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	$\triangleleft$	\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	$\ni$	\ni or \owns	$\propto$	\propto
$\vdash$	\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	$\ne$	\ne
$\notin$	\notin		

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
$\swarrow$	\swarrow	$\nwarrow$	\nwarrow

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

$$f(x) \stackrel{\text{def}}{=} x+1 \qquad \frac{\alpha\beta}{=} x+1$$

\buildrel\alpha\beta\rm def\over=} \;x+1

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
$\llbracket$	]\!]	$\langle\!\langle$	⟨⟨	$\langle\!\langle$	\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 delimiter (\left. or \right.). To specify a particular size, use the following:

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

You can also say \bigm for a large delimiter 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	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.

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	$\frac{n+1}{3}$	{n+1\over 3}	
fraction, no line	$n+1 \atop 3$	{n+1\atop 3}	
binomial coeff.	$\binom{n+1}{3}$	{n+1\choose 3}	
braced fraction	$\{n+1 \brace 3\}$	{n+1\brace 3}	
bracketed fraction	$[n+1 \brack 3]$	{n+1\brack 3}	

Commands which 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

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}

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: ... \ldots   ⋯ \cdots
Math: ... \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   scaling 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
\+⟨text₁⟩&⟨text₂⟩&···\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

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} $\left(\begin{smallmatrix} a & b \\ c & d \end{smallmatrix} \right)$
\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 eqns numbered at right
\leqalignno   display aligned eqns 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