

A_MS-*L*A_TE_X 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

```
\frontmatter in book classes)
```

• Front Matter

```
\topmatter
```

```
\title{...}
\title[running head]{...} alternative headline
```

```
\date{...}
\date{today} gives current date
```

```
\author{...}
\maketitle (not in book classes)
```

```
• Additional items — ams classes only
```

```
\translator{...}
\dedicator{...}
\address [optional name] {...}
\curraddress{...}
\email [optional name] {...}
\thanks{...}
\subclassname{XXX; Secondary: XXX}
\keyword{...}
\thanks{...}
\tableofcontents (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}
```

```
plain empty header, page number in footer
```

```
empty header and footer
```

```
headings header filled by doc class, empty footer
```

```
myheadings empty footer, fill header with info in
```

```
and \markboth{lefthead}{righthead}
```

```
\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, \textwidth, \textheight, \textwidth
```

```
\topmargin, \headheight, \headsep, \footskip
```

Bibliography (see also BIB_LTEX)

```
\begin{thebibliography}{99}... \end{...}
```

```
\bibitem{name} bibliography with widest label specified
```

```
\bibitem[Label]{name} named bibliography item
```

```
\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
```

```
Classes and Packages
```

```
\documentclass [option(s)] {class}
```

```
\usepackage [option(s)] {package(s)}
```

```
\usepackage [option(s)] {package(s)}
```

```
\usepackage [option(s)] {package(s)}
```

```
\usepackage [option(s)] {package(s)}
```

```
• 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
```

```
\allt all teletype, even \{,}
```

```
\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 multicol column 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, \oneside, \twoside, \openany, \openright
```

```
Equation Numbering
```

```
\fleqn, \leqno, \regno, \centertags, \tbtags
```

```
Equation Limits
```

```
\intlimits, \sumlimits, \nonamellimits
```

```
AMS (Postscript) Fonts
```

```
\psamsfonts, \noamsfonts
```

Cross Referencing and Numbering

```
\label{name} assign label name to numbered item
```

```
\ref{name} print number of named item
```

```
\vrefrframe} 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 \subsection \paragraph \subparagraph
```

```
\chapter \subchapter \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}
```

```
\addcontents{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 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 with spaces marked
```

```
\verbatimpackage 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{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				

$\backslash \text{Quad}$ $\backslash \text{quad}$ white space (1 space, 1 em, 2 em)

$\backslash \text{space} \{10pt\}$ specified horizontal space

$\backslash \text{space} * \{10pt\}$ space even at line start

Horizontal Spacing ($\backslash \text{Math}$): \backslash , thin space $\backslash \text{med space}$
 \backslash ; thick space $\backslash !$; neg. thin space $\backslash \text{space} \langle \text{mu} \rangle \langle \text{glue} \rangle$

$\backslash \text{strut}$, $\backslash \text{mathstrut}$ invisible vertical space

$\backslash \text{phantom} \{ \dots \}$ invisible space

$\backslash \text{vphantom} \{ \dots \}$ typeset w/zero height, depth

$\backslash \text{smash} \{ \dots \}$ fill with space

$\backslash \text{htfill}$ fill with dots

$\backslash \text{dotfill}$ fill with rule (line)

$\backslash \text{hrulefill}$ new paragraph

$\backslash \text{par}$ force a new line

$\backslash \text{newline}$ or $\backslash \backslash *$ new line, prohibit page break

$\backslash \backslash \text{[5pt]}$ new line skipping 5 pts

$\backslash \text{vspace} \{ \text{lin} \}$ specified vertical space

$\backslash \text{vspace} * \{ \text{lin} \}$ space even at page start

$\backslash \text{newpage}$ force a new page

- **Length Variables**
 - $\backslash \text{newlength} \{ \langle \text{Length} \rangle \}$ create length variable $\langle \text{Length} \rangle$
 - $\backslash \text{setlength} \{ \langle \text{Length} \rangle \{ \langle \text{dimen} \rangle \}$ set value of $\langle \text{Length} \rangle$
 - $\backslash \text{addtolength} \{ \langle \text{Length} \rangle \{ \langle \text{dimen} \rangle \}$ increase $\langle \text{Length} \rangle$
- **Useful Length Assignments**
 - $\backslash \text{enlargerhispaper} \{ \langle \text{baselinestrip} \rangle \}$ force extra line
 - $\backslash \text{setlength} \{ \langle \text{hangindent} \rangle \{ 30pt \}$ indentation
 - $\backslash \text{setlength} \{ \langle \text{hangafter} \rangle \{ 3 \}$ indent after
 - $\backslash \text{renewcommand} \{ \langle \text{baselinestretch} \rangle \{ 2 \}$ doublespaced

Accents

Type	Example	In Math	In Text
hat	\hat{a}	$\text{\hat{a}}$	\^a
expanding hat	\hat{abc}	$\text{\vwidehat{abc}}$	none
check	\check{a}	$\text{\check{a}}$	$\text{\vcheck{a}}$
tilde	\tilde{a}	$\text{\~{a}}$	$\text{\~{a}}$
expanding tilde	\tilde{abc}	$\text{\widetilde{abc}}$	none
acute	\acute{a}	$\text{\acute{a}}$	$\text{\`{a}}$
grave	\grave{a}	$\text{\grave{a}}$	$\text{\`{a}}$
dot	\dot{a}	$\text{\dot{a}}$	$\text{\cdot{a}}$
double dot	\ddot{a}	$\text{\ddot{a}}$	$\text{\`{a}}$
breve	\breve{a}	$\text{\vbreve{a}}$	$\text{\u{a}}$
bar	\bar{a}	$\text{\bar{a}}$	\=a
vector	\vec{a}	$\text{\vec{a}}$	none
cedilla	$\text{\c{c}}$	none	$\text{\c{c}}$

Tabbing Environment

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

Fonts

- **Text Fonts**
 - $\text{\textnormal} \{ \dots \}$ $\{ \text{\normalfont} \dots \}$ document font
 - $\text{\textrm} \{ \dots \}$ $\{ \text{\rmfamily} \dots \}$ roman
 - $\text{\textsf} \{ \dots \}$ $\{ \text{\sffamily} \dots \}$ sans serif font
 - $\text{\texttt} \{ \dots \}$ $\{ \text{\ttfamily} \dots \}$ typewriter style
 - $\text{\textbf} \{ \dots \}$ $\{ \text{\bfseries} \dots \}$ bold
 - $\text{\textup} \{ \dots \}$ $\{ \text{\upshape} \dots \}$ upright
 - $\text{\textit} \{ \dots \}$ $\{ \text{\itshape} \dots \}$ *italic*
 - $\text{\textsl} \{ \dots \}$ $\{ \text{\slshape} \dots \}$ *slanted*
 - $\text{\textsc} \{ \dots \}$ $\{ \text{\scshape} \dots \}$ SMALL CAPITALS
 - $\text{\emph} \{ \dots \}$ $\{ \text{\em} \dots \}$ *emphasize*
 - $\text{\fbox} \{ \dots \}$ $\{ \text{\fbox} \dots \}$ **boxed text**
- **Font Environments** exist for above types, e.g., $\text{\begin{family} \dots \end{...}}$
- **Changing Font Sizes**
 - \tiny , \scriptsize , \footnotesize , \small
 - \normalsize , \Large , \Large , \LARGE , \huge , \huge
- **Math Fonts**
 - $\text{\mathrm} \{ \dots \}$ roman
 - $\text{\mathbf} \{ \dots \}$ bold (letters)
 - $\text{\boldsymbol} \{ \dots \}$ bold (symbol) (amsmath)
 - $\text{\mathit} \{ \dots \}$ *italic*
 - $\text{\mathcal} \{ \dots \}$ calligraphic $\mathcal{A}, \mathcal{B}, \mathcal{C}$
 - $\text{\usepackage{euenc}}$ redef \mathfrak{a} to script $\mathcal{A}, \mathcal{B}, \mathcal{C}$
 - $\text{\mathfrak} \{ \dots \}$ Fraktur $\mathfrak{A}, \mathfrak{a}, \mathfrak{B}, \mathfrak{b}$ (amstoms)
 - $\text{\mathbb} \{ \dots \}$ Blackboard bold $\mathbb{A}, \mathbb{B}, \mathbb{C}$ (amstoms)
 - $\text{\boxed} \{ \dots \}$ **boxed 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} marginal comment
\marginpar{...}
\rule[-1pt]{20pt}{10pt} solid box
\raisebox{5pt}{text} raised box
\makebox[width][alignment]{text} box of text
\framebox[width][alignment]{text} boxed text
```

Overflow and Underfull Boxes

```
draft document class marks overfulls
\overfullrule width of overfull marker
\begin{setlength}{\hruzz}{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 (multico)
```

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
*fn{...} 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 \tabular**

```
\begin{table}
\begin{center}
\begin{tabular}{|l|l|c|l|} \hline
Name & Exam & Grade \\ \hline
Dan & 97\% & A \\ \hline
\end{tabular}
\end{center}
\end{table}
```

Name	Exam	Grade
Dan	97%	A

Math 101 Final Grades

File Suffixes and Types

- **L^AT_EX** Source Files
 - \.tex File containing a L^AT_EX document
 - \.sty L^AT_EX style file
 - \.cls L^AT_EX document class file
 - \.fd Font definition file
- **Files Written by L^AT_EX**
 - \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 \listoffigures)
 - \.lot list of tables (read by \listoftables)
 - \.toc table of contents (read by \tableofcontents)
 - \.bib BIB_TE_X bibliographic database file
 - \.bst BIB_TE_X bibliographic style file
 - \.bb1 BIB_TE_X document bibliography file
- **L^AT_EX** Log Files
 - \.log L^AT_EX log file
 - \.ilg MakeIndex index log file
 - \.blg BIB_TE_X log file

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,\dots,#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
\ensurmath{...} forces math mode
\showcommand print definition of \command
\showthe\paraname 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 envment
```

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 L^AT_EX to create an .idx file
`\printindex` tell L^AT_EX to print index here
`\nofiles` suppresses creation of .idx and .glo files
- **Creating MakeIndex .idx** File
`\index{entry}` main entry
`\index{entry}` subentry
`\index{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|G... \index{entry|1)}` 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{t} ⊕
\p ¶ \textvisiblespace ◻
\NS § \textbullet •
```

Counters

```
\newcounter{ctr} create new counter named ctr
\setcounter{ctr}[cnt1] reset ctr when cnt1 changes
\resetcounter{value} set value of ctr
\stepcounter{ctr} increment ctr
\resetcounter{ctr} increment and reset \label
\addcounter{ctr}{n} increment by n
\value{ctr}{n} value stored in \ctr
\thectr the value of ctr
calc package to do counter arithmetic
```

- **Counter Styles**
`\arabic{}` \roman{ } \alph{ } \Alph{ }
- **Standard Counters**
equation footnote figure page table
part chapter section subsection subsubsection
paragraph subparagraph emmi emmii emmiii emmiv
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}
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
`\partsep` 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{overly}{... \end{...}} overlay slide
\begin{note}{... \end{...}} one page note
\onlyslides{4,8-12,19} print only specified slides
\onlynotes{2,8-9,9} print only specified notes
```

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}` (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
`\mrabrev.bib` AMS file with math journal abbreviations
- **Creating BIBTEX Database File**
`@STRING{fname = "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 publisher year
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.

The Letter Document Class

```
\documentclass{letter}
\address{... \\\... \\\...}
\signature{...}
\begin{letter}{finmer address}
\opening{Dear Mr. X}
\closing{Yours truly}
\ccf{... \\\...}
\encl{...}
\psf{...}
\end{letter}
```