TEX Cookbook

1-Nov-1989

Dashes		
to get	you type	notes
a-b	`a-b`	hyphen
a–b	`a--b`	dash
a—b	`a---b`	long dash
galaxy	`gal\-axy`	discretionary hyphen

Standard ligatures (handled automatically)		
to get	you type	notes
ﬀ	`ff`	
ﬁ	`fi`	
ﬂ	`fl`	
ﬃ	`ffi`	
ﬄ	`ffl`	

Accents		
to get	you type	notes
é	`\'e`	acute accent
à	``\`a``	grave accent
ê	`\^e`	circumflex
ü	`\"u`	umlaut
ñ	`\~n`	tilde
ā	`\=a`	macron
ȧ	`\.a`	dot accent
ğ	`\u g`	breve accent
ǎ	`\v a`	háček
ő	`\H o`	long Hungarian umlaut
o͡o	`\t oo`	tie-after accent
ç	`\c c`	cedilla accent
ạ	`\d a`	dot under accent
a̱	`\b a`	bar-under accent

Special Characters		
to get	you type	notes
œ	`\oe`	French ligature oe
Œ	`\OE`	French ligature OE
æ	`\ae`	Scandinavian ligature ae
Æ	`\AE`	Scandinavian ligature AE
å	`\aa`	Scandinavian a-with-circle
Å	`\AA`	Scandinavian A-with-circle
ø	`\o`	Scandinavian o-with-slash
Ø	`\O`	Scandinavian O-with-slash
ł	`\l`	Polish suppressed-l
Ł	`\L`	Polish suppressed-L
ß	`\ss`	German sharp S
ı	`\i`	dotless i
ȷ	`\j`	dotless j

Punctuation		
to get	you type	notes
“text”	``text''	quotation marks
¡Wow!	!`Wow!	open exclamation
¿Huh?	?`Huh?	open question
$24.00	\$24.00	dollar sign
36¢	36\cents	cent sign
£16	\sterling 16	pounds sterling
item #2	item \#2	number sign
95% pure	95\% pure	percent sign
H&R Block	H\&R Block	ampersand

Special symbols		
to get	you type	notes
†	\dag	dagger
‡	\ddag	double dagger
§	\S	section number sign
¶	\P	paragraph symbol
©	\copyright	copyright symbol
TeX	\TeX	
...	\dots	ellipsis

Fonts		
to get	you type	notes
A roman font.	A {\rm roman} font.	default font
An *italic* font.	An {\it italic} font.	
A *slanted* font.	A {\sl slanted} font.	
A **bold** font.	A {\bf bold} font.	
A typewriter font.	A {\tt typewriter} font.	
A $\mathcal{CALLIGRAPHIC}$ font.	A $\cal CALLIGRAPHIC$ font.	caps only
Oldstyle digits 0123456789.	Oldstyle digits {\oldstyle 0123456789}.	

Breakable (horizontal) spaces		
to get	you type	notes
This much.	This much.	normal space
This much.	This\ much.	same as above
This much.	This\enskip much.	
This much.	This\quad much.	
This much.	This\qquad much.	
This much.	hskip <dim>	

Unbreakable (horizontal) spaces		
to get	you type	notes
This much.	This~much.	tie
This much.	This\enspace much.	
This much.	This\thinspace much.	
Thismuch.	This\negthinspace much.	
italic correction.	{\it italic\/} correction.	
This much.	kern <dim>	

Math accents		
to get	you type	notes
$\acute{x}$	`$\acute x$`	corresponds to `\'`
$\grave{x}$	`$\grave x$`	corresponds to ``\` ``
$\hat{x}$	`$\hat x$`	corresponds to `\^`
$\ddot{x}$	`$\ddot x$`	corresponds to `\"`
$\tilde{x}$	`$\tilde x$`	corresponds to `\~`
$\bar{x}$	`$\bar x$`	corresponds to `\=`
$\dot{x}$	`$\dot x$`	corresponds to `\.`
$\breve{x}$	`$\breve x$`	corresponds to `\u`
$\check{x}$	`$\check x$`	corresponds to `\v`
$\vec{x}$	`$\vec x$`	vector
$\imath$	`$\imath $`	dotless i
$\jmath$	`$\jmath $`	dotless j
$\widehat{xyz}$	`$\widehat {xyz}$`	
$\widetilde{xyz}$	`$\widetilde {xyz}$`	

Greek letters						
lower case		variant		upper case		
to get	you type	to get	you type	to get	you type	name
α	`$\alpha $`			A	`{\rm A}`	alpha
β	`$\beta $`			B	`{\rm B}`	beta
γ	`$\gamma $`			Γ	`$\Gamma $`	gamma
δ	`$\delta $`			Δ	`$\Delta $`	delta
ϵ	`$\epsilon $`	ε	`$\varepsilon $`	E	`{\rm E}`	epsilon
ζ	`$\zeta $`			Z	`{\rm Z}`	zeta
η	`$\eta $`			H	`{\rm H}`	eta
θ	`$\theta $`	ϑ	`$\vartheta $`	Θ	`$\Theta $`	theta
ι	`$\iota $`			I	`{\rm I}`	iota
κ	`$\kappa $`			K	`{\rm K}`	kappa
λ	`$\lambda $`			Λ	`$\Lambda $`	lambda
μ	`$\mu $`			M	`{\rm M}`	mu
ν	`$\nu $`			N	`{\rm N}`	nu
ξ	`$\xi $`			Ξ	`$\Xi $`	xi
o	`{\rm o}`			O	`{\rm O}`	omicron
π	`$\pi $`	ϖ	`$\varpi $`	Π	`$\Pi $`	pi
ρ	`$\rho $`	ϱ	`$\varrho $`	P	`{\rm P}`	rho
σ	`$\sigma $`	ς	`$\varsigma $`	Σ	`$\Sigma $`	sigma
τ	`$\tau $`			T	`{\rm T}`	tau
υ	`$\upsilon $`			Υ	`$\Upsilon $`	upsilon
ϕ	`$\phi $`	φ	`$\varphi $`	Φ	`$\Phi $`	phi
χ	`$\chi $`			X	`{\rm X}`	chi
ψ	`$\psi $`			Ψ	`$\Psi $`	psi
ω	`$\omega $`			Ω	`$\Omega $`	omega

<table>
<tr><th colspan="3">Math spaces</th></tr>
<tr><th>to get</th><th>you type</th><th>notes</th></tr>
<tr><td>$x\,y$</td><td><code>$x\,y$</code></td><td>thin space (1/6 quad)</td></tr>
<tr><td>$x\>y$</td><td><code>$x\>y$</code></td><td>medium space (2/9 quad)</td></tr>
<tr><td>$x\;y$</td><td><code>$x\;y$</code></td><td>thick space (5/18 quad)</td></tr>
<tr><td>$x\!y$</td><td><code>$x\!y$</code></td><td>negative thin space (-1/6 quad)</td></tr>
<tr><td></td><td><code>\thinmuskip</code></td><td>3mu</td></tr>
<tr><td></td><td><code>\medmuskip</code></td><td>4mu plus 2mu minus 4mu</td></tr>
<tr><td></td><td><code>\thickmuskip</code></td><td>5mu plus 5mu</td></tr>
<tr><td></td><td><code>mkern <muglue></code></td><td>unbreakable</td></tr>
<tr><td></td><td><code>mskip <muglue></code></td><td>breakable</td></tr>
</table>

<table>
<tr><th colspan="3">Ordinary math symbols</th></tr>
<tr><th>to get</th><th>you type</th><th>notes</th></tr>
<tr><td>$\aleph$</td><td><code>$\aleph $</code></td><td>aleph</td></tr>
<tr><td>$\hbar$</td><td><code>$\hbar $</code></td><td>h-bar</td></tr>
<tr><td>ℓ</td><td><code>$\ell $</code></td><td>script l</td></tr>
<tr><td>$\wp$</td><td><code>$\wp $</code></td><td>Weierstrass function</td></tr>
<tr><td>$\Re$</td><td><code>$\Re $</code></td><td>real part</td></tr>
<tr><td>$\Im$</td><td><code>$\Im $</code></td><td>imaginary part</td></tr>
<tr><td>∂</td><td><code>$\partial $</code></td><td>partial derivative</td></tr>
<tr><td>∞</td><td><code>$\infty $</code></td><td>infinity</td></tr>
<tr><td>$\prime$</td><td><code>$\prime $</code></td><td>prime</td></tr>
<tr><td>$\emptyset$</td><td><code>$\emptyset $</code></td><td>null set</td></tr>
<tr><td>∇</td><td><code>$\nabla $</code></td><td>nabla</td></tr>
<tr><td>$\top$</td><td><code>$\top $</code></td><td>T symbol</td></tr>
<tr><td>$\bot$</td><td><code>$\bot $</code></td><td>upside down T</td></tr>
<tr><td>$|$</td><td><code>$|$</code></td><td>divides</td></tr>
<tr><td>$\vert$</td><td><code>$\vert $</code></td><td>same as <code>|</code></td></tr>
<tr><td>$\|$</td><td><code>$\|$</code></td><td>parallel</td></tr>
<tr><td>$\Vert$</td><td><code>$\Vert $</code></td><td>same as <code>\|</code></td></tr>
<tr><td>$\angle$</td><td><code>$\angle $</code></td><td>angle</td></tr>
<tr><td>$\triangle$</td><td><code>$\triangle $</code></td><td>triangle</td></tr>
<tr><td>$\backslash$</td><td><code>$\backslash $</code></td><td>backslash</td></tr>
<tr><td>$\forall$</td><td><code>$\forall $</code></td><td>for all</td></tr>
<tr><td>$\exists$</td><td><code>$\exists $</code></td><td>there exists</td></tr>
<tr><td>$\neg$</td><td><code>$\neg $</code></td><td>negation symbol</td></tr>
<tr><td>$\flat$</td><td><code>$\flat $</code></td><td>flat</td></tr>
<tr><td>$\natural$</td><td><code>$\natural $</code></td><td>natural</td></tr>
<tr><td>$\sharp$</td><td><code>$\sharp $</code></td><td>sharp</td></tr>
<tr><td>$\clubsuit$</td><td><code>$\clubsuit $</code></td><td>club suit</td></tr>
<tr><td>$\diamondsuit$</td><td><code>$\diamondsuit $</code></td><td>diamond suit</td></tr>
<tr><td>$\heartsuit$</td><td><code>$\heartsuit $</code></td><td>heart suit</td></tr>
<tr><td>$\spadesuit$</td><td><code>$\spadesuit $</code></td><td>spadesuit</td></tr>
</table>

Subscripts and superscripts		
to get	you type	notes
x_1	`$x_1$`	
x_+	`$x_+$`	
x_α	`$x_\alpha $`	
x_{12}	`$x_{12}$`	
u_{-2}	`$u_{-2}$`	
x_{a+b}	`$x_{a+b}$`	
x^5	`$x^5$`	
x^-	`$x^-$`	
$x^\sharp$	`$x^\sharp $`	
$x^\#$	`$x^\#$`	
a^*	`$a^*$`	
x^{100}	`$x^{100}$`	
$\sin^{-1}\phi$	`$\sin ^{-1}\phi $`	
$(a+b)^{\sin\theta}$	`$(a+b)^{\sin \theta }$`	
x_3^7	`$x_3^7$`	
x_{12}^{n-1}	`$x_{12}^{n-1}$`	
x_{i_5}	`$x_{i_5}$`	
e^{x^2}	`$e^{x^2}$`	
x^{y_2}	`$x^{y_2}$`	
$x^{(a+b)^{2^{17}}}$	`$x^{(a+b)^{2^{17}}}$`	
x_{a_3+7}	`$x_{a_3+7}$`	
$x_{a_3}+7$	`$x_{a_3}+7$`	
x_a^b	`$x_a^b$`	
$x_a{}^b$	`$x_a{}^b$`	
x_{a^2}	`$x_{a^2}$`	
$x^{r_{10}}$	`$x^{r_{10}}$`	
$x_{b^2}^{r_1}$	`$x_{b^2}^{r_1}$`	
$x_{a_1^2}^{b_3^4}$	`$x_{a_1^2}^{b_3^4}$`	
$\sin 10^\circ$	`$\sin 10\degrees $`	
x'	`$x'$`	
a_3''	`$a_3''$`	
${}_2F_1x$	`${}_2F_1x$`	
The $n^{\rm th}$ word.	`The $n^{\rm th}$ word.`	

Binary operations		
to get	you type	notes
$\pm$	`$\pm $`	plus or minus
$\mp$	`$\mp $`	minus or plus
$\setminus$	`$\setminus $`	set minus
$\cdot$	`$\cdot $`	centered dot
$+$	`$+$`	plus
$-$	`$-$`	minus
$\times$	`$\times $`	times
	`$\*$`	discretionary times
$\div$	`$\div $`	divide
$\ast$	`$\ast $`	asterisk
$\star$	`$\star $`	five-pointed star
$\diamond$	`$\diamond $`	diamond
$\circ$	`$\circ $`	small circle
$\bullet$	`$\bullet $`	bullet
$\cap$	`$\cap $`	cap (intersection)
$\cup$	`$\cup $`	cup (union)
$\uplus$	`$\uplus $`	plus inside cup
$\sqcap$	`$\sqcap $`	square cap
$\sqcup$	`$\sqcup $`	square cup
$\triangleleft$	`$\triangleleft $`	triangle pointing left
$\triangleright$	`$\triangleright $`	triangle pointing right
$\wr$	`$\wr $`	wreath product
$\bigcirc$	`$\bigcirc $`	large circle
$\bigtriangleup$	`$\bigtriangleup $`	
$\bigtriangledown$	`$\bigtriangledown $`	
$\vee$	`$\vee $`	vee
$\lor$	`$\lor $`	logical or (same as `\vee`)
$\wedge$	`$\wedge $`	wedge
$\land$	`$\land $`	logical and (same as `\wedge`)
$\oplus$	`$\oplus $`	circled plus
$\ominus$	`$\ominus $`	circled minus
$\otimes$	`$\otimes $`	circled times
$\oslash$	`$\oslash $`	circled divide
$\odot$	`$\odot $`	circled dot
$\dagger$	`$\dagger $`	dagger
$\ddagger$	`$\ddagger $`	double dagger
$\amalg$	`$\amalg $`	

Order relations					
to get	you type	name	to get	you type	name
$<$	`$<$`	less than	$>$	`$>$`	greater than
$\leq$	`$\leq $`	less than or equal	$\geq$	`$\geq $`	greater than or equal
$\le$	`$\le $`	same as `\leq`	$\ge$	`$\ge $`	same as `\geq`
$\prec$	`$\prec $`	precedes	$\succ$	`$\succ $`	succeeds
$\preceq$	`$\preceq $`	precedes or equal	$\succeq$	`$\succeq $`	succeeds or equal
$\ll$	`$\ll $`	much less than	$\gg$	`$\gg $`	much greater than
$\subset$	`$\subset $`	contained in	$\supset$	`$\supset $`	contains
$\subseteq$	`$\subseteq $`	subset or equal	$\supseteq$	`$\supseteq $`	superset or equal
$\sqsubseteq$	`$\sqsubseteq $`	square subset or equal	$\sqsupseteq$	`$\sqsupseteq $`	square superset or equal

Negated relations		
to get	you type	notes
$\not<$	`$\not <$`	not less than
$\not>$	`$\not >$`	not greater than
$\not\leq$	`$\not \leq $`	not less than or equal to
$\not\geq$	`$\not \geq $`	not greater than or equal
$\not\prec$	`$\not \prec $`	does not precede
$\not\succ$	`$\not \succ $`	does not succeed
$\not\preceq$	`$\not \preceq $`	does not precede or equal
$\not\succeq$	`$\not \succeq $`	does not succeed or equal
$\not\subset$	`$\not \subset $`	not contained in
$\not\supset$	`$\not \supset $`	does not contain
$\not\subseteq$	`$\not \subseteq $`	not subset or equal
$\not\supseteq$	`$\not \supseteq $`	not superset or equal
$\not\sqsubseteq$	`$\not \sqsubseteq $`	not square subset or equal
$\not\sqsupseteq$	`$\not \sqsupseteq $`	not square superset or equal
$\not=$	`$\not =$`	not equal to
$\neq$	`$\neq $`	same as `\not =`
$\not\equiv$	`$\not \equiv $`	not equivalent to
$\not\sim$	`$\not \sim $`	not similar to
$\not\simeq$	`$\not \simeq $`	not similar or equal to
$\not\approx$	`$\not \approx $`	not approximately equal to
$\not\cong$	`$\not \cong $`	not congruent to
$\not\asymp$	`$\not \asymp $`	not asymptotic to
$\notin$	`$\notin $`	not a member of

Equivalence relations		
to get	you type	notes
$=$	`$=$`	equals
$\equiv$	`$\equiv $`	equivalent to
$\sim$	`$\sim $`	similar to
$\simeq$	`$\simeq $`	similar or equals
$\asymp$	`$\asymp $`	asymptotic to
$\approx$	`$\approx $`	approximately equal to
$\cong$	`$\cong $`	congruent to
$\bowtie$	`$\bowtie $`	bowtie
$\doteq$	`$\doteq $`	dot equal
$\parallel$	`$\parallel $`	is parallel to
$\perp$	`$\perp $`	is perpendicular to

Other binary relations		
to get	you type	notes
$\mid$	`$\mid $`	divides
$\smile$	`$\smile $`	
$\frown$	`$\frown $`	
$\in$	`$\in $`	belongs to
$\ni$	`$\ni $`	contains
$\vdash$	`$\vdash $`	
$\dashv$	`$\dashv $`	
$\models$	`$\models $`	
$\propto$	`$\propto $`	proportional to

Stacking		
to get	you type	notes
$\frac{x}{y}$	`$x\over y$`	fraction
$\frac{a+b}{c+d}$	`$a+b\over c+d$`	
$x+\frac{a+b}{c+d}-y$	`$x+{a+b\over c+d}-y$`	
${x \atop y}$	`$x\atop y$`	stacking
$\binom{x}{y}$	`$x\choose y$`	binomial coefficient
${x \above 2pt y}$	`$x\above 2pt y$`	thicker fraction line
${x \brack y}$	`$x\brack y$`	
${x \atopwithdelims<> y}$	`$x\atopwithdelims <> y$`	
${x \overwithdelims() y}$	`$x\overwithdelims () y$`	Legendre symbol
${x \abovewithdelims()1pt y}$	`$x\abovewithdelims ()1pt y$`	

Roots and radicals		
to get	you type	notes
$\sqrt{x}$	`$\sqrt x$`	square root
$\sqrt{x+y}$	`$\sqrt {x+y}$`	
$\sqrt[3]{x+y}$	`$\root 3 \of {x+y}$`	
$\sqrt[n]{3}$	`$\root n \of 3$`	
$\sqrt[n+1]{x+y}$	`$\root n+1 \of {x+y}$`	
$x^{2/3}$	`$x^{2/3}$`	

grouping		
to get	you type	notes
$\underline{x}$	`$\underline x$`	
$\underline{x+y}$	`$\underline {x+y}$`	
$\overline{x}$	`$\overline x$`	
$\overline{x+y}$	`$\overline {x+y}$`	

Dots		
to get	you type	notes
x_1, x_2, $\ldots$, x_n	`$x_1$, $x_2$, $\ldots $, $x_n$`	lower dots
$f(x_1,x_2,\ldots,x_n)$	`$f(x_1,x_2,\ldots ,x_n)$`	lower dots
$x_1+x_2+\cdots+x_n$	`$x_1+x_2+\cdots +x_n$`	centered dots
$x\cdot y$	`$x\cdot y$`	centered dot
$x\circ y$	`$x\circ y$`	centered circle
$\vdots$	`$\vdots $`	vertical dots
$\ddots$	`$\ddots $`	diagonal dots
$\dot x$	`$\dot x$`	dot math accent
$\ddot x$	`$\ddot x$`	double dot math accent
$x\doteq y$	`$x\doteq y$`	
$x\odot y$	`$x\odot y$`	circled dot
$x\bullet y$	`$x\bullet y$`	bullet
$x\bigodot y$	`$x\bigodot y$`	big circle with dot
$\sin 30^\circ$	`$\sin 30\degrees $`	degrees
and not in math mode …	`and not in math mode \dots`	ellipsis
A period ends a sentence.	`A period ends a sentence.`	period
ȧ	`\.a`	dot accent
ä	`\"a`	umlaut
ạ	`\d a`	dot under accent
ő	`\H o`	long Hungarian umlaut

Arrows			
to get	you type	to get	you type
$\leftarrow$	`$\leftarrow $`	$\rightarrow$	`$\rightarrow $`
$\gets$	`$\gets $`	$\to$	`$\to $`
$\Leftarrow$	`$\Leftarrow $`	$\Rightarrow$	`$\Rightarrow $`
$\longleftarrow$	`$\longleftarrow $`	$\longrightarrow$	`$\longrightarrow $`
$\Longleftarrow$	`$\Longleftarrow $`	$\Longrightarrow$	`$\Longrightarrow $`
$\hookleftarrow$	`$\hookleftarrow $`	$\hookrightarrow$	`$\hookrightarrow $`
$\leftharpoonup$	`$\leftharpoonup $`	$\rightharpoonup$	`$\rightharpoonup $`
$\leftharpoondown$	`$\leftharpoondown $`	$\rightharpoondown$	`$\rightharpoondown $`
$\iff$	`$\iff $`	$\rightleftharpoons$	`$\rightleftharpoons $`
$\mapsto$	`$\mapsto $`	$\longmapsto$	`$\longmapsto $`
$\leftrightarrow$	`$\leftrightarrow $`	$\longleftrightarrow$	`$\longleftrightarrow $`
$\Leftrightarrow$	`$\Leftrightarrow $`	$\Longleftrightarrow$	`$\Longleftrightarrow $`
$\uparrow$	`$\uparrow $`	$\Uparrow$	`$\Uparrow $`
$\downarrow$	`$\downarrow $`	$\Downarrow$	`$\Downarrow $`
$\updownarrow$	`$\updownarrow $`	$\Updownarrow$	`$\Updownarrow $`
$\nearrow$	`$\nearrow $`	$\nwarrow$	`$\nwarrow $`
$\searrow$	`$\searrow $`	$\swarrow$	`$\swarrow $`
$\overleftarrow{xy}$	`$\overleftarrow {xy}$`	$\overrightarrow{xy}$	`$\overrightarrow {xy}$`
$f\colon A\to B$	`$f\colon A\to B$`	$\vec{xy}$	`$\vec {xy}$`

<table>
<tr><th colspan="3">Delimiters</th></tr>
<tr><th>to get</th><th>you type</th><th>notes</th></tr>
<tr><td>$(x+y)$</td><td>`$(x+y)$`</td><td>parentheses</td></tr>
<tr><td>$[x+y]$</td><td>`$[x+y]$`</td><td>square brackets</td></tr>
<tr><td>$\{x+y\}$</td><td>`$\{x+y\}$`</td><td>curly braces</td></tr>
<tr><td>$\lbrace x+y\rbrace$</td><td>`$\lbrace x+y\rbrace $`</td><td>same as `\{` and `\}`</td></tr>
<tr><td>$\lceil x+y\rceil$</td><td>`$\lceil x+y\rceil $`</td><td>ceiling function</td></tr>
<tr><td>$\lfloor x+y\rfloor$</td><td>`$\lfloor x+y\rfloor $`</td><td>floor function</td></tr>
<tr><td>$\langle x+y\rangle$</td><td>`$\langle x+y\rangle $`</td><td>angle brackets</td></tr>
<tr><td>A/B</td><td>`$A/B$`</td><td>slash</td></tr>
<tr><td>$A\backslash B$</td><td>`$A\backslash B$`</td><td>backslash</td></tr>
<tr><td>$|x+y|$</td><td>`$|x+y|$`</td><td>vertical bar</td></tr>
<tr><td>$\vert x+y\vert$</td><td>`$\vert x+y\vert $`</td><td>same as `|`</td></tr>
<tr><td>$\|x+y\|$</td><td>`$\|x+y\|$`</td><td>double vertical bar</td></tr>
<tr><td>$\Vert x+y\Vert$</td><td>`$\Vert x+y\Vert $`</td><td>same as `\|`</td></tr>
<tr><td>$x\uparrow y$</td><td>`$x\uparrow y$`</td><td>upward arrow</td></tr>
<tr><td>$x\Uparrow y$</td><td>`$x\Uparrow y$`</td><td>upward arrow</td></tr>
<tr><td>$x\downarrow y$</td><td>`$x\downarrow y$`</td><td>downward arrow</td></tr>
<tr><td>$x\Downarrow y$</td><td>`$x\Downarrow y$`</td><td>downward arrow</td></tr>
<tr><td>$x\updownarrow y$</td><td>`$x\updownarrow y$`</td><td>up-and-down arrow</td></tr>
<tr><td>$x\Updownarrow y$</td><td>`$x\Updownarrow y$`</td><td>up-and-down arrow</td></tr>
</table>

<table>
<tr><th colspan="3">Delimiters</th></tr>
<tr><th>to get</th><th>precede the delimiter by</th><th>notes</th></tr>
<tr><td>$()\,[]\,\{\}\,\lceil\rceil\,\lfloor\rfloor\,\langle\rangle\,/\backslash\,|\,\|\,\uparrow\Uparrow\downarrow\Downarrow\updownarrow\Updownarrow$</td><td></td><td>normal size</td></tr>
<tr><td>$\big(\big)\,\big[\big]\,\big\{\big\}\,\big\lceil\big\rceil\,\big\lfloor\big\rfloor\,\big\langle\big\rangle\,\big/\big\backslash\,\big|\,\big\|\,\big\uparrow\big\Uparrow\big\downarrow\big\Downarrow\big\updownarrow\big\Updownarrow$</td><td>`\bigl` or `\bigr`</td><td>slightly larger</td></tr>
<tr><td>$\Big(\Big)\,\Big[\Big]\,\Big\{\Big\}\,\Big\lceil\Big\rceil\,\Big\lfloor\Big\rfloor\,\Big\langle\Big\rangle\,\Big/\Big\backslash\,\Big|\,\Big\|\,\Big\uparrow\Big\Uparrow\Big\downarrow\Big\Downarrow\Big\updownarrow\Big\Updownarrow$</td><td>`\Bigl` or `\Bigr`</td><td>50% taller than \big</td></tr>
<tr><td>$\bigg(\bigg)\,\bigg[\bigg]\,\bigg\{\bigg\}\,\bigg\lceil\bigg\rceil\,\bigg\lfloor\bigg\rfloor\,\bigg\langle\bigg\rangle\,\bigg/\bigg\backslash\,\bigg|\,\bigg\|\,\bigg\uparrow\bigg\Uparrow\bigg\downarrow\bigg\Downarrow\bigg\updownarrow\bigg\Updownarrow$</td><td>`\biggl` or `\biggr`</td><td>twice as tall as \big</td></tr>
<tr><td>$\Bigg(\Bigg)\,\Bigg[\Bigg]\,\Bigg\{\Bigg\}\,\Bigg\lceil\Bigg\rceil\,\Bigg\lfloor\Bigg\rfloor\,\Bigg\langle\Bigg\rangle\,\Bigg/\Bigg\backslash\,\Bigg|\,\Bigg\|\,\Bigg\uparrow\Bigg\Uparrow\Bigg\downarrow\Bigg\Downarrow\Bigg\updownarrow\Bigg\Updownarrow$</td><td>`\Biggl` or `\Biggr`</td><td>2.5 times as tall as \big</td></tr>
<tr><td colspan="3">Use \bigl, \Bigl, \biggl or \Biggl for left delimiters.
Use \bigr, \Bigr, \biggr or \Biggr for right delimiters.
Use \big, \Big, \bigg or \Bigg for delimiters with no space around them.
Use \bigm, \Bigm, \biggm or \Biggm for relational delimiters with space on both sides.</td></tr>
<tr><td colspan="3">To get matching delimiters the right size for a portion of text,
precede the left delimiter of the text by \left and precede the right delimiter by \right.
(An unmatched delimiter can be matched with a period delimiter.)</td></tr>
</table>

Large operators		
to get	you type	notes
$\sum$	`$\sum $`	summation
$\prod$	`$\prod $`	product
$\coprod$	`$\coprod $`	coproduct
$\int$	`$\int $`	integral
$\oint$	`$\oint $`	contour integral
$\bigcap$	`$\bigcap $`	intersection
$\bigcup$	`$\bigcup $`	union
$\bigsqcup$	`$\bigsqcup $`	square cup
$\bigvee$	`$\bigvee $`	disjunction
$\bigwedge$	`$\bigwedge $`	conjunction
$\bigoplus$	`$\bigoplus $`	circled plus
$\biguplus$	`$\biguplus $`	plus in U
$\bigotimes$	`$\bigotimes $`	circled times
$\bigodot$	`$\bigodot $`	circled dot

Limits on large operators		
to get	you type	in a display, looks like
$\sum _1^n x^i$	`$\sum _1^n x^i$`	$\displaystyle\sum _1^n x^i$
$\sum _{k=1}^{n-1}x^{k+1}$	`$\sum _{k=1}^{n-1}x^{k+1}$`	$\displaystyle\sum _{k=1}^{n-1}x^{k+1}$
$\prod _{k=1}^\infty {x_k\over k!}$	`$\prod _{k=1}^\infty {x_k\over k!}$`	$\displaystyle\prod _{k=1}^\infty {x_k\over k!}$
$\int _0^1x^n\,dx$	`$\int _0^1x^n\,dx$`	$\displaystyle\int _0^1x^n\,dx$
$\int _{-4}^{r^2+1}{x+1\over x+2}\,dx$	`$\int _{-4}^{r^2+1}{x+1\over x+2}\,dx$`	$\displaystyle\int _{-4}^{r^2+1}{x+1\over x+2}\,dx$
$\int _Af(\theta)\,d\theta$	`$\int _Af(\theta )\,d\theta $`	$\displaystyle\int _Af(\theta)\,d\theta$
$\bigcap _{r=1}^5A_r$	`$\bigcap _{r=1}^5A_r$`	$\displaystyle\bigcap _{r=1}^5A_r$
$\bigcup _{\alpha \in S}B_\alpha$	`$\bigcup _{\alpha \in S}B_\alpha $`	$\displaystyle\bigcup _{\alpha \in S}B_\alpha$
$\bigwedge _{\gcd (n,m)=1}P_{m,n}$	`$\bigwedge _{\gcd (n,m)=1}P_{m,n}$`	$\displaystyle\bigwedge _{\gcd (n,m)=1}P_{m,n}$
$\gcd _{i=1}^7n_i$	`$\gcd _{i=1}^7n_i$`	$\displaystyle\gcd _{i=1}^7n_i$
$\inf _{x\to \infty }A_x$	`$\inf _{x\to \infty }A_x$`	$\displaystyle\inf _{x\to \infty }A_x$
$\lim _{x\downarrow 0}e^{x^{-1}}$	`$\lim _{x\downarrow 0}e^{x^{-1}}$`	$\displaystyle\lim _{x\downarrow 0}e^{x^{-1}}$
$\liminf _{y\to 1}f(y)$	`$\liminf _{y\to 1}f(y)$`	$\displaystyle\liminf _{y\to 1}f(y)$
$\limsup _{y\uparrow 6}g(y)$	`$\limsup _{y\uparrow 6}g(y)$`	$\displaystyle\limsup _{y\uparrow 6}g(y)$
$\max _{j=1}^{f(n)}P_j(x)$	`$\max _{j=1}^{f(n)}P_j(x)$`	$\displaystyle\max _{j=1}^{f(n)}P_j(x)$
$\min _{1\leq n\leq m}G_n$	`$\min _{1\leq n\leq m}G_n$`	$\displaystyle\min _{1\leq n\leq m}G_n$
$\Pr _x f(x)$	`$\Pr _x f(x)$`	$\displaystyle\Pr _x f(x)$
$\sup _k(a_k+b_k)$	`$\sup _k(a_k+b_k)$`	$\displaystyle\sup _k(a_k+b_k)$
$\det _n M_n$	`$\det _n M_n$`	$\displaystyle\det _n M_n$

Functions		
to get	you type	notes
arccos	`$\arccos $`	
arcsin	`$\arcsin $`	
arctan	`$\arctan $`	
arg	`$\arg $`	argument
cos	`$\cos $`	cosine
cosh	`$\cosh $`	hyperbolic cosine
cot	`$\cot $`	cotangent
coth	`$\coth $`	hyperbolic cotangent
csc	`$\csc $`	cosecant
csch	`$\csch $`	hyperbolic cosecant
deg	`$\deg $`	degree
det	`$\det $`	determinant
dim	`$\dim $`	dimension
exp	`$\exp $`	exponential
gcd	`$\gcd $`	greatest common divisor
hom	`$\hom $`	
inf	`$\inf $`	infinum
ker	`$\ker $`	kernel
lg	`$\lg $`	log base 2
lim	`$\lim $`	limit
lim inf	`$\liminf $`	
lim sup	`$\limsup $`	
ln	`$\ln $`	natural log
log	`$\log $`	common log (base 10)
max	`$\max $`	maximum
min	`$\min $`	minimum
mod	`$\mod $`	modulo
Pr	`$\Pr $`	probability
sec	`$\sec $`	secant
sech	`$\sech $`	hyperbolic secant
sin	`$\sin $`	sine
sinh	`$\sinh $`	hyperbolic sine
sup	`$\sup $`	supremum
tan	`$\tan $`	tangent
tanh	`$\tanh $`	hyperbolic tangent