

LATEX 2\epsilon 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
 -
`draft` Double-space lines.
Usage: `\documentclass[opt,opt]{class}`.

Packages

`fullpage` Use 1 inch margins.
`ansize` Set margins with `\marginsize{l}{r}{t}{b}`.
`multicol` Use n columns with `\begin{multicols}{n}`.
`latextsym` Use LATEX symbol font.
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.

Document structure

`\part{title}` `\subsubsection{title}`
`\chapter{title}` `\paragraph{title}`
`\section{title}` `\subparagraph{title}`
`\subsection{title}`

Section commands can be followed with an `*`, like `\section*{title}`, to suppress heading numbers.
`\setcounter{secnumdepth}{x}` suppresses heading numbers of depth $> x$, where `chapter` has depth 0.

Text environments

`\begin{comment}` Comment block (not printed).
`\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
<code>\textrm{text}</code>	<code>\rm text</code>	Roman family
<code>\textsf{text}</code>	<code>\sf text</code>	Sans serif family
<code>\texttt{text}</code>	<code>\tt text</code>	Typewriter family
<code>\textmd{text}</code>	<code>\md text</code>	Medium series
<code>\textbf{text}</code>	<code>\bf text</code>	Bold series
<code>\textup{text}</code>	<code>\up text</code>	Upright shape
<code>\textit{text}</code>	<code>\it text</code>	<i>Italic shape</i>
<code>\textsl{text}</code>	<code>\sl text</code>	Slanted shape
<code>\textsc{text}</code>	<code>\sc text</code>	SMALL CAPS SHAPE
<code>\emph{text}</code>	<code>\em text</code>	<i>Emphasized</i>
<code>\textnormal{text}</code>	<code>\normalfont text</code>	Document font
<code>\underline{text}</code>		<u>Underline</u>

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

Font size

<code>\tiny</code>	<code>tiny</code>	<code>\Large</code> Large
<code>\scriptsize</code>	<code>scriptsize</code>	<code>\LARGE</code> LARGE
<code>\footnotesize</code>	<code>footnotesize</code>	<code>\huge</code> huge
<code>\small</code>	<code>small</code>	<code>\Huge</code> Huge
<code>\normalsize</code>	<code>normalsize</code>	
<code>\large</code>	<code>large</code>	

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 `\`.
`\verb!text!` Text between the delimiting characters (in this case `!`) is verbatim.

Justification

Environment	Declaration
<code>\begin{center}</code>	<code>\centering</code>
<code>\begin{flushleft}</code>	<code>\raggedright</code>
<code>\begin{flushright}</code>	<code>\raggedleft</code>

Miscellaneous

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

Text-mode symbols

Symbols

<code>\&</code>	<code>_</code>	<code>\ldots</code>	<code>\ldots</code>	<code>\textbullet</code>
<code>\\$</code>	<code>\^{}{}</code>	<code>\textbar</code>	<code>\textbackslash</code>	
<code>\%</code>	<code>\~{}{}</code>	<code>\#</code>	<code>\#</code>	<code>\textbar</code>

Accents

<code>\`o</code>	<code>\^o</code>	<code>\~o</code>	<code>\~o</code>	<code>\=o</code>
<code>\.o</code>	<code>\\"o</code>	<code>\c{o}</code>	<code>\v{o}</code>	<code>\H{o}</code>
<code>\c{c} c</code>	<code>\d{o}</code>	<code>\b{o}</code>	<code>\t{oo}</code>	<code>\oe</code>
<code>\OE</code>	<code>\ae</code>	<code>\AE</code>	<code>\aa</code>	<code>\AA</code>
<code>\o{o}</code>	<code>\O{o}</code>	<code>\l{l}</code>	<code>\L{L}</code>	<code>\i{i}</code>
<code>\j{j}</code>	<code>\^{\prime}</code>	<code>\?'</code>		

Delimiters

<code>\{</code>	<code>\}</code>	<code>\[</code>	<code>\[</code>	<code>\langle</code>	<code>\textless</code>
<code>\,</code>	<code>\,</code>	<code>\}</code>	<code>\]</code>	<code>\rangle</code>	<code>\textgreater</code>

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` March 3, 2005.
`\sim` Prints `\sim` 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

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

tabular elements

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

Math mode

To use math mode, surround text with \$ or use

```
\begin{equation}
^{\{x\}} \quad \text{Superscript}^x \quad _{\{x\}} \quad \text{Subscript}_x
\frac{x}{y} \quad \sum_{k=1}^n \quad \sum_{k=1}^n
\sqrt[n]{x} \quad \sqrt[n]{x}
```

Math-mode symbols

<code>\leq</code>	<code>\geq</code>	<code>\neq</code>	<code>\neq</code>
<code>\cdot</code>	<code>\cdot</code>	<code>\cdot</code>	<code>\cdot</code>
<code>\ast</code>	<code>\circ</code>	<code>\circ</code>	<code>\circ</code>
<code>\alpha</code>	<code>\beta</code>	<code>\gamma</code>	<code>\gamma</code>
<code>\delta</code>	<code>\epsilon</code>	<code>\varepsilon</code>	<code>\varepsilon</code>
<code>\zeta</code>	<code>\eta</code>	<code>\theta</code>	<code>\theta</code>
<code>\vartheta</code>	<code>\iota</code>	<code>\kappa</code>	<code>\kappa</code>
<code>\lambda</code>	<code>\mu</code>	<code>\nu</code>	<code>\nu</code>
<code>\xi</code>	<code>\pi</code>	<code>\rho</code>	<code>\rho</code>
<code>\sigma</code>	<code>\tau</code>	<code>\upsilon</code>	<code>\upsilon</code>
<code>\phi</code>	<code>\chi</code>	<code>\psi</code>	<code>\psi</code>
<code>\omega</code>	<code>\Gamma</code>	<code>\Delta</code>	<code>\Delta</code>
<code>\Theta</code>	<code>\Lambda</code>	<code>\Xi</code>	<code>\Xi</code>
<code>\Pi</code>	<code>\Sigma</code>	<code>\Upsilon</code>	<code>\Upsilon</code>
<code>\Phi</code>	<code>\Psi</code>	<code>\Omega</code>	<code>\Omega</code>

Special symbols

`^\circ` Ex: 22°C : $\$22^\circ\{\circ\}\mathbf{\text{C}}\$$.

Bibliography and citations

When using BibTeX, you need to run `latex`, `bibtex`, and `latex` twice more to resolve dependencies.

Citation types

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

BIBTeX entry types

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

BIBTeX fields

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

Not all fields need to be filled. See example below.

Common BibTeX style files

<code>abbrv</code>	Standard	<code>abstract</code>	alpha with abstract
<code>alpha</code>	Standard	<code>apa</code>	APA
<code>plain</code>	Standard	<code>unsrt</code>	Unsorted

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

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

BIBTeX example

The BibTeX 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 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}[]
\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^AT_EX

What is L^AT_EX?

L^AT_EX (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_EX created by Donald Knuth of Stanford University (his first version appeared in 1978). Leslie Lamport was responsible for creating L^AT_EX a more user friendly version of T_EX. A team of L^AT_EX programmers created the current version, L^AT_EX 2 ε .

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 $\sin(\text{x})$. 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 yields 90° 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 I want this \$\displaystyle \sum_{n=1}^{\infty}\$, not this \$\sum_{n=1}^{\infty}\$. 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{(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 (\mathbb{R} or **R**), integers (\mathbb{Z} or **Z**), rational numbers (\mathbb{Q} or **Q**), and natural numbers (\mathbb{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^AT_EX 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	(x)	(x)
brackets	[x]	[x]
curly braces	\{x\}	{x}

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

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

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^{2t} , 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	\begin{itemize} \item Thing 1 \item Thing 2 \end{itemize}	<ul style="list-style-type: none"> • Thing 1 • Thing 2
ordered list	\begin{enumerate} \item Thing 1 \item Thing 2 \end{enumerate}	<ol style="list-style-type: none"> 1. Thing 1 2. Thing 2

Symbols (in *math mode*)

The basics

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

Functions

description	command	output
maps to	\to	\rightarrow
composition	\circ	\circ
piecewise function	\begin{cases} x = \begin{cases} x & x \geq 0 \\ -x & x < 0 \end{cases} \end{cases}	$ x = \begin{cases} x & x \geq 0 \\ -x & x < 0 \end{cases}$
	\end{cases}	

Greek and Hebrew letters

command	output	command	output
\alpha	α	\tau	τ
\beta	β	\theta	θ
\chi	χ	\upsilon	υ
\delta	δ	\xi	ξ
\epsilon	ϵ	\zeta	ζ
\varepsilon	ε	\Delta	Δ
\eta	η	\Gamma	Γ
\gamma	γ	\Lambda	Λ
\iota	ι	\Omega	Ω
\kappa	κ	\Phi	Φ
\lambda	λ	\Pi	Π
\mu	μ	\Psi	Ψ
\nu	ν	\Sigma	Σ
\omega	ω	\Theta	Θ
\phi	ϕ	\Upsilon	Υ
\varphi	φ	\Xi	Ξ
\pi	π	\aleph	\aleph
\psi	ψ	\beth	\beth
\rho	ρ	\daleth	\daleth
\sigma	σ	\gimel	\gimel

Set theory

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

Calculus

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

Logic

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

Linear algebra

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

Number theory

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

Geometry and trigonometry

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

Symbols (in text mode)

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

description	command	output
dollar sign	\\$	\$
percent	\%	%
ampersand	\&	&
pound	\#	#
backslash	\textbackslash	\
left quote marks	\`	`
right quote marks	\`	`
single left quote	\`	'
single right quote	\`	,
hyphen	X-ray	X-ray
en-dash	pp. 5--15	pp. 5–15
em-dash	Yes---or no?	Yes—or no?

Resources

- TUG: The TeX Users Group
 - CTAN: The Comprehensive TeX Archive Network
 - Handwriting-to-LaTeX sites: Detexify, WebEquation
 - The Comprehensive LaTeX Symbol List
 - The Not So Short Introduction to LaTeX 2ε
 - Software that generates LaTeX code: Mathematica, Maple, GeoGebra
 - LaTeX for the Mac: MacTeX
 - LaTeX for the PC: TeXnicCenter and MiKTeX
 - LaTeX online: ShareLaTeX, Overleaf, Sage
 - LaTeX integration with Microsoft Office, Apple iWork, etc: MathType, LaTeXiT
-
- Dave Richeson, Dickinson College, <http://divisbyzero.com/>

LAT_EX Mathematical Symbols

The more unusual symbols are not defined in base L^AT_EX (NFSS) and require \usepackage{amssymb}

1 Greek and Hebrew letters

α	$\backslash alpha$	κ	$\backslash kappa$	ψ	$\backslash psi$	F	$\backslash digamma$	Δ	$\backslash Delta$	Θ	$\backslash Theta$
β	$\backslash beta$	λ	$\backslash lambda$	ρ	$\backslash rho$	ε	$\backslash varepsilon$	Γ	$\backslash Gamma$	Υ	$\backslash Upsilon$
χ	$\backslash chi$	μ	$\backslash mu$	σ	$\backslash sigma$	\varkappa	$\backslash varkappa$	Λ	$\backslash Lambda$	Ξ	$\backslash Xi$
δ	$\backslash delta$	ν	$\backslash nu$	τ	$\backslash tau$	φ	$\backslash varphi$	Ω	$\backslash Omega$		
ϵ	$\backslash epsilon$	o	\circ	θ	$\backslash theta$	ϖ	$\backslash varpi$	Φ	$\backslash Phi$	\aleph	$\backslash aleph$
η	$\backslash eta$	ω	$\backslash omega$	v	$\backslash upsilon$	ϱ	$\backslash varrho$	Π	$\backslash Pi$	\beth	$\backslash beth$
γ	$\backslash gamma$	ϕ	$\backslash phi$	ξ	$\backslash xi$	ς	$\backslash varsigma$	Ψ	$\backslash Psi$	\daleth	$\backslash daleth$
ι	$\backslash iota$	π	$\backslash pi$	ζ	$\backslash zeta$	ϑ	$\backslash vartheta$	Σ	$\backslash Sigma$	\gimel	$\backslash gimmel$

2 L^AT_EX math constructs

$\frac{abc}{xyz}$	$\backslash \frac{abc}{xyz}$	\overline{abc}	$\backslash \overline{abc}$	\overrightarrow{abc}	$\backslash \overrightarrow{abc}$
f'	f'	\underline{abc}	$\backslash \underline{abc}$	\overleftarrow{abc}	$\backslash \overleftarrow{abc}$
\sqrt{abc}	$\backslash \sqrt{abc}$	\widehat{abc}	$\backslash \widehat{abc}$	\overbrace{abc}	$\backslash \overbrace{abc}$
$\sqrt[n]{abc}$	$\backslash \sqrt[n]{abc}$	\widetilde{abc}	$\backslash \widetilde{abc}$	\underbrace{abc}	$\backslash \underbrace{abc}$

3 Delimiters

Use the pair `\left{s1` and `\right{s2}` to match height of delimiters s_1 and s_2 to the height of their contents, e.g., `\left| expr \right|`, `\left\{ expr \right\}`, `\left\langle expr \right\rangle`.

4 Variable-sized symbols (displayed formulae show larger version)

$$\begin{array}{llllll} \sum & \backslash \text{sum} & \int & \backslash \text{int} & \biguplus & \backslash \text{biguplus} & \bigoplus & \backslash \text{bigoplus} & \bigvee & \backslash \text{bigvee} \\ \prod & \backslash \text{prod} & \oint & \backslash \text{ooint} & \bigcap & \backslash \text{bigcap} & \bigotimes & \backslash \text{bigotimes} & \bigwedge & \backslash \text{bigwedge} \\ \coprod & \backslash \text{coprod} & \iint & \backslash \text{aint} & \bigcup & \backslash \text{bigcup} & \bigodot & \backslash \text{bigodot} & \bigsqcup & \backslash \text{bigsqcup} \end{array}$$

5 Standard Function Names

Function names should appear in Roman, not Italic, e.g.,

Correct: $\tan(at-n\pi) \rightarrow \tan(at - n\pi)$
 Incorrect: $\tan(at-n\pi) \rightarrow tan(at - n\pi)$

<code>arccos</code>	<code>\arccos</code>	<code>arcsin</code>	<code>\arcsin</code>	<code>arctan</code>	<code>\arctan</code>	<code>arg</code>	<code>\arg</code>
<code>cos</code>	<code>\cos</code>	<code>cosh</code>	<code>\cosh</code>	<code>cot</code>	<code>\cot</code>	<code>coth</code>	<code>\coth</code>
<code>csc</code>	<code>\csc</code>	<code>deg</code>	<code>\deg</code>	<code>det</code>	<code>\det</code>	<code>dim</code>	<code>\dim</code>
<code>exp</code>	<code>\exp</code>	<code>gcd</code>	<code>\gcd</code>	<code>hom</code>	<code>\hom</code>	<code>inf</code>	<code>\inf</code>
<code>ker</code>	<code>\ker</code>	<code>lg</code>	<code>\lg</code>	<code>lim</code>	<code>\lim</code>	<code>liminf</code>	<code>\liminf</code>
<code>lim sup</code>	<code>\limsup</code>	<code>ln</code>	<code>\ln</code>	<code>log</code>	<code>\log</code>	<code>max</code>	<code>\max</code>
<code>min</code>	<code>\min</code>	<code>Pr</code>	<code>\Pr</code>	<code>sec</code>	<code>\sec</code>	<code>sin</code>	<code>\sin</code>
<code>sinh</code>	<code>\sinh</code>	<code>sup</code>	<code>\sup</code>	<code>tan</code>	<code>\tan</code>	<code>tanh</code>	<code>\tanh</code>

6 Binary Operation/Relation Symbols

\ast	<code>\ast</code>	\pm	<code>\pm</code>	\cap	<code>\cap</code>	\triangleleft	<code>\triangleleft</code>
\star	<code>\star</code>	\mp	<code>\mp</code>	\cup	<code>\cup</code>	\triangleright	<code>\triangleright</code>
\cdot	<code>\cdot</code>	\amalg	<code>\amalg</code>	\uplus	<code>\uplus</code>	\triangleleft	<code>\triangleleft</code>
\circ	<code>\circ</code>	\odot	<code>\odot</code>	\sqcap	<code>\sqcap</code>	\triangleright	<code>\triangleright</code>
\bullet	<code>\bullet</code>	\ominus	<code>\ominus</code>	\sqcup	<code>\sqcup</code>	\triangleleft	<code>\triangleleft</code>
\bigcirc	<code>\bigcirc</code>	\oplus	<code>\oplus</code>	\wedge	<code>\wedge</code>	\triangleleft	<code>\triangleleft</code>
\diamond	<code>\diamond</code>	\oslash	<code>\oslash</code>	\vee	<code>\vee</code>	\triangleleft	<code>\triangleleft</code>
\times	<code>\times</code>	\otimes	<code>\otimes</code>	\dagger	<code>\dagger</code>	\triangleleft	<code>\triangleleft</code>
\div	<code>\div</code>	\wr	<code>\wr</code>	\ddagger	<code>\ddagger</code>	\setminus	<code>\setminus</code>
\cdot	<code>\cdot</code>	\Box	<code>\Box</code>	\barwedge	<code>\barwedge</code>	\veebar	<code>\veebar</code>
\circledast	<code>\circledast</code>	\boxplus	<code>\boxplus</code>	\Cap	<code>\Cap</code>	\curlyvee	<code>\curlyvee</code>
\circledcirc	<code>\circledcirc</code>	\boxminus	<code>\boxminus</code>	\bot	<code>\bot</code>	\Cup	<code>\Cup</code>
\circleddash	<code>\circleddash</code>	\boxtimes	<code>\boxtimes</code>	\intercal	<code>\intercal</code>	\top	<code>\top</code>
\dotplus	<code>\dotplus</code>	\boxdot	<code>\boxdot</code>	\doublebarwedge	<code>\doublebarwedge</code>	\rightthreetimes	<code>\rightthreetimes</code>
\divideontimes	<code>\divideontimes</code>	\square	<code>\square</code>			\leftthreetimes	<code>\leftthreetimes</code>
\equiv	<code>\equiv</code>	\leq	<code>\leq</code>	\geq	<code>\geq</code>	\perp	<code>\perp</code>
\cong	<code>\cong</code>	\prec	<code>\prec</code>	\succ	<code>\succ</code>	\mid	<code>\mid</code>
\neq	<code>\neq</code>	\preceq	<code>\preceq</code>	\succeq	<code>\succeq</code>	\parallel	<code>\parallel</code>
\sim	<code>\sim</code>	\ll	<code>\ll</code>	\gg	<code>\gg</code>	\bowtie	<code>\bowtie</code>
\simeq	<code>\simeq</code>	\subset	<code>\subset</code>	\supset	<code>\supset</code>	\Join	<code>\Join</code>
\approx	<code>\approx</code>	\subseteq	<code>\subseteq</code>	\supseteq	<code>\supseteq</code>	\ltimes	<code>\ltimes</code>
\asymp	<code>\asymp</code>	\sqsubset	<code>\sqsubset</code>	\sqsupset	<code>\sqsupset</code>	\rtimes	<code>\rtimes</code>
\doteq	<code>\doteq</code>	\sqsubseteq	<code>\sqsubseteq</code>	\sqsupseteq	<code>\sqsupseteq</code>	\smile	<code>\smile</code>
\propto	<code>\propto</code>	\dashv	<code>\dashv</code>	\vdash	<code>\vdash</code>	\frown	<code>\frown</code>
\models	<code>\models</code>	\in	<code>\in</code>	\ni	<code>\ni</code>	\notin	<code>\notin</code>
\approxeq	<code>\approxeq</code>	\leqq	<code>\leqq</code>	\geqq	<code>\geqq</code>	\lessgtr	<code>\lessgtr</code>
\thicksim	<code>\thicksim</code>	\lessdot	<code>\lessdot</code>	\geqslant	<code>\geqslant</code>	\lesseqgtr	<code>\lesseqgtr</code>
\backsim	<code>\backsim</code>	\lessapprox	<code>\lessapprox</code>	\gtreqless	<code>\gtreqless</code>	\lesseqqgtr	<code>\lesseqqgtr</code>
\backsimeq	<code>\backsimeq</code>	\lll	<code>\lll</code>	\ggg	<code>\ggg</code>	\gtreqqless	<code>\gtreqqless</code>
\triangleq	<code>\triangleq</code>	\lessdot	<code>\lessdot</code>	\gtreqdot	<code>\gtreqdot</code>	\gtreqless	<code>\gtreqless</code>
\circeq	<code>\circeq</code>	\lessapprox	<code>\lessapprox</code>	\gtreqsim	<code>\gtreqsim</code>	\gtreqless	<code>\gtreqless</code>
\bumpeq	<code>\bumpeq</code>	\eqslantless	<code>\eqslantless</code>	\eqslantgtr	<code>\eqslantgtr</code>	\backepsilon	<code>\backepsilon</code>
\Bumpeq	<code>\Bumpeq</code>	\precsim	<code>\precsim</code>	\succsim	<code>\succsim</code>	\between	<code>\between</code>
\doteqdot	<code>\doteqdot</code>	\approxdot	<code>\approxdot</code>	\succapprox	<code>\succapprox</code>	\pitchfork	<code>\pitchfork</code>
\thickapprox	<code>\thickapprox</code>	\Subset	<code>\Subset</code>	\Supset	<code>\Supset</code>	\shortmid	<code>\shortmid</code>
\fallingdotseq	<code>\fallingdotseq</code>	\subseteqqq	<code>\subseteqqq</code>	\supseteqqq	<code>\supseteqqq</code>	\smallfrown	<code>\smallfrown</code>
\risingdotseq	<code>\risingdotseq</code>	\sqsubset	<code>\sqsubset</code>	\sqsupset	<code>\sqsupset</code>	\smallsmile	<code>\smallsmile</code>
\varpropto	<code>\varpropto</code>	\preccurlyeq	<code>\preccurlyeq</code>	\succcurlyeq	<code>\succcurlyeq</code>	\Vdash	<code>\Vdash</code>
\therefore	<code>\therefore</code>	\curlyeqsucc	<code>\curlyeqsucc</code>	\curlyeqsucc	<code>\curlyeqsucc</code>	\vDash	<code>\vDash</code>
\because	<code>\because</code>	\blacktriangleleft	<code>\blacktriangleleft</code>	\blacktriangleright	<code>\blacktriangleright</code>	\VvDash	<code>\VvDash</code>
\eqcirc	<code>\eqcirc</code>	\trianglelefteq	<code>\trianglelefteq</code>	\trianglerighteq	<code>\trianglerighteq</code>	\shortparallel	<code>\shortparallel</code>
\neq	<code>\neq</code>	\vartriangleleft	<code>\vartriangleleft</code>	\vartriangleright	<code>\vartriangleright</code>	\nshortparallel	<code>\nshortparallel</code>
\ncong	<code>\ncong</code>	\nleq	<code>\nleq</code>	\ngeq	<code>\ngeq</code>	\nsubseteq	<code>\nsubseteq</code>
\nmid	<code>\nmid</code>	\nleqq	<code>\nleqq</code>	\ngeqq	<code>\ngeqq</code>	\nsupseteq	<code>\nsupseteq</code>
\nparallel	<code>\nparallel</code>	\nleqslant	<code>\nleqslant</code>	\ngeqslant	<code>\ngeqslant</code>	\nsubseteq	<code>\nsubseteq</code>
\nshortmid	<code>\nshortmid</code>	\nless	<code>\nless</code>	\ngtr	<code>\ngtr</code>	\nsubseteq	<code>\nsubseteq</code>
\nshortparallel	<code>\nshortparallel</code>	\nprec	<code>\nprec</code>	\nsucc	<code>\nsucc</code>	\subsetneq	<code>\subsetneq</code>
\nsim	<code>\nsim</code>	\npreceq	<code>\npreceq</code>	\nsucceq	<code>\nsucceq</code>	\supsetneq	<code>\supsetneq</code>
\nVDash	<code>\nVDash</code>	\nprecnapprox	<code>\nprecnapprox</code>	\nsuccnapprox	<code>\nsuccnapprox</code>	\subsetneqq	<code>\subsetneqq</code>
\nvDash	<code>\nvDash</code>	\precnsim	<code>\precnsim</code>	\succnsim	<code>\succnsim</code>	\supsetneqq	<code>\supsetneqq</code>
\nvdash	<code>\nvdash</code>	\lnapprox	<code>\lnapprox</code>	\gnapprox	<code>\gnapprox</code>	\varsubsetneq	<code>\varsubsetneq</code>
\ntriangleleft	<code>\ntriangleleft</code>	\nleq	<code>\nleq</code>	\gneq	<code>\gneq</code>	\varsupsetneq	<code>\varsupsetneq</code>
\ntrianglelefteq	<code>\ntrianglelefteq</code>	\nleqq	<code>\nleqq</code>	\gneqq	<code>\gneqq</code>	\varsubsetneqq	<code>\varsubsetneqq</code>
\ntriangleright	<code>\ntriangleright</code>	\nsim	<code>\nsim</code>	\gnsim	<code>\gnsim</code>	\varsupsetneqq	<code>\varsupsetneqq</code>
\ntrianglerighteq	<code>\ntrianglerighteq</code>	\lvertneqq	<code>\lvertneqq</code>	\gvertneqq	<code>\gvertneqq</code>		

7 Arrow symbols

\leftarrow	<code>\leftarrow</code>	\longleftarrow	<code>\longleftarrow</code>	\uparrow	<code>\uparrow</code>
\Leftarrow	<code>\Leftarrow</code>	\Longleftarrow	<code>\Longleftarrow</code>	\Updownarrow	<code>\Updownarrow</code>
\rightarrow	<code>\rightarrow</code>	\longrightarrow	<code>\longrightarrow</code>	\downarrow	<code>\downarrow</code>
\Rightarrow	<code>\Rightarrow</code>	\Longrightarrow	<code>\Longrightarrow</code>	\Downarrow	<code>\Downarrow</code>
\leftrightsquigarrow	<code>\leftrightsquigarrow</code>	\longleftrightsquigarrow	<code>\longleftrightsquigarrow</code>	\updownarrow	<code>\updownarrow</code>
\Leftrightarrow	<code>\Leftrightarrow</code>	\Longleftrightsquigarrow	<code>\Longleftrightsquigarrow</code>	\Updownarrow	<code>\Updownarrow</code>
\mapsto	<code>\mapsto</code>	\longmapsto	<code>\longmapsto</code>	\nearrow	<code>\nearrow</code>
\hookleftarrow	<code>\hookleftarrow</code>	\hookrightarrow	<code>\hookrightarrow</code>	\searrow	<code>\searrow</code>
\leftharpoonup	<code>\leftharpoonup</code>	\rightharpoonup	<code>\rightharpoonup</code>	\swarrow	<code>\swarrow</code>
\leftharpoondown	<code>\leftharpoondown</code>	\rightharpoondown	<code>\rightharpoondown</code>	\nwarrow	<code>\nwarrow</code>
\rightleftharpoons	<code>\rightleftharpoons</code>	\leadsto	<code>\leadsto</code>		
\dashrightarrow	<code>\dashrightarrow</code>	\dashleftarrow	<code>\dashleftarrow</code>	\leftleftarrows	<code>\leftleftarrows</code>
\leftrightsquigarrow	<code>\leftrightsquigarrow</code>	\Lleftarrow	<code>\Lleftarrow</code>	\twoheadleftarrow	<code>\twoheadleftarrow</code>
\leftarrowtail	<code>\leftarrowtail</code>	\looparrowleft	<code>\looparrowleft</code>	\leftrightharpoons	<code>\leftrightharpoons</code>
\curvearrowleft	<code>\curvearrowleft</code>	\circlearrowleft	<code>\circlearrowleft</code>	\Lsh	<code>\Lsh</code>
\upuparrows	<code>\upuparrows</code>	\upharpoonleft	<code>\upharpoonleft</code>	\downharpoonleft	<code>\downharpoonleft</code>
\multimap	<code>\multimap</code>	\leftrightsquigarrow	<code>\leftrightsquigarrow</code>	\rightrightarrows	<code>\rightrightarrows</code>
\rightleftarrows	<code>\rightleftarrows</code>	\rightarrowtail	<code>\rightarrowtail</code>	\rightleftarrows	<code>\rightleftarrows</code>
\twoheadrightarrow	<code>\twoheadrightarrow</code>	\rightarrowtail	<code>\rightarrowtail</code>	\looparrowright	<code>\looparrowright</code>
\rightleftharpoons	<code>\rightleftharpoons</code>	\curvearrowright	<code>\curvearrowright</code>	\circlearrowright	<code>\circlearrowright</code>
\Rsh	<code>\Rsh</code>	\downdownarrows	<code>\downdownarrows</code>	\upharpoonright	<code>\upharpoonright</code>
\downharpoonright	<code>\downharpoonright</code>	\rightsquigarrow	<code>\rightsquigarrow</code>		
\nleftarrow	<code>\nleftarrow</code>	\nrightarrow	<code>\nrightarrow</code>	\nLeftarrow	<code>\nLeftarrow</code>
\nrightarrow	<code>\nrightarrow</code>	\nleftrightsquigarrow	<code>\nleftrightsquigarrow</code>	\nLeftrightarrow	<code>\nLeftrightarrow</code>

8 Miscellaneous symbols

∞	<code>\infty</code>	\forall	<code>\forall</code>	\mathbb{K}	<code>\Bbbk</code>	\wp	<code>\wp</code>
∇	<code>\nabla</code>	\exists	<code>\exists</code>	\star	<code>\bigstar</code>	\angle	<code>\angle</code>
∂	<code>\partial</code>	\nexists	<code>\nexists</code>	\diagdown	<code>\diagdown</code>	\measuredangle	<code>\measuredangle</code>
\eth	<code>\eth</code>	\emptyset	<code>\emptyset</code>	\diagup	<code>\diagup</code>	\sphericalangle	<code>\sphericalangle</code>
\clubsuit	<code>\clubsuit</code>	\varnothing	<code>\varnothing</code>	\diamond	<code>\Diamond</code>	\complement	<code>\complement</code>
\diamondsuit	<code>\diamondsuit</code>	\imath	<code>\imath</code>	\vdash	<code>\Finv</code>	\triangledown	<code>\triangledown</code>
\heartsuit	<code>\heartsuit</code>	\jmath	<code>\jmath</code>	\triangleright	<code>\Game</code>	\triangle	<code>\triangle</code>
\spadesuit	<code>\spadesuit</code>	ℓ	<code>\ell</code>	\hbar	<code>\hbar</code>	\vartriangle	<code>\vartriangle</code>
\cdots	<code>\cdots</code>	$\int\int\int$	<code>\iiiint</code>	\hslash	<code>\hslash</code>	\blacklozenge	<code>\blacklozenge</code>
\vdots	<code>\vdots</code>	$\int\int\int$	<code>\iiint</code>	\lozenge	<code>\lozenge</code>	\blacksquare	<code>\blacksquare</code>
\ldots	<code>\ldots</code>	$\int\int$	<code>\iint</code>	\mho	<code>\mho</code>	\blacktriangle	<code>\blacktriangle</code>
\ddots	<code>\ddots</code>	\sharp	<code>\sharp</code>	\prime	<code>\prime</code>	\blacktriangledown	<code>\blacktriangledown</code>
\Im	<code>\Im</code>	\flat	<code>\flat</code>	\square	<code>\square</code>	\backprime	<code>\backprime</code>
\Re	<code>\Re</code>	\natural	<code>\natural</code>	\surd	<code>\surd</code>	\circledS	<code>\circledS</code>

9 Math mode accents

\acute{a}	<code>\acute{a}</code>	\bar{a}	<code>\bar{a}</code>	$\acute{\mathcal{A}}$	<code>\Acute{\Acute{A}}</code>	$\bar{\mathcal{A}}$	<code>\Bar{\Bar{A}}</code>
\breve{a}	<code>\breve{a}</code>	\check{a}	<code>\check{a}</code>	$\breve{\mathcal{A}}$	<code>\Breve{\Breve{A}}</code>	$\check{\mathcal{A}}$	<code>\Check{\Check{A}}</code>
\ddot{a}	<code>\ddot{a}</code>	\dot{a}	<code>\dot{a}</code>	$\ddot{\mathcal{A}}$	<code>\Ddot{\Ddot{A}}</code>	$\dot{\mathcal{A}}$	<code>\Dot{\Dot{A}}</code>
\grave{a}	<code>\grave{a}</code>	\hat{a}	<code>\hat{a}</code>	$\grave{\mathcal{A}}$	<code>\Grave{\Grave{A}}</code>	$\hat{\mathcal{A}}$	<code>\Hat{\Hat{A}}</code>
\tilde{a}	<code>\tilde{a}</code>	\vec{a}	<code>\vec{a}</code>	$\tilde{\mathcal{A}}$	<code>\Tilde{\Tilde{A}}</code>	$\vec{\mathcal{A}}$	<code>\Vec{\Vec{A}}</code>

10 Array environment, examples

Simplest version:

```
\begin{array}{cols} row_1 \\ row_2 \\ \dots row_m \end{array}
```

where *cols* includes one character [lrc] for each column (with optional characters | inserted for vertical lines) and *row_j* includes character & a total of (*n* – 1) times to separate the *n* elements in the row. Examples:

```
\left( \begin{array}{cc} 2\tau & 7\phi-\frac{5}{12} \\ 3\psi & \frac{\pi}{8} \end{array} \right) \left( \begin{array}{c} x \\ y \end{array} \right) \text{ and } \left[ \begin{array}{cc|c} 3 & 4 & 5 \\ 1 & 3 & 729 \end{array} \right]
```

```
f(z) = \left( \begin{array}{rcl} \overline{\overline{z^2} + \cos z} & \text{for} & |z| < 3 \\ 0 & \text{for} & 3 \leq |z| \leq 5 \\ \sin \overline{z} & \text{for} & |z| > 5 \end{array} \right)
```

$$\left(\begin{array}{cc} 2\tau & 7\phi - \frac{5}{12} \\ 3\psi & \frac{\pi}{8} \end{array} \right) \left(\begin{array}{c} x \\ y \end{array} \right) \text{ and } \left[\begin{array}{cc|c} 3 & 4 & 5 \\ 1 & 3 & 729 \end{array} \right]$$

$$f(z) = \begin{cases} \overline{\overline{z^2} + \cos z} & \text{for } |z| < 3 \\ 0 & \text{for } 3 \leq |z| \leq 5 \\ \sin \overline{z} & \text{for } |z| > 5 \end{cases}$$

11 Other Styles (math mode only)

Caligraphic letters: \mathcal{A} etc.: *A B C D E F G H I J K L M N O P Q R S T U V W X Y Z*

Mathbb letters: \mathbb{A} etc.: *A B C D E F G H I J K L M N O P Q R S T U V W X Y Z*

Mathfrak letters: \mathfrak{A} etc.: *A B C D E F G H I J K L M N O P Q R S T U V W X Y Z a b c 1 2 3*

Math Sans serif letters: A etc.: *A B C D E F G H I J K L M N O P Q R S T U V W X Y Z a b c 1 2 3*

Math bold letters: \mathbf{A} etc.: *A B C D E F G H I J K L M N O P Q R S T U V W X Y Z a b c 1 2 3*

Math bold italic letters: define `\def\mathbi#1{\textbf{\em #1}}` then use \mathbi{A} etc.:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z a b c 1 2 3

12 Font sizes

Math Mode:	$\int f^{-1}(x - x_a) dx$	$\$ \{\displaystyle \int f^{-1}(x - x_a) dx \}$$
	$\int f^{-1}(x - x_a) dx$	$\$ \{\textstyle \int f^{-1}(x - x_a) dx \}$$
	$\int f^{-1}(x - x_a) dx$	$\$ \{\scriptstyle \int f^{-1}(x - x_a) dx \}$$
	$\int f^{-1}(x - x_a) dx$	$\$ \{\scriptscriptstyle \int f^{-1}(x - x_a) dx \}$$
Text Mode:	$\tiny = \text{smallest}$	$\normalsize = \text{normal}$
	$\scriptsize = \text{very small}$	$\large = \text{large}$
	$\footnotesize = \text{smaller}$	$\Large = \text{Large}$
	$\small = \text{small}$	$\LARGE = \text{LARGE}$
		$\huge = \text{huge}$
		$\Huge = \text{Huge}$

13 Text Mode: Accents and Symbols

ó	\'{o}	ö	\"{o}	ô	\^{o}	ò	\'{o}	ó	\~{o}	ó	\={o}	ó	\d{s}
ó	\.{o}	ö	\u{o}	ô	\H{o}	ò	\t{o}	ó	\c{o}	ó	\d{o}	ó	\r{s}
ó	\b{o}	Å	\AA	å	\aa	ß	\ss	í	\i	j	\j	í	\H{s}
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