Symbols & Logical Syntax in LaTeX

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Greek & Hebrew Characters

Alphabetical Letters

A, α	`\Alpha, \alpha`	I, ι	`\Iota, \iota`	P, ρ, ϱ	`\Rho, \rho, \varrho`
B, β	`\Beta, \beta`	K, κ, $\varkappa$	`\Kappa, \kappa, \varkappa`	Σ, σ, ς	`\Sigma, \sigma, \varsigma`
Γ, γ	`\Gamma, \gamma`	Λ, λ	`\Lambda, \lambda`	T, τ	`\Tau, \tau`
Δ, δ	`\Delta, \delta`	M, μ	`\Mu, \mu`	Υ, υ	`\Upsilon, \upsilon`
E, ϵ, ε	`\Epsilon, \epsilon, \varepsilon`	N, ν	`\Nu, \nu`	Φ, ϕ, φ	`\Phi, \phi, \varphi`
Z, ζ	`\Zeta, \zeta`	Ξ, ξ	`\Xi, \xi`	X, χ,	`\Chi, \chi`
H, η	`\Eta, \eta`	O, o	`\Omicron, \omicron`	Ψ, ψ	`\Psi, \psi`
Θ, θ, ϑ	`\Theta, \theta, \vartheta`	Π, π, ϖ	`\Pi, \pi, \varpi`	Ω, ω	`\Omega, \omega`

Miscellaneous Characters & Punctuation

$\digamma$	`\digamma`	∁	`\complement`	∠	`\angle`	ℑ	`\Im`	⅁	`\Game`
ℵ	`\aleph`	ℓ	`\ell`	∡	`\measuredangle`	ℜ	`\Re`	ⅎ	`\Finv`
ℶ	`\beth`	ð	`\eth`	∢	`\sphericalangle`	℧	`\mho`	∂	`\partial`
ℸ	`\daleth`	$\hbar$	`\hbar`	$\surd$	`\surd`	℘	`\wp`	™, ©	`\trademark, \copyright`
ℷ	`\gimel`	ħ	`\hslash`	♮	`\natural`	𝕜	`\Bbbk`	£, $	`\pounds, \$`
$\imath$	`\imath`	⊤	`\top`	♯	`\sharp`	∅	`\emptyset`	◇, ◊	`\diamondsuit, \lozenge`
$\jmath$	`\jmath`	⊥	`\bot`	♭	`\flat`	∞	`\infty`	♡	`\heartsuit`
∇	`\nabla`	§	`\S`	△	`\vartriangle`	□, ☐	`\Box, \square`	♣	`\clubsuit`
△	`\triangle`	∅	`\varnothing`	▽	`\triangledown`	◇	`\Diamond`	♠	`\spadesuit`
▲	`\blacktriangle`	■	`\blacksquare`	╲	`\diagdown`	∃	`\exists`	★	`\bigstar`
▼	`\blacktriangledown`	♦	`\blacklozenge`	╱	`\diagup`	∄	`\nexists`		

Text Mode Miscellaneous Characters & Punctuation

ó	`\'{o}`	o̲	`\b{o}`	ŏ	`\v o`	Ø, ø	`\O, \o`	¶	`\P`	£, $	`\pounds, \$`
ò	`\‘{o}`	ȯ	`\.{o}`	o̩	`\d o`	Å, å	`\AA, \aa`	§	`\S`	!, ?	`!,?`
ö	`\"{o}`	o̩	`\d{o}`	o̊	`\r o`	Æ, æ	`\AE, \ae`	†	`\dag`	., ,	`., ,`
ô	`\^{o}`	o̧	`\c{o}`	ő	`\H o`	ß	`\ss`	‡	`\ddag`	‘, ’	`‘, ’`
õ	`\~{o}`	o̍	`\u{o}`	o͡o	`\t o`	ı	`\i`	™, ©	`\trademark, \copyright`	“, ”	`‘‘, ’’ or "`
ō	`\={o}`	o̎	`\H{o}`	o͡o	`\t{oo}`	ȷ	`\j`	®, ®	`\textregistered, \circledR`	:, ;	`:, ;`

Basic Math Mode

Alphabets

XYX xyz	`XYZ\ xyz`	**XYZ xyz**	`\mathbf{XYZ\ xyz}`	$\mathbb{XYZ}$	`\mathbb{XYZ}`
XYZ xyz	`\mathnormal{XYZ\ xyz}`	XYZ xyz	`\mathsf{XYZ\ xyz}`	$\mathcal{XYZ}$	`\mathcal{XYZ}`
XYZ xyz	`\mathit{XYZ\ xyz}`	$\mathtt{XYZ}$ $\mathtt{xyz}$	`\mathtt{XYZ\ xyz}`	$\mathfrak{XYZ}$	`\mathfrak{XYZ}`
XYZ xyz	`\mathrm{XYZ\ xyz}`				

Spacing

xyz	`xyz`	Default math	dxd	`a\!b\mspace{-3mu}c\negthinspace d`	Neg. 3mu ‘thin’
$x\ y\ z$	`x\ y\ z`	Expanded	dxd	`a\negmedspace b\mspace{-4mu}c\negmedspace d`	Neg. 4mu ‘medium’
$\sin x \cos y$	`\sin x\cos y`	Operator	dxd	`a\negthickspace b\mspace{-5mu}c\negthickspace d`	Neg. 5mu ‘thick’
$a\,b\,c\,d$	`a\,b\mspace{3mu}c\thinspace d`	3mu ‘thin’	ab	`a\phantom{xxx}b`	Width of ‘xxx’
$a\:b\:c\:d$	`a\:b\mspace{4mu}c\medspace d`	4mu ‘medium’			
$a\;b\;c\;d$	`a\;b\mspace{5mu}c\thickspace d`	5mu ‘thick’			

Math Accents & Constructs

Note that most basic accents can be stacked. For example, `\acute{\acute{x}}` yields $\acute{\acute{x}}$. Or, `\acute{\tilde{x}}` yields $\acute{\tilde{x}}$.

$\acute{x}$	`\acute{x}`	$\dot{x}$	`\dot{x}`	$\overline{xyz}$	`\overline{xyz}`	$\xleftarrow{xyz}$	`\xleftarrow[abc]{xyz}`	$\sum^{K}$	`\overset{K}{\sum}`
$\grave{x}$	`\grave{x}`	$\ddot{x}$	`\ddot{x}`	$\underline{xyz}$	`\underline{xyz}`	$\xrightarrow[abc]{xyz}$	`\xrightarrow[abc]{xyz}`	$\sum_{k=1}$	`\underset{k=1}{\sum}`
$\bar{x}$	`\bar{x}`	$\check{x}$	`\check{x}`	$\overrightarrow{xyz}$	`\overrightarrow{xyz}`	$\overbrace{xyz}$	`\overbrace{xyz}`	$\sqrt{x}$	`\sqrt{x}`
$\hat{x}$	`\hat{x}`	$\vec{x}$	`\vec{x}`	$\overleftarrow{xyz}$	`\overleftarrow{xyz}`	$\underbrace{xyz}$	`\underbrace{xyz}`	$\sqrt[n]{x}$	`\sqrt[n]{x}`
$\tilde{x}$	`\tilde{x}`	$\widehat{xyz}$	`\widehat{xyz}`	$\overleftrightarrow{xyz}$	`\overleftrightarrow{xyz}`	$f,\ f',\ f\prime$	`f, f', f\prime`		
$\breve{x}$	`\breve{x}`	$\widetilde{xyz}$	`\widetilde{xyz}`	$\frac{abc}{xyz}$	`\frac{abc}{xyz}`	${}^{x}_{y}\sum^{j}_{k}$	`\sideset{_y^x}{_k^j}\sum`		

Binary Relations

Note that you can produce according negations by either adding the `\not` command as a prefix or ordinarily by preceding the commands with ‘`n`’. For example, `\not=` or `\neq` turns $=$ to $\neq$.

$<$	<	$>$	>	$=$	=	$\in$	\in	$\ni$	\ni or \owns
$\leq$	\leq or \le	$\geq$	\geq or \ge	$\equiv$	\equiv	$\vdash$	\vdash	$\dashv$	\dashv
$\ll$	\ll	$\gg$	\gg	$\doteq$	\doteq	$\mid$	\mid	$\parallel$	\parallel
$\prec$	\prec	$\succ$	\succ	$\sim$	\sim	$\smile$	\smile	$\frown$	\frown
$\preceq$	\preceq	$\succeq$	\succeq	$\simeq$	\simeq	$\exists$	\exists	$\neg$	\lnot or \neg
$\subset$	\subset	$\supset$	\supset	$\approx$	\approx	$\models$	\models	$\perp$	\perp
$\subseteq$	\subseteq	$\supseteq$	\supseteq	$\cong$	\cong	$\asymp$	\asymp	$\propto$	\propto
$\sqsubset$	\sqsubset	$\sqsupset$	\sqsupset	$\bowtie$	Join	$\neq$	\neq	$\forall$	\forall
$\sqsubseteq$	\sqsubseteq	$\sqsupseteq$	\sqsupseteq	$\bowtie$	\bowtie	$\notin$	\notin	$\prime$, $\backprime$	\prime, \backprime

Binary Operators

Standard Operators

$+$	+	$-$	-	$\vee$	\lor or \vee	$\wedge$	\land or \wedge	$\lhd$	\lhd	$\rhd$	\rhd
$\pm$	\pm	$\mp$	\mp	$\oplus$	\oplus	$\ominus$	\ominus	$\unlhd$	\unlhd	$\unrhd$	\unrhd
$\times$	\times	$\cdot$	\cdot	$\odot$	\odot	$\oslash$	\oslash	$\bullet$	\bullet	$\circ$	\circ
$\div$	\div	$\setminus$	\setminus	$\otimes$	\otimes	$\bigcirc$	\bigcirc	$*$	\ast	$\star$	\star
$\cup$	\cup	$\cap$	\cap	$\triangle$	\bigtriangleup	$\bigtriangledown$	\bigtriangledown	$\diamond$	\diamond	$\wr$	\wr
$\sqcup$	\sqcup	$\sqcap$	\sqcap	$\triangleleft$	\triangleleft	$\triangleright$	\triangleright	$\amalg$	\amalg	$\uplus$	\uplus

Large Operators

$\sum$	\sum	$\int$	\int	$\iiint$	\iiint	$\bigcap$	\bigcap	$\bigoplus$	\bigoplus	$\bigvee$	bigvee
$\prod$	\prod	$\oint$	\oint	$\iiiint$	\iiiint	$\bigcup$	\bigcup	$\bigotimes$	\bigotimes	$\bigwedge$	\bigwedge
$\coprod$	\coprod	$\iint$	\iint			$\biguplus$	\bigoplus	$\bigodot$	\bigodot	$\bigsqcup$	\bigsqcup

Functions

arccos	\arcoss	csc	\csc	inj lim	\injlim	max	\max	tan	\tan
arcsin	\arcsin	deg	\deg	ker	\ker	min	\min	tanh	\tanh
arctan	\arctan	det	\det	lg	\lg	Pr	\Pr	$\varinjlim$	\varinjlim
arg	\arg	dim	\dim	lim	\lim	proj lim	\projlim	$\varprojlim$	\varprojlim
cos	\cos	exp	\exp	lim inf	\liminf	sec	\sec	$\varliminf$	\varliminf
cosh	\cosh	gcd	\gcd	lim sup	\limsup	sin	\sin	$\varlimsup$	\varlimsup
cot	\cot	hom	\hom	ln	\ln	sinh	\sinh	226^1_0	\operatorname{226}_0^1
coth	\coth	inf	\inf	log	\log	sup	sup		

Delimiters

Note that you can produce according relatively sized symbols by preceding the commands with `\left` or `\right`. For example, `\left(\frac{abc}{xyz}\right)` turns $(\frac{abc}{xyz})$ to $\left(\frac{abc}{xyz}\right)$. Sometimes commands can be preceded with '`l`' or '`r`' e.g., `\lVert xyz\rVert` makes $\lVert xyz\rVert$. Thus, giving the `\Vert` command properties of paired symbols.

Standard Delimiters

(	(	[	\lbrack or [	$\langle$	\langle	$\lfloor$	\lfloor	$\ulcorner$	\ulcorner	$\uparrow$	\uparrow
)	)	]	\rbrack or]	$\rangle$	\rangle	$\lceil$	\lceil	$\urcorner$	\urcorner	$\downarrow$	\downarrow
$\lvert$	\vert or \lvert	{	\lbrace or \{	$\lceil$	\lceil	/	/	$\llcorner$	\llcorner	$\Uparrow$	\Uparrow
$\lVert$	\Vert or \lVert	}	\rbrace or \}	$\lfloor$	\lfloor	\	\backslash	$\lrcorner$	\rcorner	$\Downarrow$	\Downarrow

Large Delimiters

$\lgroup$	\lgroup	$\rgroup$	\rgroup	$\lmoustache$	\lmoustache	$\rmoustache$	\rmoustache	$\arrowvert$	\arrowvert	$\Arrowvert$	\Arrowvert	$\bracevert$	\bracevert

Arrows

$\leftarrow$	\leftarrow or \gets	$\rightarrow$	\rightarrow or \to	$\Leftarrow$	\Leftarrow	$\Rightarrow$	\Rightarrow
$\longleftarrow$	\longleftarrow	$\longrightarrow$	\longrightarrow	$\Longleftarrow$	\Longleftarrow	$\Longrightarrow$	\Longrightarrow
$\leftrightarrow$	\leftrightarrow	$\longleftrightarrow$	\longlaeftrightarrow	$\Leftrightarrow$	\Leftrightarrow	$\Longleftrightarrow$	\Longleftrightarrow
$\uparrow$	\uparrow	$\downarrow$	\downarrow	$\Uparrow$	\Uparrow	$\Downarrow$	\Downarrow
$\updownarrow$	\updownarrow	$\mapsto$	\mapsto	$\Updownarrow$	Updownarrow	$\longmapsto$	\longmapsto
$\hookleftarrow$	\hookleftarrow	$\hookrightarrow$	\hookrightarrow	$\iff$	\iff (larger spaces)		
$\nearrow$	\nearrow	$\searrow$	\searrow	$\swarrow$	\swarrow	$\nwarrow$	\nwarrow
$\nleftarrow$	\nleftarrow	$\nrightarrow$	\nrightarrow	$\nLeftarrow$	\nLeftarrow	$\nRightarrow$	\nRightarrow
$\nleftrightarrow$	\nleftrightarrow			$\nLeftrightarrow$	\nLeftrightarrow		

$\dashleftarrow$	\dashleftarrow	$\dashrightarrow$	\dashrightarrow	$\leftleftarrows$	\leftleftarrows	$\rightrightarrows$	\rightroghtarrows	$\leftrightarrows$	\leftrightarrows
$\Lleftarrow$	\Lleftarrow	$\Rrightarrow$	\Rrightarrow	$\upuparrows$	\upuparrows	$\downdownarrows$	\downdownarrows	$\rightleftarrows$	\rightleftarrows
$\upharpoonleft$	\upharpoonleft	$\upharpoonright$	\upharpoonright	$\downharpoonleft$	\downharpoonleft	$\downharpoonright$	\downharpoonright	$\leftrightharpoons$	\leftrightharpoons
$\twoheadleftarrow$	\twoheadleftarrow	$\twoheadrightarrow$	\twoheadrightarrow	$\leftarrowtail$	\leftarrowtail	$\rightarrowtail$	\rightarrowtail	$\rightleftharpoons$	\rightleftharpoons
$\Lsh$	\Lsh	$\Rsh$	\Rsh	$\looparrowleft$	\looparrowleft	$\looparrowright$	\looparrowright		
$\curvearrowleft$	\curvearrowleft	$\curvearrowright$	\curvearrowright	$\circlearrowleft$	\circlearrowleft	$\circlearrowright$	\circlearrowright		
$\leadsto$	\leadsto	$\rightsquigarrow$	\rightsquigarrow	$\leftrightsquigarrow$	\leftrightsquigarrow	$\multimap$	\multimap		

Matrices

Note that any of the following can also be displayed inline as well as stand-alone. It's recommended that you use `smallmatrix` for this. Thus, you must preceed and succeed `\begin` and `\end smallmatrix` with `\left<delimiter>` and `\right<delimiter>`, respectively. For example, `\left(\begin{smallmatrix}a & b & c\\x & y & z\end{smallmatrix}\right)` yields $\left(\begin{smallmatrix}a & b & c\\x & y & z\end{smallmatrix}\right)$.

Basic Syntax

$$\begin{matrix} a & b & c \\ x & y & z \end{matrix}$$
```
\begin{matrix}
a & b & c\\
x & y & z
\end{matrix}
```

$$\begin{pmatrix} a & b & c \\ x & y & z \end{pmatrix}$$
```
\begin{pmatrix}
a & b & c\\
x & y & z
\end{pmatrix}
```

$$\begin{bmatrix} a & b & c \\ x & y & z \end{bmatrix}$$
```
\begin{bmatrix}
a & b & c\\
x & y & z
\end{bmatrix}
```

$$\begin{Bmatrix} a & b & c \\ x & y & z \end{Bmatrix}$$
```
\begin{Bmatrix}
a & b & c\\
x & y & z
\end{Bmatrix}
```

$$\begin{vmatrix} a & b & c \\ x & y & z \end{vmatrix}$$
```
\begin{vmatrix}
a & b & c\\
x & y & z
\end{vmatrix}
```

$$\begin{Vmatrix} a & b & c \\ x & y & z \end{Vmatrix}$$
```
\begin{Vmatrix}
a & b & c\\
x & y & z
\end{Vmatrix}
```

$$\left\lceil \begin{matrix} a & b & c \\ x & y & z \end{matrix} \right\rceil$$
```
\left\lceil\begin{matrix}
a & b & c\\
x & y & z
\left\rceil\end{matrix}
```

$$\left\langle \begin{matrix} a & b & c \\ x & y & z \end{matrix} \right\| $$
```
\left\langle\begin{matrix}
a & b & c\\
x & y & z
\right\Vert\end{pmatrix}
```

Dots

$\dots$	`\dots` or `\ldots`	$\cdots$	`\cdots`	$\ddots$	`\ddots`	$\vdots$	`\vdots`

Array Environment

Sizes

Math Mode

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
```
\displaystyle x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}
```

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
```
\textstyle x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}
```

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
```
\scriptstyle x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}
```

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
```
\scriptscriptstyle x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}
```

Text Mode

tiny	`\tiny{tiny}`	normal	`\normalsize{normal}`	huge	`\huge{huge}`
script	`\scriptsize{script}`	large	`\large{large}`		
footnote	`\footnotesize{footnote}`	Large	`\Large{Large}`	Huge	`\huge{huge}`
small	`\small{small}`	LARGE	`\LARGE{LARGE}`		