

# AMS- $\text{\TeX}$ Reference Card #1

See the  $\text{\TeX}$  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{left head}{righthad}
and \markright{righthad}
```

```
\thispagestyle{style} set \pagestyle, only current page
fancyheadings package allows custom headers and footers
```

### • Page Style Parameters

```
\hoffset, \voffset move page right, down
\paperwidth, \paperheight, \textheight, \textwidth
\topmargin, \headheight, \headsep, \footskip
```

## Bibliography (see also $\text{\BIBTeX}$ )

```
\begin{thebibliography}{99}... \end{...}
bibliography with widest label specified
\bibitem{name} named bibliography item
\bibitem[label]{name} with alternative label to print
\byname 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
```

## 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, graphics  
fancyheadings allows custom headers and footers  
alltt all teletype, even  $\backslash$ ,  $\{$ ,  $\}$   
makeidx, showidx create index, show in margin  
graphics 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

### • 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, onside, twoside, openany, openright  
Equation Numbering  
fleqn, leqno, reqno, centertags, tbtags  
Equation Limits  
intlimits, sumlimits, nonamlimits  
AMS (Postscript) Fonts  
psamsfonts, noamsfonts

## 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 suppressed
\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}
```

## 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
enumerate package extends enumerate
```

## Displayed Text Material

```
\begin{center}... \end{...} centered material
\begin{flushright}... \end{...} flush right material
\begin{flushleft}... \end{...} flush left material
\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[ $\backslash$ cmd]{text} assign input to  $\backslash$ cmd
\protect protects fragile commands
^- optional hyphen
\hyphenation{hyphenated words} extra hyphenated words
```

## Dimensions, Spacing, and Glue

Dimensions are specified as  $\langle \text{number} \rangle \langle \text{unit of measure} \rangle$ .  
 Glue is specified as  $\langle \text{dimen} \rangle \text{plus} \langle \text{dimen} \rangle \text{minus} \langle \text{dimen} \rangle$ .

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

$\backslash$   $\quad$   $\quad$  white space (1 space, 1 em, 2 em)

$\backslash$ hspace{10pt} specified horizontal space  
 $\backslash$ hspace\*{10pt} space even at line start

Horizontal Spacing (Math):  $\backslash$ , thin space  $\backslash$ : med space  
 $\backslash$ ; thick space  $\backslash$ ! neg. thin space  $\backslash$ mspace(mu glue)

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

### • Length Variables

$\backslash$ newlength{ $\backslash$ length} create length variable  $\backslash$ length  
 $\backslash$ setlength{ $\backslash$ length}{dimen} set value of  $\backslash$ length  
 $\backslash$ addtolength{ $\backslash$ length}{dimen} increase  $\backslash$ length

### • Useful Length Assignments

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

## Accents

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

## Tabbing Environment

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

## Fonts

### • Text Fonts

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

• Font Environments exist for above types, e.g.,

$\backslash$ begin{ttfamily}... $\backslash$ end{...}

### • Changing Font Sizes

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

### • Math Fonts

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

### • Math Font Sizes

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

## Boxes

$\backslash$ mbox{...} one line of text  
 $\backslash$ text{...} one line of text (amsmath)  
 $\backslash$ parbox{width}{text} paragraph of text  
 $\backslash$ parbox[align][height][inner align]{width}{text}  
 $\backslash$ marginpar{...} marginal comment  
 $\backslash$ rule[-1pt]{20pt}{10pt} solid box ████  
 $\backslash$ raisebox{5pt}{text} raised box  
 $\backslash$ makebox[width][alignment]{text} box of text  
 $\backslash$ framebox[width][alignment]{text} framed text

## Overfull and Underfull Boxes

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

## Multicolumn Printing

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

## Array and Tabular Environments

$\backslash$ begin{tabular}[POS]{COLS}... $\backslash$ end{...}  
 $\backslash$ begin{array}[POS]{COLS}... $\backslash$ end{...}  
 Use tabular for text, array for mathematics  
 $\&$ ,  $\backslash$  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  
 $\*{n}$ {...}  $n$  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

### • Example of a table using $\backslash$ tabular

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

Name	Exam	Grade
Dan	97%	A

Math 101 Final Grades

## File Suffixes and Types

### • L<sup>A</sup>T<sub>E</sub>X Source Files

.tex File containing a L<sup>A</sup>T<sub>E</sub>X document  
 .sty L<sup>A</sup>T<sub>E</sub>X style file  
 .cls L<sup>A</sup>T<sub>E</sub>X document class file  
 .fd Font definition file

### • Files Written by L<sup>A</sup>T<sub>E</sub>X

$\backslash$ nofiles suppresses all except .log and .dvi  
 .aux cross-referencing and list information  
 .dvi device independent typeset file  
 .idx list of index entries (used by MakeIndex)  
 .ind index file created by MakeIndex  
 .glo list of glossary entries  
 .lof list of figures (read by  $\backslash$ listoffigures)  
 .lot list of tables (read by  $\backslash$ listoftables)  
 .toc table of contents (read by  $\backslash$ tableofcontents)  
 .bib BIB<sub>T</sub>E<sub>X</sub> bibliographic database file  
 .bst BIB<sub>T</sub>E<sub>X</sub> bibliographic style file  
 .bbl BIB<sub>T</sub>E<sub>X</sub> document bibliography file

### • L<sup>A</sup>T<sub>E</sub>X Log Files

.log L<sup>A</sup>T<sub>E</sub>X log file  
 .ilg MakeIndex index log file  
 .blg BIB<sub>T</sub>E<sub>X</sub> log file

Copyright © 2003 J.H. Silverman, January 2003 v1.0  
 Math. Dept., Brown Univ., Providence, RI 02912 USA

Permission is granted for noncommercial distribution of this card provided the copyright notice and this permission notice are preserved on all copies.

# AMS- $\text{\TeX}$ Reference Card #2

See the  $\text{\TeX}$  Reference Card for additional commands.  
The notation (package) indicates a required package.

## Math Environments

$\langle \dots \rangle$ or $\$ \dots \$$	inline math
$\langle [ \dots ] \rangle$ or $\$ \$ \dots \$ \$$	displayed math
$\begin{equation} \langle \dots \rangle \end{equation}$	numbered and labeled equation
$\ref{eqname}$	refer to labeled eqn
$\mbox{\dots}$	text in math
• The following require <code>amsmath</code>	
$\text{\text{\dots}}$	text in math
$\begin{equation*} \dots \end{equation*}$	unnumbered eqn
$\tag{eqtag}$	use eqtag instead of number
$\notag$	suppress equation tag
$\eqref{eqname}$	ref with parens
$\begin{subequations} \dots \end{subequations}$	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
$\theoremstyle{definition}$	medium emphasis
$\theoremstyle{remark}$	least emphatic
• Invoking Theorem-Like Environments	
$\begin{name} \dots \end{name}$	invoke environment
$\begin{name}[label] \dots$	invoke with new label
If proclamation starts with a list, put in $\hfill$	
$\begin{proof} \dots \end{proof}$	proof environment
$\begin{proof}[label] \dots \end{proof}$	proof with label
$\qedsymbol$	end of proof marker
$\renewcommand{\qedsymbol}{\dots}$	redefine marker

## Commutative Diagrams (amscd)

Separate lines with  $\backslash\backslash$ , do not use  $\&\$$

$\begin{CD} \dots \end{CD}$	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  $\backslash\begin{command} \dots \backslash\end{command}$

Separate items with  $\&$ , separate lines with  $\backslash\backslash$  on last line,  $\backslash\backslash[dim]$  to skip space

- Full Math Environments (full line)
 

<code>gather</code>	centered, numbered equations
<code>gather*</code>	centered, unnumbered equations
<code>multline</code>	first line left, last line right, rest centered
<code>multline*</code>	same as multline, but unnumbered
<code>align</code>	formulas aligned at $\&$ signs
<code>align*</code>	same as align, but unnumbered
<code>flalign</code>	flush left and right align
<code>alignat</code>	align without space, needs argument $\backslash\begin{alignat}\{#\}$ of cols
- Math Subenvironments (within math display)
 

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

Other commands:

$\intertext{text}$	text between lines
$\shoveleft, \shoveright$	move multiline line left, right
$\allowdisplaybreaks$	allow page breaks ( $\backslash\backslash*$ prohibits)
$\displaybreak$	force page break (before $\backslash\backslash$ )

## Overlines, Underlines, and Arrows

$\underline{\dots}$	underline
$\overline{\dots}$	overline
$\overbrace{\dots}^{\dots}$	overbrace
$\underbrace{\dots}_{\dots}$	underbrace
$\overrightarrow{\dots}$	over right arrow
$\overleftarrow{\dots}$	over left arrow
$\overleftrightarrow{\dots}$	over left-right arrow
$\underrightarrow{\dots}, \underleftarrow{\dots}$	, etc.
$\xrightarrow[bot]{top}$	stretchable w/sub/supscripts
$\xleftarrow[bot]{top}$	stretchable w/sub/supscripts

## Operator Names

$\arccos$	$\cos$	$\csc$	$\exp$	$\ker$	$\liminf$	$\min$	$\sinh$
$\arcsin$	$\cosh$	$\deg$	$\gcd$	$\lg$	$\limsup$	$\Pr$	$\sup$
$\arctan$	$\cot$	$\det$	$\hom$	$\lim$	$\log$	$\sec$	$\tan$
$\arg$	$\coth$	$\dim$	$\inf$	$\ln$	$\max$	$\sin$	$\tanh$
$a \equiv b \pmod{m}$	$a \equiv b \pmod{m}$						
$a \equiv b \pmod{m}$	$a \equiv b \pmod{m}$						
$a \bmod m$	$a \bmod m$						
$\DeclareMathOperator{\cmd}{opname}$	create operator						
$\DeclareMathOperator*{\cmd}{opname}$	with limits						
$\operatorname{\dots}$	typeset as an operator						
$\operatorname*{\dots}$	with limits						

## Large Operators

$\sum$	$\bigcup$	$\bigodot$
$\prod$	$\bigcap$	$\bigotimes$
$\coprod$	$\bigsqcup$	$\bigoplus$
$\int$	$\bigvee$	$\biguplus$
$\oint$	$\bigwedge$	
$\substack{xxx \backslash\backslash yyy}$	stacked sub or superscripts	
$\limits, \nolimits$	force or forbid displayed limits	
$\iint, \iiint, \dotsint$	integral variants (amsmath)	

## Delimiters

$\lbracket$ or $\lrcorner$	$\lbrace$ or $\{$	$\langle$
$\rbracket$ or $\lrcorner$	$\rbrace$ or $\}$	$\rangle$
$\lvert$ or $\ $	$\lfloor$	$\lceil$
$\Vert$ or $\ $	$\rfloor$	$\rceil$
$\uparrow$	$\Uparrow$	$\Downarrow$
$\downarrow$	$\Downarrow$	$\Updownarrow$
$\left( \right)$	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

$\sqrt{\dots}$	square root $\sqrt{\quad}$
$\sqrt[n]{\dots}$	$n$ th root $\sqrt[n]{\quad}$
$\leftroot{2}, \uproot{2}$	move root left or up

## Ellipses

$\ldots, \cdots, \dots$	ellipses
$\vdots, \ddots$	vertical and diagonal dots
$\dotsc, \dotssb, \dotssm, \dotssi$	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 $\binom{n}{d}$
$\genfrac{l}{rdelim}{thick}{style}{num}{den}$	continued fraction
$\cfrac{\dots}{\dots}$	continued fraction
$\stackrel{top}{\underset{bot}{}}$	stacked relation
$\overset{top}{\underset{bot}{}}$	stacked symbol (amsmath)
$\underset{bot}{\overset{top}{}}$	stacked relation (amsmath)
$\sideset{ll}{ul}{_l}{_r}{_ur}$	large operator
	large operator with left/right sub/supscripts

## Negated Relations

$\not$	negate a relation
$\neq$	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{...}{...} redefine 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 MakeIndex entry listing file  
.ind MakeIndex index file  
.ilg MakeIndex index 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 suppresses 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.

## Time and Date

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

## Additional Text Symbols

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

## 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}{n} 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 subsection
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

```
\topsep separate preceding text and first item
\parsep separate paragraphs within items
\itemsep separate items
\leftmargin indent of item box from left margin
\rightmargin indent of item box from right margin
\labelwidth width of box for item label
\itemindent indent of label box from left margin
\labelsep separate label box from item box
\listparindent indent item paragraphs
```

## The slide Document Class

```
\documentclass{slides}
\begin{slide}
\begin{center}
\emph{Slide Title}
\end{center}
Slide material
\end{slide}
\begin{overlay}... \end{...} overlay slide
\begin{note}... \end{...} one page note
\onlyslides{4,8-12,19} print only specified slides
\onlynotes{2,8-99} print only specified notes
```

## BIBT<sub>E</sub>X

### • BIBT<sub>E</sub>X File Suffixes

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

### • BIBT<sub>E</sub>X Commands in Document File

```
\bibliographystyle{bib style file} (e.g. plain, amsplain)
\bibliography{bib database file(s)}
\cite{label} cite a reference
\nocite{label} include ref in bib without citation
\nocite{*} include all references in bibliography
mrabbrev.bib AMS file with math journal abbreviations
```

### • Creating BIBT<sub>E</sub>X 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(...)
```

#### • 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 BIBT<sub>E</sub>X

- (1) Typeset document to get new .aux file.
- (2) Run BIBT<sub>E</sub>X on .aux file to create .bbl file.
- (3) Retypeset document twice.

## The letter Document Class

```
\documentclass{letter}
\address{... \... \...}
\signature{...}
\begin{letter}{inner address}
\opening{Dear Mr. X}
\closing{Yours truly,}
\cc{... \...}
\encl{...}
\ps{...}
\end{letter}
```