# Symbols & Logical Syntax in $\LaTeX$

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## Greek & Hebrew Alphabetical Letters

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $\mathrm{A}$, $\alpha$ | `\Alpha, \alpha` | $\mathrm{I}$, $\iota$ | `\Iota, \iota` | $\mathrm{P}$, $\rho$, $\varrho$ | `\Rho, \rho, \varrho` | $\digamma$ | `\digamma` |
| $\mathrm{B}$, $\beta$ | `\Beta, \beta` | $\mathrm{K}$, $\kappa$, $\varkappa$ | `\Kappa, \kappa, \varkappa` | $\Sigma$, $\sigma$, $\varsigma$ | `\Sigma, \sigma, \varsigma` | $\aleph$ | `\aleph` |
| $\Gamma$, $\gamma$ | `\Gamma, \gamma` | $\Lambda$, $\lambda$ | `\Lambda, \lambda` | $\mathrm{T}$, $\tau$ | `\Tau, \tau` | $\beth$ | `\beth` |
| $\Delta$, $\delta$ | `\Delta, \delta` | $\mathrm{M}$, $\mu$ | `\Mu, \mu` | $\Upsilon$, $\upsilon$ | `\Upsilon, \upsilon` | $\daleth$ | `\daleth` |
| $\mathrm{E}$, $\epsilon$, $\varepsilon$ | `\Epsilon, \epsilon, \varepsilon` | $\mathrm{N}$, $\nu$ | `\Nu, \nu` | $\Phi$, $\phi$, $\varphi$ | `\Phi, \phi, \varphi` | $\gimel$ | `\gimel` |
| $\mathrm{Z}$, $\zeta$ | `\Zeta, \zeta` | $\Xi$, $\xi$ | `\Xi, \xi` | $\mathrm{X}$, $\chi$, | `\Chi, \chi` | | |
| $\mathrm{H}$, $\eta$ | `\Eta, \eta` | $\mathrm{O}$, $\mathrm{o}$ | `\Omicron, \omicron` | $\Psi$, $\psi$ | `\Psi, \psi` | | |
| $\Theta$, $\theta$, $\vartheta$ | `\Theta, \theta, \vartheta` | $\Pi$, $\pi$, $\varpi$ | `\Pi, \pi, \varpi` | $\Omega$, $\omega$ | `\Omega, \omega` | | |

## Basic Math Mode Syntax

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $XYZ\ xyz$ | `XYZ\ xyz` | $\mathrm{XYZ\ xyz}$ | `\mathrm{XYZ\ xyz}` | $\mathit{XYZ\ xyz}$ | `\mathit{XYZ\ xyz}` | $\mathbf{XYZ\ xyz}$ | `\mathbf{XYZ\ xyz}` |
| $\mathbb{XYZ}$ | `\mathbb{XYZ}` | $\mathcal{XYZ}$ | `\mathcal{XYZ}` | $\mathfrak{XYZ\ xyz}$ | `\mathfrak{XYZ\ xyz}` | $\mathtt{XYZ\ xyz}$ | `\mathtt{XYZ\ xyz}` |

| | | | | | |
|---|---|---|---|---|---|
| $xyz$ | `xyz` | Math spacing | $\sin x\cos y$ | `\sin x\cos y` | Operator spacing |
| $x\ y\ z$ | `x\ y\ z` | Extended spacing | $a\,b\mspace{3mu}c\thinspace d$ | `a\,b\mspace{3mu}c\thinspace d` | 3mu (‘thin’) space |
| $a\:b\mspace{4mu}c\medspace d$ | `a\:b\mspace{4mu}c\medspace d` | 4mu (‘medium’) space | $a\;b\mspace{5mu}c\thickspace d$ | `a\;b\mspace{5mu}c\thickspace d` | 5mu (‘thick’) space |
| $a\quad b\mspace{18mu}c\quad d$ | `a\quad b\mspace{18mu}c\quad d` | 18mu (‘quad’) space | $a\!b\mspace{-3mu}c\negthinspace d$ | `a\!b\mspace{-3mu}c\negthinspace d` | Neg. 3mu (‘thin’) space |
| $a\phantom{xxx}b$ | `a\phantom{xxx}b` | Space width of ‘xxx’ | | | |

## Math Accents & Constructs

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| $\hat{x}$ | `\hat{x}` | $\check{x}$ | `\check{x}` | $\tilde{x}$ | `\tilde{x}` | $\acute{x}$ | `\acute{x}` | $\grave{x}$ | `\grave{x}` |
| $\dot{x}$ | `\dot{x}` | $\ddot{x}$ | `\ddot{x}` | $\breve{x}$ | `\breve{x}` | $\bar{x}$ | `\bar{x}` | $\vec{x}$ | `\vec{x}` |
| $\widehat{xyz}$ | `\widehat{xyz}` | $\widetilde{xyz}$ | `\widetilde{xyz}` | $\frac{abc}{xyz}$ | `\frac{abc}{xyz}` | $f$, $f'$ | `f, f'` | $\sqrt{x}$ | `\sqrt{x}` |
| $\sqrt[n]{x}$ | `\sqrt[n]{x}` | $\overline{xyz}$ | `\overline{xyz}` | $\underline{xyz}$ | `\underline{xyz}` | $\overbrace{xyz}$ | `\overbrace{xyz}` | $\underbrace{xyz}$ | `\underbrace{xyz}` |
| $\overrightarrow{xyz}$ | `\overrightarrow{xyz}` | $\overleftarrow{xyz}$ | `\overleftarrow{xyz}` | | | | | | |

## 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` | $:$ | `:` | $\notin$ | `\notin` |
| $\subset$ | `\subset` | $\supset$ | `\supset` | $\approx$ | `\approx` | $\models$ | `\models` | $\perp$ | `\perp` |
| $\subseteq$ | `\subseteq` | $\supseteq$ | `\supseteq` | $\cong$ | `\cong` | $\asymp$ | `\asymp` | $\propto$ | `\propto` |
| $\sqsubset$ | `\sqsubset` | $\sqsupset$ | `\sqsupset` | $\Join$ | `Join` | $\neq$ | `\neq` | $\forall$ | `\forall` |
| $\sqsubseteq$ | `\sqsubseteq` | $\sqsupseteq$ | `\sqsupseteq` | $\bowtie$ | `\bowtie` | | | | |

## Binary Operators

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $+$ | `+` | $-$ | `-` | $\vee$ | `\lor` or `\vee` | $\wedge$ | `\land` or `\wedge` | $\lhd$ | `\lhd` | $\rhd$ | `\rhd` | $\dagger$ | `\dagger` | $\ddagger$ | `\ddagger` |
| $\pm$ | `\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` | $\ast$ | `\ast` | $\star$ | `\star` | | | | |
| $\cup$ | `\cup` | $\cap$ | `\cap` | $\bigtriangleup$ | `\bigtriangleup` | $\bigtriangledown$ | `\bigtriangledown` | $\diamond$ | `\diamond` | $\wr$ | `\wr` | | | | |
| $\sqcup$ | `\sqcup` | $\sqcap$ | `\sqcap` | $\triangleleft$ | `\triangleleft` | $\triangleright$ | `\triangleright` | $\amalg$ | `\amalg` | $\uplus$ | `\uplus` | | | | |