# Symbols & Logical Syntax in $\LaTeX$

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#### Greek & Hebrew Letters

## Alphabetical Characters

A, $\alpha$	\Alpha, \alpha	I, ι	\Iota, \iota	Ρ, ρ, ρ	\Rho, \rho, \varrho
B, $\beta$	\Beta, \beta	Κ, κ, κ	\Kappa, \kappa, \varkappa	$\Sigma$ , $\sigma$ , $\varsigma$	\Sigma, \sigma, \varsigma
$\Gamma$ , $\gamma$	\Gamma, \gamma	$\Lambda, \lambda$	\Lambda, \lambda	T, τ	\Tau, \tau
$\Delta$ , $\delta$	\Delta, \delta	Μ, μ	\Mu, \mu	$\Upsilon$ , $v$	\Upsilon, \upsilon
E, $\epsilon$ , $\varepsilon$	\Epsilon, \epsilon, \varepsilon	Ν, ν	\Nu, \nu	$\Phi, \phi, \varphi$	\Phi, \phi, \varphi
$Z, \zeta$	\Zeta, \zeta	$\Xi, \xi$	\Xi, \xi	Χ, χ,	\Chi, \chi
H, $\eta$	\Eta, \eta	О, о	\Omicron, \omicron	$\Psi, \psi$	\Psi, \psi
$\Theta$ , $\theta$ , $\vartheta$	\Theta, \theta, \vartheta	$\Pi, \pi, \varpi$	\Pi, \pi, \varpi	$\Omega, \omega$	\Omega, \omega

#### Miscellaneous Characters & Punctuation

F	\digamma	C	\complement	$\Im$	\Im	Ð	\Game	£	\pounds		
×	\aleph	$\ell$	\ell	R	\Re	F	\Finv	\$	\\$	,	,
コ	\beth	ð	\eth	Ω	$\mbox{mho}$	$\partial$	\partial	§	\S	٠, ,	·, ,
٦	\daleth	ħ	\hbar	80	\wp	TM	\trademark	!	!	", "	", " or "
ב	\gimel	ħ	\hslash	k	\Bbbk	(R), (R)	\textregistered, \circledR	?	?	., ;	\colon or :, ;

# Basic Math Mode Syntax

	XY	Z xyz	XYZ\ xyz \mathbb{XYZ}	XYZ xyz		XYZ xyz XYI 193	<pre>\mathit{XYZ\ xyz} \mathfrak{XYZ\ xyz}</pre>	XYZ xyz	<pre>\mathbf{XYZ\ xyz} \mathtt{XYZ\ xyz}</pre>
xyz		xyz			Math spacing	$ \sin x \cos y $	\sin x\cos y		Operator spacing
x y z		x\ y\	z		Extended spacing	a b c d	ab\mspace{3mu}c\t	chinspace d	3mu ('thin') space
$a\ b\ c\ d$		a\:b\n	nspace{4mu}c\med	lspace d	4mu ('medium') space	a b c d	a\;b\mspace{5mu}c\t	hickspace d	5mu ('thick') space
a $b$ $c$	d	a	i b\mspace{18mu}	-c d	18mu ('quad') space	abad	a\!b\mspace{-3mu}c\	negthinspace	Neg. 3mu ('thin') space
. 1		. \ . 1	(		C				

## Math Accents & Constructs

$\hat{x}$	\hat{x}		\check{x}	$\tilde{x}$	\tilde{x}	x x	\acute{x}	ì	\grave{x}
$\dot{x}$	\dot{x}	$\ddot{x}$	\ddot{x}	$reve{x}$	\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\prime	$\sqrt{x}$	\sqrt{x}
$\sqrt[n]{x}$	\sqrt[n]{x}	$\overline{xyz}$	\overline{xyz}	$\frac{xyz}{}$	\underline{xyz}	$\widehat{xyz}$	\overbrace{xyz}	xyz	\underbrace{xyz}
$\overrightarrow{xyz}$	\overrightarrow{xyz}	$\frac{\overleftarrow{xyz}}{}$	\overleftarrow{xyz}	$\overleftrightarrow{xyz}$	\overleftrightarrow{xyz}	$\frac{xyz}{abc}$	\xleftarrow[abc]{xyz}	xyz $abc$	\xrightarrow[abc]{:
$\sum_{y=0}^{x} \sum_{k=0}^{j} $	$\left( x^{x}_{y^{x}}_{k^{j}}\right) $	$\sum_{K}$	\overset{K}{\sum}	$\sum_{l=-1}$	\sunderset{k=1}{\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  $\not$ = turns = to  $\neq$ .

<	<	>	>	=	=	€	\in	€	\ni or \owns
$\leq$	$\leq or \leq o$	≥	\geq or \ge	=	\equiv	-	\vdash	-	\dashv
«	\11	>>	\gg	÷	\doteq		\mid		\parallel
$\prec$	\prec	>	\succ	~	\sim	$\overline{}$	\smile		\frown
$\preceq$	\preceq	≥	\succeq	$\simeq$	\simeq				
$\subset$	\subset	$\supset$	\supset	$\approx$	\approx	=	\models	1	\perp
$\subseteq$	\subseteq	⊇	\supseteq	$\cong$	\cong	$\asymp$	$\agnumber \agnumber \agn$	$\propto$	\propto
	\sqsubset		\sqsupset	M	Join	<b>≠</b>	\neq	A	\forall
	\sqsubseteq		\sqsupseteq	$\bowtie$	\bowtie	∉	\notin	,	\prime

## **Binary Operators**

+	+	_	-	V	\lor or \vee	_ ^	\land or \	\wedge	⊲	\lhd	$\triangleright$	\rhd	†	\dagger
$\pm$	\pm	Ŧ	\mp	$\oplus$	\oplus	$\Theta$	\ominus		⊴	$\unline$	⊵	\unrhd	‡	\ddagger
×	\times		\cdot	0	\odot	0	\oslash		•	\bullet	0	\circ	¶	<b>\</b> P
÷	\div	\	\setminus	$\otimes$	\otimes	0	\bigcirc		*	\ast	*	\star		
$\cup$	\cup	$\cap$	\cap	Δ	\bigtriangleup	$\nabla$	\bigtriangledown		<b>♦</b>	$\diamond$	₹	\wr	c	
$\sqcup$	\sqcup	П	\sqcap	⊲	$\triangleleft$	▷	\triangleright		П	$\aggreen$	₩	\uplus		
∑ \sum ∏ \prod ∐ \copr			od	∫ \int   ∩ ∮ \oint   ∪ ∫∫ \iint   ⊕	\b:	igcup	⊗ \big	goplus gotime godot	s \	igvee bigwed bigsqd	~			

## **Delimiters**

Note that you can produce according relatively sized symbols by preceding the commands with  $\left(\frac{abc}{xyz}\right)$  For example,  $\left(\frac{abc}{xyz}\right)$  turns  $\left(\frac{abc}{xyz}\right)$  to  $\left(\frac{abc}{xyz}\right)$ . Sometimes commands can be preceded with '1' or 'r' e.g.,  $\left(\frac{abc}{xyz}\right)$ . Thus, giving the  $\left(\frac{abc}{xyz}\right)$  to  $\left(\frac{abc}{xyz}\right)$ .

(	(	[	\lbrack or [	(	\langle	[	\lfloor	Г	\ulcorner	↑	\uparrow
)	)	]	\rbrack or ]	>	\rangle	[	\lceil	٦	\urcorner	↓	\downarrow
	\vert or	{	\lbrace or $\{$	Γ	\lceil	/	/	L	\llcorner	1	\Uparrow
	\Vert or \	}	\rbrace or \}	1	\lfloor	\	\backslash	_	\rcorner	↓	\Downarrow

#### Arrows

	$\leftarrow$	\leftarrow or \gets			\rightar	\rightarrow or \to			\Leftarrow			$\Rightarrow$	\Rightarrow		·ow
	←	\longlefta	arrow	$\longrightarrow$	\longrig	htarro	W	⇐=	\Longleftarrow			$\implies$	\Longrightarrow		
	$\leftrightarrow$	\leftrightarrow			\longla@	\longlaeftrightarrow			\Leftrightarrow			$\iff$	\Longleftrightarrow		
	↑ \uparrow			↓	\downarr	\downarrow			\Uparrow			↓	\Downarrow		
	<b>‡</b>	\updownar	$\mapsto$	\mapsto		1 Updown			wnarrow		$\longmapsto$	\lon	gmaps	to	
	← \hookleftarrow				\hookrig	htarro	W	. ←⇒							
	/\nearrow		>	\searrow	\searrow			\swarrow			K	\nwarrow			
												•			
<b>←</b>	\dashlef	tarrow	→	\dashrig	htarrow		\leftleftarrows		S	$\Rightarrow$	\rightroghtarrows		ows	$\leftrightarrows$	\leftrightarrows
⊭	\Lleftar:	row	⇒	\Rrighta	rrow	cow       \upup		arrows	↓↓ \downdo			ownarrows		$\rightleftharpoons$	\rightleftarrows
1	\upharpo	onleft	1	\upharpo	onright	1	downharpoonleft			l l	\downharpoonright			$\leftrightharpoons$	\leftrightharpoons
<del>«</del>	\twohead	leftarrow		\twohead	rightarrow	←	\lefta	arrowtail		$\rightarrow$	\righta	rrowtail	.	$\rightleftharpoons$	\rightleftharpoons
ń	\Lsh		\Rsh		↔	\loopa	arrowleft		↔	\loopar	rowright	;			
$\sim$	\curvearrowleft \rightarrow\c		\curvear	curvearrowright		\circlearrowleft		ft	Ö	\circle	\circlearrowright				
$\sim$	\leadsto		\rightsq	ghtsquigarrow		\leftrightsquigarrow		garrow		\multimap					