \l	L \L	ı \i
J \j	i \i	ı \i	ı \i	ı \i

### Delimiters

' ' " "	{ \{ [ [ ( ( < \textless
' ' " "	} \} ] ] ) ) > \textgreater

### Dashes

Name	Source	Example	Usage
hyphen	-	X-ray	In words.
en-dash	--	1-5	Between numbers.
em-dash	---	Yes—or no?	Punctuation.

## Line and page breaks

\\ Begin new line without new paragraph.  
 \\* Prohibit pagebreak after linebreak.  
 \kill Don't print current line.  
 \pagebreak Start new page.  
 \noindent Do not indent current line.

## Miscellaneous

\today February 25, 2014.  
 \$\sim\$ Prints ~ instead of \~{}, which makes ~.  
 ~ Space, disallow linebreak (W.J.~Clinton).  
 \@. Indicate that the . ends a sentence when following an uppercase letter.  
 \hspace{l} Horizontal space of length *l* (Ex: *l* = 20pt).  
 \vspace{l} Vertical space of length *l*.  
 \rule{w}{h} Line of width *w* and height *h*.

## Tabular environments

### tabbing environment

\= Set tab stop. \> Go to tab stop.  
 Tab stops can be set on "invisible" lines with \kill at the end of the line. Normally \\ is used to separate lines.

## tabular environment

```
\begin{array}[pos]{cols}
\begin{tabular}[pos]{cols}
\begin{tabular*}{width}[pos]{cols}
```

## tabular column specification

```
l      Left-justified column.
c      Centered column.
r      Right-justified column.
p{width} Same as \parbox[t]{width}.
@{decl} Insert decl instead of inter-column space.
|      Inserts a vertical line between columns.
```

## tabular elements

```
\hline      Horizontal line between rows.
\cline{x-y} Horizontal line across columns x through y.
\multicolumn{n}{cols}{text}
           A cell that spans n columns, with cols column
           specification.
```

## Math mode

For inline math, use  $\langle \dots \rangle$  or  $\langle \dots \rangle$ . For displayed math, use  $\langle \dots \rangle$  or  $\langle \dots \rangle$ .

```
Superscriptx  ^{x}      Subscriptx  _{x}
 $\frac{x}{y}$   \frac{x}{y}   $\sum_{k=1}^n$   \sum_{k=1}^n
 $\sqrt[n]{x}$   \sqrt[n]{x}   $\prod_{k=1}^n$   \prod_{k=1}^n
```

## Math-mode symbols

```
≤ \leq      ≥ \geq      ≠ \neq      ≈ \approx
× \times    ÷ \div      ± \pm      · \cdot
° \circ     ° \circ     ′ \prime   … \cdots
∞ \infty    ¬ \neg      ∧ \wedge  ∨ \vee
⊃ \supset   ∀ \forall    ∈ \in     → \rightarrow
⊂ \subset   ∃ \exists    ∉ \notin  ⇒ \Rightarrow
∪ \cup      ∩ \cap      | \mid    ⇔ \Leftrightarrow
â \dot a    â \hat a    ā \bar a  ã \tilde a
α \alpha    β \beta     γ \gamma  δ \delta
ε \epsilon  ζ \zeta     η \eta    ε \varepsilon
θ \theta    ι \iota     κ \kappa  ϑ \vartheta
λ \lambda   μ \mu      ν \nu    ξ \xi
π \pi       ρ \rho     σ \sigma  τ \tau
υ \upsilon  φ \phi     χ \chi   ψ \psi
ω \omega    Γ \Gamma   Δ \Delta  Θ \Theta
Λ \Lambda   Ξ \Xi     Π \Pi    Σ \Sigma
Υ \Upsilon  Φ \Phi    Ψ \Psi   Ω \Omega
```

## Bibliography and citations

When using  $\text{\LaTeX}$ , you need to run `latex`, `bibtex`, and `latex` twice more to resolve dependencies.

## Citation types

```
\cite{key}      Full author list and year. (Watson and Crick
1953)
\citeA{key}     Full author list. (Watson and Crick)
\citeN{key}     Full author list and year. Watson and Crick
(1953)
\shortcite{key} Abbreviated author list and year. ?
\shortciteA{key} Abbreviated author list. ?
\shortciteN{key} Abbreviated author list and year. ?
\citeyear{key}  Cite year only. (1953)
All the above have an NP variant without parentheses; Ex.
\citeNP.
```

## $\text{\LaTeX}$ entry types

```
@article      Journal or magazine article.
@book         Book with publisher.
@booklet      Book without publisher.
@conference   Article in conference proceedings.
@inbook       A part of a book and/or range of pages.
@incollection A part of book with its own title.
@misc         If nothing else fits.
@phdthesis    PhD. thesis.
@proceedings  Proceedings of a conference.
@techreport   Tech report, usually numbered in series.
@unpublished  Unpublished.
```

## $\text{\LaTeX}$ fields

```
address      Address of publisher. Not necessary for major
publishers.
author       Names of authors, of format ...
booktitle    Title of book when part of it is cited.
chapter      Chapter or section number.
edition      Edition of a book.
editor       Names of editors.
institution   Sponsoring institution of tech. report.
journal      Journal name.
key          Used for cross ref. when no author.
month        Month published. Use 3-letter abbreviation.
note         Any additional information.
number       Number of journal or magazine.
organization Organization that sponsors a conference.
pages        Page range (2,6,9--12).
publisher    Publisher's name.
school       Name of school (for thesis).
series       Name of series of books.
title        Title of work.
type         Type of tech. report, ex. "Research Note".
volume       Volume of a journal or book.
year         Year of publication.
Not all fields need to be filled. See example below.
```

## Common $\text{\LaTeX}$ style files

```
abbrv Standard      abstract alpha with abstract
alpha Standard      apa APA
plain Standard      unsrt Unsorted
```

The  $\text{\LaTeX}$  document should have the following two lines just before `\end{document}`, where `bibfile.bib` is the name of the  $\text{\LaTeX}$  file.

```
\bibliographystyle{plain}
\bibliography{bibfile}
```

## $\text{\LaTeX}$ example

The  $\text{\LaTeX}$  database goes in a file called `file.bib`, which is processed with `bibtex` file.

```
@String{N = {Na\-ture}}
@Article{WC:1953,
  author = {James Watson and Francis Crick},
  title = {A structure for Deoxyribose Nucleic Acid},
  journal = N,
  volume = {171},
  pages = {737},
  year = 1953
}
```

## Sample $\text{\LaTeX}$ document

```
\documentclass[11pt]{article}
\usepackage{fullpage}
\title{Template}
\author{Name}
\begin{document}
\maketitle

\section{section}
\subsection*{subsection without number}
text \textbf{bold text} text. Some math:  $\$2+2=5\$$ 
\subsection{subsection}
text \emph{emphasized text} text. \cite{WC:1953}
discovered the structure of DNA.
```

```
A table:
\begin{table}[!th]
\begin{tabular}{|l|c|r|}
\hline
first & row & data \\
second & row & data \\
\hline
\end{tabular}
\caption{This is the caption}
\label{ex:table}
\end{table}
```

The table is numbered `\ref{ex:table}`.  
`\end{document}`

# A quick guide to L<sup>A</sup>T<sub>E</sub>X

## What is L<sup>A</sup>T<sub>E</sub>X?

L<sup>A</sup>T<sub>E</sub>X (usually pronounced “LAY teck,” sometimes “LAH teck,” and never “LAY tex”) is a mathematics typesetting program that is the standard for most professional mathematics writing. It is based on the typesetting program T<sub>E</sub>X created by Donald Knuth of Stanford University (his first version appeared in 1978). Leslie Lamport was responsible for creating L<sup>A</sup>T<sub>E</sub>X a more user friendly version of T<sub>E</sub>X. A team of L<sup>A</sup>T<sub>E</sub>X programmers created the current version, L<sup>A</sup>T<sub>E</sub>X 2 $\epsilon$ .

## Math vs. text vs. functions

In properly typeset mathematics variables appear in italics (e.g.,  $f(x) = x^2 + 2x - 3$ ). The exception to this rule is predefined functions (e.g.,  $\sin(x)$ ). Thus it is important to **always** treat text, variables, and functions correctly. See the difference between  $x$  and  $x$ ,  $-1$  and  $-1$ , and  $\sin(x)$  and  $\sin(x)$ . There are two ways to present a mathematical expression—*inline* or as an *equation*.

## Inline mathematical expressions

Inline expressions occur in the middle of a sentence. To produce an inline expression, place the math expression between dollar signs (\$). For example, typing  $90^\circ$  is the same as  $\frac{\pi}{2}$  radians.

## Equations

Equations are mathematical expressions that are given their own line and are centered on the page. These are usually used for important equations that deserve to be showcased on their own line or for large equations that cannot fit inline. To produce an inline expression, place the mathematical expression between the symbols \[ and \]. Typing  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$  yields

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

## Displaystyle

To get full-sized inline mathematical expressions use `\displaystyle`. Use this sparingly. Typing  $\sum_{n=1}^{\infty} \frac{1}{n}$ , not  $\sum_{n=1}^{\infty} \frac{1}{n}$  yields

I want this  $\sum_{n=1}^{\infty} \frac{1}{n}$ , not this  $\sum_{n=1}^{\infty} \frac{1}{n}$ .

## Images

You can put images (pdf, png, jpg, or gif) in your document. They need to be in the same location as your .tex file when you compile the document. Omit `[width=.5in]` if you want the image to be full-sized.

```
\begin{figure}[ht]
\includegraphics[width=.5in]{imagename.jpg}
\caption{The (optional) caption goes here.}
\end{figure}
```

## Text decorations

Your text can be *italics* (`\textit{italics}`), **boldface** (`\textbf{boldface}`), or underlined (`\underline{underlined}`).

Your math can contain boldface, **R** (`\mathbf{R}`), or blackboard bold, **R** (`\mathbb{R}`). You may want to use these to express the sets of real numbers (**R** or **R**), integers (**Z** or **Z**), rational numbers (**Q** or **Q**), and natural numbers (**N** or **N**).

To have text appear in a math expression use `\text`.  $(0, 1] = \{x \in \mathbb{R} : x > 0 \text{ and } x \leq 1\}$  yields  $(0, 1] = \{x \in \mathbb{R} : x > 0 \text{ and } x \leq 1\}$ . (Without the `\text` command it treats “and” as three variables:  $(0, 1] = \{x \in \mathbb{R} : x > 0 \text{ and } x \leq 1\}$ .)

## Spaces and new lines

L<sup>A</sup>T<sub>E</sub>X ignores extra spaces and new lines. For example, `This sentence will look fine after it is compiled.`

This sentence will look fine after it is compiled.

Leave one full empty line between two paragraphs. Place `\` at the end of a line to create a new line (but not create a new paragraph).

```
This
compiles
```

```
like\
this.
This compiles
like
this.
```

Use `\noindent` to prevent a paragraph from indenting.

## Comments

Use `%` to create a comment. Nothing on the line after the `%` will be typeset. `$f(x) = \sin(x)$ %this is the sine function` yields  $f(x) = \sin(x)$

## Delimiters

description	command	output
parentheses	<code>(x)</code>	$(x)$
brackets	<code>[x]</code>	$[x]$
curly braces	<code>\{x\}</code>	$\{x\}$

To make your delimiters large enough to fit the content, use them together with `\right` and `\left`. For example, `\left\{\sin\left(\frac{1}{n}\right)\right\}_{n=1}^{\infty}` produces

$$\left\{\sin\left(\frac{1}{n}\right)\right\}_{n=1}^{\infty}.$$

Curly braces are non-printing characters that are used to gather text that has more than one character. Observe the differences between the four expressions `x^2`, `x^{2}`, `x^2t`, `x^{2t}` when typeset:  $x^2$ ,  $x^2$ ,  $x^2t$ ,  $x^{2t}$ .

## Lists

You can produce ordered and unordered lists.

description	command	output
unordered list	<code>\begin{itemize}</code>	
	<code>\item</code>	
	<code>\end{itemize}</code>	
ordered list	<code>\begin{enumerate}</code>	
	<code>\item</code>	
	<code>\end{enumerate}</code>	

## Symbols (in math mode)

### The basics

description	command	output
addition	<code>+</code>	$+$
subtraction	<code>-</code>	$-$
plus or minus	<code>\pm</code>	$\pm$
multiplication (times)	<code>\times</code>	$\times$
multiplication (dot)	<code>\cdot</code>	$\cdot$
division symbol	<code>\div</code>	$\div$
division (slash)	<code>/</code>	$/$
circle plus	<code>\oplus</code>	$\oplus$
circle times	<code>\otimes</code>	$\otimes$
equal	<code>=</code>	$=$
not equal	<code>\neq</code>	$\neq$
less than	<code>&lt;</code>	$<$
greater than	<code>&gt;</code>	$>$
less than or equal to	<code>\leq</code>	$\leq$
greater than or equal to	<code>\geq</code>	$\geq$
approximately equal to	<code>\approx</code>	$\approx$
infinity	<code>\infty</code>	$\infty$
dots	<code>1,2,3,\ldots</code>	$1, 2, 3, \dots$
dots	<code>1+2+3+\cdots</code>	$1 + 2 + 3 + \dots$
fraction	<code>\frac{a}{b}</code>	$\frac{a}{b}$
square root	<code>\sqrt{x}</code>	$\sqrt{x}$
nth root	<code>\sqrt[n]{x}</code>	$\sqrt[n]{x}$
exponentiation	<code>a^b</code>	$a^b$
subscript	<code>a_b</code>	$a_b$
absolute value	<code> x </code>	$ x $
natural log	<code>\ln(x)</code>	$\ln(x)$
logarithms	<code>\log_{a}b</code>	$\log_a b$
exponential function	<code>e^x = \exp(x)</code>	$e^x = \exp(x)$
degree	<code>\deg(f)</code>	$\deg(f)$

## Functions

description	command	output
maps to	<code>\to</code>	$\rightarrow$
composition	<code>\circ</code>	$\circ$
piecewise function	<code>\begin{cases}</code> <code>x &amp; x \ge 0 \\ -x &amp; x &lt; 0</code> <code>\end{cases}</code>	$ x  = \begin{cases} x & x \ge 0 \\ -x & x < 0 \end{cases}$

## Greek and Hebrew letters

command	output	command	output
<code>\alpha</code>	$\alpha$	<code>\tau</code>	$\tau$
<code>\beta</code>	$\beta$	<code>\theta</code>	$\theta$
<code>\chi</code>	$\chi$	<code>\upsilon</code>	$\upsilon$
<code>\delta</code>	$\delta$	<code>\xi</code>	$\xi$
<code>\epsilon</code>	$\epsilon$	<code>\zeta</code>	$\zeta$
<code>\varepsilon</code>	$\varepsilon$	<code>\Delta</code>	$\Delta$
<code>\eta</code>	$\eta$	<code>\Gamma</code>	$\Gamma$
<code>\gamma</code>	$\gamma$	<code>\Lambda</code>	$\Lambda$
<code>\iota</code>	$\iota$	<code>\Omega</code>	$\Omega$
<code>\kappa</code>	$\kappa$	<code>\Phi</code>	$\Phi$
<code>\lambda</code>	$\lambda$	<code>\Pi</code>	$\Pi$
<code>\mu</code>	$\mu$	<code>\Psi</code>	$\Psi$
<code>\nu</code>	$\nu$	<code>\Sigma</code>	$\Sigma$
<code>\omega</code>	$\omega$	<code>\Theta</code>	$\Theta$
<code>\phi</code>	$\phi$	<code>\Upsilon</code>	$\Upsilon$
<code>\varphi</code>	$\varphi$	<code>\Xi</code>	$\Xi$
<code>\pi</code>	$\pi$	<code>\aleph</code>	$\aleph$
<code>\psi</code>	$\psi$	<code>\beth</code>	$\beth$
<code>\rho</code>	$\rho$	<code>\daleth</code>	$\daleth$
<code>\sigma</code>	$\sigma$	<code>\gimel</code>	$\gimel$

## Set theory

description	command	output
set brackets	<code>\{1,2,3\}</code>	$\{1, 2, 3\}$
element of	<code>\in</code>	$\in$
not an element of	<code>\notin</code>	$\notin$
subset of	<code>\subset</code>	$\subset$
subset of	<code>\subseteq</code>	$\subseteq$
not a subset of	<code>\not\subset</code>	$\not\subset$
contains	<code>\supset</code>	$\supset$
contains	<code>\supseteq</code>	$\supseteq$
union	<code>\cup</code>	$\cup$
intersection	<code>\cap</code>	$\cap$
big union	<code>\bigcup_{n=1}^{10} A_n</code>	$\bigcup_{n=1}^{10} A_n$
big intersection	<code>\bigcap_{n=1}^{10} A_n</code>	$\bigcap_{n=1}^{10} A_n$
empty set	<code>\emptyset</code>	$\emptyset$
power set	<code>\mathcal{P}</code>	$\mathcal{P}$
minimum	<code>\min</code>	min
maximum	<code>\max</code>	max
supremum	<code>\sup</code>	sup
infimum	<code>\inf</code>	inf
limit superior	<code>\limsup</code>	lim sup
limit inferior	<code>\liminf</code>	lim inf
closure	<code>\overline{A}</code>	$\overline{A}$

## Calculus

description	command	output
derivative	<code>\frac{df}{dx}</code>	$\frac{df}{dx}$
derivative	<code>\fprime</code>	$f'$
partial derivative	<code>\frac{\partial f}{\partial x}</code>	$\frac{\partial f}{\partial x}$
integral	<code>\int</code>	$\int$
double integral	<code>\iint</code>	$\iint$
triple integral	<code>\iiint</code>	$\iiint$
limits	<code>\lim_{x \to \infty}</code>	$\lim_{x \rightarrow \infty}$
summation	<code>\sum_{n=1}^{\infty} a_n</code>	$\sum_{n=1}^{\infty} a_n$
product	<code>\prod_{n=1}^{\infty} a_n</code>	$\prod_{n=1}^{\infty} a_n$

## Logic

description	command	output
not	<code>\sim</code>	$\sim$
and	<code>\land</code>	$\wedge$
or	<code>\lor</code>	$\vee$
if...then	<code>\to</code>	$\rightarrow$
if and only if	<code>\leftrightarrow</code>	$\leftrightarrow$
logical equivalence	<code>\equiv</code>	$\equiv$
therefore	<code>\therefore</code>	$\therefore$
there exists	<code>\exists</code>	$\exists$
for all	<code>\forall</code>	$\forall$
implies	<code>\Rightarrow</code>	$\Rightarrow$
equivalent	<code>\Leftrightarrow</code>	$\Leftrightarrow$

## Linear algebra

description	command	output
vector	<code>\vec{v}</code>	$\vec{v}$
vector	<code>\mathbf{v}</code>	$\mathbf{v}$
norm	<code>  \vec{v}  </code>	$  \vec{v}  $
matrix	<code>\left[ \begin{array}{ccc} 1 &amp; 2 &amp; 3 \\ 4 &amp; 5 &amp; 6 \\ 7 &amp; 8 &amp; 0 \end{array} \right]</code>	$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 0 \end{bmatrix}$
determinant	<code>\left  \begin{array}{ccc} 1 &amp; 2 &amp; 3 \\ 4 &amp; 5 &amp; 6 \\ 7 &amp; 8 &amp; 0 \end{array} \right </code>	$\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 0 \end{vmatrix}$
determinant	<code>\det(A)</code>	$\det(A)$
trace	<code>\operatorname{tr}(A)</code>	$\operatorname{tr}(A)$
dimension	<code>\dim(V)</code>	$\dim(V)$

## Number theory

description	command	output
divides	<code> </code>	$ $
does not divide	<code>\not </code>	$\nmid$
div	<code>\operatorname{div}</code>	div
mod	<code>\mod</code>	mod
greatest common divisor	<code>\gcd</code>	gcd
ceiling	<code>\lceil x \rceil</code>	$\lceil x \rceil$
floor	<code>\lfloor x \rfloor</code>	$\lfloor x \rfloor$

## Geometry and trigonometry

description	command	output
angle	<code>\angle ABC</code>	$\angle ABC$
degree	<code>90^\circ</code>	$90^\circ$
triangle	<code>\triangle ABC</code>	$\triangle ABC$
segment	<code>\overline{AB}</code>	$\overline{AB}$
sine	<code>\sin</code>	sin
cosine	<code>\cos</code>	cos
tangent	<code>\tan</code>	tan
cotangent	<code>\cot</code>	cot
secant	<code>\sec</code>	sec
cosecant	<code>\csc</code>	csc
inverse sine	<code>\arcsin</code>	arcsin
inverse cosine	<code>\arccos</code>	arccos
inverse tangent	<code>\arctan</code>	arctan

## Symbols (in text mode)

The following symbols do **not** have to be surrounded by dollar signs.

description	command	output
dollar sign	<code>\\$</code>	$\$$
percent	<code>\%</code>	$\%$
ampersand	<code>\&amp;</code>	$\&$
pound	<code>\#</code>	$\#$
backslash	<code>\textbackslash</code>	$\backslash$
left quote marks	<code>‘ ‘</code>	$‘ ‘$
right quote marks	<code>’ ’</code>	$’ ’$
single left quote	<code>‘</code>	$‘$
single right quote	<code>’</code>	$’$
hyphen	<code>X-ray</code>	X-ray
en-dash	<code>pp. 5--15</code>	pp. 5–15
em-dash	<code>Yes---or no?</code>	Yes—or no?

## Resources

TUG: The TeX Users Group  
 CTAN: The Comprehensive TeX Archive Network  
 Handwriting-to-L<sup>A</sup>T<sub>E</sub>X sites: [Detexify](#), [WebEquation](#)  
 The Comprehensive L<sup>A</sup>T<sub>E</sub>X Symbol List  
 The Not So Short Introduction to L<sup>A</sup>T<sub>E</sub>X 2 $\epsilon$   
 Software that generates L<sup>A</sup>T<sub>E</sub>X code: Mathematica, Maple, GeoGebra  
 L<sup>A</sup>T<sub>E</sub>X for the Mac: [MacTeX](#)  
 L<sup>A</sup>T<sub>E</sub>X for the PC: [TeXnicCenter](#) and [MiKTeX](#)  
 L<sup>A</sup>T<sub>E</sub>X online: [ShareLaTeX](#), [WriteLaTeX](#)  
 L<sup>A</sup>T<sub>E</sub>X integration with Microsoft Office, Apple iWork, etc:  
[MathType](#), [L<sup>A</sup>T<sub>E</sub>XiT](#)

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