3.9 List of Mathematical Symbols

In the following tables, you find all the symbols normally accessible from *math mode*.

To use the symbols listed in Tables 3.12–3.16,⁶ the package amssymb must be loaded in the preamble of the document and the AMS math fonts must be installed, on the system. If the AMS package and fonts are not installed, on your system, have a look at

CTAN:/tex-archive/macros/latex/packages/amslatex

Table 3.1: Math Mode Accents.

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

Table 3.2: Lowercase Greek Letters.

α	\alpha	θ	\theta	o	0	v	\upsilon
β	\beta	ϑ	$\$ vartheta	π	\pi	ϕ	\phi
γ	\gamma	ι	\iota	ϖ	\varpi	φ	\varphi
δ	\delta	κ	\kappa	ho	\rho	χ	\chi
ϵ	\epsilon	λ	\lambda	ϱ	\varrho	ψ	\psi
ε	$\vert varepsilon$	μ	\mu	σ	\sigma	ω	\omega
ζ	\zeta	ν	\nu	ς	\varsigma		
n	\eta	ξ	\xi	au	\tau		

Table 3.3: Uppercase Greek Letters.

Γ	\Gamma	Λ	\Lambda	\sum	\Sigma	Ψ	\Psi
Δ	\Delta	Ξ	\Xi	Υ	\Upsilon	Ω	\Omega
Θ	\Thota	П	\Pi	Φ	\ Phi		

⁶These tables were derived from symbols.tex by David Carlisle and subsequently changed extensively as suggested by Josef Tkadlec.

Table 3.4: Binary Relations.

You can produce corresponding negations by adding a \not command as prefix to the following symbols.

<	<	>	>	=	=
\leq	$\leq or \leq o$	\geq	\geq or \ge	\equiv	\equiv
\ll	\11	\gg	\gg	Ė	\doteq
\prec	\prec	\succ	\succ	\sim	\sim
\preceq	\preceq	\succeq	\succeq	\simeq	\simeq
\subset	\subset	\supset	\supset	\approx	\approx
\subseteq	\subseteq	\supseteq	\supseteq	\cong	\cong
	\sqsubset a		\sqsupset a	\bowtie	$\$ Join a
	\sqsubseteq	\supseteq	\sqsupseteq	\bowtie	\bowtie
\in	\in	\ni	\ni , \owns	\propto	\propto
\vdash	\vdash	\dashv	\dashv	 	\models
	\mid		\parallel	\perp	\perp
\smile	\smile	\frown	\frown	\asymp	\agnormalise
:	:	∉	\notin	\neq	\neq or \ne

 $[^]a\mathrm{Use}$ the latexsym package to access this symbol

Table 3.5: Binary Operators.

+	+	_	-		
\pm	\pm	干	\mp	◁	\triangleleft
•	\cdot	÷	\div	\triangleright	\triangleright
×	\times	\	\setminus	*	\star
\cup	\cup	\cap	\cap	*	\ast
\sqcup	\sqcup	П	\sqcap	0	\circ
\vee	\ve , \lor	\wedge	\wedge , \label{land}	•	\bullet
\oplus	\oplus	\ominus	\ominus	\Diamond	\diamond
\odot	\odot	\oslash	\oslash	\boxplus	\uplus
\otimes	\otimes	\bigcirc	\bigcirc	П	\amalg
\triangle	$\$ bigtriangleup	∇	\bigtriangledown	†	\dagger
\triangleleft	\backslash lhd a	\triangleright	$\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	‡	\ddagger
\leq	\backslash unlhd a	\trianglerighteq	\unrhd a	?	\wr

Table 3.6: BIG Operators.							
\sum \sum \prod \prod \prod \coprod \int \int	U ∩ ↓	\bigcup \bigcap \bigsqcup \oint	\ \ >	\bigwee \bigwedge	$\oplus \otimes \odot \oplus$	\b \b	igoplus igotimes igodot iguplus
		Table 3	3.7: Arr	ows.			
\leftarrow or \ \rightarrow or \ \leftrightarrow \ \Leftarrow \ \Rightarrow \ \Leftrightarrow \ \mapsto \ \hookleftarrow \ \leftharpoonup \ \leftharpoondo \ \rightleftharp	\to w w wn oons	$\begin{array}{c} \longrightarrow \\ \longleftrightarrow \\ \longleftrightarrow \\ \Longrightarrow \\ \longrightarrow$	\longr \longl \Longl \Longl \Longl \longm \hookr \right \right \iff (l	eftarrow ightarrow eftrightarrow ightarrow eftrightarrow apsto ightarrow harpoonup harpoondown bigger spaces) access this symb	υW	$\uparrow \downarrow \uparrow \uparrow \uparrow \downarrow \downarrow \downarrow \nearrow \nearrow \nearrow \nearrow \nearrow $	\uparrow \downarrow \updownarrow \Uparrow \Downarrow \Updownarrow \nearrow \searrow \swarrow \nwarrow \leadsto a
		Table 3.	8: Delin	niters.			
<pre>([or \lbrack \{ or \lbrace \langle \lfloor</pre>	} \ } \	or \rbrac } or \rbra rangle rfloor	*	\uparrow \downarrow \updownarro or \vert \lceil		$\uparrow \downarrow \downarrow$	\Uparrow \Downarrow \Updownarrow \ or \Vert \rceil

Table 3.9: Large Delimiters.

 $\begin{tabular}{ll} \textbf{backslash} \end{array}$

(\lgroup	\rgroup	\lmoustache	\rmoustache
\arrowvert	\Arrowvert	\bracevert	•

. (dual. empty)

Table 3.10: Miscellaneous Symbols.

	\dots		\cdots	÷	\vdots	٠.	\ddots
\hbar	\hbar	\imath	\imath	\jmath	$\$ jmath	ℓ	\ell
\Re	\Re	\Im	\Im	×	\aleph	60	\wp
\forall	\forall	\exists	\exists	Ω	\mho a	∂	\partial
′	,	1	\prime	Ø	\emptyset	∞	∞
∇	\nabla	\triangle	$\$ triangle		ackbox^a	\Diamond	$\$ Diamond a
\perp	\bot	T	\top	_	\angle	$\sqrt{}$	\surd
\Diamond	\diamondsuit	\Diamond	\heartsuit	*	\clubsuit	\spadesuit	\spadesuit
\neg	\neg or \lnot	b	\flat	þ	\natural	#	\sharp

^aUse the latexsym package to access this symbol

Table 3.11: Non-Mathematical Symbols.

These symbols can also be used in text mode.

Table 3.12: AMS Delimiters.

```
\lceil \ulcorner \rceil \urcorner \lfloor \llcorner \rfloor \lrcorner
```

Table 3.13: AMS Greek and Hebrew.

 \digamma \digamma \varkappa \varkappa \beth \beth \gimel \daleth \beth \gimel

Table 3.14: AMS Binary Relations.

<	\lessdot	>	\gtrdot	÷	\doteqdot or \Doteq
\leq	\leqslant	≽	\geqslant	≓	\rightarrow risingdotseq
<	\eqslantless	≽	\eqslantgtr	Έ.	\fallingdotseq
\leq	\leqq	\geq	\geqq		\eqcirc
~	\label{liles}	>>>	\ggg or \gggtr	<u>•</u>	\circeq
\lesssim	\lesssim	\gtrsim	\gtrsim	\triangleq	\triangleq
×≈	\lessapprox	\gtrapprox	\gtrapprox	<u>~</u>	\bumpeq
\$	\lessgtr		\gtrless	≎	\Bumpeq
\leq	\lesseqgtr	>	\gtreqless	~	\thicksim
W VINVII/	\lesseqqgtr	W /IWIIV	\gtreqqless	\approx	\thickapprox
$\stackrel{\sim}{\preccurlyeq}$	\preccurlyeq	≽	\succcurlyeq	\approxeq	\approxeq
\curlyeqprec	\curlyeqprec	\succcurlyeq	\curlyeqsucc	~	\backsim
\preceq	\precsim	\searrow	\succsim	2	\backsimeq
\approx	\precapprox	XX	\succapprox	F	\vDash
\subseteq	\subseteqq	\supseteq	\supseteqq	I	\Vdash
€	\Subset	∋	\Supset	II⊢	\Vvdash
	\sqsubset	\Box	\sqsupset	Э	\backepsilon
··.	\therefore	•:	\because	\propto	\varpropto
1	\shortmid	П	\shortparallel	Ŏ	\between
\smile	\smallsmile	$\overline{}$	\smallfrown	ф	\pitchfork
\triangleleft	\vartriangleleft	\triangleright	\vartriangleright	•	$\blue{location}$
\leq	\trianglelefteq	\trianglerighteq	\trianglerighteq	•	\blacktriangleright

Table 3.15: AMS Arrows.

←	\dashleftarrow		\dashrightarrow	- 0	\multimap
\rightleftharpoons	\leftleftarrows	\Rightarrow	\rightrightarrows	$\uparrow\uparrow$	\upuparrows
\leftrightarrows	$\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	ightleftarrows	$\$ rightleftarrows	$\downarrow \downarrow$	\downdownarrows
\Leftarrow	\Lleftarrow	\Rightarrow	\Rrightarrow	1	\upharpoonleft
	\twoheadleftarrow	\longrightarrow	\twoheadrightarrow	1	\upharpoonright
\longleftrightarrow	\leftarrowtail	\rightarrowtail	\rightarrowtail	1	\downharpoonleft
\leftrightharpoons	$\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	\rightleftharpoons	\rightleftharpoons	ļ	\downharpoonright
$\dot{\neg}$	\Lsh	ightharpoons	\Rsh	~→	\rightsquigarrow
\leftarrow P	\looparrowleft	\hookrightarrow	\looparrowright	< ~~→	\leftrightsquigarrow
$ \checkmark $	\curvearrowleft	\curvearrowright	\curvearrowright		
Q	\circlearrowleft	\bigcirc	\circlearrowright		

Table 3.16: AMS Negated Binary Relations and Arrows.

≮	\nless	\nearrow	\ngtr	$\not\subseteq$	\varsubsetneqq
\leq	\lneq	\geq	\gneq	\supseteq	\varsupsetneqq
≰	\nleq	≱	\ngeq	≨	\nsubseteqq
≰	\nleqslant	$\not\geq$	\ngeqslant	$\not\supseteq$	\nsupseteqq
\neq	\lneqq	\geqq	\gneqq	ł	\nmid
$\stackrel{\leq}{=}$	\lvertneqq	\geqq	\gvertneqq	#	\nparallel
≰	\nleqq	≱	\ngeqq	ł	\nshortmid
\lesssim	\lnsim		\gnsim	Ħ	\nshortparallel
≨	\lnapprox	^∻ ^₩	\gnapprox	~	\nsim
\star	\nprec	7	\nsucc	\ncong	\ncong
\npreceq	\npreceq	$\not\succeq$	\nsucceq	$\not\vdash$	\nvdash
$\not\supseteq$	\precneqq	$\not\succeq$	\succneqq	⊭	\nvDash
$\stackrel{\sim}{\sim}$	\precnsim	/ ≯	\succnsim	\mathbb{H}	\nVdash
%	\precnapprox	 ₩	\succnapprox	$\not\Vdash$	\nVDash
\subsetneq	\subsetneq	\supseteq	\supsetneq		\ntriangleleft
\neq	\varsubsetneq	\supseteq	\varsupsetneq	\not	\ntriangleright
$\not\sqsubseteq$	\nsubseteq	$ ot \geq$	\nsupseteq	⊉	\ntrianglelefteq
\subseteq	\subsetneqq	\supseteq	\supsetneqq	⊭	\ntrianglerighteq
↔	\nleftarrow	\rightarrow	\nrightarrow	$\leftrightarrow \rightarrow$	\nleftrightarrow
#	\nLeftarrow	\Rightarrow	\nRightarrow	⇔	\n

Table 3.17: AMS Binary Operators.

÷	\dotplus		\centerdot	Τ	\intercal
K	\ltimes	×	\rtimes	*	\divideontimes
$ \ \ \bigcup$	\Cup or \doublecup	\square	\Cap or \doublecap	\	\smallsetminus
$\underline{\vee}$	\veebar	$\overline{\wedge}$	\barwedge	_	\doublebarwedge
\blacksquare	\boxplus	\Box	\boxminus	\ominus	\circleddash
\boxtimes	\boxtimes	$\overline{}$	\boxdot	0	\circledcirc
λ	\leftthreetimes	\angle	\rightthreetimes	*	\circledast
Υ	\curlvvee	人	\curlywedge		

Table 3.18: AMS Miscellaneous.

\hbar	\hbar	\hbar	\hslash	\Bbbk	\Bbbk
	\square		\blacksquare	\odot	\circledS
Δ	$\$ vartriangle	A	\blacktriangle	C	\complement
∇	\triangledown	▼	\blacktriangledown	G	\Game
\Diamond	\lozenge	♦	\blacklozenge	*	\bigstar
_	\angle	4	\measuredangle	⋖	\sphericalangle
/	\diagup		\diagdown	1	\backprime
∄	\nexists	Е	\Finv	Ø	\vert varnothing
ð	\eth	Ω	\mho		

Table 3.19: Math Alphabets.

Example	Command	Required package
ABCdef	\mathrm{ABCdef}	
ABCdef	\mathit{ABCdef}	
ABCdef	\mathnormal{ABCdef}	
\mathcal{ABC}	\mathcal{ABC}	
ABC	\mathcal{ABC}	mathrsfs
\mathcal{ABC}	\mathcal{ABC}	eucal with option: mathcal or
	\mathscr{ABC}	eucal with option: mathscr
AB Edef	\mathfrak{ABCdef}	eufrak
\mathbb{ABC}	\mathbb{ABC}	amsfonts $or amssymb$