# TEX Cookbook

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| 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 |
| a̲ | `\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 |
| $\alpha$ | `$\alpha $` | | | A | `{\rm A}` | alpha |
| $\beta$ | `$\beta $` | | | B | `{\rm B}` | beta |
| $\gamma$ | `$\gamma $` | | | $\Gamma$ | `$\Gamma $` | gamma |
| $\delta$ | `$\delta $` | | | $\Delta$ | `$\Delta $` | delta |
| $\epsilon$ | `$\epsilon $` | $\varepsilon$ | `$\varepsilon $` | E | `{\rm E}` | epsilon |
| $\zeta$ | `$\zeta $` | | | Z | `{\rm Z}` | zeta |
| $\eta$ | `$\eta $` | | | H | `{\rm H}` | eta |
| $\theta$ | `$\theta $` | $\vartheta$ | `$\vartheta $` | $\Theta$ | `$\Theta $` | theta |
| $\iota$ | `$\iota $` | | | I | `{\rm I}` | iota |
| $\kappa$ | `$\kappa $` | | | K | `{\rm K}` | kappa |
| $\lambda$ | `$\lambda $` | | | $\Lambda$ | `$\Lambda $` | lambda |
| $\mu$ | `$\mu $` | | | M | `{\rm M}` | mu |
| $\nu$ | `$\nu $` | | | N | `{\rm N}` | nu |
| $\xi$ | `$\xi $` | | | $\Xi$ | `$\Xi $` | xi |
| o | `{\rm o}` | | | O | `{\rm O}` | omicron |
| $\pi$ | `$\pi $` | $\varpi$ | `$\varpi $` | $\Pi$ | `$\Pi $` | pi |
| $\rho$ | `$\rho $` | $\varrho$ | `$\varrho $` | P | `{\rm P}` | rho |
| $\sigma$ | `$\sigma $` | $\varsigma$ | `$\varsigma $` | $\Sigma$ | `$\Sigma $` | sigma |
| $\tau$ | `$\tau $` | | | T | `{\rm T}` | tau |
| $\upsilon$ | `$\upsilon $` | | | $\Upsilon$ | `$\Upsilon $` | upsilon |
| $\phi$ | `$\phi $` | $\varphi$ | `$\varphi $` | $\Phi$ | `$\Phi $` | phi |
| $\chi$ | `$\chi $` | | | X | `{\rm X}` | chi |
| $\psi$ | `$\psi $` | | | $\Psi$ | `$\Psi $` | psi |
| $\omega$ | `$\omega $` | | | $\Omega$ | `$\Omega $` | omega |

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

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

| Subscripts and superscripts | | |
|---|---|---|
| to get | you type | notes |
| $x_1$ | `$x_1$` | |
| $x_+$ | `$x_+$` | |
| $x_\alpha$ | `$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 $n^{\text{th}}$ 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 |
| $\leq$ | `$\le $` | same as `\leq` | $\geq$ | `$\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 |
| $\neq$ | `$\not =$` | 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 |
| $\frac{a+b}{c+d}$ | `$a+b\over c+d$` | |
| $x+\frac{a+b}{c+d}-y$ | `$x+{a+b\over c+d}-y$` | |
| $\begin{matrix}x\\y\end{matrix}$ | `$x\atop y$` | stacking |
| $\binom{x}{y}$ | `$x\choose y$` | binomial coefficient |
| $\begin{matrix}x\\ \blacksquare \\ y\end{matrix}$ | `$x\above 2pt y$` | thicker fraction line |
| $\left[\begin{matrix}x\\y\end{matrix}\right]$ | `$x\brack y$` | |
| $\left\langle\begin{matrix}x\\y\end{matrix}\right\rangle$ | `$x\atopwithdelims <> y$` | |
| $\left(\frac{x}{y}\right)$ | `$x\overwithdelims () y$` | Legendre symbol |
| $\left(\frac{x}{y}\right)$ | `$x\abovewithdelims ()1pt y$` | |

| 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 |
| $x_1$, $x_2$, …, $x_n$ | `$x_1$, $x_2$, $\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 $` |
| $\leftarrow$ | `$\gets $` | $\rightarrow$ | `$\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 $` |
| $\overleftarrow{xy}$ | `$\overleftarrow {xy}$` | $\overrightarrow{xy}$ | `$\overrightarrow {xy}$` |
| $f\colon A \to B$ | `$f\colon A\to B$` | $\vec{xy}$ | `$\vec {xy}$` |

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

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

| 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 |
| $\sum_1^n x^i$ | `$\sum _1^n x^i$` | $\sum_1^n x^i$ |
| $\sum_{k=1}^{n-1} x^{k+1}$ | `$\sum _{k=1}^{n-1}x^{k+1}$` | $\sum_{k=1}^{n-1} x^{k+1}$ |
| $\prod_{k=1}^{\infty} \frac{x_k}{k!}$ | `$\prod _{k=1}^\infty {x_k\over k!}$` | $\prod_{k=1}^{\infty} \frac{x_k}{k!}$ |
| $\int_0^1 x^n\,dx$ | `$\int _0^1x^n\,dx$` | $\int_0^1 x^n\,dx$ |
| $\int_{-4}^{r^2+1} \frac{x+1}{x+2}\,dx$ | `$\int _{-4}^{r^2+1}{x+1\over x+2}\,dx$` | $\int_{-4}^{r^2+1} \frac{x+1}{x+2}\,dx$ |
| $\int_A f(\theta)\,d\theta$ | `$\int _Af(\theta )\,d\theta $` | $\int_A f(\theta)\,d\theta$ |
| $\bigcap_{r=1}^{5} A_r$ | `$\bigcap _{r=1}^5A_r$` | $\bigcap_{r=1}^{5} A_r$ |
| $\bigcup_{\alpha\in S} B_\alpha$ | `$\bigcup _{\alpha \in S}B_\alpha $` | $\bigcup_{\alpha\in S} B_\alpha$ |
| $\bigwedge_{\gcd(n,m)=1} P_{m,n}$ | `$\bigwedge _{\gcd (n,m)=1}P_{m,n}$` | $\bigwedge_{\gcd(n,m)=1} P_{m,n}$ |
| $\gcd_{i=1}^{7} n_i$ | `$\gcd _{i=1}^7n_i$` | $\gcd_{i=1}^{7} n_i$ |
| $\inf_{x\to\infty} A_x$ | `$\inf _{x\to \infty }A_x$` | $\inf_{x\to\infty} A_x$ |
| $\lim_{x\downarrow 0} e^{x^{-1}}$ | `$\lim _{x\downarrow 0}e^{x^{-1}}$` | $\lim_{x\downarrow 0} e^{x^{-1}}$ |
| $\liminf_{y\to 1} f(y)$ | `$\liminf _{y\to 1}f(y)$` | $\liminf_{y\to 1} f(y)$ |
| $\limsup_{y\uparrow 6} g(y)$ | `$\limsup _{y\uparrow 6}g(y)$` | $\limsup_{y\uparrow 6} g(y)$ |
| $\max_{j=1}^{f(n)} P_j(x)$ | `$\max _{j=1}^{f(n)}P_j(x)$` | $\max_{j=1}^{f(n)} P_j(x)$ |
| $\min_{1\leq n\leq m} G_n$ | `$\min _{1\leq n\leq m}G_n$` | $\min_{1\leq n\leq m} G_n$ |
| $\Pr_x f(x)$ | `$\Pr _x f(x)$` | $\Pr_x f(x)$ |
| $\sup_k (a_k+b_k)$ | `$\sup _k(a_k+b_k)$` | $\sup_k (a_k+b_k)$ |
| $\det_n M_n$ | `$\det _n M_n$` | $\det_n M_n$ |

| 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 |