$\mathcal{AMS}$-LaTeX Reference Card #1

See the TeX Reference Card for additional commands.
Required packages are indicated as (package).

Document Structure

• **Preamble**
  `\documentclass`[option(s)]{class}
  `\usepackage`[option(s)]{package(s)}
`\begin{document}`
• **Body**
  • **Front Matter** (`\frontmatter` in `book` classes)
    • **Top Matter**
      `\title{...}`
      `\title`[running head]`{...}` alternative headline
      `\date{...}`
      `\date{\today}` gives current date
      `\author{...}`
      `\maketitle` (not in `book` classes)
      • **Additional items — ams classes only**
      `\translator{...}`
      `\dedicatory{...}`
      `\address`[optional name]`{...}`
      `\curraddress{...}`
      `\email`[optional name]`{...}`
      `\thanks{...}`
      `\subjclass{Primary: XXX; Secondary: XXX}`
      `\keywords{...}`
      `\thanks{...}`
    `\tableofcontents`
    `\chapter{Introduction}` (in `book` classes)
    •**Abstract** (not in `book` classes)
      `\begin{abstract}...\end{abstract}`
  • **Main Matter** (`\mainmatter` in `book` classes)
    `\chapter{...}`
    `\section{...}`
    `\subsection{...}`
    `\appendix`
  • **Back Matter** (`\backmatter` in `book` classes)
    `\begin{thebibliography}{99}...\end{...}`
`\end{document}`

Page Style

`\pagestyle`{style} set page style to one of:
  `plain` empty header, page number in footer
  `empty` empty header and footer
  `headings` header filled by doc class, empty footer
  `myheadings` empty footer, fill header with info in `\markboth`{lefthead}{righthead} and `\markright`{righthead}
`\thispagestyle`{style} set `\pagestyle`, only current page
`\enlargethispage{\baselineskip}` force an extra line
`\renewcommand{\baselinestretch}{2}` doublespaced
fancyheadings package allows custom headers and footers
• **Page Style Parameters**
`\hoffset`, `\voffset` move page right, down
`\paperwidth`, `\paperheight`, `\textheight`, `\textwidth`
`\topmargin`, `\headheight`, `\headsep`, `\footskip`
`\pagenumbering{...}` e.g., arabic, roman

Classes and Packages

`\documentclass`[option(s)]{class}
`\usepackage`[option(s)]{package(s)}
`\NeedsTeXFormat{LaTeX2e}[1994/12/01]`
•**Document Classes**
  `article, book, letter, report, slides`
  `amsart, amsbook, amsproc` (all autoload amsmath)
•**Useful Packages**
  `amsmath,amsthm,amscd,amssymb,latexsym`
  `fancyheadings` allows custom headers and footers
  `alltt` all teletype, even \,{,}
  `makeidx,showidx` create index, show in margin
  `graphics,graphicx` inclusion of graphics
  `enumerate` extends the enumerate environment
  `layout` shows page layout of doc class
  `multicol` flexible multicolumn typesetting
  `showkeys` print label keys in margin
  `verbatim` extends verbatim environment
  `url` typeset URLs allowing line breaks
  `graphpap` `\graphpaper` command for `\picture` environ.
•**Document and Package Options**
  Font Size
    `8pt, 9pt, 10pt, 11pt, 12pt`
  Paper Size
    `a4paper,a5paper,b5paper,legalpaper,letterpaper`
  Document Preparation
    `draft,final,notitlepage,titlepage`
  Page Formatting
    `onecolumn,twocolumn,oneside,twoside,openany,openright`
  Equation Numbering
    `fleqn,leqno,reqno,centertags,tbtags`
  Equation Limits
    `intlimits,sumlimits,nonamelimits`
  AMS (Postscript) Fonts
    `psamsfonts,noamsfonts`

Bibliography (see also BibTeX)

`\begin{thebibliography}{99}...\end{...}`
  bibliography with widest label specified
`\bibitem{name}` named bibliography item
`\bibitem[label]{name}` with alternative label to print
`\bysame` use long line for same author
`\renewcommand{\bibname}{title}` use custom title
`\cite{name}` print number of named bib item
`\cite[text]{name}` with extra text

Cross Referencing and Numbering

`\label{name}` assign label name to numbered item
`\ref{name}` print number of named item
`\eqref{name}` print number in parentheses (amsmath)
`\pageref{name}` print page location of named item
`\cite{name}` print number of named bibliography item
`\cite[text]{name}` with extra text
`\numberwithinsection{equation}{section}` number by section

Sectioning and Table of Contents

• Sectioning commands

`\command{title}`	sectioning command with title
`\command[head]{title}`	with alternative running head
`\command*{title}`	with number supressed

`\part` `\section` `\paragraph`
`\chapter` `\subsection` `\subparagraph`
`\subsubsection`

`\appendix`	start appendix

• Table of Contents

`\tableofcontents`	create and print contents
`filename.toc`	contents associated to `filename.tex`
`\addcontentsline{toc}{section}{line to add}`	
`\addtocontents{toc}{material to add}`	
`\setcounter{tocdepth}{...}`	set amount to print

Tables and Figures

`\begin{table}` ... `\caption{text}` `\label{name}` `\end{table}`

`\listoftables`	create and print list of tables

`\begin{figure}` ... `\caption{text}` `\label{name}` `\end{figure}`

`\includegraphics{filename}`	include image (graphics)
`\scaledbox{.5}{\includegraphics{filename}}`	scaled graphic
`\listoffigures`	create and print list of figures

Lists

`\item`	item within list
`\item[label]`	item with label
`\begin{enumerate}...\end{...}`	numbered items
`\begin{itemize}...\end{...}`	bulleted items
`\begin{description}...\end{...}`	captioned items
`\setlength{\itemsep}{0pt}`	move items closer
enumerate package	extends `enumerate`

Displayed Text Material

`\begin{center}...\end{...}`	centered matrial
`\begin{flushright}...\end{...}`	flush right matrial
`\begin{flushleft}...\end{...}`	flush left matrial
`\begin{quote}...\end{...}`	short quote
`\begin{quotation}...\end{...}`	long quote
`\begin{verse}...\end{...}`	poetry
`\begin{verbatim}...\end{...}`	verbatim material
`\verb|...|`	verbatim material
`\verb*|...|`	verbatim with spaces marked
verbatim package	extends `verbatim`

Footnotes, Comments, Other Stuff

`\footnote{text}`	numbered footnote
`%`	comment out a line
`\begin{comment}...\end{...}`	long comment (verbatim)
`\typeout{text}`	print to terminal
`\typein{text}`	get input from keyboard
`\typein[\cmd]{text}`	assign input to `\cmd`
`\protect`	protects fragile commands
`\-`	optional hyphen
`\hyphenation{hypenated words}`	extra hyphenated words

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

`\ \quad \qquad`	white space (1 space, 1 em, 2 em)
`\hspace{10pt}`	specified horizontal space
`\hspace*{10pt}`	space even at line start

Horizontal Spacing (Math): `\,` thin space `\:` med space `\;` thick space `\!` neg. thin space `\mspace`⟨muglue⟩

`\strut`,`\mathstrut`	invisible vertical space
`\phantom{...}`	invisible space
`\vphantom{...}`	invisible vertical space
`\smash[bt]{...}`	typeset w/zero height,depth
`\hfill`	fill with space
`\dotfill`	fill with dots
`\hrulefill`	fill with rule (line)
`\par`	new paragraph
`\newline` or `\\`	force a new line
`\\*`	new line, prohibit page break
`\\[5pt]`	new line skipping 5 pts
`\vspace{1in}`	specified vertical space
`\vspace*{1in}`	space even at page start
`\newpage`	force a new page

• Length Variables

`\newlength{\lngth}`	create length varible `\lngth`
`\setlength{\lngth}{dimen}`	set value of `\lngth`
`\addtolength{\lngth}{dimen}`	increase `\lngth`

• Useful Length Assignments

`\enlargethispage{\baselineskip}`	force extra line
`\setlength{\hangindent}{30pt}`	indentation
`\setlength{\hangafter}{3}`	indent after
`\renewcommand{\baselinestretch}{2}`	doublespaced

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
cedilla	ç	none	`\c`

Additional Text Symbols

`\dag`	†	`\copyright`	©	`\pounds`	£
`\ddag`	‡	`\textcircled{r}`	ⓡ		
`\P`	¶	`\textvisiblespace`	␣		
`\S`	§	`\textbullet`	•		

Fonts

• **Text Fonts**

`\textnormal{...}`	`{\normalfont...}`	document font
`\textrm{...}`	`{\rmfamily...}`	roman
`\textsf{...}`	`{\sffamily...}`	sans serif font
`\texttt{...}`	`{\ttfamily...}`	`typewriter style`
`\textbf{...}`	`{\bfseries...}`	**bold**
`\textup{...}`	`{\upshape...}`	upright
`\textit{...}`	`{\itshape...}`	*italic*
`\textsl{...}`	`{\slshape...}`	*slanted*
`\textsc{...}`	`{\scshape...}`	Small Capitals
`\emph{...}`	`{\em...}`	*emphasize*
`\fbox{...}`		framed text

• **Font Environments** exist for above types, e.g., `\begin{ttfamily}...\end{...}`

• **Changing Font Sizes**

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

• **Math Fonts**

`\mathrm{...}`	roman
`\mathbf{...}`	**bold** (letters)
`\boldsymbol{...}`	**bold** (symbol) (amsmath)
`\mathit{...}`	*italic*
`\mathcal{...}`	caligraphic $\mathcal{A}, \mathcal{B}, \mathcal{C}$
`\usepacakge{eucal}`	redef `\mathcal` to script $\mathcal{A}$, $\mathcal{B}$, $\mathcal{C}$
`\mathfrak{...}`	Fraktur $\mathfrak{A}$, $\mathfrak{a}$, $\mathfrak{B}$, $\mathfrak{b}$ (amsfonts)
`\mathbb{...}`	Blackboard bold $\mathbb{A}$, $\mathbb{B}$, $\mathbb{C}$ (amsfonts)
`\boxed{...}`	framed math

• **Math Font Sizes**

`\displaystyle`	display size
`\textstyle`	text size
`\scriptsize`	sub/superscript size
`\scriptscriptsize`	doubly sub/superscripted size

Boxes

`\mbox{...}`	one line of text
`\text{...}`	one line of text (amsmath)
`\parbox{width}{text}`	paragraph of text
`\parbox[align][height][inner align]{width}{text}`	
`\marginpar{...}`	marginal comment
`\rule[-1pt]{20pt}{10pt}`	solid box ■
`\raisebox{5pt}{text}`	raised box
`\makebox[width][alignment]{text}`	box of text
`\framebox[width][alignment]{text}`	framed text
`\setlength{\fboxsep}{5pt}`	space around text
`\setlength{\fboxrule}{3pt}`	width of box borders

Overfull and Underfull Boxes

draft	document class marks overfulls
`\overfullrule`	width of overfull marker
`\begin{setlength}{\hfuzz}{2pt}...\end{...}`	allow small overfulls

Multicolumn Printing

`\twocolumn`	double column on new page
`\onecolumn`	single column on new page
`\begin{multicols}{`n`}[title]...\end{...}`	multicolumn environment (multicol)

Array and Tabular Environments

`\begin{tabular}[POS]{COLS}...\end{...}`
`\begin{array}[POS]{COLS}...\end{...}`
Use `tabular` for text, `array` for mathematics

`&, \\`	column and row separators

POS aligns top (`t`), bottom (`b`), center (default)
COLS gives formats for columns:

`l,c,r`	left, center, right justified
`|`	vertical rule
`@{...}`	material between columns
`@{}`	no space between columns
`*{n}{...}`	n copies of material
`p{width}`	set column width
`\hline`	horizontal line between rows
`\cline{i-j}`	line across columns i to j
`\multicolumn{n}{COLS}{...}`	span n columns using format in COLS
`\setlength{\tabcolsep}{0pt}`	set column separation
`\setlength{\itemsep}{0pt}`	set item separation
`\renewcommand{\arraystretch}{1.25}`	open up array

• **Example of a table using `\tabular`**

```
\begin{table}
  \begin{center}
    \begin{tabular}{|l|c|c|} \hline
      Name & Exam & Grade \\ \hline
      Dan & 97\% & A \\ \hline
    \end{tabular}
    \caption{Math 101 Final Grades}
    \label{GradeTable}
  \end{center}
\end{table}
```

Name	Exam	Grade
Dan	97%	A

Math 101 Final Grades

Tabbing Environment

`\begin{tabbing}...\end{...}`	tabbing environment
`\=`	set tab
`\\`	end line
`\>`	move to next tab
`\kill`	do not print line

File Suffixes and Types

• **LaTeXSource Files**

`.tex`	File containing a LaTeXdocument
`.sty`, `.cls`	LaTeX style and document class files
`.fd`	Font definition file

• **Files Written by LaTeX**

(See also BibTeXand MakeIndex)

`.aux`	cross-referencing and list information
`.dvi`	device independent typeset file
`.glo`	list of glossary entries
`.lof`	list of figures (read by `\listoffigures`)
`.lot`	list of tables (read by `\listoftables`)
`.toc`	table of contents (read by `\tableofcontents`)
`.log`	LaTeX log file
`\nofiles`	supresses all except `.log` and `.dvi`

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$\mathcal{A}_{\mathcal{M}}\mathcal{S}$-LaTeX Reference Card #2

See the TeX Reference Card for additional commands.
The notation (package) indicates a required package.

Math Environments

`\(...\)` or `$...$`	inline math
`\[...\]` or `$$...$$`	displayed math
`\begin{equation}\label{eqname}...\end{...}`	numbered and labeled equation
`\ref{eqname}`	refer to labeled eqn
`\mbox{...}`	text in math

• The following require amsmath

`\text{...}`	text in math
`\begin{equation*}...\end{...}`	unnumbered eqn
`\tag{eqtag}`	use eqtag instead of number
`\notag`	supress equation tag
`\eqref{eqname}`	ref with parens
`\begin{subequations}...\end{...}`	group equations for numbering
`\numberwithin{equation}{section}`	number equations within sections

Theorems, Lemmas, Etc.

• Defining Theorem-Like Environments

`\newtheorem{name}{label}`	theorem environment
`\newtheorem*{name}{label}`	unnumbered (amsthm)
`\newtheorem{name}[other name]{label}`	numbered consecutively with other environment
`\newtheorem{name}{label}[section]`	numbered by section (or `chapter`, etc.)
`\swapnumbers`	put numbers on left

• Theorem-Like Environment Styles (amsthm)

`\theoremstyle{plain}`	most emphatic
`\theoremstyle{defintion}`	medium emphasis
`\theoremstyle{remark}`	least emphatic

• Invoking Theorem-Like Environments

`\begin{name}...\end{...}`	invoke environment
`\begin{name}[label]...`	invoke with new label

If proclamation starts with a list, put in `\hfill`

`\begin{proof}...\end{...}`	proof environment
`\begin{proof}[label]...\end{...}`	proof with label
`\qedsymbol`	end of proof marker
`\renewcommand{\qedsymbol}{...}`	redefine marker

Commutative Diagrams (amscd)

Separate lines with `\\`, do not use `&`s

`\begin{CD}...\end{CD}`	commutative diagram
`@>#1>#2>`	right arrow with labels
`@<#1<#2<`	left arrow with labels
`@V#1V#2V`	down arrow with labels
`@A#1A#2A`	up arrow with labels
`@=`	long horizontal equal sign
`@|`	long vertical equal sign
`@.`	leave out an arrow

Multiline Math Displays (amsmath)

`Use as \begin{command}...\end{command}`
`Separate items with &, separate lines with \\`
`No \\ on last line, \\[dim] to skip space`

• Full Math Environments (full line)

`gather`	centered, numbered equations
`gather*`	centered, unnumbered equations
`multline`	first line left, last line right, rest centered
`multline*`	same as multline, but unnumbered
`align`	formulas aligned at `&` signs
`align*`	same as align, but unnumbered
`flalign`	flush left and right align
`alignat`	`align` without space, needs argument `\begin{alignat}{`# of cols`}`
`\intertext{text}`	text between lines
`\shoveleft`,`\shoveright`	move `multline` line left, right
`\allowdisplaybreaks`	allow page breaks (`\\*` prohibits)
`\displaybreak`	force page break (before `\\`)

• Math Subenvironments (within math display)

`gathered`	centered equations
`aligned`	formulas aligned at `&` signs
`split`	split long formula within other environment
`cases`	cases, with { on left
`matrix`	matrix (of up to 10 columns)
`pmatrix, bmatrix, vmatrix, Vmatrix`	matrix variants enclosed by $(\cdots)$, $[\cdots]$, $\lvert\cdots\rvert$, $\lVert\cdots\rVert$
`\setcounter{MaxMatrixCols}{12}`	increase number of matrix columns
`\hdotsfor{num}`	dots across columns

Overlines, Underlines, and Arrows

`\underline{...}`	underline
`\overline{...}`	overline
`\overbrace{...}^{...}`	overbrace
`\underbrace{...}_{...}`	underbrace
`\overrightarrow{...}`	over right arrow
`\overleftarrow{...}`	over left arrow
`\overleftrightarrow{...}`	over left-right arrow

`\underrightarrow{...}`,`\underleftarrow{...}`, etc.

`\xrightarrow[bot]{top}`	stretchable w/sub/supscripts
`\xleftarrow[bot]{top}`	stretchable w/sub/supscripts

Operator Names

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

`a \equiv b \pmod{m}`	$a \equiv b \pmod{m}$
`a \equiv b \mod{m}`	$a \equiv b \mod m$
`a \bmod m`	$a \bmod m$
`\DeclareMathOperator{\cmd}{opname}`	create operator
`\DeclareMathOperator*{\cmd}{opname}`	with limits
`\operatorname{...}`	typeset as an operator
`\operatorname*{...}`	with limits

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		

\substack{xxx\\ yyy} stacked sub or superscripts
\limits,\nolimits force or forbid displayed limits
\oint,\iint,\iiint,\iiiint,\idotsint
integral variants (amsmath)

Delimiters

[	\lbrack or \[	{	\lbrace or \{	$\langle$	\langle
]	\rbrack or \]	}	\rbrace or \}	$\rangle$	\rangle
$\vert$	\vert or |	$\lfloor$	\lfloor	$\lceil$	\lceil
$\Vert$	\Vert or \\|	$\rfloor$	\rfloor	$\rceil$	\rceil
$\uparrow$	\uparrow	$\Uparrow$	\Uparrow	$\updownarrow$	\updownarrow
$\downarrow$	\downarrow	$\Downarrow$	\Downarrow	$\Updownarrow$	\Updownarrow

\left(\right) expanding delimiters
\left. \right. empty delimiters
\bigl(\bigr) big delimiters
\Bigl(\Bigr) bigger delimiters
\biggl(\biggr) even bigger delimiters
\bigm| ,\biggm| big binary relation delimiters

Roots

\sqrt{...} square root $\sqrt{\ }$
\sqrt[n]{...} nth root $\sqrt[n]{\ }$
\leftroot{2},\uproot{2} move root left or up

Ellipses

\ldots,\cdots,\dots ellipses
\vdots,\ddots vertical and diagonal dots
\dotsc,\dotsb,\dotsm,\dotsi more ellipses (amsmath)

Fractions and Stacked Relations

\frac{n}{d} fraction $\frac{n}{d}$
\dfrac{n}{d} displaystyle fraction
\tfrac{n}{d} textstyle fraction
\binom{n}{d} binomial coefficient $\binom{n}{d}$
\genfrac{ldelim}{rdelim}{thick}{style}{num}{den}
\cfrac{...}{...} continued fraction
\stackrel{top}{bot} stacked relation
\overset{top}{bot} stacked symbol (amsmath)
\underset{bot}{top} stacked relation (amsmath)
\sideset{_{ll}^{ul}}{_{lr}^{ur}}{largeop}
large operator with left/right sub/supscripts

Negated Relations

\not negate a relation
\ne not equal $\neq$
\notin not a member of $\notin$
\nmid not divisible $\nmid$

User Defined Commands

\newcommand{\name}{replacement text} new command
\newcommand{\name}[n]{text with #1,#2,...,#n}
new command with n arguments
Example: \newcommand{\vect}[2]{#1_1,\ldots,#1_{#2}}
\newcommand{\name}[n][default]{...}
command with args and default value for #1
\renewcommand{...}{...} redefine existing command
\providecommand{...}{...} define if doesn't exist
\newcommand*{...}{...} command with one par arg
\ensuremath{...} forces math mode
\show\command print definition of \command
\showthe\paramname print value of a parameter

User Defined Environments

\newenvironment{name}{pretext}{posttext}
new environment with material before and after
\newenvironment[n]{name}{...}{...}
environment with n arguments
\newenvironment[n][default]{name}{...}{...}
environment with default value for #1
\renewenvironment{name}{...}{...} redefine envrment

MakeIndex

• **MakeIndex** File Suffixes
.idx, .ind, .ilg entry listing, index file, log file
• **MakeIndex** Commands in Document File
\usepackage{makeidx} use indexing package
(Do not include this line if using AMS packages.)
\makeindex tell LaTeX to create an .idx file
\printindex tell LaTeX to print index here
\nofiles supresses creation of .idx and .glo files
• Creating **MakeIndex** .idx File
\index{entry} main entry
\index{entry!entry} subentry
\index{entry!entry!entry} subsubentry
\index{text@entry} with placement info
\index{entry|see{entry}} cross referenced entry
\index{entry|modifier} entry with page modifier
e.g. \index{gnats|textbf} give bold page number
\index{entry|(} ... \index{entry|)} page range
Special Characters: "! "@ "| ""
• Creating An Index With **MakeIndex**
(1) Typeset document containing \makeindex command.
(2) Run MakeIndex on .idx file to create .ind file.
(3) Typeset document containing \printindex command.

Glossary

\makeglossary tell LaTeX to create a .glo file
\glossary{entry} create a glossary entry
\glossaryentry{entry}{page no.} entries in .glo file
\input filename.glo read glossary file
User must define \makeglossary, e.g.,
\newcommand{\glossaryentry}[2]{#1, page #2\par}

Time and Date

\today current date
Use \the to display the following items
\day, \month, \year, \time (minutes since midnight)

Counters

`\newcounter{cntr}`	create new counter named `cntr`
`\newcounter{cntr}[cntr1]`	reset `cntr` when `cntr1` changes
`\setcounter{cntr}{value}`	set value of `cntr`
`\stepcounter{cntr}`	increment `cntr`
`\refstepcounter{cntr}`	increment and reset `\label`
`\addtocounter{cntr}{`n`}`	increment by n
`\value{cntr}`	value stored in `\cntr`
`\thecntr`	the value of `cntr`
calc	package to do counter arithmetic

• Counter Styles

`\arabic{}` `\roman{}` `\Roman{}` `\alph{}` `\Alph{}`

• Standard Counters

`equation` `footnote` `figure` `page` `table`
`part` `chapter` `section` `subsection` `subsubsection`
`paragraph` `subparagraph` `enumi` `enumii` `enumiii` `enumiv`

`secnumdepth`	depth to which sections are numbered
`tocdepth`	depth to which sections are put into toc

Customized List Environments

`\begin{list}{`default label`}{`declarations`}`
`\item` item 1 text
`\item` item 2 text
`\end{list}`
`\begin{trivlist}`...`\end{trivlist}`
list with no labels or declarations, trivial lengths

•Declarations

`\setlength{`length parameter`}{`length`}`
`\usecounter{`counter name`}`
[Create counter first using `\newcounter{`counter name`}`.]

•Length Parameters (see page 113 of Lamport for more)

`\topsep`	separate preceding text and first item
`\itemsep`	separate items
`\leftmargin`	indent of item box from left margin
`\labelwidth`	width of box for item label
`\labelsep`	separate label box from item box

The `picture` Environment

`\begin{picture}(`w`,`$h`)`...`\end{picture}`	picture
`\begin{picture}(`w`,`$h`)(`$\Delta x$`,`$\Delta y$`)`...	with offset
`\put(`x`,`$y`){`picture object`}`	place object
`\multiput(`x`,`$y`)(`$\Delta x$`,`$\Delta y$`){`$n$`}{`object`}`	n times

Picture Objects:

`\makebox(`x`,`$y`)[tblr]{`text`}`	box with text
`\line(`Δx`,`Δy`){`x length`}`	line of slope $\Delta y/\Delta x$
`\vector(`Δx`,`Δy`){`x length`}`	arrow of slope $\Delta y/\Delta x$
`\circle{`r`}`	circle of radius r
`\circle*{`r`}`	filled circle
`\oval(`x`,`$y`)[lrtb]`	oval (part or whole)
`\shortstack{`abc`\\`xyz`\\}`	stacked text
`\framebox(`x`,`$y`)[tblr]{`text`}`	framed text
`\frame{`text`},fbox{`text`}`	other framed boxes
`\dashbox{`d`}(`x`,`$y`){`text`}`	dashed box
`\qbezier(`x_1`,`y_1`)(`x_2`,`y_2`)(`x_3`,`y_3`)`	quadratic curve
`\savebox{\name}(`x`,`$y`){`...`}`	store material
`\usebox{\name}`	retrieve material

`\graphpaper[`n`]{`x`,`$y`}{`$w$`,`$h`}`	print grid (graphpap)
`\setlength{\unitlength}{1pt}`	change size of picture
`\thinlines,\thicklines`	adjust line thickness

Color (color)

`\color{`color`}`	change color
`\textcolor{`color`}{`text`}`	colored text
`\colorbox{`color`}{`text`}`	colored background
`\fcolorbox{`col_1`}{`col_2`}{`text`}`	colored border & background
`\setlength{\fboxsep}{5pt}`	put space around text
`\setlength{\fboxrule}{3pt}`	width of border of box
`\pagecolor{`color`}`	set background color of page
`\definecolor{`name`}{rgb}{`r, g, b`}`	define an RGB color
`\definecolor{`name`}{cmyk}{`c, m, y, k`}`	define a CMYK color

Predefined Colors

`black, white, red, green, blue, yellow, cyan, magenta`

BibTeX

• BibTeX File Suffixes

`.bib`	BibTeX bibliographic database file
`.bst`	BibTeX bibliographic style file
`.blg`	BibTeX log file
`.bbl`	BibTeX document bibliography file

• BibTeX Commands in Document File

`\bibliographystyle{`bib style file`}`
Examples: `plain`, `amsplain`, `unsrt`, `alpha`, `abbrv`
`\bibliography{`bib database file(s)`}`

`\cite{`label`}`	cite a reference
`\nocite{`label`}`	include ref in bib without citation
`\nocite{*}`	include all references in bibliography

• Creating **BibTeX** Database File

`@STRING{name = "text"}` define an abbreviation

Put braces around non-initial capitalized title words.
Use `and` to separate multiple authors in `author` field

•General Format of a Database Entry

```
@ENTRYTYPE{label,
    fieldtype1 = {entry1},
    fieldtype2 = {entry2},
        ⋮
}
```

•Database Entry Types

`@ARTICLE{...}`	`@MASTERSTHESIS{...}`
`@BOOK{...}`	`@MISC{...}`
`@BOOKLET{...}`	`@PHDTHESIS{...}`
`@INBOOK{...}`	`@PROCEEDINGS{...}`
`@INCOLLECTION{...}`	`@TECHREPORT{...}`
`@INPROCEEDINGS{...}`	`@UNPUBLISHED{...}`
`@MANUAL{...}`	`@COMMENT{...}`

•Field Types Within Entries

`address`	`editor`	`month`	`school`
`author`	`howpublished`	`note`	`series`
`booktitle`	`institution`	`number`	`title`
`chapter`	`journal`	`organization`	`type`
`crossref`	`key`	`pages`	`volume`
`edition`	`language`	`publisher`	`year`

• Creating Document Bibliography With **BibTeX**

(1) Typeset document to get new `.aux` file.
(2) Run BibTeX on `.aux` file to create `.bbl` file.
(3) Retypeset document twice.

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