Latex Cheatsheet
by Blair Labatt III, page 1 of 2

See here for comprehesive list of primitive[†] TEX cmds. For plain TEX macros, see here. TeX for the Impatient (chap 13) has a list of all plain TEX commands, as does The TEXbook (appen B).

1 Document

Headers & Footers

Use **fancyhdr** *package to define a style:*

```
\fancypagestyle{appendix}{      # name style
  # now dictate customizations:
  \fancyhead[RO,LE]{header \thepage}
  \renewcommand\headrulewidth0pt
}
```

. . . and then declare its use:

```
\pagestyle{appendix}          # for all pages
\thispagestyle{addendix}      # this page only
```

Document Types

```
\documentclass{<type>}# set type, ∈:
```

article report extreport slides
amsart beamer book

Sections & Contents

Designate organization ([sub]sections) inline:*

```
\part{<name>}          # level 1
\chapter{<name>}       # level 2
\section{<name>}       # level 3
\subsection{<name>}    # level 4
```

For a table of contents, use `\tableofcontents`

Layout

```
\usepackage{geometry}[margin=5mm]
\documentclass[landscape]   # landscape
\vfill\,                    # flush, vertically
```

Spacing, Rules, Pagination

```
\thepage        # current page number
\newpage        # page break
\clearpage      # page break
\vspace{3mm}    # vertical separation
\hspace{4mm}    # horizontal separation
```

Some **hspace** *aliases (macros):*

`\enskip` `\thinspace` `\quad` `\qquad`

Page Anchors ("References")

```
\label{<name>}      # place anchor
\ref{<name>}        # point to anchor
\pageref{<name>}    # page # of ref
```

Footnotes

```
\footnote{...}      # basic use
\footnote[3]{...}   # micromanage foot num
\thefootnote        # last foot #
```

Set style as follows:

`\renewc'md{\thefootnote}{\roman{footnote}}`

Use symbols rather than numbers (from here):

`\usepackage[symbol]{footmisc}`
`\renewc'md{\thefootnote}{\fnsymbol{footnote}}`
`\footnote[<num>]{text}` # <num> ∈: 1-9

Overlays

2 Text

Font Size

Magnify text using `\magstep#`*, but it is better to set font face size using* `\font\...` at # *construct (below), or to use a macro like:*

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

Font Family

serif	\textrm {...}	\rmfamily
sans-serif	\textsf {...}	\sffamily
typewriter	\texttt {...}	\ttfamily

Font Styles

medium	\textmd{...}	\mdseries	{\md }
bold	\textbf{...}	\bfseries	{\bf }
upright	\textup{...}	\upshape	{\up }
italic	\textit{...}	\itshape	{\it }
slanted	\textsl{...}	\slshape	{\sl }
SML CAPS	\textsc{...}	\scshape	{\sc }

Fonts ("Typefaces")

The font catalog contains a long list of fonts which can only be used if compiling with XeLaTeX or LuaLaTex. Otherwise, normal LATEX only enables open fonts (see here).

```
\usepackage{fontspec}     # catalog package
\font\myft=cmr at 10pt    # raw TEX alias
\newfontfamily\myfont{<font>}# ibid, XeTeX
{\myfont ...}             # use the above
\setmainfont{<font>}      # set overall
\setsansfont{<font>}      # set sans overall
\setmonofont{<font>}      # set mono overall
```

QTBlimpo QTArtiston qtusa-uncial
QTTimesroll QTKCorral Fontauri
QTPalatine pica ocr
QTTechtone lmodern QTTimeOutline

Font Decorations

```
\underline\ul{text}     # text
\subscript{text}        # text
\superscript{text}      # text
{\color{red}text}       # text
\hl{text}               # text
```

Accents

If using XeLaTex and **fontenc** *you can use the character code directly, rather than the following:*

ò	\`o	ó	\'o	ô	\^o	õ	\~o	ō	\=o
ȯ	\.o	ö	\"o	o	\c o	ŏ	\u o	ǒ	\v o
ő	\H o	o	\d o	o	\b o	o͡o	\t oo	œ	\oe
Œ	\OE	æ	\ae	Æ	\AE	å	\aa	Å	\AA
ø	\e	Ø	\O	ł	\l	Ł	\L	ı	\i
ȷ	\j	¡	!`	¿	?`				

Characters (more here)

^	\textasciicircum	~	\textasciitilde
†	\textdagger	‡	\textdaggerdbl
§	\textsection	¶	\textparagraph
✓	\checkmark	°	\textdegree
↑	$\uparrow$	'	\textquotesingle

∃ *thousands of wilder symbols, including:*

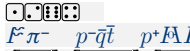

signals


dice


particles


keys


E, O runes


zodiac


musical

For native characters (UTF-8 encoded ASCII), you can use keyboard characters or, masochistically, enter the ASCII code (in hex or octal):

```
\char\<schar>   # insert special char
^^<hex>         # insert char by <hex> code
```

Primitive character[†] manipulation:

accent *catcode* **char** *chardef*
endlinech'r *esc'pechar* *lccode* **lowercase**
newlinech'r **number** **rom'nnumeral** *sfcode*
string *uccode* **uppercase**

Define your own, such as these keyboard icons:

⏻ ⮌ ⮎ ⮍ ⭲ ⏯ ⇤ ✐ ⏏ ⇪ ⏾ ⌘ ⌫ ⇧ ^ ⌥ ⌘

Quotations

```
``is a quote''          # "is a quote"
```ˋˋqts `in''qts'\thinspace '' # "'qts 'in" qts'"
\say{is a quote}        # quote altern.
\midinsert\narrower ...\endinsert # blkquote
```

Lorem Ipsem

```
\blindtext[7]     # from pkg blindtext
\lipsum[2-4]      # from pkg lipsum
```

Alignment

```
\centering                  # center within group
\centerline{...}            # center envmt
\rightline{...}             # right justified
\hfil <text> \hfil\hfil     # 2/3 to left
```

Kerning & Ligatures

```
ff → ff                 # automatic "ligature"
\not\kern-1pt =         # "kerning" (DIY lig's): ≠
hey – you               # ligature removal -{}-
- – — –                 # dashes: - – — $-$
```

Kerning primitives[†]:

kern *lastkern* **lower** **moveleft**
moveright **raise** **unkern**

3 Math

Greek Symbols

Greek (omitted capitals are identical to latin):

α	\alpha	ν	\nu
β	\beta	$\xi\Xi$	\xi
$\gamma\Gamma$	\[g]amma	oO	o
$\delta\Delta$	\[d]elta	$\pi\Pi$	\pi
$\epsilon\varepsilon$	\[var]epsilon	$\rho\varrho$	\[var]rho
ζ	\zeta	$\sigma\Sigma$	\sigma
η	\eta	τ	\tau
$\theta\Theta$	\theta	$\upsilon\Upsilon$	\upsilon
ι	\iota	$\phi\varphi\Phi$	\[var][p]hi
κ	\kappa	χ	\chi
$\lambda\Lambda$	\lambda	$\psi\Psi$	\psi
μ	\mu	$\omega\Omega$	\omega

Adornments

$\vec{a}$	\vec{a}		
30°	\ang{30}	$\hat{a}$	\hat{a}
$\overline{a}$	\overline a	$\tilde{a}$	\tilde{a}

Operators

$\times$	\times	$\div$	\div
$\oplus$	\oplus	$\otimes$	\otimes
$\cdot$	\cdot	$\bullet$	\bullet
$\wedge$	\wedge	$\vee$	\vee

Relations

The below can all be negated by either an 'n' in front or being preceeded by **\neg**:

$<$	<	$>$	>
$\nless$	\nless	$\ngtr$	\[n]gtr
$\leq\nleq$	\[n]leq	$\geq\ngeq$	\[n]geq
$\ll\lll$	\[n]ll	$\gg\ggg$	\[n]gg
$\prec$	\prec	$\succ$	\succ
$\preceq$	\preceq	$\succeq$	\succeq
$\equiv$	\equiv	$\approx$	\approx
$\cong$	\cong	$\simeq$	\simeq
$\sim$	\sim	$\propto$	\propto
$=$	=	$\neq$	\neq
$\parallel\nparallel$	\[n]parallel	$\perp$	\perp
$\in\notin$	\[not]in	$\ni$	\ni

Groupings

The below can be prefixed by **big**, **Big**, *Bigg, for larger openers. Preface with* **r...** *to close:*

[	\lbrack	$\lfloor$	\lfloor
$\lceil$	\lceil	{	\lbrace
$\langle$	\langle		

Algebra

\[|d|t|s]frac{1}{2}	# $\frac{1}{2}$, $\dfrac{1}{2}$, $\tfrac{1}{2}$, $^1/_2$
\cancel{5}	# $\cancel{5}$

Sets

Write symbols like $\mathbb{C}$, $\mathbb{R}$, $\mathcal{Z}$, *etc*

name	mathbb	mathcal	code
Integers	$\mathbb{Z}$	$\mathcal{Z}$	Z
Rational	$\mathbb{Q}$	$\mathcal{Q}$	Q
Real	$\mathbb{R}$	$\mathcal{R}$	R
Complex	$\mathbb{C}$	$\mathcal{C}$	C
```

$\cap$ \cap	$\cup$ \cup
$\subset$ \subset	$\supset$ \supset
$\not\subset$ \not\subset	$\not\supset$ \not\supset
$\subseteq$ \subseteq	$\supseteq$ \supseteq
$\nsubseteq$ \nsubseteq	$\nsupseteq$ \nsupseteq

Logic

$\exists \nexists$ \[n]exists	$\forall$ \forall
$\Rightarrow$ \Rightarrow	$\Leftarrow$ \Leftarrow
$\neg$ \neg	$\Leftrightarrow$ \Leftrighta.
$\vee$ \lor	$\wedge$ \land

Calculus

$\sum$ \sum	$\lim$ \lim
$\int$ \int	$\oint$ \oint
$\iint$ \iint	$\iiint$ \iiint
∇ \nabla	$\times$ \times
$\lvert_{x=0}$ \rvert	

Geometry

$\angle$ \angle	$\perp$ \perp
$\parallel$ \parallel	

Linear Algebra

```
\begin{[|p|b]matrix}  # a matrix
  A & B & C \\        # 3 columns
  D & E & F\\         # 2 rows
\end{pmatrix}         # end matrix def
```

Organization

$\overbrace{x=y}$ \overbrace{x=y}

$\begin{cases} a \\ b \end{cases}$ \begin{cases}...

$\begin{rcases} a \\ b \end{rcases}$ \begin{rcases}... [align issue]

$\underset{\mathbf{A}}{\dots}$ \underset{ }

$\boxed{e=mc^2}$ \boxed ...

Aligned Equations

```
\begin{equation*}                  # align eqns
\begin{split}                      # not sure?
  c^2 &= a^2 + b^2                 # pythag. thm
  c^2-2bc\cos A &= a^2+b^2         # general form
\end{split}\end{equation}          # closeout
```

```
\begin{flalign*}                   # left aligned
  c^2 &= a^2 + b^2 &               # pythag
\end{flalign*}                     # closeout
```

Math Primitives†

above	*abv.disp.sk.s.*	*ab'vdisk.skp*
ab'vw'thdelims	**atop**	**atopwithdelims**
bel.disp.s.s.	*bel.disp.skp*	*binoppenalty*
def'ltskewchar	*delcode*	**delimiter**
delim.factor	*delim.shortfall*	*displayindent*
displaylimits	**displaystyle**	*disp.win.pen.*
displaywidth	**eqno**	*everydisplay*
everymath	*fam*	**left**
leqno	**limits**	**mathaccent**
mathbin	**mathchar**	**mathchardef**
mathchoice	**mathclose**	*mathcode*
mathinner	**mathop**	**mathopen**
mathord	**mathpunct**	**mathrel**
mathsurrn'd	*medmuskip*	**mkern**
mskip	*muskip*	**muskipdef**
nolimits	**nonscript**	*nulldelmt'rsp'c*
over	**overline**	**overwithdl'ms**
postdisp.pen.	*predisp.pen.*	*predisp.size*
radical	*relpenalty*	**right**
scriptfont	*script"'font*	**script"'tstyle**
scriptspace	**scriptstyle**	*skewchar*
textfont	**textstyle**	*thickmuskip*
thinmuskip	**underline**	**vcenter**

4 Lists and Tables

enumerate

```
\begin{enumerate}          # begin
  \item ...                # unnumbered
\end{enumerate}            # end
```

Can nest lists and mix **enumerate** *and* **itemize** *nested lists. To change numbering style:*
`\renewcommand{\labelenumii}{\Roman{enumii}}`

itemize

Same format as **enumerate**:

```
\begin{itemize}                # begin
  [topsep=8pt,itemsep=4pt,     # some params
  parsep=4pt,leftmargin=*]     # ... and more
  \item ...                    #
\end{itemize}                  # end
```

tabular[LaTeX]

```
\begin{tabular}{r r r}  # 3 right cols
\multicolumn{2}{c}      # 2-col spread (cent'd)
```

Table Primitives†

cr	**crcr**	*everycr*	**halign**	**noalign**
omit	**span**	*tabskip*	**valign**	

5 Alignment

*TEX "glues" horizontal and then vertical "boxes" together to make lines, paragraphs / pages (respectively). TEX primitives† (**cmds** & params) afford fine-grained control of placement. For narrow eqn, force box height / depth to 0pt with* `\smash`.

Boxes†

badness	**box**	*boxmaxdepth*	**cleaders**
copy	*dp*	*everyhbox*	*everyvbox*
hbadness	**hbox**	*hfuzz*	**hrule**
ht	**lastbox**	**leaders**	*overfullrule*
prevdepth	**setbox**	**unhbox**	**unhcopy**
unvbox	**unvcopy**	*vbadness*	**vbox**
vfuzz	**vrule**	**vtop**	*wd*
xleaders			

Glue†

hfil	**hfill**	**hfilneg**	**hskip**	**hss**	**unskip**
vfil	**vfill**	**vfilneg**	**vskip**	**vss**	*lastskip*

Pages†

hoffset	*maxdepth*	*pagedepth*	*p'filllstretch*
p'fillstretch	*p'filstretch*	*pagegoal*	*pageshrink*
pagestretch	*pagetotal*	*topskip*	*voffset*
vsize			

Paragraphs†

adjdemerits	*baselineskip*	*d'blhyp.d's*	*emerg.stretch*
fin.hyph.d's	*hangafter*	*hsize*	**ignorespaces**
indent	*leftskip*	*lineskip*	*linesk.lim*
looseness	**noboundary**	**noindent**	**par**
parfillskip	*parindent*	*parshape*	*parskip*
pretolerance	*prevgraf*	*rightskip*	*spacefactor*
spaceskip	*tolerance*	**vadjust**	*xspaceskip*

parbox[LaTeX]

Where pos ∈ [top|bot|cent]

```
\parbox[pos][height][contentpos]?{width}{text}
\parbox[t][2cm]{...} # top-align, 2cm high
```

minipage[LaTeX]

```
\begin{minipage}{3cm}[t]...# top-align
```

6 Graphics

Inclusion

```
\includegraphics{a.jpg}          # basic invocation
\includegraphics[5,10][2,2]{a.jpg}# specific loc.
```

Positioning

scalebox *and* resizebox *resize content to arguments. Use "!" in one of* `<h-scl>`, `<v-scl>` *(while setting the other) to retain aspect ratio.*

```
\scalebox{<h-scl>}{<v-scl>}{...}
\resizebox{<h-scl>}{<v-scl>}{...}
```

Rotation

```
\rotatebox{90}{text}     # 90° rotat'n
```

Wrapping

```
\begin{wrapfigure}[9]{l}{3cm}# 3 wide, 9 lines
  \vspace{-3mm}              # micromanage
  \includegraphics[]{...jpg} # fig to wrap
\end{wrapfigure}             # close out
```

7 Control

Content

```
\input{file.tex}      % insert content
\include{file.tex}    % see diff here
```

Macros

Macro defs "expand" into "replacement" text:

```
\def\x{5.0}                      # simple replace
\def\double#1{#1*2}              # one param
\def\times#1#2{#1*#2}            # multip. params
\definecolor\{grn}{HTML}{228822}# colors
\colorlet\{prpl}{purple!80!pink}     # ibid
```

LaTeX provides for multi-line "environment" defs:

```
\newenvironment{myenv}[1] # one param
  {...}                   # initializt'n cmds
  {...}                   # closing cmds
```

aft.assign.	**aft.group**	**begingroup**	**csname**
def	**edef**	**endcsname**	**endgroup**
expandaft.	**futurelet**	**gdef**	**global**
globaldefs	**let**	**long**	**noexpand**
outer	**relax**	**the**	**xdef**

Logic & Loops

```
\ifnum\balance=0 ... \fi   # simple compare
\ifnum\count0<100 ... \fi  # register compare
\ifdim\hsize>100pt ... \fi # another if type
\newif\ifabc               # define own if-type
\loop α\if<cond> β \repeat # repeat β
```

else	**fi**	**if**	**ifcase**	**ifcat**
ifdim	**ifeof**	**iffalse**	**ifhbox**	**ifhmode**
ifinner	**ifmmode**	**ifnum**	**ifodd**	**iftrue**
ifvbox	**ifvmode**	**ifvoid**	**ifx**	**or**

Registers

Each type (count, dimen, skip, muskip, toks) ∋ 255 registers. Access these directly, or, preferably, define an alias for what you'll use. Groups ({}) create a lexical stack of new registers.

```
\count5=123              # set register
\advance\count by 1      # mutate register
\multiply\dimen4 by 3    # another mutate
\newcount\myname         # "reserve" a reg
```

advance	*count*	**countdef**	*dimen*
dimendef	**divide**	**multiply**	*skip*
skipdef	*toks*	**toksdef**	

8 Packages

- **amsmath** equation envmts & math aids
- **comment** multi-line `\begin{comment}...`
- **dirtytalk** easier quoting with `\say{...}`
- **fontspec** many fonts `\setmainfont{...}`
- **graphics** see § Graphics
- **listings** sourcecode: `\begin{lstlisting}`
- **multicol** `\begin{multicols}...`
- **soul** `{\color{red}}`; `\ul{...}`); etc
- **tabto** affords `\tabto{...}` tabbing
- **tabularx** additions atop **tabular**
- **tcolorbox** `\begin{tcolorbox}...`
- **wrapfig** (see § Graphics)
- **xcolor**
- **xfp** floating pt arithmetic
- **xparse** LaTeXadvanced functions
- **xstring** String manipulation & conditionals
- **pgfgantt** Gantt charts
- **sankey** Sankey diagrams