LaTeX 2ε 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 with \marginsize{*l*}{*r*}{*t*}{*b*}.
multicol   Use *n* columns with \begin{multicols}{*n*}.
latexsym   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 supress heading numbers.
\setcounter{secnumdepth}{*x*} supresses 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}   Bulletted 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*}	{\rm *text*}	Roman family
\textsf{*text*}	{\sf *text*}	Sans serif family
\texttt{*text*}	{\tt *text*}	Typewriter family
\textmd{*text*}	{\md *text*}	Medium series
\textbf{*text*}	{\bf *text*}	**Bold series**
\textup{*text*}	{\up *text*}	Upright shape
\textit{*text*}	{\it *text*}	*Italic shape*
\textsl{*text*}	{\sl *text*}	*Slanted shape*
\textsc{*text*}	{\sc *text*}	SMALL CAPS SHAPE
\emph{*text*}	{\em *text*}	*Emphasized*
\textnormal{*text*}	{\normalfont *text*}	Document font
\underline{*text*}		Underline

The command (t*ttt*) form handles spacing better than the declaration (t*ttt*) form.

Font size

\tiny   tiny
\scriptsize   scriptsize
\footnotesize   footnotesize
\small   small
\normalsize   normalsize
\large   large

\Large   Large
\LARGE   LARGE
\huge   huge
\Huge   Huge

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
\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
%	\%	~	\~{}	#	\#	| \textbar

Accents

ò \'o	ó \'o	ô \^o	õ \~o	ō \=o
ȯ \.o	ö \"o	ǫ \c o	ŏ \v o	ő \H o
ç \c c	ọ \d o	o̲ \b o	o͡o \t oo	œ \oe
Œ \OE	æ \ae	Æ \AE	å \aa	Å \AA
ø \o	Ø \O	ł \l	Ł \L	ı \i
J \j	�ı ˜'	¿ ?'		

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   May 11, 2002.
$\sim$ 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: $l = 20$pt).
\vspace{*l*}   Vertical space of length *l*.
\rule{*w*}{*h*} Line of width *w* and height *h*.

TeX Reference Card

(for Plain TeX)

Greek Letters

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

Symbols of Type Ord

$\aleph$	\aleph	$\prime$	\prime	$\forall$	\forall
$\hbar$	\hbar	$\emptyset$	\emptyset	$\exists$	\exists
$\imath$	\imath	∇	\nabla	$\neg$	\neg or \lnot
$\jmath$	\jmath	$\surd$	\surd	$\flat$	\flat
ℓ	\ell	$\top$	\top	$\natural$	\natural
$\wp$	\wp	$\bot$	\bot	$\sharp$	\sharp
$\Re$	\Re	$\|$	|	$\clubsuit$	\clubsuit
$\Im$	\Im	$\angle$	\angle	$\diamondsuit$	\diamondsuit
∂	\partial	$\triangle$	\triangle	$\heartsuit$	\heartsuit
∞	\infty	$\backslash$	\backslash	$\spadesuit$	\spadesuit

Large Operators

$\sum$	\sum	$\bigcap$	\bigcap	$\bigodot$	\bigodot
$\prod$	\prod	$\bigcup$	\bigcup	$\bigotimes$	\bigotimes
$\coprod$	\coprod	$\bigsqcup$	\bigsqcup	$\bigoplus$	\bigoplus
$\int$	\int	$\bigvee$	\bigvee	$\biguplus$	\biguplus
$\oint$	\oint	$\bigwedge$	\bigwedge		

Binary Operations

$\pm$	\pm	$\cap$	\cap	$\vee$	\vee or \lor
$\mp$	\mp	$\cup$	\cup	$\wedge$	\wedge or \land
$\setminus$	\setminus	$\uplus$	\uplus	$\oplus$	\oplus
$\cdot$	\cdot	$\sqcap$	\sqcap	$\ominus$	\ominus
$\times$	\times	$\sqcup$	\sqcup	$\otimes$	\otimes
$\ast$	\ast	$\triangleleft$	\triangleleft	$\oslash$	\oslash
$\star$	\star	$\triangleright$	\triangleright	$\odot$	\odot
$\diamond$	\diamond	$\wr$	\wr	$\dagger$	\dagger
$\circ$	\circ	$\bigcirc$	\bigcirc	$\ddagger$	\ddagger
$\bullet$	\bullet	$\bigtriangleup$	\bigtriangleup	$\amalg$	\amalg
$\div$	\div	$\bigtriangledown$	\bigtriangledown		

Page Layout

\hsize=⟨dimen⟩	set width of page
\vsize=⟨dimen⟩	set height of page
\displaywidth=⟨dimen⟩	set width of math displays
\hoffset=⟨dimen⟩	move page horizontally
\voffset=⟨dimen⟩	move page vertically

Relations

$\leq$	\leq or \le	$\geq$	\geq or \ge	$\equiv$	\equiv
$\prec$	\prec	$\succ$	\succ	$\sim$	\sim
$\preceq$	\preceq	$\succeq$	\succeq	$\simeq$	\simeq
$\ll$	\ll	$\gg$	\gg	$\asymp$	\asymp
$\subset$	\subset	$\supset$	\supset	$\approx$	\approx
$\subseteq$	\subseteq	$\supseteq$	\supseteq	$\cong$	\cong
$\sqsubseteq$	\sqsubseteq	$\sqsupseteq$	\sqsupseteq	$\bowtie$	\bowtie
$\in$	\in	$\notin$	\notin	$\ni$	\ni or \owns
$\vdash$	\vdash	$\dashv$	\dashv	$\models$	\models
$\smile$	\smile	$\mid$	\mid	$\doteq$	\doteq
$\frown$	\frown	$\parallel$	\parallel	$\perp$	\perp
$\propto$	\propto				

Most relations can be negated by prefixing them with \not.

$\not\equiv$	\not\equiv	$\notin$	\notin	$\ne$	\ne

Arrows

$\leftarrow$	\leftarrow or \gets	$\longleftarrow$	\longleftarrow
$\Leftarrow$	\Leftarrow	$\Longleftarrow$	\Longleftarrow
$\rightarrow$	\rightarrow or \to	$\longrightarrow$	\longrightarrow
$\Rightarrow$	\Rightarrow	$\Longrightarrow$	\Longrightarrow
$\leftrightarrow$	\leftrightarrow	$\longleftrightarrow$	\longleftrightarrow
$\Leftrightarrow$	\Leftrightarrow	$\Longleftrightarrow$	\Longleftrightarrow
$\mapsto$	\mapsto	$\longmapsto$	\longmapsto
$\hookleftarrow$	\hookleftarrow	$\hookrightarrow$	\hookrightarrow
$\uparrow$	\uparrow	$\Uparrow$	\Uparrow
$\downarrow$	\downarrow	$\Downarrow$	\Downarrow
$\updownarrow$	\updownarrow	$\Updownarrow$	\Updownarrow
$\nearrow$	\nearrow	$\searrow$	\searrow
$\nwarrow$	\nwarrow	$\swarrow$	\swarrow

The \buildrel macro puts one symbol over another. The format is \buildrel⟨superscript⟩\over⟨relation⟩.

$\overset{\alpha\beta}{\longrightarrow}$ \buildrel\alpha\beta\over\longrightarrow

$f(x) \overset{\text{def}}{=} x+1$ f(x)\; {\buildrel\rm def\over=} \;x+1

Delimiters

[	\lbrack or [	{	\lbrace or \{	$\langle$	\langle
]	\rbrack or]	}	\rbrace or \}	$\rangle$	\rangle
|	\vert or |	$\lfloor$	\lfloor	$\lceil$	\lceil
$\|$	\Vert or |	$\rfloor$	\rfloor	$\rceil$	\rceil
[[	[\!\[	((	(\!\(	$\langle\!\langle$	\langle\!\langle
]]	]\!\]	))	)\!\)	$\rangle\!\rangle$	\rangle\!\rangle

Left and right delimiters will be enlarged if they are prefixed with \left or \right. Each \left must have a matching \right, one of which may be an empty delimeter (\left. or \right.). To specify a particular size, use the following:

  \bigl, \bigr   \Bigl, \Bigr   \biggl, \biggr

You can also say \bigm for a large delimeter in the middle of a formula, or just \big for one that acts as an ordinary symbol.

Every Time Insertions

\everypar	insert whenever a paragraph begins
\everymath	insert whenever math in text begins
\everydisplay	insert whenever displayed math begins
\everycr	insert after every \cr

Accents

Type	Example	In Math	In Text
hat	$\hat{a}$	\hat	\^
expanding hat	$\widehat{abc}$	\widehat	none
check	$\check{a}$	\check	\v
tilde	$\tilde{a}$	\tilde	\~
expanding tilde	$\widetilde{abc}$	\widetilde	none
acute	$\acute{a}$	\acute	\'
grave	$\grave{a}$	\grave	\`
dot	$\dot{a}$	\dot	\.
double dot	$\ddot{a}$	\ddot	\"
breve	$\breve{a}$	\breve	\u
bar	$\bar{a}$	\bar	\=
vector	$\vec{a}$	\vec	none

The \skew⟨number⟩ command shifts accents for proper positioning, the larger the ⟨number⟩, the more right the shift. Compare

  \hat{\hat A} gives $\hat{\hat A}$,   \skew6\hat{\hat A} gives $\hat{\hat A}$.

Elementary Math Control Sequences

overline a formula	$\overline{x+y}$	\overline{x+y}
underline a formula	$\underline{x+y}$	\underline{x+y}
square root	$\sqrt{x+2}$	\sqrt{x+2}
higher order roots	$\sqrt[n]{x+2}$	\root n\of{x+2}
fraction	$\dfrac{n+1}{3}$	{n+1\over 3}
fraction, no line	$\genfrac{}{}{0pt}{}{n+1}{3}$	{n+1\atop 3}
binomial coeff.	$\binom{n+1}{3}$	{n+1\choose 3}
braced fraction	$\genfrac{\{}{\}}{0pt}{}{n+1}{3}$	{n+1\brace 3}
bracketed fraction	$\genfrac{[}{]}{0pt}{}{n+1}{3}$	{n+1\brack 3}

The following specify a style for typesetting formulas.

\displaystyle \textstyle \scriptstyle \scriptscriptstyle

Non-Italic Function Names

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

a \pmod{m}	$a \pmod{m}$	mod with parentheses
a \bmod m	$a \bmod m$	mod without parentheses

The following examples use \mathop to create function names.

Example	Command	Plain TeX Definition
$\lim_{x\to2}$	\lim_{x\to2}	\def\lim{\mathop{\rm lim}}
$\log_2$	\log_2	\def\log{\mathop{\rm log}\nolimits}

Footnotes, Insertions, and Underlines

\footnote⟨marker⟩{⟨text⟩}	footnote
\topinsert⟨vmode material⟩\endinsert	insert at top of page
\pageinsert⟨vmode material⟩\endinsert	insert on full page
\midinsert⟨vmode material⟩\endinsert	insert middle of page
\underbar{⟨text⟩}	underline text

Useful Parameters and Conversions

\day,\month,\year	the current day, month, year
\jobname	name of current job
\romannumeral⟨number⟩	convert to lower case roman nums.
\uppercase{⟨token list⟩}	convert to upper case
\lowercase{⟨token list⟩}	convert to lower case

Fills, Leaders and Ellipses

Text or Math: ... \dots

Math: ... \ldots ··· \cdots : \vdots ·. \ddots

The following fill space with the indicated item.

\hrulefill \rightarrowfill \leftarrowfill \dotfill

The general format for constructing leaders is

\leaders⟨box or rule⟩\hskip⟨glue⟩	repeat box or rule
\leaders⟨box or rule⟩\hfill	fill space with box or rule

TEX Fonts and Magnification

\rm	Roman	\bf	**Bold**	\tt	Typewriter
\sl	*Slant*	\it	*Italic*	\/	"italic correction"

\magnification=⟨number⟩	scale document by $n/1000$
\magstep⟨number⟩	scaling factor of $1.2^n \times 1000$
\magstephalf	scalling factor of $\sqrt{1.2}$
\font\FN=⟨fontname⟩	load a font, naming it \FN
\font\FN=⟨fontname⟩ at ⟨dimen⟩	
	load font scaled to dimension
\font\FN=⟨fontname⟩ scaled ⟨number⟩	
	load font scaled by $n/1000$
true ⟨dimen⟩	dimension with no scaling

Alignment Displays

\settabs⟨number⟩\columns	set equally spaced tabs
\settabs\+⟨sample line⟩\cr	set tabs as per sample line
\+⟨text$_1$⟩&⟨text$_2$⟩&···\cr	tabbed text to be typeset
\halign	horizontal alignment
\halign to⟨dimen⟩	horizontal alignment
\openup⟨dimen⟩	add space between lines
\noalign{⟨vmode material⟩}	insert material after any \cr
\tabskip=⟨glue⟩	set glue at tab stops
\omit	omit the template for a column
\span	span two columns
\multispan⟨number⟩	span several columns
\hidewidth	ignore the width of an entry
\crcr	insert \cr if one is not present

Boxes

\hbox to⟨dimen⟩	hbox of given dimension
\vbox to⟨dimen⟩	vbox, bottom justified
\vtop to⟨dimen⟩	vbox, top justified
\vcenter to⟨dimen⟩	vbox, center justified (math only)
\rlap	right overlap material
\llap	left overlap material

Overfull Boxes

\hfuzz	allowable excess in hboxes
\vfuzz	allowable excess in vboxes
\overfullrule	width of overfull box marker. To eliminate entirely, set \overfullrule=0pt.

Indentation and Itemized Lists

\indent	indent
\noindent	do not indent
\parindent=⟨dimen⟩	set indentation of paragraphs
\displayindent=⟨dimen⟩	set indentation of math displays
\leftskip=⟨dimen⟩	skip space on left
\rightskip=⟨dimen⟩	skip space on right
\narrower	make paragraph narrower
\item{⟨label⟩}	singly indented itemized list
\itemitem{⟨label⟩}	doubly indented itemized list
\hangindent=⟨dimen⟩	hanging indentation for paragraph
\hangafter=⟨number⟩	start hanging indent after line n. If $n < 0$, indent first $|n|$ lines.
\parshape=⟨number⟩	general paragraph shaping macro

Headers, Footers, and Page Numbers

\nopagenumbers	turn off page numbering
\pageno	current page number. To get roman nums, set \pageno=⟨negative number⟩
\folio	current page number, roman num if < 0
\footline	material to put at foot of page
\headline	material to put at top of page. To leave space, set \voffset=2\baselineskip, make room with \advance\vsize by-\voffset.

Macro Definitions

\def\cs{⟨replacement text⟩}	define the macro \cs
\def\cs#1···#n{⟨repl. text⟩}	macro with parameters
\let\cs=⟨token⟩	give \cs token's current meaning

Advanced Macro Definition Commands

\long\def	macro whose args may include \par
\outer\def	macro not allowed inside definitions
\global\def or \gdef	definition that transcends grouping
\edef	expand while defining macro
\xdef or \global\edef	global version of \edef
\noexpand⟨token⟩	do not expand token
\expandafter⟨token⟩	expand item after token first
\futurelet\cs⟨tok$_1$⟩⟨tok$_2$⟩	equals \let\cs=⟨tok$_2$⟩⟨tok$_1$⟩⟨tok$_2$⟩
\csname...\endcsname	create a control sequence name
\string\cs	list characters in name, \ c s
\number⟨number⟩	list of characters in number
\the⟨internal quantity⟩	list of tokens giving value of quantity

Conditionals

The general format of a conditional is

    \if⟨condition⟩⟨true text⟩\else⟨false text⟩\fi

\ifnum⟨num$_1$⟩⟨relation⟩⟨num$_2$⟩	compare two integers
\ifdim⟨dimen$_1$⟩⟨relation⟩⟨dimen$_2$⟩	compare two dimensions
\ifodd⟨num⟩	test for an odd integer
\ifmmode	test for math mode
\if⟨token$_1$⟩⟨token$_2$⟩	test if character codes agree
\ifdim	compare two dimensions
\ifx⟨token$_1$⟩⟨token$_2$⟩	test if tokens agree
\ifeof⟨number⟩	test for end of file
\iftrue, \iffalse	always true, always false
\ifcase⟨number⟩⟨text$_0$⟩\or⟨text$_1$⟩\or···	
\or⟨text$_n$⟩\else⟨text⟩\fi	choose text by ⟨number⟩
\loop α \if...β \repeat	loop $\alpha\beta\alpha···\alpha$ until \if is false
\newif\ifblob	create a new conditional called \ifblob
\blobtrue, \blobfalse	set conditional \ifblob true, false

Dimensions, Spacing, and Glue

Dimensions are specified as ⟨number⟩⟨unit of measure⟩.
Glue is specified as ⟨dimen⟩ plus⟨dimen⟩ minus⟨dimen⟩.

point	pt	pica	pc	inch	in	centimeter	cm
m width	em	x height	ex	math unit	mu	millimeter	mm

1 pc = 12 pt | 1 in = 72.72 pt | 2.54 cm = 1 in | 18 mu = 1 em

Horizontal Spacing: \quad (skip 1em) \qquad
Horizontal Spacing (Text): \thinspace \enspace \enskip
\hskip⟨glue⟩ \hfil \hfill \hfilneg
Horizontal Spacing (Math): thin space \, medium space \>
thick space \; neg. thin space \! \mskip⟨muglue⟩

Vertical Spacing: \vskip⟨glue⟩ \vfil \vfill

\strut	box w/ ht and depth of "(", zero width
	invisible box with dim of ⟨text⟩
\vphantom{⟨text⟩}	box w/ ht & depth of ⟨text⟩, zero width
\hphantom{⟨text⟩}	box w/ width of ⟨text⟩, zero ht & depth
\smash{⟨text⟩}	typeset ⟨text⟩, set ht & depth to zero
\raise⟨dimen⟩\hbox{⟨text⟩}	raise box up
\lower⟨dimen⟩\hbox{⟨text⟩}	lower box down
\moveleft⟨dimen⟩\vbox{⟨text⟩}	move box left
\moveright⟨dimen⟩\vbox{⟨text⟩}	move box right

Skip Space Between Lines: \smallskip \medskip \bigskip
  encourage a break \smallbreak \medbreak \bigbreak
  break if no room \filbreak
Set Line Spacing: \baselineskip = ⟨glue⟩
  single space \baselineskip = 12pt
  1 1/2 space \baselineskip = 18pt
  double space \baselineskip = 24pt
Increase Line Spacing \openup⟨dimen⟩
  use \jot's 1\jot = 3pt
Allow Unjustified Lines \raggedright
Allow Unjustified Pages \raggedbottom

Braces and Matrices

\matrix	rectangular array of entries
\pmatrix	matrix with parentheses
\bordermatrix	matrix with labels on top and left
\overbrace	overbrace, may be superscripted
\underbrace	underbrace, may be subscripted

For small matrices in text, use the following constructions:

    {a\,b \choose c\,d} $\binom{a\ b}{c\ d}$

    \left({a\atop c} {b\atop d} \right) $\left(\begin{smallmatrix} a\ b \\ c\ d \end{smallmatrix}\right)$

Displayed Equations

\eqno	equation number at right
\leqno	equation number at left
\eqalign	display several aligned equations
\eqalignno	display aligned equations numbered at right
\leqalignno	display aligned equations numbered at left
\displaylines	display several equations, centered
\cases	case by case definitions
\noalign	to insert space between lines in displays, use \noalign{\vskip⟨glue⟩} after any \cr
\openup⟨dimen⟩	add space between all lines in a display

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

To use math mode, surround text with `$` or use `\begin{equation}`.

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

Math-mode symbols

$\leq$	`\leq`	$\geq$	`\geq`	$\neq$	`\neq`
$\cdot$	`\cdot`	$\times$	`\times`	$\div$	`\div`
$*$	`\ast`	$\circ$	`\circ`	$\cdots$	`\cdots`
α	`\alpha`	β	`\beta`	γ	`\gamma`
δ	`\delta`	ϵ	`\epsilon`	ε	`\varepsilon`
ζ	`\zeta`	η	`\eta`	θ	`\theta`
ϑ	`\vartheta`	ι	`\iota`	κ	`\kappa`
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`

Special symbols

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

Bibliography and citations

When using BIBTEX, 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`.

BIBTEX 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.
`@manual`	Technical documentation.
`@mastersthesis`	Master's thesis.
`@misc`	If nothing else fits.
`@phdthesis`	PhD. thesis.
`@proceedings`	Proceedings of a conference.
`@techreport`	Tech report, usually numbered in series.
`@unpublished`	Unpublished.

BIBTEX 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 BIBTEX style files

`abbrv`	Standard	`abstract`	`alpha` with abstract
`alpha`	Standard	`apa`	APA
`plain`	Standard	`unsrt`	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}[!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}
```