

Appendix B

Summary of **T_EX** and **L^AT_EX** Symbols

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

Table B.1. Accents.

\grave{o}	<code>\`{o}</code>	\acute{o}	<code>\^{o}</code>	\ddot{o}	<code>\~{o}</code>	\dot{o}	<code>\c{o}</code>	\breve{o}	<code>\={o}</code>
\bar{o}	<code>\={o}</code>	\check{o}	<code>\H{o}</code>	\dot{o}	<code>\d{o}</code>	\hat{o}	<code>\^{\prime}{o}</code>	$\grave{\dot{o}}$	<code>\.{o}</code>
\ddot{o}	<code>\t{oo}</code>	\underline{o}	<code>\b{o}</code>	\ddot{o}	<code>\^{\prime\prime}{o}</code>	\breve{o}	<code>\u{o}</code>	$\grave{\ddot{o}}$	<code>\r{o}</code>

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

\imath \jmath \Jmath

Table B.3. Math mode accents.

\ddot{a}	<code>\ddot{a}</code>	\acute{a}	<code>\acute{a}</code>	\bar{a}	<code>\bar{a}</code>	\dot{a}	<code>\dot{a}</code>
\breve{a}	<code>\breve{a}</code>	\check{a}	<code>\check{a}</code>	\grave{a}	<code>\grave{a}</code>	\vec{a}	<code>\vec{a}</code>
\hat{a}	<code>\hat{a}</code>	\widehat{a}	<code>\widehat{a}</code>	\tilde{a}	<code>\tilde{a}</code>	\widetilde{a}	<code>\widetilde{a}</code>

Table B.4. Foreign symbols.

\oe	<code>\oe</code>	\OE	<code>\OE</code>	\ae	<code>\ae</code>	\AA	<code>\AA</code>	\aa	<code>\aa</code>
\AA	<code>\AA</code>	\emptyset	<code>\emptyset</code>	\varnothing	<code>\varnothing</code>	\varnothing	<code>\varnothing</code>	\varnothing	<code>\varnothing</code>
\ss	<code>\ss</code>	\SS	<code>\SS</code>	?^{\prime}	<code>\text{?}^{\prime}</code>	!^{\prime}	<code>\text{!}^{\prime}</code>	!^{\prime}	<code>\text{!}^{\prime}</code>

Table B.5. Greek letters.

α	\alpha	θ	\theta	\circ	\circ	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	\triangleup	\triangleup
\times	\times	\oplus	\oplus	\triangledown	\triangledown
\div	\div	\sqcap	\sqcap	\triangleleft	\triangleleft
$*$	\ast	\sqcup	\sqcup	\triangleright	\triangleright
\star	\star	\vee	\vee (or \lor)	\triangle	\triangle
\circ	\circ	\wedge	\wedge (or \land)	\lhd^*	\lhd*
\bullet	\bullet	\setminus	\setminus	\rhd^*	\rhd*
\cdot	\cdot	\wr	\wr	\unlhd^*	\unlhd*
\oplus	\oplus	\ominus	\ominus	\unrhd^*	\unrhd*
\oslash	\oslash	\odot	\odot	\otimes	\otimes
\dagger	\dagger	\ddagger	\ddagger	\bigcirc	\bigcirc
$+$	+	$-$	-	\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 (or \leq)	\geq (or \geq)	\equiv	\equiv
\sqsubseteq	\prec	\succ	\sim	\sim
\sqsubset	\preceq	\succeq	\simeq	\simeq
\sqsupseteq	\sqsupset	\sqsubset	\asymp	\asymp
\sqsupset	\sqsubseteq	\sqsupseteq	\approx	\approx
\sqsupseteq^*	\sqsupseteq^*	\sqsupseteq^*	\cong	\cong
\sqsupseteq^*	\sqsupseteq^*	\sqsupseteq^*	\neq (or \neq)	\neq (or \neq)
\in	\sqsubset	\sqsupset	\doteq	\doteq
\vdash	\sqsupset	\sqsubset	$\not\in$	$\not\in$
\models	\sqsupset	\sqsubset	\mid	\mid
\parallel	\bowtie	\bowtie	\Join^*	\Join^*
\smile	\frown	\frown	\propto	\propto
$=$	$>$	$<$	$:$	$:$

* Not predefined in $\text{\LaTeX} 2_{\epsilon}$. 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	\longleftarrow
\Leftarrow	\Leftarrow	\Longleftarrow
\rightarrow	\rightarrow	\longrightarrow
\Rightarrow	\Rightarrow	\Longrightarrow
\leftrightarrow	\leftrightarrow	\longleftrightarrow
\Leftrightarrow	\Leftrightarrow	\Longleftrightarrow
\mapsto	\mapsto	\longmapsto
\hookleftarrow	\hookleftarrow	\hookrightarrow
\leftharpoonup	\leftharpoonup	\rightharpoonup
\leftharpoondown	\leftharpoondown	\rightharpoondown
\rightleftharpoons	\rightleftharpoons	\leadsto^*
\uparrow	\downarrow	\downarrow
$\uparrow\downarrow$	$\uparrow\downarrow$	\Downarrow
\nearrow	\searrow	\nearrow
\swarrow	\nwarrow	\searrow

* Not predefined in $\text{\LaTeX} 2_{\epsilon}$. 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.

\dagger	$\backslash dag$	\S	$\backslash S$	\circledcirc	$\backslash copyright$
\ddagger	$\backslash ddag$	\P	$\backslash P$	\mathcal{L}	$\backslash pounds^*$
LATEX	$\backslash LaTeX^*$	LATEX 2 ϵ	$\backslash LaTeXe^*$		
...	$\backslash ldots^*$...	$\backslash cdots$:	$\backslash vdots$
.	$\backslash ddots$				
\aleph	$\backslash aleph$	'	$\backslash prime$	\forall	$\backslash forall$
\hbar	$\backslash hbar$	\emptyset	$\backslash emptyset$	\exists	$\backslash exists$
\imath	$\backslash imath$	∇	$\backslash nabla$	\neg	$\backslash neg$ (or $\backslash lnot$)
\jmath	$\backslash jmath$	\surd	$\backslash surd$	\flat	$\backslash flat$
ℓ	$\backslash ell$	\top	$\backslash top$	\natural	$\backslash natural$
\wp	$\backslash wp$	\bot	$\backslash bot$	\sharp	$\backslash sharp$
\Re	$\backslash Re$	\backslash	$\backslash backslash$	\angle	$\backslash angle$
\Im	$\backslash Im$	∂	$\backslash partial$	\mho	$\backslash mho^*$
.	.	∞	$\backslash infty$	\Box	$\backslash Box^*$
\diamond	$\backslash Diamond^*$	\triangle	$\backslash triangle$	\clubsuit	$\backslash clubsuit$
\lozenge	$\backslash diamondsuit$	\heartsuit	$\backslash heartsuit$	\spadesuit	$\backslash spadesuit$

* Predefined in LATEX 2 ϵ but not in TEX.# Or $\backslash dots$.

Table B.11. Variable-sized symbols.

\sum	$\backslash sum$	\cap	$\backslash bigcap$	\odot	$\backslash bigodot$
\prod	$\backslash prod$	\cup	$\backslash bigcup$	\otimes	$\backslash bigotimes$
\coprod	$\backslash coprod$	\sqcup	$\backslash bigsqcup$	\oplus	$\backslash bigoplus$
\int	$\backslash int$	\vee	$\backslash bigvee$	\uplus	$\backslash biguplus$
\oint	$\backslash oint$	\wedge	$\backslash bigwedge$		

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 $\backslash lbrack$)]	(or $\backslash rbrack$)
{	$\backslash \{$	}	$\backslash \}$
\uparrow	\uparrow uparrow	\downarrow	\downarrow downarrow
\Uparrow	\Uparrow	\Downarrow	\Downarrow
\updownarrow	\updownarrow updownarrow	\Updownarrow	\Updownarrow
\lfloor	\lfloor lfloor	\rfloor	\rfloor rfloor
\lceil	\lceil lceil	\rceil	\rceil rceil
\langle	\langle langle	\rangle	\rangle rangle
$/$	$/$	\backslash	\backslash backslash
$ $	(or $\backslash vert$)	\parallel	\parallel l (or $\backslash Vert$)

Table B.14. Large delimiters.

\rmoustache	\lceil	\lmoustache	\rceil	\rgroup
\lgroup	$ $	\arrowvert	\rvert	\Arrowvert
\bracevert				

Table B.15. Some other constructions.

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

* Predefined in $\text{\LaTeX}\ 2\varepsilon$ 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
][\quad\quad	qquad (two quads)

* Can appear only in math mode.

† The medium space is \!: in L^AT_EX but \> in T_EX.

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	~~~	\rightrightsquigarrow
↑↑	\rightleftarrows	↑↑	\rightrightarrows
↑↑	\rightleftarrows	↑↓	\twoheadrightarrow
Y	\rightarrowtail	↑↓	\looparrowright
	\rightleftharpoons	↑↓	\curvearrowright
○	\circlearrowright	↑↓	\Rsh
↓↓	\downdownarrows	↑↓	\upharpoonright
↓	\downharpoonright	~~~	\rightsquigarrow

Table B.19. AMS Negated Arrows.

$\leftarrow$	<code>\nleftarrow</code>	$\rightarrow$	<code>\nrightarrow</code>
$\Leftarrow$	<code>\nLeftarrow</code>	$\Rightarrow$	<code>\nRightarrow</code>
$\Leftrightarrow$	<code>\nLeftrightarrow</code>	$\Leftrightarrow$	<code>\nLeftrightarrow</code>

Table B.20. AMS Greek.

$\digamma$   $\varkappa$  `\digamma` `\varkappa`

Table B.21. AMS Hebrew.

$\beth$   $\daleth$   $\gimel$  `\beth` `\daleth` `\gimel`

Table B.22. AMS Miscellaneous.

$\hbar$	<code>\hbar</code>	$\hslash$	<code>\hslash</code>	$\triangle$	<code>\vartriangle</code>
$\triangledown$	<code>\triangledown</code>	$\square$	<code>\square</code>	$\lozenge$	<code>\lozenge</code>
$\circledS$	<code>\circledS</code>	$\angle$	<code>\angle</code>	$\measuredangle$	<code>\measuredangle</code>
$\nexists$	<code>\nexists</code>	$\mho$	<code>\mho</code>	$\Finv$	<code>\Finv</code>
$\Game$	<code>\Game</code>	$\Bbbk$	<code>\Bbbk</code>	$\backprime$	<code>\backprime</code>
$\varnothing$	<code>\varnothing</code>	$\blacktriangle$	<code>\blacktriangle</code>	$\blacktriangledown$	<code>\blacktriangledown</code>
$\blacksquare$	<code>\blacksquare</code>	$\blacklozenge$	<code>\blacklozenge</code>	$\bigstar$	<code>\bigstar</code>
$\sphericalangle$	<code>\sphericalangle</code>	$\complement$	<code>\complement</code>	$\eth$	<code>\eth</code>
$\diagup$	<code>\diagup</code>	$\diagdown$	<code>\diagdown</code>		

Table B.23. AMS Binary Operators.

$+$	<code>\dotplus</code>	$\setminus$	<code>\smallsetminus</code>	$\Cap$	<code>\Cap</code>
$\Cup$	<code>\Cup</code>	$\barwedge$	<code>\barwedge</code>	$\veebar$	<code>\veebar</code>
$\doublebarwedge$	<code>\doublebarwedge</code>	$\boxminus$	<code>\boxminus</code>	$\boxtimes$	<code>\boxtimes</code>
$\boxdot$	<code>\boxdot</code>	$\boxplus$	<code>\boxplus</code>	$\divideontimes$	<code>\divideontimes</code>
$\ltimes$	<code>\ltimes</code>	$\rtimes$	<code>\rtimes</code>	$\leftthreetimes$	<code>\leftthreetimes</code>
$\rightthreetimes$	<code>\rightthreetimes</code>	$\curlywedge$	<code>\curlywedge</code>	$\curlyvee$	<code>\curlyvee</code>
$\circledash$	<code>\circledash</code>	$\circledast$	<code>\circledast</code>	$\circledcirc$	<code>\circledcirc</code>
$\centerdot$	<code>\centerdot</code>	$\intercal$	<code>\intercal</code>		

Table B.24. AMS Binary Relations.

$\leqslant$	<code>\leqslant</code>	$\leqslant_{\text{slant}}$	<code>\leqslant_{\text{slant}}</code>
$\lessdot$	<code>\lessdot</code>	$\lessdot_{\text{approx}}$	<code>\lessdot_{\text{approx}}</code>
$\lessgtr$	<code>\lessgtr</code>	$\lessgtr_{\text{approx}}$	<code>\lessgtr_{\text{approx}}</code>
$\lesseqgtr$	<code>\lesseqgtr</code>	$\lesseqgtr_{\text{approx}}$	<code>\lesseqgtr_{\text{approx}}</code>
$\risingdotseq$	<code>\risingdotseq</code>	$\risingdotseq_{\text{approx}}$	<code>\risingdotseq_{\text{approx}}</code>
$\backsim$	<code>\backsim</code>	$\backsim_{\text{approx}}$	<code>\backsim_{\text{approx}}</code>
$\subsetneqq$	<code>\subsetneqq</code>	$\subsetneqq_{\text{approx}}$	<code>\subsetneqq_{\text{approx}}</code>
$\sqsubset$	<code>\sqsubset</code>	$\sqsubset_{\text{approx}}$	<code>\sqsubset_{\text{approx}}</code>
$\curlyeqsucc$	<code>\curlyeqsucc</code>	$\curlyeqsucc_{\text{approx}}$	<code>\curlyeqsucc_{\text{approx}}</code>
$\precapprox$	<code>\precapprox</code>	$\precapprox_{\text{approx}}$	<code>\precapprox_{\text{approx}}</code>
$\trianglelefteq$	<code>\trianglelefteq</code>	$\trianglelefteq_{\text{approx}}$	<code>\trianglelefteq_{\text{approx}}</code>
$\vvdash$	<code>\vvdash</code>	$\vvdash_{\text{approx}}$	<code>\vvdash_{\text{approx}}</code>
$\smallfrown$	<code>\smallfrown</code>	$\smallfrown_{\text{approx}}$	<code>\smallfrown_{\text{approx}}</code>
$\Bumpeq$	<code>\Bumpeq</code>	$\Bumpeq_{\text{approx}}$	<code>\Bumpeq_{\text{approx}}</code>
$\geqslant$	<code>\geqslant</code>	$\geqslant_{\text{approx}}$	<code>\geqslant_{\text{approx}}</code>
$\gtrsim$	<code>\gtrsim</code>	$\gtrsim_{\text{approx}}$	<code>\gtrsim_{\text{approx}}</code>
$\gtrdot$	<code>\gtrdot</code>	$\gtrdot_{\text{approx}}$	<code>\gtrdot_{\text{approx}}</code>
$\gtrless$	<code>\gtrless</code>	$\gtrless_{\text{approx}}$	<code>\gtrless_{\text{approx}}</code>
$\gtreqless$	<code>\gtreqless</code>	$\gtreqless_{\text{approx}}$	<code>\gtreqless_{\text{approx}}</code>
$\circeq$	<code>\circeq</code>	$\circeq_{\text{approx}}$	<code>\circeq_{\text{approx}}</code>
$\thicksim$	<code>\thicksim</code>	$\thicksim_{\text{approx}}$	<code>\thicksim_{\text{approx}}</code>
$\supseteqq$	<code>\supseteqq</code>	$\supseteqq_{\text{approx}}$	<code>\supseteqq_{\text{approx}}</code>
$\sqsupset$	<code>\sqsupset</code>	$\sqsupset_{\text{approx}}$	<code>\sqsupset_{\text{approx}}</code>
$\curlyeqsucc$	<code>\curlyeqsucc</code>	$\curlyeqsucc_{\text{approx}}$	<code>\curlyeqsucc_{\text{approx}}</code>
$\succapprox$	<code>\succapprox</code>	$\succapprox_{\text{approx}}$	<code>\succapprox_{\text{approx}}</code>
$\trianglerighteq$	<code>\trianglerighteq</code>	$\trianglerighteq_{\text{approx}}$	<code>\trianglerighteq_{\text{approx}}</code>
$\shortmid$	<code>\shortmid</code>	$\shortmid_{\text{approx}}$	<code>\shortmid_{\text{approx}}</code>
$\between$	<code>\between</code>	$\between_{\text{approx}}$	<code>\between_{\text{approx}}</code>
$\varpropto$	<code>\varpropto</code>	$\varpropto_{\text{approx}}$	<code>\varpropto_{\text{approx}}</code>
$\therefore$	<code>\therefore</code>	$\therefore_{\text{approx}}$	<code>\therefore_{\text{approx}}</code>
$\blacktriangleright$	<code>\blacktriangleright</code>	$\blacktriangleright_{\text{approx}}$	<code>\blacktriangleright_{\text{approx}}</code>

Table B.25. AMS Negated Binary Relations.

$\nless$	<code>\nless</code>	$\nleq$	<code>\nleq</code>	$\nleqslant$	<code>\nleqslant</code>
$\nleqq$	<code>\nleqq</code>	$\lneq$	<code>\lneq</code>	$\lneq$	<code>\lneq</code>
$\lvertneqq$	<code>\lvertneqq</code>	$\lnsim$	<code>\lnsim</code>	$\lnapprox$	<code>\lnapprox</code>
$\nprec$	<code>\nprec</code>	$\npreceq$	<code>\npreceq</code>	$\precnsim$	<code>\precnsim</code>
$\precnapprox$	<code>\precnapprox</code>	$\nsim$	<code>\nsim</code>	$\nshortmid$	<code>\nshortmid</code>
$\nmid$	<code>\nmid</code>	$\nvDash$	<code>\nvDash</code>	$\nvDash$	<code>\nvDash</code>
$\ntriangleleft$	<code>\ntriangleleft</code>	$\ntrianglelefteq$	<code>\ntrianglelefteq</code>	$\nsubseteq$	<code>\nsubseteq</code>
$\subsetneq$	<code>\subsetneq</code>	$\varsubsetneq$	<code>\varsubsetneq</code>	$\subsetneqq$	<code>\subsetneqq</code>
$\varsubsetneqq$	<code>\varsubsetneqq</code>	$\ngtr$	<code>\ngtr</code>	$\ngeq$	<code>\ngeq</code>
$\ngeqslant$	<code>\ngeqslant</code>	$\geqq$	<code>\geqq</code>	$\gneq$	<code>\gneq</code>
$\gneqq$	<code>\gneqq</code>	$\gvertneqq$	<code>\gvertneqq</code>	$\gnsim$	<code>\gnsim</code>
$\gnapprox$	<code>\gnapprox</code>	$\nsucc$	<code>\nsucc</code>	$\nsucceq$	<code>\nsucceq</code>
$\nsuccceq$	<code>\nsuccceq</code>	$\succnsim$	<code>\succnsim</code>	$\succnapprox$	<code>\succnapprox</code>
$\ncong$	<code>\ncong</code>	$\nshortparallel$	<code>\nshortparallel</code>	$\parallel$	<code>\parallel</code>
$\nvDash$	<code>\nvDash</code>	$\nVdash$	<code>\nVdash</code>	$\ntriangleright$	<code>\ntriangleright</code>
$\ntrianglerighteq$	<code>\ntrianglerighteq</code>	$\nsupseteq$	<code>\nsupseteq</code>	$\nsupseteqq$	<code>\nsupseteqq</code>
$\supsetneq$	<code>\supsetneq</code>	$\varsupsetneq$	<code>\varsupsetneq</code>	$\supsetneqq$	<code>\supsetneqq</code>
$\varsupsetneqq$	<code>\varsupsetneqq</code>				

Table B.26. Math Alphabets.

		Required package
$ABCdef$	<code>\mathrm{ABCdef}</code>	
$ABCdef$	<code>\mathrm{it}{ABCdef}</code>	
$ABCdef$	<code>\mathrm{normal}{ABCdef}</code>	
$ABC$	<code>\mathrm{cal}{ABC}</code>	
$ABC$	<code>\mathrm{cal}{ABC}</code>	euscript with option <code>mathcal</code>
$\mathfrak{ABCdef}$	<code>\mathfrak{ABCdef}</code>	<code>eufrak</code>
$\mathbb{ABC}$	<code>\mathbb{ABC}</code>	<code>amsfonts</code> or <code>amssymb</code>