Appendix B
Summary of TEX and LATEX Symbols

This appendix is based on `symbols.tex` version 3.2 by David Carlisle, available from the CTAN Archives.

Table B.1. Accents.

ò	\`{o}	õ	\~{o}	ŏ	\v{o}	ǫ	\c{o}	ó	\'{o}
ō	\={o}	ő	\H{o}	ọ	\d{o}	ô	\^{o}	ȯ	\.{o}
o͡o	\t{oo}	o̲	\b{o}	ö	\"{o}	ǒ	\u{o}	ů	\r{o}

Table B.2. Dotless letters for use with accents.

ı	\i	ȷ	\j

Table B.3. Math mode accents.

$\ddot{a}$	\ddot{a}	$\acute{a}$	\acute{a}	$\bar{a}$	\bar{a}	$\dot{a}$	\dot{a}
$\breve{a}$	\breve{a}	$\check{a}$	\check{a}	$\grave{a}$	\grave{a}	$\vec{a}$	\vec{a}
$\hat{a}$	\hat{a}	$\widehat{a}$	\widehat{a}	$\tilde{a}$	\tilde{a}	$\widetilde{a}$	\widetilde{a}

Table B.4. Foreign symbols.

œ	\oe	Œ	\OE	æ	\AE	Æ	\AE	å	\aa
Å	\AA	ø	\o	Ø	\O	ł	\l	Ł	\E
ß	\ss	SS	\SS	¿	?‘	¡	!‘		

Table B.5. Greek letters.

α	\alpha	θ	\theta	o	o	τ	\tau
β	\beta	ϑ	\vartheta	π	\pi	υ	\upsilon
γ	\gamma	γ	\gamma	ϖ	\varpi	ϕ	\phi
δ	\delta	κ	\kappa	ρ	\rho	φ	\varphi
ϵ	\epsilon	λ	\lambda	ϱ	\varrho	χ	\chi
ε	\varepsilon	μ	\mu	σ	\sigma	ψ	\psi
ζ	\zeta	ν	\nu	ς	\varsigma	ω	\omega
η	\eta	ξ	\xi				
Γ	\Gamma	Λ	\Lambda	Σ	\Sigma	Ψ	\Psi
Δ	\Delta	Ξ	\Xi	Υ	\Upsilon	Ω	\Omega
Θ	\Theta	Π	\Pi	Φ	\Phi		

Table B.6. Binary operation symbols.

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

* Not predefined in LaTeX 2_ε. Use one of the packages `latexsym`, `amsfonts` or `amssymb`.

Table B.7. Punctuation symbols.

,	,	;	;	:	\colon	.	\ldotp	·	\cdotp

Table B.8. Relation symbols.

$\leq$	\leq (or \le)	$\geq$	\geq (or \ge)	$\equiv$	\equiv
$\prec$	\prec	$\succ$	\succ	$\sim$	\sim
$\preceq$	\preceq	$\succeq$	\succeq	$\simeq$	\simeq
$\ll$	\ll	$\gg$	\gg	$\asymp$	\asymp
$\subset$	\subset	$\supset$	\supset	$\approx$	\approx
$\subseteq$	\subseteq	$\supseteq$	\supseteq	$\cong$	\cong
$\sqsubset$	\sqsubset*	$\sqsupset$	\sqsupset*	$\neq$	\neq (or \ne)
$\sqsubseteq$	\sqsubseteq	$\sqsupseteq$	\sqsupseteq	$\doteq$	\doteq
$\in$	\in	$\ni$	\ni (or \owns)	$\notin$	\notin
$\vdash$	\vdash	$\dashv$	\dashv	$<$	<
$\models$	\models	$\perp$	\perp	$\mid$	\mid
$\parallel$	\parallel	$\bowtie$	\bowtie	$\bowtie$	\Join*
$\smile$	\smile	$\frown$	\frown	$\propto$	\propto
$=$	=	$>$	>	$:$	:

* Not predefined in LaTeX 2_ε. Use one of the packages `latexsym`, `amsfonts` or `amssymb`.

These symbols can be negated by preceding them with `\not`. Example: `\not\equiv` produces $\not\equiv$.

Table B.9. Arrow symbols.

$\leftarrow$	\leftarrow (or \gets)	$\longleftarrow$	\longleftarrow
$\Leftarrow$	\Leftarrow	$\Longleftarrow$	\Longleftarrow
$\rightarrow$	\rightarrow (or \to)	$\longrightarrow$	\longrightarrow
$\Rightarrow$	\Rightarrow	$\Longrightarrow$	\Longrightarrow
$\leftrightarrow$	\leftrightarrow	$\longleftrightarrow$	\longleftrightarrow
$\Leftrightarrow$	\Leftrightarrow	$\Longleftrightarrow$	\Longleftrightarrow†
$\mapsto$	\mapsto	$\longmapsto$	\longmapsto
$\hookleftarrow$	\hookleftarrow	$\hookrightarrow$	\hookrightarrow
$\leftharpoonup$	\leftharpoonup	$\rightharpoonup$	\rightharpoonup
$\leftharpoondown$	\leftharpoondown	$\rightharpoondown$	\rightharpoondown
$\rightleftharpoons$	\rightleftharpoons	$\leadsto$	\leadsto*
$\uparrow$	\uparrow	$\downarrow$	\downarrow
$\Uparrow$	\Uparrow	$\Downarrow$	\Downarrow
$\updownarrow$	\updownarrow	$\Updownarrow$	\Updownarrow
$\nwarrow$	\nwarrow	$\nearrow$	\nearrow
$\swarrow$	\swarrow	$\searrow$	\searrow

* Not predefined in LaTeX 2_ε. Use one of the packages `latexsym`, `amsfonts` or `amssymb`.

† Also `\iff`, which puts an extra thick space on either side.

Table B.10. Miscellaneous symbols.

†	\dag	§	\S	©	\copyright
‡	\ddag	¶	\P	£	\pounds*
LaTeX	\LaTeX*	LaTeX 2ε	\LaTeXe*		
…	\ldots#	⋯	\cdots	⋮	\vdots
⋱	\ddots				
ℵ	\aleph	′	\prime	∀	\forall
ℏ	\hbar	∅	\emptyset	∃	\exists
ı	\imath	∇	\nabla	¬	\neg (or \lnot)
ȷ	\jmath	√	\surd	♭	\flat
ℓ	\ell	⊤	\top	♮	\natural
℘	\wp	⊥	\bot	♯	\sharp
ℜ	\Re	\	\backslash	∠	\angle
ℑ	\Im	∂	\partial	℧	\mho*
.	.	∞	\infty	□	\Box*
◇	\Diamond*	△	\triangle	♣	\clubsuit
♢	\diamondsuit	♡	\heartsuit	♠	\spadesuit

* Predefined in LaTeX 2ε but not in TEX.
# Or \dots.

Table B.11. Variable-sized symbols.

∑	\sum	⋂	\bigcap	⊙	\bigodot
∏	\prod	⋃	\bigcup	⊗	\bigotimes
∐	\coprod	⨆	\bigsqcup	⊕	\bigoplus
∫	\int	⋁	\bigvee	⨄	\biguplus
∮	\oint	⋀	\bigwedge		

Table B.12. Log-like symbols.

\arccos	\cos	\csc	\exp	\ker	\limsup	\min	\sinh
\arcsin	\cosh	\deg	\gcd	\lg	\ln	\Pr	\sup
\arctan	\cot	\det	\hom	\lim	\log	\sec	\tan
\arg	\coth	\dim	\inf	\liminf	\max	\sin	\tanh

Table B.13. Delimiters.

(	(	)	)
[	[(or \lbrack)	]	] (or \rbrack)
{	\{	}	\}
↑	\uparrow	↓	\downarrow
⇑	\Uparrow	⇓	\Downarrow
↕	\updownarrow	⇕	\Updownarrow
⌊	\lfloor	⌋	\rfloor
⌈	\lceil	⌉	\rceil
⟨	\langle	⟩	\rangle
/	/	\	\backslash
|	| (or \vert)	‖	\\| (or \Vert)

Table B.14. Large delimiters.

⎫	\rmoustache	⎧	\lmoustache	⎭	\rgroup
⎩	\lgroup	⏐	\arrowvert	‖	\Arrowvert
⎪	\bracevert				

Table B.15. Some other constructions.

$\widetilde{abc}$	\widetilde{abc}	$\widehat{abc}$	\widehat{abc}
$\overleftarrow{abc}$	\overleftarrow{abc}	$\overrightarrow{abc}$	\overrightarrow{abc}
$\overline{abc}$	\overline{abc}	$\underline{abc}$	\underline{abc}
$\overbrace{abc}$	\overbrace{abc}	$\underbrace{abc}$	\underbrace{abc}
$\sqrt{abc}$	\sqrt{abc}	$\sqrt[n]{abc}$	\sqrt[n]{abc}*
f'	f'	$\frac{abc}{xyz}$	\frac{abc}{xyz}*

* Predefined in LaTeX 2_ε but not in TeX.

Table B.16. Spacing.

[]	\!	negative thin space* (normally −1/6 quad)
][	\,	thin space (normally 1/6 of a quad)
] [	\:†	medium space* (normally 2/9 of a quad)
] [	\;	thick space* (normally 5/18 of a quad)
] [	\quad	quad
] [	\qquad	qquad (two quads)

* Can appear only in math mode.

† The medium space is \: in LaTeX but \> in TeX.

Table B.17. AMS Delimiters.

⌜	\ulcorner	⌝	\urcorner	⌞	\llcorner	⌟	\lrcorner

Table B.18. AMS Arrows.

⇢	\dashrightarrow	⇠	\dashleftarrow
⇇	\leftleftarrows	⇆	\leftrightarrows
⇚	\Lleftarrow	↞	\twoheadleftarrow
↢	\leftarrowtail	↫	\looparrowleft
⇋	\leftrightharpoons	↶	\curvearrowleft
↺	\circlearrowleft	↰	\Lsh
⇈	\upuparrows	↿	\upharpoonleft
⇃	\downharpoonleft	⊸	\multimap
↭	\leftrightsquigarrow	⇉	\rightrightarrows
⇄	\rightleftarrows	⇉	\rightrightarrows
⇄	\rightleftarrows	↠	\twoheadrightarrow
↣	\rightarrowtail	↬	\looparrowright
⇌	\rightleftharpoons	↷	\curvearrowright
↻	\circlearrowright	↱	\Rsh
⇊	\downdownarrows	↾	\upharpoonright
⇂	\downharpoonright	⇝	\rightsquigarrow

Table B.19. AMS Negated Arrows.

↚	\nleftarrow	↛	\nrightarrow
⇍	\nLeftarrow	⇏	\nRightarrow
↮	\nleftrightarrow	⇎	\nLeftrightarrow

Table B.20. AMS Greek.

F	\digamma	$\varkappa$	\varkappa

Table B.21. AMS Hebrew.

ℶ	\beth	ℸ	\daleth	ℷ	\gimel

Table B.22. AMS Miscellaneous.

ℏ	\hbar	ℏ	\hslash	△	\vartriangle
▽	\triangledown	□	\square	◊	\lozenge
Ⓢ	\circledS	∠	\angle	∡	\measuredangle
∄	\nexists	℧	\mho	ⅎ	\Finv
⅁	\Game	𝕜	\Bbbk	‵	\backprime
∅	\varnothing	▲	\blacktriangle	▼	\blacktriangledown
■	\blacksquare	⧫	\blacklozenge	★	\bigstar
∢	\sphericalangle	∁	\complement	ð	\eth
⁄	\diagup	╲	\diagdown		

Table B.23. AMS Binary Operators.

∔	\dotplus	∖	\smallsetminus	⋒	\Cap
⋓	\Cup	⊼	\barwedge	⩒	\veebar
⩖	\doublebarwedge	⊟	\boxminus	⊠	\boxtimes
⊡	\boxdot	⊞	\boxplus	⋇	\divideontimes
⋉	\ltimes	⋊	\rtimes	⋋	\leftthreetimes
⋌	\rightthreetimes	⋏	\curlywedge	⋎	\curlyvee
⊝	\circleddash	⊛	\circledast	◎	\circledcirc
⋅	\centerdot	⊺	\intercal		

Table B.24. AMS Binary Relations.

$\leqq$	\leqq	$\leqslant$	\leqslant
$\eqslantless$	\eqslantless	$\lesssim$	\lesssim
$\lessapprox$	\lessapprox	$\approxeq$	\approxeq
$\lessdot$	\lessdot	$\lll$	\lll
$\lessgtr$	\lessgtr	$\lesseqgtr$	\lesseqgtr
$\lesseqqgtr$	\lesseqqgtr	$\doteqdot$	\doteqdot
$\risingdotseq$	\risingdotseq	$\fallingdotseq$	\fallingdotseq
$\backsim$	\backsim	$\backsimeq$	\backsimeq
$\subseteqq$	\subseteqq	$\Subset$	\Subset
$\sqsubset$	\sqsubset	$\preccurlyeq$	\preccurlyeq
$\curlyeqprec$	\curlyeqprec	$\precsim$	\precsim
$\precapprox$	\precapprox	$\vartriangleleft$	\vartriangleleft
$\trianglelefteq$	\trianglelefteq	$\vDash$	\vDash
$\Vvdash$	\Vvdash	$\smallsmile$	\smallsmile
$\smallfrown$	\smallfrown	$\bumpeq$	\bumpeq
$\Bumpeq$	\Bumpeq	$\geqq$	\geqq
$\geqslant$	\geqslant	$\eqslantgtr$	\eqslantgtr
$\gtrsim$	\gtrsim	$\gtrapprox$	\gtrapprox
$\gtrdot$	\gtrdot	$\ggg$	\ggg
$\gtrless$	\gtrless	$\gtreqless$	\gtreqless
$\gtreqqless$	\gtreqqless	$\eqcirc$	\eqcirc
$\circeq$	\circeq	$\triangleq$	\triangleq
$\thicksim$	\thicksim	$\thickapprox$	\thickapprox
$\supseteqq$	\supseteqq	$\Supset$	\Supset
$\sqsupset$	\sqsupset	$\succcurlyeq$	\succcurlyeq
$\curlyeqsucc$	\curlyeqsucc	$\succsim$	\succsim
$\succapprox$	\succapprox	$\vartriangleright$	\vartriangleright
$\trianglerighteq$	\trianglerighteq	$\Vdash$	\Vdash
$\shortmid$	\shortmid	$\shortparallel$	\shortparallel
$\between$	\between	$\pitchfork$	\pitchfork
$\varpropto$	\varpropto	$\backepsilon$	\backepsilon
$\therefore$	\therefore	$\because$	\because
$\blacktriangleright$	\blacktriangleright	$\blacktriangleleft$	\blacktriangleleft

Table B.25. AMS Negated Binary Relations.

$\nless$	`\nless`	$\nleq$	`\nleq`	$\nleqslant$	`\nleqslant`
$\nleqq$	`\nleqq`	$\lneq$	`\lneq`	$\lneqq$	`\lneqq`
$\lvertneqq$	`\lvertneqq`	$\lnsim$	`\lnsim`	$\lnapprox$	`\lnapprox`
$\nprec$	`\nprec`	$\npreceq$	`\npreceq`	$\precnsim$	`\precnsim`
$\precnapprox$	`\precnapprox`	$\nsim$	`\nsim`	$\nshortmid$	`\nshortmid`
$\nmid$	`\nmid`	$\nvdash$	`\nvdash`	$\nvDash$	`\nvDash`
$\ntriangleleft$	`\ntriangleleft`	$\ntrianglelefteq$	`\ntrianglelefteq`	$\nsubseteq$	`\nsubseteq`
$\subsetneq$	`\subsetneq`	$\varsubsetneq$	`\varsubsetneq`	$\subsetneqq$	`\subsetneqq`
$\varsubsetneqq$	`\varsubsetneqq`	$\ngtr$	`\ngtr`	$\ngeq$	`\ngeq`
$\ngeqslant$	`\ngeqslant`	$\ngeqq$	`\ngeqq`	$\gneq$	`\gneq`
$\gneqq$	`\gneqq`	$\gvertneqq$	`\gvertneqq`	$\gnsim$	`\gnsim`
$\gnapprox$	`\gnapprox`	$\nsucc$	`\nsucc`	$\nsucceq$	`\nsucceq`
$\nsucceq$	`\nsucceq`	$\succnsim$	`\succnsim`	$\succnapprox$	`\succnapprox`
$\ncong$	`\ncong`	$\nshortparallel$	`\nshortparallel`	$\nparallel$	`\nparallel`
$\nvDash$	`\nvDash`	$\nVDash$	`\nVDash`	$\ntriangleright$	`\ntriangleright`
$\ntrianglerighteq$	`\ntrianglerighteq`	$\nsupseteq$	`\nsupseteq`	$\nsupseteqq$	`\nsupseteqq`
$\supsetneq$	`\supsetneq`	$\varsupsetneq$	`\varsupsetneq`	$\supsetneqq$	`\supsetneqq`
$\varsupsetneqq$	`\varsupsetneqq`				

Table B.26. Math Alphabets.

		Required package
ABCdef	`\mathrm{ABCdef}`	
ABCdef	`\mathit{ABCdef}`	
ABCdef	`\mathnormal{ABCdef}`	
$\mathcal{ABC}$	`\mathcal{ABC}`	
$\mathcal{ABC}$	`\mathcal{ABC}`	`euscript` with option `mathcal`
$\mathfrak{ABCdef}$	`\mathfrak{ABCdef}`	`eufrak`
$\mathbb{ABC}$	`\mathbb{ABC}`	`amsfonts` or `amssymb`