The Comprehensive LaTeX Symbol List

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Abstract

This document lists 14032 symbols and the corresponding LaTeX commands that produce them. Some of these symbols are guaranteed to be available in every LaTeX 2ε system; others require fonts and packages that may not accompany a given distribution and that therefore need to be installed. All of the fonts and packages used to prepare this document—as well as this document itself—are freely available from the Comprehensive TeX Archive Network (http://www.ctan.org/).

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*The original version of this document was written by David Carlisle, with several additional tables provided by Alexander Holt. See Section 10.8 on page 225 for more information about who did what.

1 Introduction

Welcome to the Comprehensive LaTeX Symbol List! This document strives to be your primary source of LaTeX symbol information: font samples, LaTeX commands, packages, usage details, caveats—everything needed to put thousands of different symbols at your disposal. All of the fonts covered herein meet the following criteria:

1. They are freely available from the Comprehensive TeX Archive Network (`http://www.ctan.org/`).
2. All of their symbols have LaTeX 2ε bindings. That is, a user should be able to access a symbol by name (e.g., `\bigtriangleup`)

As of version 12 of the Comprehensive LaTeX Symbol List, that second restriction has been relaxed with the inclusion of Section 9, which showcases fonts that provide, at a minimum, either TeX font-metric files (`.tfm`) or the METAFONT sources (`.mf`) that produce those font-metric files. Some of the Section 9 fonts do include LaTeX font-definition files (`.fd`). However, what sets the fonts in Section 9 apart from the fonts in rest of the document is that they lack a LaTeX style file (`.sty`) that individually names each of the glyphs.

The restrictions listed above are not particularly limiting criteria; the Comprehensive LaTeX Symbol List contains samples of 14032 symbols—quite a large number. Some of these symbols are guaranteed to be available in every LaTeX 2ε system; others require fonts and packages that may not accompany a given distribution and that therefore need to be installed. See `http://www.tex.ac.uk/cgi-bin/texfaq2html?label=instpackages+wherefiles` for help with installing new fonts and packages.

1.1 Document Usage

Each section of this document contains a number of font tables. Each table shows a set of symbols, with the corresponding LaTeX command to the right of each symbol. A table's caption indicates what package needs to be loaded in order to access that table's symbols. For example, the symbols in Table 45, "textcomp Old-Style Numerals", are made available by putting "`\usepackage{textcomp}`" in your document's preamble. "AMS" means to use the AMS packages, viz. amssymb and/or amsmath. Notes below a table provide additional information about some or all the symbols in that table.

One note that appears a few times in this document, particularly in Section 2, indicates that certain symbols do not exist in the OT1 font encoding (Donald Knuth's original, 7-bit font encoding, which is the default font encoding for LaTeX) and that you should use fontenc to select a different encoding, such as T1 (a common 8-bit font encoding). That means that you should put "`\usepackage[`⟨*encoding*⟩`]{fontenc}`" in your document's preamble, where ⟨*encoding*⟩ is, e.g., `T1` or `LY1`. To limit the change in font encoding to the current group, use "`\fontencoding{`⟨*encoding*⟩`}\selectfont`".

Section 10 contains some additional information about the symbols in this document. It discusses how certain mathematical symbols can vary in height, shows which symbol names are not unique across packages, gives examples of how to create new symbols out of existing symbols, explains how symbols are spaced in math mode, compares various schemes for boldfacing symbols, presents LaTeX ASCII and Latin 1 tables, shows how to input and output Unicode characters, and provides some information about this document itself. The Comprehensive LaTeX Symbol List ends with an index of all the symbols in the document and various additional useful terms.

1.2 Frequently Requested Symbols

There are a number of symbols that are requested over and over again on `comp.text.tex`. If you're looking for such a symbol the following list will help you find it quickly.

␣, as in "Spaces␣are␣significant."	13
ı̄, ı̃, ı̋, ı̆, ı̌, etc. (versus ī, ĩ, i̋, ĭ, and ǐ)	19
¢	24
€	24
©, ®, and ™	25
‰	26
∯	39
∴	47
:= and ::=	48
≲ and ≳	61
⋰	109
°, as in "180°" or "15℃"	114

2 Body-text symbols

This section lists symbols that are intended for use in running text, such as punctuation marks, accents, ligatures, and currency symbols.

TABLE 1: LaTeX 2_ε Escapable "Special" Characters

$	\$	%	\%	_	_*	}	\}	&	\&	#	\#	{	\{

* The underscore package redefines "_" to produce an underscore in text mode (i.e., it makes it unnecessary to escape the underscore character).

TABLE 2: Predefined LaTeX 2_ε Text-mode Commands

^		\textasciicircum*	<		\textless
~		\textasciitilde*	a	a	\textordfeminine
*	*	\textasteriskcentered	o	o	\textordmasculine
\		\textbackslash	¶	¶	\textparagraph†
|		\textbar	·	·	\textperiodcentered
‖	‖	\textbardbl	‰	‰	\textpertenthousand
◯	◯	\textbigcircle	‰	‰	\textperthousand
{		\textbraceleft†	¿		\textquestiondown
}		\textbraceright†	“		\textquotedblleft
•	•	\textbullet	”		\textquotedblright
©	©	\textcopyright†	‘		\textquoteleft
†	†	\textdagger†	’		\textquoteright
‡	‡	\textdaggerdbl†	®	®	\textregistered
$	$	\textdollar†	§	§	\textsection†
...		\textellipsis†	£	£	\textsterling†
—		\textemdash	TM	™	\texttrademark
–		\textendash	_		\textunderscore†
¡		\textexclamdown	␣		\textvisiblespace
>		\textgreater			

The first symbol column represents the—sometimes "faked"—symbol that LaTeX 2_ε provides by default. The second symbol column represents the symbol as redefined by textcomp (if textcomp redefines it). The textcomp package is generally required to typeset Table 2's symbols in italic, and some symbols additionally require the T1 font encoding for italic.

* `\^{}` and `\~{}` can be used instead of `\textasciicircum` and `\textasciitilde`. See the discussion of "~" on page 221.

† It's generally preferable to use the corresponding symbol from Table 3 on the following page because the symbols in that table work properly in both text mode and math mode.

Table 3: LaTeX 2ε Commands Defined to Work in Both Math and Text Mode

{		\{	_		_	‡	‡	\ddag	£		\pounds
}		\}	©	©	\copyright	…		\dots	§	§	\S
$	$	\$	†	†	\dag	¶	¶	\P			

The first symbol column represents the—sometimes "faked"—symbol that LaTeX 2ε provides by default. The second symbol column represents the symbol as redefined by textcomp (if textcomp redefines it). The textcomp package is generally required to typeset Table 3's symbols in italic, and some symbols additionally require the T1 font encoding for italic.

Table 4: AMS Commands Defined to Work in Both Math and Text Mode

✓	\checkmark	®	\circledR	✠	\maltese

Table 5: Non-ASCII Letters (Excluding Accented Letters)

å	\aa	Ð	\DH*	Ł	\L	ø	\o	ß	\ss
Å	\AA	ð	\dh*	ł	\l	Ø	\O	SS	\SS
Æ	\AE	Đ	\DJ*	Ŋ	\NG*	Œ	\OE	Þ	\TH*
æ	\ae	đ	\dj*	ŋ	\ng*	œ	\oe	þ	\th*

* Not available in the OT1 font encoding. Use the fontenc package to select an alternate font encoding, such as T1.

Table 6: textgreek Upright Greek Letters

α	\textalpha	η	\texteta	ν	\textnu	τ	\texttau
β	\textbeta	ϑ	\texttheta	ξ	\textxi	υ	\textupsilon
γ	\textgamma	ι	\textiota	ο	\textomikron	φ	\textphi
δ	\textdelta	ϰ	\textkappa	π	\textpi	χ	\textchi
ε	\textepsilon	λ	\textlambda	ρ	\textrho	ψ	\textpsi
ζ	\textzeta	μ	\textmu*	σ	\textsigma	ω	\textomega
A	\textAlpha	H	\textEta	N	\textNu	T	\textTau
B	\textBeta	Θ	\textTheta	Ξ	\textXi	ϒ	\textUpsilon
Γ	\textGamma	I	\textIota	O	\textOmikron	Φ	\textPhi
Δ	\textDelta	K	\textKappa	Π	\textPi	X	\textChi
E	\textEpsilon	Λ	\textLambda	P	\textRho	Ψ	\textPsi
Z	\textZeta	M	\textMu	Σ	\textSigma	Ω	\textOmega

* Synonyms for \textmu include \textmicro and \textmugreek.

textgreek tries to use a Greek font that matches the body text. As a result, the glyphs may appear slightly different from the above.

Unlike upgreek (Table 183 on page 89), textgreek works in text mode.

The symbols in this table are intended to be used sporadically throughout a document (e.g., in phrases such as "β-decay"). In contrast, Greek body text can be typeset using the babel package's greek (or polutonikogreek) option—and, of course, a font that provides the glyphs for the Greek alphabet.

Table 7: Letters Used to Typeset African Languages

Đ	\B{D}	ƈ	\m{c}	ʃ	\m{f}	ƙ	\m{k}	ƫ	\M{t}	ȝ	\m{Z}
đ	\B{d}	Ɗ	\m{D}	Ƒ	\m{F}	Ɲ	\m{N}	Ƭ	\M{T}	Ɛ̃	\T{E}
Ħ	\B{H}	ɖ	\M{d}	Ɣ	\m{G}	ŋ	\m{n}	ƭ	\m{t}	ɛ̃	\T{e}
ħ	\B{h}	Ð	\M{D}	ɣ	\m{g}	ɔ	\m{o}	Ʈ	\M{T}	Õ	\T{O}
ŧ	\B{t}	ƈ	\m{d}	Ɩ	\m{I}	Ɔ	\m{O}	ʊ	\m{u}*	õ	\T{o}
Ŧ	\B{T}	Ɛ	\m{E}	ɩ	\m{i}	Ƥ	\m{P}	Ʊ	\m{U}*		
ɓ	\m{b}	ɛ	\m{e}	Ɲ	\m{J}	ƥ	\m{p}	Ƴ	\m{Y}		
Ɓ	\m{B}	Ǝ	\M{E}	ɲ	\m{j}	ʃ	\m{s}	ƴ	\m{y}		
Ƈ	\m{C}	ə	\M{e}	Ƙ	\m{K}	Ʃ	\m{S}	ʒ	\m{z}		

These characters all need the T4 font encoding, which is provided by the fc package.

* \m{v} and \m{V} are synonyms for \m{u} and \m{U}.

Table 8: Letters Used to Typeset Vietnamese

Ơ	\OHORN	ơ	\ohorn	Ư	\UHORN	ư	\uhorn

These characters all need the T5 font encoding, which is provided by the vntex package.

Table 9: Punctuation Marks Not Found in OT1

«	\guillemotleft	‹	\guilsinglleft	„	\quotedblbase	"	\textquotedbl
»	\guillemotright	›	\guilsinglright	‚	\quotesinglbase		

To get these symbols, use the fontenc package to select an alternate font encoding, such as T1.

Table 10: pifont Decorative Punctuation Marks

❛	\ding{123}	❝	\ding{125}	❡	\ding{161}	❣	\ding{163}
❜	\ding{124}	❞	\ding{126}	❢	\ding{162}		

TABLE 11: tipa Phonetic Symbols

ɤ	\textbabygamma	ʔ	\textglotstop	ɳ	\textrtailn
ƀ	\textbarb	ˑ	\texthalflength	ɽ	\textrtailr
ɕ	\textbarc	ъ	\texthardsign	ʂ	\textrtails
đ	\textbard	ʱ	\texthooktop	ʈ	\textrtailt
ɟ	\textbardotlessj	ɓ	\texthtb	ʐ	\textrtailz
ǥ	\textbarg	ƒ	\texthtbardotlessj	˞	\textrthook
ʡ	\textbarglotstop	ƈ	\texthtc	ᴀ	\textsca
ɨ	\textbari	ɗ	\texthtd	ʙ	\textscb
ɬ	\textbarl	ɠ	\texthtg	ᴇ	\textsce
ɵ	\textbaro	ɦ	\texthth	ɢ	\textscg
ʕ	\textbarrevglotstop	ʄ	\texththeng	ʜ	\textsch
ʉ	\textbaru	ƙ	\texthtk	ə	\textschwa
ɬ	\textbeltl	ɸ	\texthtp	ɪ	\textsci
β	\textbeta	ʠ	\texthtq	ᴊ	\textscj
ʘ	\textbullseye	ʈ	\texthtrtaild	ʟ	\textscl
ˊ	\textceltpal	ɠ	\texthtscg	ɴ	\textscn
χ	\textchi	ƭ	\texthtt	œ	\textscoelig
ɔ	\textcloseepsilon	ʰʊ	\texthvlig	ɷ	\textscomega
ɷ	\textcloseomega	ɔ	\textinvglotstop	ʀ	\textscr
ɜ	\textcloserevepsilon	ʁ	\textinvscr	ɑ	\textscripta
ʒ	\textcommatailz	ɩ	\textiota	ɡ	\textscriptg
˥	\textcorner	λ	\textlambda	ʊ	\textscriptv
ƀ	\textcrb	ː	\textlengthmark	ᴜ	\textscu
đ	\textcrd	ʮ	\textlhookt	ʏ	\textscy
ǥ	\textcrg	ɭ	\textlhtlongi	ˌ	\textsecstress
ħ	\textcrh	ʯ	\textlhtlongy	ь	\textsoftsign
ɔ	\textcrinvglotstop	ɾ	\textlonglegr	ʗ	\textstretchc
ƛ	\textcrlambda	˂	\textlptr	ʦ	\texttctclig
ƨ	\textcrtwo	ɱ	\textltailm	ʧ	\textteshlig
ȼ	\textctc	ɲ	\textltailn	ϑ	\texttheta
ȡ	\textctd	ɬ	\textltilde	þ	\textthorn
ȡʑ	\textctdctzlig	ƪ	\textlyoghlig	ǀ	\texttoneletterstem
ʃ	\textctesh	ɟ	\textObardotlessj	ʦ	\texttslig
ʝ	\textctj	ƪ	\textOlyoghlig	ɐ	\textturna
ɳ	\textctn	ω	\textomega	œ	\textturncelig
ʇ	\textctt	ˠ	\textopencorner	ɥ	\textturnh
ʇɕ	\textcttctclig	ɔ	\textopeno	ʞ	\textturnk
ʒ	\textctyogh	ˌ	\textpalhook	ʟ	\textturnlonglegr
ʑ	\textctz	φ	\textphi	ɯ	\textturnm
ʤ	\textdctzlig	ǀ	\textpipe	ɯɻ	\textturnmrleg
ǯ	\textdoublebaresh	ˈ	\textprimstress	ɹ	\textturnr
ǂ	\textdoublebarpipe	ʔ	\textraiseglotstop	ɻ	\textturnrrtail
≠	\textdoublebarslash	ɺ	\textraisevibyi	ɒ	\textturnscripta
‖	\textdoublepipe	ɤ	\textramshorns	ʇ	\textturnt
‖	\textdoublevertline	ʻ	\textrevapostrophe	ʌ	\textturnv
↓	\textdownstep	ɘ	\textreve	ʍ	\textturnw
ʤ	\textdyoghlig	ɜ	\textrevepsilon	ʎ	\textturny
ʤ	\textdzlig	ʕ	\textrevglotstop	ʊ	\textupsilon
ɛ	\textepsilon	ʢ	\textrevyogh	↑	\textupstep
ʃ	\textesh	ɜ˞	\textrhookrevepsilon	ǀ	\textvertline
ɾ	\textfishhookr	ɚ	\textrhookschwa	ɺ	\textvibyi

(continued on next page)

(continued from previous page)

g	\textg	˞	\textrhoticity	ʯ	\textvibyy
ɣ	\textgamma	˃	\textrptr	ƿ	\textwynn
↘	\textglobfall	ɖ	\textrtaild	ȝ	\textyogh
↗	\textglobrise	ɭ	\textrtaill		

tipa defines shortcut characters for many of the above. It also defines a command \tone for denoting tone letters (pitches). See the tipa documentation for more information.

TABLE 12: tipx Phonetic Symbols

ɐ̃	\textaolig	ʃ̩	\texthtbardotlessjvar	˔	\textrthooklong
ʒ̵	\textbenttailyogh	ʊ	\textinvomega	ᴔ	\textscaolig
ɣ̆	\textbktailgamma	ʌ	\textinvsca	ᴧ	\textscdelta
ʖ	\textctinvglotstop	ɑ	\textinvscripta	ꜰ	\textscf
ʝ	\textctjvar	ɬ	\textlfishhookrlig	ᴋ	\textsck
ʗ	\textctstretchc	ɻ	\textlhookfour	ᴍ	\textscm
ʗ̆	\textctstretchcvar	ɺ	\textlhookp	ᴘ	\textscp
ʞ	\textctturnt	ɪ	\textlhti	ǫ	\textscq
ɗ	\textdblig	ʅ	\textlooptoprevesh	←	\textspleftarrow
ǂ	\textdoublebarpipevar	ɳ	\textnrleg	ɕ	\textstretchcvar
‖	\textdoublepipevar	⊙	\textObullseye	↔	\textsubdoublearrow
↓	\textdownfullarrow	˩	\textpalhooklong	→	\textsubrightarrow
♀	\textfemale	ʲ	\textpalhookvar	þ	\textthornvari
ɲ	\textfrbarn	ǀ	\textpipevar	þ	\textthornvarii
ɗ	\textfrhookd	ɋ	\textqplig	þ	\textthornvariii
ɗ	\textfrhookdvar	▫	\textrectangle	þ	\textthornvariv
ƭ	\textfrhookt	⊷	\textretractingvar	ɾ	\textturnglotstop
ɣ	\textfrtailgamma	ɹ	\textrevscl	ʞ	\textturnsck
ʔ	\textglotstopvari	ʁ	\textrevscr	∩	\textturnscu
ʔ	\textglotstopvarii	ɑ̢	\textrhooka	ɛ	\textturnthree
ʔ	\textglotstopvariii	e̢	\textrhooke	ƻ	\textturntwo
ɣ	\textgrgamma	ɛ̢	\textrhookepsilon	♀	\textuncrfemale
ɧ	\textheng	ɤ̢	\textrhookopeno	↑	\textupfullarrow
ɱ	\texthmlig	ʃ̢	\textrtailhth		

TABLE 13: wsuipa Phonetic Symbols

ɤ	\babygamma	ŋ	\eng	ɱ	\labdentalnas	ə	\schwa
ƀ	\barb	ɚ	\er	ɬ	\latfric	ɪ	\sci
đ	\bard	ʃ	\esh	ɯ̹	\legm	ɴ	\scn
ɨ	\bari	ð	\eth	ɾ	\legr	ʀ	\scr
ɬ	\barl	ɾ	\flapr	ɮ	\lz	ɑ	\scripta
ɵ	\baro	ʔ	\glotstop	ɑ	\nialpha	ɡ	\scriptg
ᵽ	\barp	ɓ	\hookb	β	\nibeta	ʊ	\scriptv
ɨ	\barsci	ɗ	\hookd	χ	\nichi	ᴜ	\scu
ʉ	\barscu	ɠ	\hookg	ɛ	\niepsilon	ʏ	\scy
ʉ	\baru	ɦ	\hookh	ɣ	\nigamma	ⱱ	\slashb
ʘ	\clickb	ʄ	\hookheng	ɪ	\niiota	ⱦ	\slashc
ǀ	\clickc	ɜ	\hookrevepsilon	ʎ	\nilambda	ⱥ	\slashd
ǂ	\clickt	ʰʊ	\hv	ɯ̹	\niomega	ᵾ	\slashu
ɷ	\closedniomega	ɐ	\inva	ɸ	\niphi	ᶑ	\taild
ɞ	\closedrevepsilon	ʃ	\invf	σ	\nisigma	ᶊ	\tailinvr
ƀ	\crossb	ɔ	\invglotstop	θ	\nitheta	ɭ	\taill
đ	\crossd	ɥ	\invh	ʊ	\niupsilon	ɳ	\tailn
ħ	\crossh	ɺ	\invlegr	ɲ	\nj	ɽ	\tailr
ƛ	\crossnilambda	ɯ	\invm	œ	\oo	ʂ	\tails
ɕ	\curlyc	ɹ	\invr	ɔ	\openo	ʈ	\tailt
ʆ	\curlyesh	ʁ	\invscr	ɘ	\reve	ᶎ	\tailz
ʒ	\curlyyogh	ɒ	\invscripta	ʕ	\reveject	ʧ	\tesh
ʑ	\curlyz	ʌ	\invv	ɜ	\revepsilon	þ	\thorn
ɨ	\dlbari	ʍ	\invw	ʕ	\revglotstop	ƫ	\tildel
ʤ	\dz	ʎ	\invy	ᴅ	\scd	ʒ	\yogh
ʔ	\ejective	ɣ	\ipagamma	ɢ	\scg		

TABLE 14: wasysym Phonetic Symbols

Ð	\DH	ð	\dh	ɔ	\openo
Þ	\Thorn	ə	\inve	þ	\thorn

TABLE 15: phonetic Phonetic Symbols

ɟ	\barj	ɾ	\flap	ɨ	\ibar	ɒ	\rotvara	ɪ	\vari
ƛ	\barlambda	ʔ	\glottal	ɔ	\openo	ʍ	\rotw	ɷ	\varomega
ɱ	\emgma	Ɓ	\hausaB	ħ	\planck	ʎ	\roty	ɔ	\varopeno
ŋ	\engma	ɓ	\hausab	ʌ	\pwedge	ə	\schwa	ʏ	\vod
ɲ	\enya	ɗ	\hausad	Ɖ	\revD	þ	\thorn	ɦ	\voicedh
ɛ	\epsi	Ɗ	\hausaD	ɹ	\riota	ʉ	\ubar	ʒ	\yogh
ʃ	\esh	ƙ	\hausak	ɯ̹	\rotm	ɥ	\udesc		
ð	\eth	Ƙ	\hausaK	ʊ	\rotOmega	ɑ	\vara		
ʄ	\fj	ɗ	\hookd	ɹ	\rotr	ɡ	\varg		

Table 16: t4phonet Phonetic Symbols

đ	\textcrd	ƈ	\texthtd	ǀ	\textpipe
ħ	\textcrh	ƙ	\texthtk	ȡ	\textrtaild
ɛ	\textepsilon	ƥ	\texthtp	ʈ	\textrtailt
ʃ	\textesh	ƭ	\texthtt	ƈ	\textschwa
ʩ	\textfjlig	ɩ	\textiota	ʃ	\textscriptv
ɓ	\texthtb	ɲ	\textltailn	ʧ	\textteshlig
ƈ	\texthtc	ɔ	\textopeno	ʒ	\textyogh

The idea behind the t4phonet package's phonetic symbols is to provide an interface to some of the characters in the T4 font encoding (Table 7 on page 15) but using the same names as the tipa characters presented in Table 11 on page 16.

Table 17: semtrans Transliteration Symbols

ʾ	\Alif	ʿ	\Ayn

Table 18: Text-mode Accents

Ää	\"{A}\"{a}	Ȧȧ	\\|{A}\\|{a}‡	Ȃȃ	\f{A}\f{a}¶	A͡a͡	\t{A}\t{a}
Áá	\'{A}\'{a}	Ãã	\~{A}\~{a}	Ää	\G{A}\G{a}‡	Ăă	\u{A}\u{a}
Ȧȧ	\.{A}\.{a}	A̲a̲	\b{A}\b{a}	Åå	\h{A}\h{a}§	Ää	\U{A}\U{a}‡
Āā	\={A}\={a}	Ąą	\c{A}\c{a}	Ő̋ő̋	\H{A}\H{a}	Ăă	\U{A}\U{a}¶
Ȃȃ	\^{A}\^{a}	Ȁȁ	\C{A}\C{a}¶	Ąą	\k{A}\k{a}†	Ăă	\v{A}\v{a}
Àà	\‘{A}\‘{a}	Ạạ	\d{A}\d{a}	Åå	\r{A}\r{a}		

Ȃȃ \newtie{A}\newtie{a}* Ⓐⓐ \textcircled{A}\textcircled{a}

* Requires the textcomp package.

† Not available in the OT1 font encoding. Use the fontenc package to select an alternate font encoding, such as T1.

‡ Requires the T4 font encoding, provided by the fc package.

§ Requires the T5 font encoding, provided by the vntex package.

¶ Requires one of the Cyrillic font encodings (T2A, T2B, T2C, or X2). Use the fontenc package to select an encoding.

Also note the existence of `\i` and `\j`, which produce dotless versions of "i" and "j" (viz., "ı" and "ȷ"). These are useful when the accent is supposed to replace the dot in encodings that need to composite (i.e., combine) letters and accents. For example, "`na\"{\i}ve`" always produces a correct "naïve", while "`na\"{i}ve`" yields the rather odd-looking "naïve" when using the OT1 font encoding and older versions of LaTeX. Font encodings other than OT1 and newer versions of LaTeX properly typeset "`na\"{i}ve`" as "naïve".

Table 19: tipa Text-mode Accents

Á◌́	\textacutemacron{A}\textacutemacron{a}
Á◌́	\textacutewedge{A}\textacutewedge{a}
A◌̟	\textadvancing{A}\textadvancing{a}
A◌͡◌	\textbottomtiebar{A}\textbottomtiebar{a}
Ă◌̆	\textbrevemacron{A}\textbrevemacron{a}
Ã◌̃	\textcircumacute{A}\textcircumacute{a}
Â◌̊	\textcircumdot{A}\textcircumdot{a}
Ǎ◌̈	\textdotacute{A}\textdotacute{a}
Ȧ◌̆	\textdotbreve{A}\textdotbreve{a}
A◌̏	\textdoublegrave{A}\textdoublegrave{a}
A◌̎	\textdoublevbaraccent{A}\textdoublevbaraccent{a}
Ã◌̃	\textfallrise{A}\textfallrise{a}
A◌̑	\textgravecircum{A}\textgravecircum{a}
Ȧ◌̀	\textgravedot{A}\textgravedot{a}
À◌̄	\textgravemacron{A}\textgravemacron{a}
A◌̀	\textgravemid{A}\textgravemid{a}
Á◌́	\texthighrise{A}\texthighrise{a}
A◌̪	\textinvsubbridge{A}\textinvsubbridge{a}
A◌̞	\textlowering{A}\textlowering{a}
A◌̗	\textlowrise{A}\textlowrise{a}
Á◌́	\textmidacute{A}\textmidacute{a}
Ă◌̆	\textovercross{A}\textovercross{a}
A◌̽	\textoverw{A}\textoverw{a}
Ą◌̨	\textpolhook{A}\textpolhook{a}
A◌̝	\textraising{A}\textraising{a}
A◌̠	\textretracting{A}\textretracting{a}
Å◌̊	\textringmacron{A}\textringmacron{a}
A◌̌	\textrisefall{A}\textrisefall{a}
Â◌̂	\textroundcap{A}\textroundcap{a}
A◌̼	\textseagull{A}\textseagull{a}
A◌̩	\textsubacute{A}\textsubacute{a}
A◌̯	\textsubarch{A}\textsubarch{a}
A◌̲	\textsubbar{A}\textsubbar{a}
A◌̪	\textsubbridge{A}\textsubbridge{a}
A◌̭	\textsubcircum{A}\textsubcircum{a}
Ạ◌̣	\textsubdot{A}\textsubdot{a}
A◌̗	\textsubgrave{A}\textsubgrave{a}
Ą◌̡	\textsublhalfring{A}\textsublhalfring{a}
A◌̟	\textsubplus{A}\textsubplus{a}
A◌̜	\textsubrhalfring{A}\textsubrhalfring{a}
A◌̥	\textsubring{A}\textsubring{a}

(continued on next page)

(continued from previous page)

A̪a̪	`\textsubsquare{A}\textsubsquare{a}`
A̰a̰	`\textsubtilde{A}\textsubtilde{a}`
A̤a̤	`\textsubumlaut{A}\textsubumlaut{a}`
A̬a̬	`\textsubw{A}\textsubw{a}`
A̯a̯	`\textsubwedge{A}\textsubwedge{a}`
A~~a~~	`\textsuperimposetilde{A}\textsuperimposetilde{a}`
Aᵎa	`\textsyllabic{A}\textsyllabic{a}`
Ȧ̰ạ̰̇	`\texttildedot{A}\texttildedot{a}`
A͡a͡	`\texttoptiebar{A}\texttoptiebar{a}`
Aˈa	`\textvbaraccent{A}\textvbaraccent{a}`

tipa defines shortcut sequences for many of the above. See the tipa documentation for more information.

Table 20: extraipa Text-mode Accents

A̪a̪	`\bibridge{A}\bibridge{a}`
A̸a̸	`\crtilde{A}\crtilde{a}`
Ȧ̰ạ̰̇	`\dottedtilde{A}\dottedtilde{a}`
A̰̰ạ̰̰	`\doubletilde{A}\doubletilde{a}`
A̬a̬	`\finpartvoice{A}\finpartvoice{a}`
Ḁḁ	`\finpartvoiceless{A}\finpartvoiceless{a}`
A̰a̰	`\inipartvoice{A}\inipartvoice{a}`
Åå	`\inipartvoiceless{A}\inipartvoiceless{a}`
A̅a̅	`\overbridge{A}\overbridge{a}`
A͓a͓	`\partvoice{A}\partvoice{a}`
A᷎a᷎	`\partvoiceless{A}\partvoiceless{a}`
A⇝a⇝	`\sliding{A}\sliding{a}`
A↭a↭	`\spreadlips{A}\spreadlips{a}`
A̺a̺	`\subcorner{A}\subcorner{a}`
A̪̍a̪̍	`\subdoublebar{A}\subdoublebar{a}`
Ä̪ä̪	`\subdoublevert{A}\subdoublevert{a}`
A̹a̹	`\sublptr{A}\sublptr{a}`
A̻a̻	`\subrptr{A}\subrptr{a}`
Aʷa	`\whistle{A}\whistle{a}`

Table 21: wsuipa Text-mode Accents

A̪a̪	`\dental{A}\dental{a}`
A̠a̠	`\underarch{A}\underarch{a}`

Table 22: phonetic Text-mode Accents

A͡a	`\hill{A}\hill{a}`	A̡a̡	`\rc{A}\rc{a}`	A͠a͠	`\ut{A}\ut{a}`
A̚a̚	`\od{A}\od{a}`	Ạạ	`\syl{A}\syl{a}`		
Ââ	`\ohill{A}\ohill{a}`	A̤a̤	`\td{A}\td{a}`		

The phonetic package provides a few additional macros for linguistic accents. `\acbar` and `\acarc` compose characters with multiple accents; for example, `\acbar{\'}{a}` produces "ā́" and `\acarc{\"}{e}` produces "ë̆". `\labvel` joins two characters with an arc: `\labvel{mn}` → "m͡n". `\upbar` is intended to go between characters as in "`x\upbar{}y''` → "x|y". Lastly, `\uplett` behaves like `\textsuperscript` but uses a smaller font. Contrast "`p\uplett{h}''` → "p$^{\text{h}}$" with "`p\textsuperscript{h}''` → "p$^{\text{h}}$".

Table 23: metre Text-mode Accents

Áá	`\acutus{A}\acutus{a}`
Ăă	`\breve{A}\breve{a}`
Ãã	`\circumflexus{A}\circumflexus{a}`
Ää	`\diaeresis{A}\diaeresis{a}`
Àà	`\gravis{A}\gravis{a}`
Āā	`\macron{A}\macron{a}`

Table 24: t4phonet Text-mode Accents

Ä̏ä̏	`\textdoublegrave{A}\textdoublegrave{a}`
Ȧ̀ȧ̀	`\textvbaraccent{A}\textvbaraccent{a}`
Ä̍ä̍	`\textdoublevbaraccent{A}\textdoublevbaraccent{a}`

The idea behind the t4phonet package's text-mode accents is to provide an interface to some of the accents in the T4 font encoding (accents marked with "‡" in Table 18 on page 19) but using the same names as the tipa accents presented in Table 19 on page 20.

Table 25: arcs Text-mode Accents

A͡a͡	`\overarc{A}\overarc{a}`	A͜a͜	`\underarc{A}\underarc{a}`

The accents shown above scale only to a few characters wide. An optional macro argument alters the effective width of the accented characters. See the arcs documentation for more information.

At the time of this writing (2015/11/12), there exists an incompatibility between the arcs package and the relsize package, upon which arcs depends. As a workaround, one should apply the patch proposed by Michael Sharpe on the XeTeX mailing list (Subject: "The arcs package", dated 2013/08/25) to prevent spurious text from being added to the document (as in, "5.0pt$\widehat{\text{A}}$" when "$\widehat{\text{A}}$" is expected).

Table 26: semtrans Accents

A̤a̤	`\D{A}\D{a}`	A̬a̬	`\U{A}\U{a}`
∀ɐ	`\T{A}\T{a}`*		

`\T` is not actually an accent but a command that rotates its argument 180° using the graphicx package's `\rotatebox` command.

Table 27: ogonek Accents

Ąą	`\k{A}\k{a}`

Table 28: combelow Accents

Ạạ	`\cb{A}\cb{a}`

`\cb` places a comma *above* letters with descenders. Hence, while "`\cb{s}`" produces "ș", "`\cb{g}`" produces "ģ".

Table 29: wsuipa Diacritics

ʿ	`\ain`	˂	`\leftp`	˚	`\overring`	ˈ	`\stress`	ˬ	`\underwedge`
˥	`\corner`	˩	`\leftt`	˛	`\polishhook`	ˌ	`\syllabic`	˄	`\upp`
˅	`\downp`	ː	`\length`	˃	`\rightp`	¨	`\underdots`	˩	`\upt`
˧	`\downt`	~	`\midtilde`	˪	`\rightt`	˚	`\underring`		
ˑ	`\halflength`	˨	`\open`	ˌ	`\secstress`	~	`\undertilde`		

The wsuipa package defines all of the above as ordinary characters, not as accents. However, it does provide `\diatop` and `\diaunder` commands, which are used to compose diacritics with other characters. For example, `\diatop[\overring|a]` produces "å", and `\diaunder[\underdots|a]` produces "a̤". See the wsuipa documentation for more information.

Table 30: textcomp Diacritics

˝	`\textacutedbl`	ˇ	`\textasciicaron`	¯	`\textasciimacron`
´	`\textasciiacute`	¨	`\textasciidieresis`	‟	`\textgravedbl`
˘	`\textasciibreve`	`	`\textasciigrave`		

The textcomp package defines all of the above as ordinary characters, not as accents. You can use `\llap` or `\rlap` to combine them with other characters. See the discussion of `\llap` and `\rlap` on page 213 for more information.

TABLE 31: marvosym Diacritics

$\vec{}$	\arrowOver	$\bar{}$	\barOver	/	\StrikingThrough
$\vec{}$	\ArrowOver	$\bar{}$	\BarOver		

The marvosym package defines all of the above as ordinary characters, not as accents. You can use \llap or \rlap to combine them with other characters. See the discussion of \llap and \rlap on page 213 for more information.

TABLE 32: textcomp Currency Symbols

฿	\textbaht	$	\textdollar*	₲	\textguarani	₩	\textwon
¢	\textcent	$	\textdollaroldstyle	£	\textlira	¥	\textyen
¢	\textcentoldstyle	₫	\textdong	₦	\textnaira		
₡	\textcolonmonetary	€	\texteuro	₱	\textpeso		
¤	\textccurrency	f	\textflorin	£	\textsterling*		

* It's generally preferable to use the corresponding symbol from Table 3 on page 14 because the symbols in that table work properly in both text mode and math mode.

TABLE 33: marvosym Currency Symbols

ℛ	\Denarius	€	\EURcr	€	\EURtm	ϖ	\Pfund
℮	\Ecommerce	€	\EURdig	$	\EyesDollar	ß	\Shilling
€	\EUR	€	\EURhv	ƒ	\Florin		

The different euro signs are meant to be visually compatible with different fonts—Courier (\EURcr), Helvetica (\EURhv), Times Roman (\EURtm), and the marvosym digits listed in Table 274 (\EURdig). The mathdesign package redefines \texteuro to be visually compatible with one of three additional fonts: Utopia (€), Charter (€), or Garamond (€).

TABLE 34: fontawesome Currency Symbols

฿	\faBtc	₪	\faIls	₩	\faKrw	$	\faUsd
€	\faEur	₹	\faInr	₽	\faRub	₭	\faViacoin
£	\faGbp	¥	\faJpy	₺	\faTry		

fontawesome defines \faBitcoin as a synonym for \faBtc; \faCny, \faYen, and \faRmb as synonyms for \faJpy; \faDollar as a synonym for \faUsd; \faEuro as a synonym for \faEur; \faRouble and \faRuble as synonyms for \faRub; \faRupee as a synonym for \faInr; \faShekel and \faSheqel as synonyms for \faIls; \faTurkishLira as a synonym for \faTry; and \faWon as a synonym for \faKrw.

TABLE 35: wasysym Currency Symbols

¢	\cent	¤	\currency

Table 36: LaTeX 2e Currency Symbols

€	\Euro	₰	\Pound

Table 37: teubner Currency Symbols

𐆖	\denarius	ↄ	\hemiobelion	Ↄ	\tetartemorion
⊢	\dracma	⚡	\stater		

Table 38: tfrupee Currency Symbols

₹	\rupee

Table 39: eurosym Euro Signs

€	\geneuro	€	\geneuronarrow	€	\geneurowide	€	\officialeuro

\euro is automatically mapped to one of the above—by default, \officialeuro—based on a eurosym package option. See the eurosym documentation for more information. The \geneuro... characters are generated from the current body font's "C" character and therefore may not appear exactly as shown.

Table 40: fourier Euro Signs

€	\eurologo	€	\texteuro

Table 41: textcomp Legal Symbols

Ⓟ	\textcircledP	©	Ⓒ	\textcopyright		℠	\textservicemark
ↄ	\textcopyleft	®	Ⓡ	\textregistered	TM	™	\texttrademark

The first symbol column represents the—sometimes "faked"—symbol that LaTeX 2ε provides by default. The second symbol column represents the symbol as redefined by textcomp. The textcomp package is generally required to typeset Table 41's symbols in italic.

See http://www.tex.ac.uk/cgi-bin/texfaq2html?label=tradesyms for solutions to common problems that occur when using these symbols (e.g., getting a "ⓡ" when you expected to get a "Ⓡ").

Table 42: fontawesome Legal Symbols

©	\faCopyright	®	\faRegistered
🅭	\faCreativeCommons	™	\faTrademark

TABLE 43: cclicenses Creative Commons License Icons

Ⓒ	\cc	Ⓝ	\ccnc*	Ⓢ	\ccsa*
Ⓑ	\ccby	Ⓓ	\ccnd		

* These symbols utilize the rotating package and therefore display improperly in some DVI viewers.

TABLE 44: ccicons Creative Commons License Icons

Ⓐ	\ccAttribution	Ⓔ	\ccNonCommercialEU	Ⓢ	\ccShare
Ⓒ	\ccCopy	Ⓙ	\ccNonCommercialJP	Ⓢ	\ccShareAlike
Ⓒ	\ccLogo	Ⓟ	\ccPublicDomain	Ⓩ	\ccZero
Ⓓ	\ccNoDerivatives	Ⓡ	\ccRemix		
Ⓝ	\ccNonCommercial	Ⓢ	\ccSampling		

ccicons additionally defines a set of commands for typesetting many complete Creative Commons licenses (i.e., juxtapositions of two or more of the preceding icons). For example, the \ccbyncnd command typesets the "Attribution–Noncommercial–No Derivative Works" license ("ⒸⒶⓃⒹ"). See the ccicons documentation for more information.

TABLE 45: textcomp Old-style Numerals

0	\textzerooldstyle	4	\textfouroldstyle	8	\texteightoldstyle
1	\textoneoldstyle	5	\textfiveoldstyle	9	\textnineoldstyle
2	\texttwooldstyle	6	\textsixoldstyle		
3	\textthreeoldstyle	7	\textsevenoldstyle		

Rather than use the bulky \textoneoldstyle, \texttwooldstyle, etc. commands shown above, consider using \oldstylenums{...} to typeset an old-style number.

TABLE 46: Miscellaneous textcomp Symbols

ƀ	\textblank	¶	\textpilcrow
¦	\textbrokenbar	'	\textquotesingle
=	\textdblhyphen	'	\textquotestraightbase
=	\textdblhyphenchar	"	\textquotestraightdblbase
⁒	\textdiscount	℞	\textrecipe
℮	\textestimated	※	\textreferencemark
⸘	\textinterrobang	—	\textthreequartersemdash
¡	\textinterrobangdown	~	\texttildelow
№	\textnumero	—	\texttwelveudash
○	\textopenbullet		

TABLE 47: Miscellaneous wasysym Text-mode Symbols

‰	\permil

3 Mathematical symbols

Most, but not all, of the symbols in this section are math-mode only. That is, they yield a "`Missing $ inserted`" error message if not used within `$`...`$`, `\[`...`\]`, or another math-mode environment. Operators marked as "variable-sized" are taller in displayed formulas, shorter in in-text formulas, and possibly shorter still when used in various levels of superscripts or subscripts.

Alphanumeric symbols (e.g., "$\mathscr{L}$" and "$\mathbb{Z}$") are usually produced using one of the math alphabets in Table 299 rather than with an explicit symbol command. Look there first if you need a symbol for a transform, number set, or some other alphanumeric.

Although there have been many requests on `comp.text.tex` for a contradiction symbol, the ensuing discussion invariably reveals innumerable ways to represent contradiction in a proof, including "↯" (`\blitza`), "⇒⇐" (`\Rightarrow\Leftarrow`), "⊥" (`\bot`), "↮" (`\nleftrightarrow`), and "※" (`\textreferencemark`). Because of the lack of notational consensus, it is probably better to spell out "Contradiction!" than to use a symbol for this purpose. Similarly, discussions on `comp.text.tex` have revealed that there are a variety of ways to indicate the mathematical notion of "is defined as". Common candidates include "$\triangleq$" (`\triangleq`), "≡" (`\equiv`), "$:=$" (*various*[1]), and "$\stackrel{\text{def}}{=}$" (`\stackrel{\text{def}}{=}`). See also the example of `\equalsfill` on page 214. Depending upon the context, disjoint union may be represented as "$\coprod$" (`\coprod`), "⊔" (`\sqcup`), "⊍" (`\dotcup`), "⊕" (`\oplus`), or any of a number of other symbols.[2] Finally, the average value of a variable x is written by some people as "$\overline{x}$" (`\overline{x}`), by some people as "$\langle x \rangle$" (`\langle x \rangle`), and by some people as "$\varnothing x$" or "$\varnothing x$" (`\diameter x` or `\varnothing x`). The moral of the story is that you should be careful always to explain your notation to avoid confusing your readers.

Table 48: Math-Mode Versions of Text Symbols

$	`\mathdollar`	¶	`\mathparagraph`	£	`\mathsterling`
…	`\mathellipsis`	§	`\mathsection`	_	`\mathunderscore`

It's generally preferable to use the corresponding symbol from Table 3 on page 14 because the symbols in that table work properly in both text mode and math mode.

Table 49: cmll Unary Operators

!	`\oc`*	↑	`\shneg`	?	`\wn`*
↕	`\shift`	↓	`\shpos`		

* `\oc` and `\wn` differ from "!" and "?" in terms of their math-mode spacing: `$A=!B$` produces "$A =!B$", for example, while `$A=\oc B$` produces "$A = !B$".

[1] In txfonts, pxfonts, and mathtools the symbol is called `\coloneqq`. In mathabx and MnSymbol it's called `\coloneq`. In colonequals it's called `\colonequals`.

[2] Bob Tennent listed these and other disjoint-union symbol possibilities in a November 2007 post to `comp.text.tex`.

TABLE 50: Binary Operators

∐	\amalg	∪	\cup	⊕	\oplus	×	\times
∗	\ast	†	\dagger	⊘	\oslash	◁	\triangleleft
◯	\bigcirc	‡	\ddagger	⊗	\otimes	▷	\triangleright
▽	\bigtriangledown	⋄	\diamond	±	\pm	⊴	\unlhd*
△	\bigtriangleup	÷	\div	▷	\rhd*	⊵	\unrhd*
•	\bullet	◁	\lhd*	\	\setminus	⊎	\uplus
∩	\cap	∓	\mp	⊓	\sqcap	∨	\vee
·	\cdot	⊙	\odot	⊔	\sqcup	∧	\wedge
∘	\circ	⊖	\ominus	⋆	\star	≀	\wr

* Not predefined by the LaTeX 2ε core. Use the latexsym package to expose this symbol.

TABLE 51: $\mathcal{AMS}$ Binary Operators

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

* Some people use a superscripted \intercal for matrix transpose: "A^\intercal" ↦ "$A^{\intercal}$". (See the May 2009 comp.text.tex thread, "raising math symbols", for suggestions about altering the height of the superscript.) \top (Table 195 on page 91), T, and \mathsf{T} are other popular choices: "$A^{\top}$", "A^{T}", "A^{T}".

TABLE 52: stmaryrd Binary Operators

⧶	\baro	⫼	\interleave	⊛	\varoast
⧵	\bbslash	◅	\leftslice	⊍	\varobar
&	\binampersand	⩛	\merge	⊘	\varobslash
⅋	\bindnasrepma	⊖	\minuso	⊚	\varocircle
⧆	\boxast	⫡	\moo	⊙	\varodot
⧈	\boxbar	⨣	\nplus	⋛	\varogreaterthan
⧈	\boxbox	⊍	\obar	⋚	\varolessthan
⧅	\boxbslash	□	\oblong	⊖	\varominus
⧇	\boxcircle	⊘	\obslash	⊕	\varoplus
⊡	\boxdot	⋛	\ogreaterthan	⊘	\varoslash
□	\boxempty	⋚	\olessthan	⊗	\varotimes
⧄	\boxslash	⍱	\ovee	⍱	\varovee
⋎	\curlyveedownarrow	⍲	\owedge	⍲	\varowedge
⋎	\curlyveeuparrow	▻	\rightslice	⨯	\vartimes
⋏	\curlywedgedownarrow	⫽	\sslash	⟙	\Ydown
⋏	\curlywedgeuparrow	⫿	\talloblong	≺	\Yleft
⧹	\fatbslash	◯	\varbigcirc	≻	\Yright
⨟	\fatsemi	⋎	\varcurlyvee	⟘	\Yup
⧸	\fatslash	⋏	\varcurlywedge		

TABLE 53: wasysym Binary Operators

◁	\lhd	○	\ocircle	►	\RHD	⊵	\unrhd
◄	\LHD	▷	\rhd	⊴	\unlhd		

TABLE 54: txfonts/pxfonts Binary Operators

⦶	\circledbar	⦵	\circledwedge	○	\medcirc
⦸	\circledbslash	⅋	\invamp	⊞	\sqcapplus
⦷	\circledvee	●	\medbullet	⊎	\sqcupplus

TABLE 55: mathabx Binary Operators

∗	\ast	⅄	\curlywedge	⊓	\sqcap
✻	\Asterisk	⨪	\divdot	⊔	\sqcup
⩛	\barwedge	⋇	\divideontimes	⩏	\sqdoublecap
★	\bigstar	∸	\dotdiv	⩎	\sqdoublecup
✶	\bigvarstar	∔	\dotplus	▫	\square
⬥	\blackdiamond	⇜	\dottimes	⊌	\squplus
∩	\cap	⩙	\doublebarwedge	⋅	\udot
⨣	\circplus	⋒	\doublecap	⊎	\uplus
⁎	\coasterisk	⋓	\doublecup	⋆	\varstar
✲	\coAsterisk	⋉	\ltimes	∨	\vee
✳	\convolution	⨦	\pluscirc	⩡	\veebar
∪	\cup	⋊	\rtimes	⩢	\veedoublebar
⋎	\curlyvee	▪	\sqbullet	∧	\wedge

Many of the preceding glyphs go by multiple names. `\centerdot` is equivalent to `\sqbullet`, and `\ast` is equivalent to `*`. `\asterisk` produces the same glyph as `\ast`, but as an ordinary symbol, not a binary operator. Similarly, `\bigast` produces a large-operator version of the `\Asterisk` binary operator, and `\bigcoast` produces a large-operator version of the `\coAsterisk` binary operator.

TABLE 56: MnSymbol Binary Operators

⨿	\amalg	⩔	\doublesqcup	∴	\righttherefore
∗	\ast	⩊	\doublevee	⋏	\rightthreetimes
⍀	\backslashdiv	⩓	\doublewedge	⊁	\rightY
⋈	\bowtie	⋱	\downtherefore	⋊	\rtimes
•	\bullet	⊬	\downY	⍁	\slashdiv
∩	\cap	⨰	\dtimes	∏	\smallprod
⩀	\capdot	⁘	\fivedots	⊓	\sqcap
⨢	\capplus	∞	\hbipropto	⩍	\sqcapdot
·	\cdot	‥	\hdotdot	⨅	\sqcapplus
∘	\circ	⌐	\lefthalfcap	⊔	\sqcup

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⩛	\closedcurlyvee	⌞	\lefthalfcup	⊔	\sqcupdot
⩜	\closedcurlywedge	∵	\leftthereforе	⊎	\sqcupplus
∪	\cup	⋉	\leftthreetimes	::	\squaredots
⊍	\cupdot	⋎	\leftY	×	\times
⊎	\cupplus	⋉	\ltimes	⋰	\udotdot
⋎	\curlyvee	⧹	\medbackslash	∴	\uptherefore
⩛	\curlyveedot	○	\medcircle	⋏	\upY
⋏	\curlywedge	⟋	\medslash	⨻	\utimes
⩜	\curlywedgedot	∣	\medvert	⨂	\vbipropto
⋱	\ddotdot	∣·	\medvertdot	:	\vdotdot
⋰	\diamonddots	−	\minus	∨	\vee
÷	\div	∸	\minusdot	⩒	\veedot
·∣	\dotmedvert	∓	\mp	⧖	\vertbowtie
∸	\dotminus	⍁	\neswbipropto	·∣·	\vertdiv
⋒	\doublecap	⍀	\nwsebipropto	∧	\wedge
⋓	\doublecup	+	\plus	⩓	\wedgedot
⩟	\doublecurlyvee	±	\pm	≀	\wreath
⩚	\doublecurlywedge	⌝	\righthalfcap		
⩏	\doublesqcap	⌟	\righthalfcup		

MnSymbol defines \setminus and \smallsetminus as synonyms for \medbackslash; \Join as a synonym for \bowtie; \wr as a synonym for \wreath; \shortmid as a synonym for \medvert; \Cap as a synonym for \doublecap; \Cup as a synonym for \doublecup; and, \uplus as a synonym for \cupplus.

TABLE 57: fdsymbol Binary Operators

⨿	\amalg	⩡	\doublevee	⋊	\rtimes
∗	\ast	⩚	\doublewedge	\	\setminus
⊼	\barwedge	⋎	\downY	⊓	\sqcap
∩	\cap	⧢	\dtimes	⩎	\sqcapdot
⩀	\capdot	‥	\hdotdot	⨅	\sqcapplus
⨢	\capplus	⨍	\intercal	⊔	\sqcup
·	\cdot	⨝	\intprod	⩏	\sqcupdot
▪	\centerdot	⨙	\intprodr	⨆	\sqcupplus
∪	\cup	⋋	\leftthreetimes	×	\times
⊍	\cupdot	⋎	\leftY	⨴	\timesbar
⊎	\cupplus	⋉	\ltimes	⋰	\udotdot
⋎	\curlyvee	⧹	\medbackslash	⧖	\upbowtie
⋏	\curlywedge	⟋	\medslash	⋏	\upY
⋱	\ddotdot	−	\minus	⨻	\utimes
÷	\div	∸	\minusdot	⨿	\varamalg
⋇	\divideontimes	∹	\minusfdots	:	\vdotdot
⁄	\divslash	≑	\minusrdots	⋮	\vdots
∸	\dotminus	∓	\mp	∨	\vee
∔	\dotplus	+	\plus	⩖	\veebar

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⨰	\dottimes	∔	\plusdot	⩒	\veedot
⩚	\doublebarwedge	±	\pm	⩡	\veedoublebar
⋒	\doublecap	⌟	\pullback	∧	\wedge
⋓	\doublecup	⌜	\pushout	⩀	\wedgedot
⩏	\doublesqcap	⋏	\rightthreetimes	≀	\wreath
⩐	\doublesqcup	≻	\rightY		

fdsymbol defines \btimes as a synonym for \dtimes; \Cap as a synonym for \doublecap; \Cup as a synonym for \doublecup; \hookupminus as a synonym for \intprodr; \hourglass as a synonym for \upbowtie; \land as a synonym for \wedge; \lor as a synonym for \vee; \minushookup as a synonym for \intprod; \smalldivslash as a synonym for \medslash; \smallsetminus as a synonym for \medbackslash; \Sqcap as a synonym for \doublesqcap; \Sqcup as a synonym for \doublesqcup; \ttimes as a synonym for \utimes; \lJoin as a synonym for \ltimes; \rJoin as a synonym for \rtimes; \Join and \lrtimes as synonyms for \bowtie; \uplus as a synonym for \cupplus; \veeonvee as a synonym for \doublevee; \wedgeonwedge as a synonym for \doublewedge; and \wr as a synonym for \wreath).

TABLE 58: boisik Binary Operators

∗	\ast	⨰	\dottimes	⧓	\rtimesblack
ɸ	\baro	⩚	\doublebarwedge	⧹	\smallsetminus
⊼	\barwedge	⨟	\fatsemi	⨳	\smashtimes
⧹	\bbslash	⩾	\gtrdot	⨲	\squplus
⅋	\binampersand	⊺	\intercal	⫽	\sslash
⅋	\bindnasrepma	⟅	\lbag	×	\times
⧓	\blackbowtie	⧑	\lblackbowtie	⊎	\uplus
⋈	\bowtie	◁	\leftslice	∩	\varcap
∩	\cap	⋉	\leftthreetimes	∪	\varcup
⋒	\Cap	⩿	\lessdot	⊺	\varintercal
·	\cdot	⋉	\ltimes	⊓	\varsqcap
.	\centerdot	⧔	\ltimesblack	⊔	\varsqcup
∔	\circplus	⩓	\merge	⨯	\vartimes
⁎	\coAsterisk	⊖	\minuso	∨	\vee
⁎	\convolution	⍟	\moo	⩔	\Vee
∪	\cup	∓	\mp	⩒	\veebar
⋓	\Cup	⨦	\nplus	⩛	\veeonvee
⊌	\cupleftarrow	⊕	\pluscirc	∧	\wedge
⋎	\curlyvee	⨣	\plustrif	⩓	\Wedge
⋏	\curlywedge	±	\pm	⋎	\Ydown
†	\dagger	⨍	\rbag	≺	\Yleft
‡	\ddagger	⧓	\rblackbowtie	≻	\Yright
÷	\div	▷	\rightslice	⋏	\Yup
⋇	\divideontimes	⋋	\rightthreetimes		
∔	\dotplus	⋊	\rtimes		

Table 59: stix Binary Operators

⨿	\amalg	⨟	\fcmp	⊔	\sqcup
∗	\ast	⁄	\fracslash	⩏	\Sqcup
⩍	\barcap	⊺	\intercal	⫽	\sslash
⩌	\barcup	⫼	\interleave	⁝	\threedotcolon
⩒	\barvee	⨏	\intprod	×	\times
⊼	\barwedge	⨎	\intprodr	⨴	\timesbar
⩟	\bigslopedvee	∾	\invlazys	−	\tminus
⩠	\bigslopedwedge	⋋	\leftthreetimes	+	\tplus
⨲	\btimes	◁	\lhd	⧺	\tripleplus
∩	\cap	⋉	\ltimes	⧻	\trslash
⋒	\Cap	⩚	\midbarvee	⩎	\twocaps
⩉	\capbarcup	⩛	\midbarwedge	⩊	\twocups
⩀	\capdot	∸	\minusdot	∶	\typecolon
⩇	\capovercup	⨪	\minusfdots	⊎	\uminus
⩆	\capwedge	⨫	\minusrdots	⊴	\unlhd
⩃	\closedvarcap	∓	\mp	⊵	\unrhd
⩂	\closedvarcup	⫛	\nhVvert	⩑	\upand
⩐	\closedvarcupsmashprod	⨢	\opluslhrim	⨄	\uplus
∹	\commaminus	⨣	\oplusrhrim	⩡	\varbarwedge
∪	\cup	⨵	\otimeslhrim	⩢	\vardoublebarwedge
⋓	\Cup	⨶	\otimesrhrim	⩒	\varveebar
⩈	\cupbarcap	∔	\plusdot	×	\vectimes
⊍	\cupdot	⩲	\pluseqq	⩔	\Vee
⊌	\cupleftarrow	⨤	\plushat	∨	\vee
⩅	\cupovercap	⨦	\plussim	⩒	\veebar
⩏	\cupvee	⨧	\plussubtwo	∀	\veedot
⋎	\curlyvee	⨱	\plustrif	⩖	\veedoublebar
⋏	\curlywedge	±	\pm	⩛	\veemidvert
†	\dagger	▷	\rhd	⩊	\veeodot
‡	\ddagger	⋏	\rightthreetimes	⩚	\veeonvee
÷	\div	⨰	\ringplus	⩓	\Wedge
⋇	\divideontimes	⨸	\rsolbar	∧	\wedge
∸	\dotminus	⋊	\rtimes	⩀	\wedgebar
∔	\dotplus	\	\setminus	⩛	\wedgedot
⨯	\dottimes	⧢	\shuffle	⩕	\wedgedoublebar
⩗	\doublebarvee	⨣	\simplus	⩚	\wedgemidvert
⩘	\doublebarwedge	⧹	\smallsetminus	⩛	\wedgeodot
⧺	\doubleplus	⨳	\smashtimes	⩙	\wedgeonwedge
⧸	\dsol	⊓	\sqcap	≀	\wr
∓	\eqqplus	⩏	\Sqcap		

stix defines \land as a synonym for \wedge, \lor as a synonym for \vee, \doublecap as a synonym for \Cap, and \doublecup as a synonym for \Cup.

Table 60: mathdesign Binary Operators

⨲ \dtimes ⨳ \udtimes ⨴ \utimes

The mathdesign package additionally provides versions of each of the binary operators shown in Table 51 on page 28.

Table 61: cmll Binary Operators

⅋	`\parr`*	&	`\with`†

* cmll defines `\invamp` as a synonym for `\parr`.

† `\with` differs from `\&` in terms of its math-mode spacing: `$A \& B$` produces "$A \& B$", for example, while `$A \with B$` produces "$A \with B$".

Table 62: shuffle Binary Operators

⧢	`\cshuffle`	⧢	`\shuffle`

Table 63: ulsy Geometric Binary Operators

⦶	`\odplus`

Table 64: mathabx Geometric Binary Operators

▾	`\blacktriangledown`	⊞	`\boxright`	⊖	`\ominus`
◂	`\blacktriangleleft`	⊡	`\boxslash`	⊕	`\oplus`
▸	`\blacktriangleright`	⊠	`\boxtimes`	⊕	`\oright`
▴	`\blacktriangleup`	⊟	`\boxtop`	⊘	`\oslash`
⊛	`\boxasterisk`	⊡	`\boxtriangleup`	⊗	`\otimes`
⊡	`\boxbackslash`	□	`\boxvoid`	⊗	`\otop`
⊟	`\boxbot`	⊛	`\oasterisk`	⊙	`\otriangleup`
⊡	`\boxcirc`	⊘	`\obackslash`	○	`\ovoid`
⊛	`\boxcoasterisk`	⊖	`\obot`	▿	`\smalltriangledown`
⊟	`\boxdiv`	⊙	`\ocirc`	◃	`\smalltriangleleft`
⊡	`\boxdot`	⊛	`\ocoasterisk`	▹	`\smalltriangleright`
⊞	`\boxleft`	⊘	`\odiv`	▵	`\smalltriangleup`
⊟	`\boxminus`	⊙	`\odot`		
⊞	`\boxplus`	⊕	`\oleft`		

TABLE 65: MnSymbol Geometric Binary Operators

⧅	\boxbackslash	▼	\filledmedtriangledown	◎	\ocirc
⧈	\boxbox	◀	\filledmedtriangleleft	⊙	\odot
⊡	\boxdot	▶	\filledmedtriangleright	⊖	\ominus
⊟	\boxminus	▲	\filledmedtriangleup	⊕	\oplus
⊞	\boxplus	▪	\filledsquare	⊘	\oslash
⧄	\boxslash	⋆	\filledstar	⊛	\ostar
⊠	\boxtimes	▾	\filledtriangledown	⊗	\otimes
◫	\boxvert	◂	\filledtriangleleft	⟁	\otriangle
⟐	\diamondbackslash	▸	\filledtriangleright	⦶	\overt
⟐	\diamonddiamond	▴	\filledtriangleup	⛤	\pentagram
⟐	\diamonddot	◇	\meddiamond	⋄	\smalldiamond
⟐	\diamondminus	□	\medsquare	▫	\smallsquare
⟐	\diamondplus	☆	\medstar	⋆	\smallstar
⟐	\diamondslash	▽	\medtriangledown	▿	\smalltriangledown
⟐	\diamondtimes	◁	\medtriangleleft	◃	\smalltriangleleft
⟐	\diamondvert	▷	\medtriangleright	▹	\smalltriangleright
▽	\downslice	△	\medtriangleup	▵	\smalltriangleup
◆	\filleddiamond	⊛	\oast	⋆	\thinstar
■	\filledmedsquare	⦸	\obackslash	△	\upslice

MnSymbol defines \blacksquare as a synonym for \filledmedsquare; \square and \Box as synonyms for \medsquare; \diamond as a synonym for \smalldiamond; \Diamond as a synonym for \meddiamond; \star as a synonym for \thinstar; \circledast as a synonym for \oast; \circledcirc as a synonym for \ocirc; and, \circleddash as a synonym for \ominus.

TABLE 66: fdsymbol Geometric Binary Operators

⧅	\boxbackslash	▼	\medblacktriangledown	⊕	\oplus
⧈	\boxbox	◀	\medblacktriangleleft	⊘	\oslash
⊡	\boxdot	▶	\medblacktriangleright	⊗	\otimes
⊟	\boxminus	▲	\medblacktriangleup	⦶	\overt
⊞	\boxplus	○	\medcircle	●	\smallblackcircle
⧄	\boxslash	◇	\meddiamond	◆	\smallblackdiamond
⊠	\boxtimes	⟋	\medslash	▪	\smallblacksquare
◫	\boxvert	□	\medsquare	⋆	\smallblackstar
⟐	\diamondbackslash	▽	\medtriangledown	▾	\smallblacktriangledown
⟐	\diamonddiamond	◁	\medtriangleleft	◂	\smallblacktriangleleft
⟐	\diamonddot	▷	\medtriangleright	▸	\smallblacktriangleright
⟐	\diamondminus	△	\medtriangleup	▴	\smallblacktriangleup
⟐	\diamondplus	☆	\medwhitestar	∘	\smallcircle
⟐	\diamondslash	⊛	\oast	⋄	\smalldiamond
⟐	\diamondtimes	⦸	\obackslash	▫	\smallsquare
⟐	\diamondvert	◎	\ocirc	▿	\smalltriangledown
●	\medblackcircle	⊖	\odash	◃	\smalltriangleleft
◆	\medblackdiamond	⊙	\odot	▹	\smalltriangleright
■	\medblacksquare	⊜	\oequal	▵	\smalltriangleup
★	\medblackstar	⊖	\ominus	☆	\smallwhitestar

fdsymbol defines synonyms for most of the preceding symbols:

◆	\blackdiamond	◇	\diamond	•	\smblkcircle
▲	\blacktriangle	◇	\Diamond	◆	\smblkdiamond
▼	\blacktriangledown	⟐	\diamondbslash	▪	\smblksquare
◀	\blacktriangleleft	⟡	\diamondcdot	☆	\smwhitestar
▶	\blacktriangleright	◆	\mdblkdiamond	∘	\smwhtcircle
□	\Box	■	\mdblksquare	◇	\smwhtdiamond
◫	\boxbar	●	\mdlgblkcircle	▫	\smwhtsquare
⧅	\boxbslash	◆	\mdlgblkdiamond	□	\square
⧄	\boxdiag	■	\mdlgblksquare	★	\star
•	\bullet	○	\mdlgwhtcircle	△	\triangle
∘	\circ	◇	\mdlgwhtdiamond	▽	\triangledown
⊛	\circledast	□	\mdlgwhtsquare	◁	\triangleleft
◎	\circledcirc	◇	\mdwhtdiamond	▷	\triangleright
⊖	\circleddash	□	\mdwhtsquare	△	\vartriangle
⊜	\circledequal	★	\medstar		
⦶	\circledvert	⦸	\obslash		

TABLE 67: boisik Geometric Binary Operators

⧫	\blacklozenge	⊞	\boxright	▯	\oblong
■	\blacksquare	⧄	\boxslash	⊖	\obot
▲	\blacktriangle	⊠	\boxtimes	⦸	\obslash
▼	\blacktriangledown	⊟	\boxtop	⧁	\ogreaterthan
◀	\blacktriangleleft	⧈	\boxtriangle	⦵	\oleft
▶	\blacktriangleright	⊛	\circledast	⧀	\olessthan
⊠	\boxast	◎	\circledcirc	⊖	\ominus
◫	\boxbar	⊝	\circleddash	⊕	\oplus
⊡	\boxbot	⋄	\diamond	⦶	\oright
⧈	\boxbox	⟠	\diamondbar	⊘	\oslash
⧅	\boxbslash	⟐	\diamondcircle	⊗	\otimes
⊡	\boxcircle	⟢	\diamondminus	⦷	\otop
⊞	\boxdivision	◇	\diamondop	⟑	\otriangle
⊡	\boxdot	⟡	\diamondplus	⩒	\ovee
⊞	\boxleft	⟣	\diamondtimes	⩑	\owedge
⊟	\boxminus	⟐	\diamondtriangle	⋆	\star
⊞	\boxplus	⦶	\obar	▯	\talloblong

TABLE 68: stix Geometric Binary Operators

⧗	\blackhourglass	⟡	\concavediamondtickleft	⊕	\oplus
⊛	\boxast	⟡	\concavediamondtickright	⊘	\oslash
◫	\boxbar	⋄	\diamond	⊗	\otimes
⧈	\boxbox	◁	\dsub	⨂	\Otimes
⧅	\boxbslash	⧖	\hourglass	⍟	\otimeshat
⊡	\boxcircle	⟠	\lozengeminus	▷	\rsub
⧄	\boxdiag	⧫	\mdlgblklozenge	•	\smblkcircle
⊡	\boxdot	○	\mdlgwhtcircle	⋆	\star
⊟	\boxminus	⦶	\obar	∥	\talloblong
⊞	\boxplus	⦵	\obot*	△	\triangle
⊠	\boxtimes	⦸	\obslash	◬	\triangleminus
⊛	\circledast	⨸	\odiv	◬	\triangleplus
⊚	\circledcirc	⊙	\odot	△	\triangleserifs
⊝	\circleddash	⦼	\odotslashdot*	◬	\triangletimes
⊜	\circledequal	⦁	\ogreaterthan	•	\vysmblkcircle†
⫼	\circledparallel	⊠	\olcross*	∘	\vysmwhtcircle
⦶	\circledvert	⦀	\olessthan	⊣□	\whitesquaretickleft
⊖	\circlehbar	⊖	\ominus	□⊢	\whitesquaretickright
⟡	\concavediamond	⦱	\operp		

* Defined as an ordinary character, not as a binary relation. However, these symbols more closely resemble the other symbols in this table than they do the geometric shapes presented in Table 372, which is why they are included here.

† stix defines \bullet as a synonym for \vysmblkcircle.

TABLE 69: stix Small Integrals

⨏	\smallawint	⨙	\smallintcap	∲	\smalloint
∳	\smallcirfnint	⨗	\smallintclockwise	∲	\smallointctrclockwise
⨍	\smallfint	⨘	\smallintcup	⨐	\smallpointint
⨌	\smalliiiint	⨚	\smallintlarhk	⨒	\smallrppolint
∭	\smalliiint	⨜	\smallintx	⨑	\smallscpolint
∬	\smalliint	⨍	\smalllowint	⨖	\smallsqint
∫	\smallint	⨒	\smallnpolint	⨋	\smallsumint
⨍	\smallintbar	⨌	\smalloiiint	⨍	\smallupint
⨎	\smallintBar	∯	\smalloiint	∲	\smallvarointclockwise

By default, each of the preceding commands points to a slanted version of the glyph, as shown. The upint package option typesets each integral instead as an upright version. Slanted and upright integrals can be mixed, however, by explicitly using the commands shown in Table 70.

Table 70: stix Small Integrals with Explicit Slant

$\smallawintsl$	\smallawintsl	$\smallawintup$	\smallawintup
$\smallcirfnintsl$	\smallcirfnintsl	$\smallcirfnintup$	\smallcirfnintup
$\smallfintsl$	\smallfintsl	$\smallfintup$	\smallfintup
$\smalliiiintsl$	\smalliiiintsl	$\smalliiiintup$	\smalliiiintup
$\smalliiintsl$	\smalliiintsl	$\smalliiintup$	\smalliiintup
$\smalliintsl$	\smalliintsl	$\smalliintup$	\smalliintup
$\smallintbarsl$	\smallintbarsl	$\smallintBarup$	\smallintBarup
$\smallintBarsl$	\smallintBarsl	$\smallintbarup$	\smallintbarup
$\smallintcapsl$	\smallintcapsl	$\smallintcapup$	\smallintcapup
$\smallintclockwisesl$	\smallintclockwisesl	$\smallintclockwiseup$	\smallintclockwiseup
$\smallintcupsl$	\smallintcupsl	$\smallintcupup$	\smallintcupup
$\smallintlarhksl$	\smallintlarhksl	$\smallintlarhkup$	\smallintlarhkup
$\smallintsl$	\smallintsl	$\smallintup$	\smallintup
$\smallintxsl$	\smallintxsl	$\smallintxup$	\smallintxup
$\smalllowintsl$	\smalllowintsl	$\smalllowintup$	\smalllowintup
$\smallnpolintsl$	\smallnpolintsl	$\smallnpolintup$	\smallnpolintup
$\smalloiiintsl$	\smalloiiintsl	$\smalloiiintup$	\smalloiiintup
$\smalloiintsl$	\smalloiintsl	$\smalloiintup$	\smalloiintup
$\smallointctrclockwisesl$	\smallointctrclockwisesl	$\smallointctrclockwiseup$	\smallointctrclockwiseup
$\smallointsl$	\smallointsl	$\smallointup$	\smallointup
$\smallpointintsl$	\smallpointintsl	$\smallpointintup$	\smallpointintup
$\smallrppolintsl$	\smallrppolintsl	$\smallrppolintup$	\smallrppolintup
$\smallscpolintsl$	\smallscpolintsl	$\smallscpolintup$	\smallscpolintup
$\smallsqintsl$	\smallsqintsl	$\smallsqintup$	\smallsqintup
$\smallsumintsl$	\smallsumintsl	$\smallsumintup$	\smallsumintup
$\smallupintsl$	\smallupintsl	$\smallupintup$	\smallupintup
$\smallvarointclockwisesl$	\smallvarointclockwisesl	$\smallvarointclockwiseup$	\smallvarointclockwiseup

Instead of using the preceding symbols directly, it is generally preferable to use the symbols listed in Table 69 either with or without the upint package option. Specifying upint selects each integral's upright (up) variant, while omitting upint selects each integral's slanted (sl) variant. Use the symbols shown in Table 70 only when you need to include both upright and slanted variations of a symbol in the same document.

Table 71: Variable-sized Math Operators

$\bigcap$	\bigcap	$\bigotimes$	\bigotimes	$\bigwedge$	\bigwedge	$\prod$	\prod
$\bigcup$	\bigcup	$\bigsqcup$	\bigsqcup	$\coprod$	\coprod	$\sum$	\sum
$\bigodot$	\bigodot	$\biguplus$	\biguplus	$\int$	\int		
$\bigoplus$	\bigoplus	$\bigvee$	\bigvee	$\oint$	\oint		

TABLE 72: $\mathcal{AMS}$ Variable-sized Math Operators

$\iint$	$\iint$	`\iint`	$\iiint$	$\iiint$	`\iiint`
$\iiiint$	$\iiiint$	`\iiiint`	$\int\cdots\int$	$\int\cdots\int$	`\idotsint`

TABLE 73: stmaryrd Variable-sized Math Operators

$\boxdot$	`\bigbox`	$\leftthreetimes$	`\biginterleave`	$\sqcap$	`\bigsqcap`
$\curlyvee$	`\bigcurlyvee`	$\bigoplus$	`\bignplus`	$\bigtriangledown$	`\bigtriangledown`
$\curlywedge$	`\bigcurlywedge`	$\parallel$	`\bigparallel`	$\bigtriangleup$	`\bigtriangleup`

TABLE 74: wasysym Variable-sized Math Operators

$\int$	`\int`	$\iint$	`\iint`	$\iiint$	`\iiint`
$\oint$	`\oint`	$\oiint$	`\oiint`		

If wasysym is loaded without package options then none of the preceding symbols are defined. However, `\varint` produces wasysym's `\int` glyph, and `\varoint` produces wasysym's `\oint` glyph.

If wasysym is loaded with the integrals option then all of the preceding symbols are defined, but `\varint` and `\varoint` are left undefined.

If wasysym is loaded with the nointegrals option then none of the preceding symbols, `\varint`, or `\varoint` are defined.

TABLE 75: mathabx Variable-sized Math Operators

$\curlyvee$	`\bigcurlyvee`	$\boxslash$	`\bigboxslash`	$\bigoplus$	`\bigoright`
$\sqcap$	`\bigsqcap`	$\boxtimes$	`\bigboxtimes`	$\bigoslash$	`\bigoslash`
$\curlywedge$	`\bigcurlywedge`	$\boxplus$	`\bigboxtop`	$\bigotimes$	`\bigotop`

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⊛ ⊛	\bigboxasterisk	△ △	\bigboxtriangleup	⟁ ⟁	\bigotriangleup
⧅ ⧅	\bigboxbackslash	□ □	\bigboxvoid	◯ ◯	\bigovoid
⊟ ⊟	\bigboxbot	⋒ ⋒	\bigcomplementop	⨁ ⨁	\bigplus
⊡ ⊡	\bigboxcirc	⊛ ⊛	\bigoasterisk	⨆ ⨆	\bigsquplus
⊛ ⊛	\bigboxcoasterisk	⦸ ⦸	\bigobackslash	⨉ ⨉	\bigtimes
⨪ ⨪	\bigboxdiv	⊖ ⊖	\bigobot	⨌ ∭	\iiint
⊡ ⊡	\bigboxdot	⊙ ⊙	\bigocirc	∬ ∬	\iint
⊞ ⊞	\bigboxleft	⊛ ⊛	\bigocoasterisk	∫ ∫	\int
⊟ ⊟	\bigboxminus	⊘ ⊘	\bigodiv	∯ ∰	\oiint
⊞ ⊞	\bigboxplus	⊕ ⊕	\bigoleft	∮ ∮	\oint
⊞ ⊞	\bigboxright	⊖ ⊖	\bigominus		

Table 76: txfonts/pxfonts Variable-sized Math Operators

⨍	⨍	\bigsqcapplus	∲	∲	\ointclockwise
⨆	⨆	\bigsqcupplus	∳	∳	\ointctrclockwise
⨍	⨍	\fint	⨌	⨌	\sqiiint
∫⋯∫	∫⋯∫	\idotsint	⨏	⨏	\sqiint
⨋	⨌	\iiiint	⨖	⨖	\sqint

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⨌	⨌	\iiint	⨐	⨐	\varoiiintclockwise
∬	∬	\iint	⨏	⨏	\varoiiintctrclockwise
∰	∰	\oiiintclockwise	⨍	⨍	\varoiintclockwise
∰	∰	\oiiintctrclockwise	⨎	⨎	\varoiintctrclockwise
∰	∰	\oiiint	∮	∮	\varointclockwise
∯	∯	\oiintclockwise	∮	∮	\varointctrclockwise
∯	∯	\oiintctrclockwise	×	×	\varprod
∯	∯	\oiint			

Table 77: esint Variable-sized Math Operators

∫···∫	∫···∫	\dotsint	∮	∮	\ointclockwise
⨍	⨍	\fint	∮	∮	\ointctrclockwise
⨌	⨌	\iiiint	⨖	⨖	\sqiint
∭	∭	\iiint	⨕	⨕	\sqint
∬	∬	\iint	⨏	⨏	\varoiint
⨎	⨎	\landdownint	∮	∮	\varointclockwise
⨍	⨍	\landupint	∮	∮	\varointctrclockwise
∯	∯	\oiint			

TABLE 78: bigints Variable-sized Math Operators

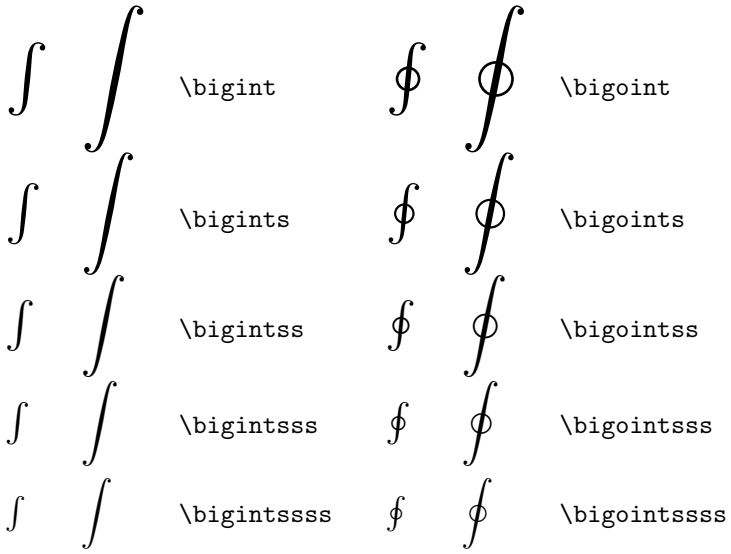

TABLE 79: MnSymbol Variable-sized Math Operators

⋂	⋂	\bigcap	⨀	⨀	\bigodot	∁	∁	\complement
⨍	⨍	\bigcapdot	⨁	⨁	\bigoplus	∐	∐	\coprod
⨎	⨎	\bigcapplus	⨸	⨸	\bigoslash	∫⋯∫	∫⋯∫	\idotsint
○	○	\bigcircle	⍟	⍟	\bigostar	⨌	⨌	\iiiint
⋃	⋃	\bigcup	⨂	⨂	\bigotimes	∭	∭	\iiint
⨃	⨃	\bigcupdot	⨋	⨋	\bigotriangle	∬	∬	\iint
⨄	⨄	\bigcupplus*	⨇	⨇	\bigovert	∫	∫	\int
⋎	⋎	\bigcurlyvee	+	+	\bigplus	⨏	⨏	\landdownint
⋎	⋎	\bigcurlyveedot	⨅	⨅	\bigsqcap	⨎	⨎	\landupint
⋏	⋏	\bigcurlywedge	⨅	⨅	\bigsqcapdot	∲	∲	\lcircleleftint
⋏	⋏	\bigcurlywedgedot	⨅	⨅	\bigsqcapplus	∲	∲	\lcirclerightint
⩛	⩛	\bigdoublecurlyvee	⨆	⨆	\bigsqcup	∯	∯	\oiint
⩚	⩚	\bigdoublecurlywedge	⨆	⨆	\bigsqcupdot	∮	∮	\oint
⩛	⩛	\bigdoublevee	⨆	⨆	\bigsqcupplus	∏	∏	\prod
⩚	⩚	\bigdoublewedge	×	×	\bigtimes	∲	∲	\rcircleleftint
⊛	⊛	\bigoast	∨	∨	\bigvee	∲	∲	\rcirclerightint

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⦸	⦸	\bigobackslash	⩔	⩔	\bigveedot	⨍	⨍	\strokedint
⨾	⨾	\bigocirc	⋀	⋀	\bigwedge	∑	∑	\sum
⨀	⨀	\bigodot	⟑	⟑	\bigwedgedot	∑	∑	\sumint

* MnSymbol defines \biguplus as a synonym for \bigcupplus.

TABLE 80: fdsymbol Variable-sized Math Operators

⋂	⋂	\bigcap	⨆	⨆	\bigsqcup	⨍	⨍	\landupint
⨀	⨀	\bigcapdot	⨆	⨆	\bigsqcupdot	∮	∮	\lcircleleftint
⨁	⨁	\bigcapplus	⨆	⨆	\bigsqcupplus	∮	∮	\lcirclerightint
⋃	⋃	\bigcup	⨉	⨉	\bigtimes	∰	∰	\oiiint
⨃	⨃	\bigcupdot	⋁	⋁	\bigvee	∯	∯	\oiint
⨄	⨄	\bigcupplus	⩒	⩒	\bigveedot	∮	∮	\oint
⋎	⋎	\bigcurlyvee	⋀	⋀	\bigwedge	∑	∑	\osum
⋏	⋏	\bigcurlywedge	⟑	⟑	\bigwedgedot	∏	∏	\prod
⩔	⩔	\bigdoublevee	∐	∐	\coprod	∮	∮	\rcircleleftint
⩓	⩓	\bigdoublewedge	⨍	⨍	\fint	∮	∮	\rcirclerightint
⨳	⨳	\bigoast	∫⋯∫	∫⋯∫	\idotsint	∑	∑	\sum
⨀	⨀	\bigodot	⨌	⨌	\iiiint	∑	∑	\sumint
⨁	⨁	\bigoplus	∭	∭	\iiint	∐	∐	\varcoprod
⨂	⨂	\bigotimes	∬	∬	\iint	∑	∑	\varosum
⨁	⨁	\bigplus	∫	∫	\int	∏	∏	\varprod
⨅	⨅	\bigsqcap	⨍	⨍	\intbar	∑	∑	\varsum
⨅	⨅	\bigsqcapdot	⨎	⨎	\intBar	∑	∑	\varsumint
⨅	⨅	\bigsqcapplus	⨏	⨏	\landdownint			

* fdsymbol defines `\awint` as a synonym for `\landdownint`, `\biguplus` as a synonym for `\bigcupplus`, `\conjquant` as a synonym for `\bigdoublewedge`, `\disjquant` as a synonym for `\bigdoublevee`, `\dotsint` as a synonym for `\idotsint`, `\intclockwise` as a synonym for `\landupint`, `\intctrclockwise` as a synonym for `\landdownint`, `\modtwosum` as a synonym for `\osum`, `\ointclockwise` as a synonym for `\lcircleleftint`, `\ointctrclockwise` as a synonym for `\rcirclerightint`, `\varmodtwosum` as a synonym for `\varosum`, `\varointclockwise` as a synonym for `\lcirclerightint`, and `\varointctrclockwise` as a synonym for `\rcircleleftint`.

TABLE 81: boisik Variable-sized Math Operators

$\int$	$\int$	`\intup`

boisik additionally provides all of the symbols in Table 71.

TABLE 82: stix Variable-sized Math Operators

$\fatslash$	$\fatslash$	`\awint`	$\amalg$	$\amalg$	`\coprod`	$\oiiint$	$\oiiint$	`\oiiint`
$\Bbbsum$	$\Bbbsum$	`\Bbbsum`	$\Vee$	$\Vee$	`\disjquant`	$\oiint$	$\oiint$	`\oiint`
$\cap$	$\bigcap$	`\bigcap`	$\fint$	$\fint$	`\fint`	$\oint$	$\oint$	`\oint`
$\cup$	$\bigcup$	`\bigcup`	$\iiiint$	$\iiiint$	`\iiiint`	$\ointctrclockwise$	$\ointctrclockwise$	`\ointctrclockwise`
$\cupdot$	$\bigcupdot$	`\bigcupdot`	$\iiint$	$\iiint$	`\iiint`	$\pointint$	$\pointint$	`\pointint`
$\odot$	$\bigodot$	`\bigodot`	$\iint$	$\iint$	`\iint`	$\prod$	$\prod$	`\prod`
$\oplus$	$\bigoplus$	`\bigoplus`	$\int$	$\int$	`\int`	$\rppolint$	$\rppolint$	`\rppolint`
$\otimes$	$\bigotimes$	`\bigotimes`	$\fint$	$\fint$	`\intbar`	$\scpolint$	$\scpolint$	`\scpolint`
$\sqcap$	$\bigsqcap$	`\bigsqcap`	$\intBar$	$\intBar$	`\intBar`	$\sqint$	$\sqint$	`\sqint`
$\sqcup$	$\bigsqcup$	`\bigsqcup`	$\intcap$	$\intcap$	`\intcap`	$\sum$	$\sum$	`\sum`
$\talloblong$	$\talloblong$	`\bigtalloblong`	$\intclockwise$	$\intclockwise$	`\intclockwise`	$\sumint$	$\sumint$	`\sumint`

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$\bigtimes$		\bigtimes	$\intcup$		\intcup	$\upint$		\upint
$\biguplus$		\biguplus	$\intlarhk$		\intlarhk	$\varointclockwise$		\varointclockwise
$\bigvee$		\bigvee	$\intx$		\intx	$\xbsol$		\xbsol
$\bigwedge$		\bigwedge	$\lowint$		\lowint	$\xsol$		\xsol
$\cirfnint$		\cirfnint	$\modtwosum$		\modtwosum			
$\conjquant$		\conjquant	$\npolint$		\npolint			

By default, each of the integral-producing commands in Table 82 points to a slanted version of the glyph, as shown. The upint package option typesets each integral instead as an upright version. Slanted and upright integrals can be mixed, however, by explicitly using the commands shown in Table 83.

TABLE 83: stix Integrals with Explicit Slant

$\intsl$		\intsl	$\intup$		\intup
$\iintsl$		\iintsl	$\iintup$		\iintup
$\iiintsl$		\iiintsl	$\iiintup$		\iiintup
$\ointsl$		\ointsl	$\ointup$		\ointup
$\oiintsl$		\oiintsl	$\oiintup$		\oiintup
$\oiiintsl$		\oiiintsl	$\oiiintup$		\oiiintup
$\intclockwisesl$		\intclockwisesl	$\intclockwiseup$		\intclockwiseup
$\varointclockwisesl$		\varointclockwisesl	$\varointclockwiseup$		\varointclockwiseup
$\ointctrclockwisesl$		\ointctrclockwisesl	$\ointctrclockwiseup$		\ointctrclockwiseup

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		\sumintsl			\sumintup
		\iiiintsl			\iiiintup
		\intbarsl			\intbarup
		\intBarsl			\intBarup
		\fintsl			\fintup
		\cirfnintsl			\cirfnintup
		\awintsl			\awintup
		\rppolintsl			\rppolintup
		\scpolintsl			\scpolintup
		\npolintsl			\npolintup
		\pointintsl			\pointintup
		\sqintsl			\sqintup
		\intlarhksl			\intlarhkup
		\intxsl			\intxup
		\intcapsl			\intcapup
		\intcupsl			\intcupup
		\upintsl			\upintup
		\lowintsl			\lowintup

Instead of using the preceding symbols directly, it is generally preferable to use the symbols listed in Table 82 either with or without the upint package option. Specifying upint selects each integral's upright (up) variant, while omitting upint selects each integral's slanted (sl) variant. Use the symbols shown in Table 83 only when you need to include both upright and slanted variations of a symbol in the same document.

Table 84: mathdesign Variable-sized Math Operators

$\intclockwise$		`\intclockwise`	$\ointclockwise$		`\ointclockwise`
$\oiiint$		`\oiiint`	$\ointctrclockwise$		`\ointctrclockwise`
$\oiint$		`\oiint`			

The mathdesign package provides three versions of each integral—in fact, of every symbol—to accompany different text fonts: Utopia ($\int$), Garamond ($\int$), and Charter ($\int$).

Table 85: prodint Variable-sized Math Operators

$\prodi$	`\prodi`	$\Prodi$	`\Prodi`	$\PRODI$	`\PRODI`

prodint currently requires the author to manually specify `\prodi` for inlined expressions (`$...$`), `\Prodi` for displayed math (`\[...\]`), and `\PRODI` for displayed math involving tall integrands. The package does not define a product integral command that scales automatically akin to the symbols in Table 71.

Table 86: cmll Large Math Operators

$\parr$	`\bigparr`*	$\with$	`\bigwith`

* cmll defines `\biginvamp` as a synonym for `\bigparr`.

Table 87: Binary Relations

$\approx$	`\approx`	$\equiv$	`\equiv`	$\perp$	`\perp`	$\smile$	`\smile`
$\asymp$	`\asymp`	$\frown$	`\frown`	$\prec$	`\prec`	$\succ$	`\succ`
$\bowtie$	`\bowtie`	$\Join$	`\Join`*	$\preceq$	`\preceq`	$\succeq$	`\succeq`
$\cong$	`\cong`	$\mid$	`\mid`†	$\propto$	`\propto`	$\vdash$	`\vdash`
$\dashv$	`\dashv`	$\models$	`\models`	$\sim$	`\sim`		
$\doteq$	`\doteq`	$\parallel$	`\parallel`	$\simeq$	`\simeq`		

* Not predefined by the LaTeX 2_ε core. Use the latexsym package to expose this symbol.

† The difference between `\mid` and `|` is that the former is a binary relation while the latter is a math ordinal. Consequently, LaTeX typesets the two with different surrounding spacing. Contrast "`P(A | B)`" ↦ "$P(A|B)$" with "`P(A \mid B)`" ↦ "$P(A \mid B)$".

TABLE 88: $\mathcal{AMS}$ Binary Relations

≊	\approxeq	≖	\eqcirc	≿	\succapprox
϶	\backepsilon	≒	\fallingdotseq	≽	\succcurlyeq
∽	\backsim	⊸	\multimap	≿	\succsim
⋍	\backsimeq	⋔	\pitchfork	∴	\therefore
∵	\because	≾	\precapprox	≈	\thickapprox
≬	\between	≼	\preccurlyeq	∼	\thicksim
≎	\Bumpeq	≾	\precsim	∝	\varpropto
≏	\bumpeq	≒	\risingdotseq	⊩	\Vdash
≗	\circeq	∣	\shortmid	⊨	\vDash
≺	\curlyeqprec	∥	\shortparallel	⊪	\Vvdash
≻	\curlyeqsucc	⌢	\smallfrown		
≒	\doteqdot	⌣	\smallsmile		

TABLE 89: $\mathcal{AMS}$ Negated Binary Relations

≇	\ncong	∦	\nshortparallel	⊯	\nVDash
∤	\nmid	≁	\nsim	⪹	\precnapprox
∦	\nparallel	⊁	\nsucc	⋨	\precnsim
⊀	\nprec	⋡	\nsucceq	⪺	\succnapprox
⋠	\npreceq	⊭	\nvDash	⋩	\succnsim
∤	\nshortmid	⊬	\nvdash		

TABLE 90: stmaryrd Binary Relations

⋵	\inplus	⋹	\niplus

TABLE 91: wasysym Binary Relations

⌐	\invneg	⇝	\leadsto	∝	\wasypropto
⋈	\Join	⊛	\logof		

TABLE 92: txfonts/pxfonts Binary Relations

⧁	\circledgtr	⋉	\lJoin	×	\opentimes
⧀	\circledless	⋈	\lrtimes	⫫	\Perp
:≈	\colonapprox	⊸	\multimap	⪵	\preceqq
::≈	\Colonapprox	⊶	\multimapboth	⪹	\precneqq
:−	\coloneq	⧟	\multimapbothvert	⋊	\rJoin
::−	\Coloneq	⧟	\multimapdot	⋐	\strictfi
::=	\Coloneqq	⧟	\multimapdotboth	⋑	\strictif
:=	\coloneqq*	⧟	\multimapdotbothA	⋐⋑	\strictiff
::~	\Colonsim	⧟	\multimapdotbothAvert	⪶	\succeqq
:~	\colonsim	⧟	\multimapdotbothB	⪺	\succneqq
−::	\Eqcolon	⧟	\multimapdotbothBvert	//	\varparallel
−:	\eqcolon	⧟	\multimapdotbothvert	\\	\varparallelinv
=:	\eqqcolon	⧟	\multimapdotinv	⫦	\VvDash
=::	\Eqqcolon	⊷	\multimapinv		
≂	\eqsim	⤫	\openJoin		

* As an alternative to using txfonts/pxfonts, a ":=" symbol can be constructed with "\mathrel{\mathop:}=".

TABLE 93: txfonts/pxfonts Negated Binary Relations

≋̸	\napproxeq	⋠	\npreccurlyeq	≉	\nthickapprox
≁	\nasymp	⪵̸	\npreceqq	↞̸	\ntwoheadleftarrow
∽̸	\nbacksim	⋡	\nprecsim	↠̸	\ntwoheadrightarrow
≠	\nbacksimeq	≠	\nsimeq	∦	\nvarparallel
≠	\nbumpeq	⪸̸	\nsuccapprox	⫮	\nvarparallelinv
≠	\nBumpeq	⋩	\nsucccurlyeq	⊮	\nVdash
≢	\nequiv	⪶̸	\nsucceqq		
≾̸	\nprecapprox	≿̸	\nsuccsim		

TABLE 94: mathabx Binary Relations

≬	\between	∣	\divides	≓	\risingdotseq
≒	\botdoteq	≒	\dotseq	≿	\succapprox
≎	\Bumpedeq	≖	\eqbumped	≽	\succcurlyeq
≏	\bumpedeq	≗	\eqcirc	≻	\succdot
≗	\circeq	≕	\eqcolon	≿	\succsim
≔	\coloneq	≒	\fallingdotseq	∴	\therefore
≙	\corresponds	⋙	\ggcurly	≒	\topdoteq
⋞	\curlyeqprec	⋘	\llcurly	⊨	\vDash
⋟	\curlyeqsucc	≾	\precapprox	⊩	\Vdash
⫤	\DashV	≼	\preccurlyeq	⊫	\VDash
⫤	\Dashv	≺	\precdot	⊪	\Vvdash
⫣	\dashVv	≾	\precsim		

TABLE 95: mathabx Negated Binary Relations

≋̸	\napprox	⊥̸	\notperp	⊭	\nvDash
≇	\ncong	⊀	\nprec	⊯	\nVDash
⋞̸	\ncurlyeqprec	⪷̸	\nprecapprox	⊮	\nVdash
⋟̸	\ncurlyeqsucc	⋠	\npreccurlyeq	⊬	\nvdash
⫤̸	\nDashv	⪯̸	\npreceq	⊮	\nVvash
⊯	\ndashV	⋨	\nprecsim	⪹̸	\precnapprox
⊭	\ndashv	⊀	\nsim	⪵̸	\precneq
⫤̸	\nDashV	≄	\nsimeq	⋨̸	\precnsim
⫤̸	\ndashVv	⊁	\nsucc	⪺̸	\succnapprox
≠	\neq	⪸̸	\nsuccapprox	⪶̸	\succneq
≄	\notasymp	⋡	\nsucccurlyeq	⋩̸	\succnsim
∤	\notdivides	⪰̸	\nsucceq		
≢	\notequiv	⋩	\nsuccsim		

The \changenotsign command toggles the behavior of \not to produce either a vertical or a diagonal slash through a binary operator. Thus, "$a \not= b$" can be made to produce either "$a \not= b$" or "$a \neq b$".

TABLE 96: MnSymbol Binary Relations

≈	\approx	≙	\hateq	∝	\rightpropto
≅	\approxeq	≍	\hcrossing	▷	\rightslice
≳	\backapprox	⊢	\leftfootline	⊩	\rightVdash
≅	\backapproxeq	←	\leftfree	⊢	\rightvdash
≌	\backcong	⫤	\leftmodels	≒	\risingdotseq
≍	\backeqsim	⫤	\leftModels	↘	\sefootline
∽	\backsim	∝	\leftpropto	↘	\sefree
≃	\backsimeq	—	\leftrightline	⪪	\seModels
≋	\backtriplesim	=	\Leftrightline	⪪	\semodels
≬	\between	◁	\leftslice	)(	\separated
≏	\bumpeq	⫣	\leftVdash	⪫	\seVdash
≎	\Bumpeq	⊣	\leftvdash	⪦	\sevdash
≗	\circeq	↗	\nefootline	∥	\shortparallel
⊡	\closedequal	↗	\nefree	~	\sim
≺	\closedprec	⪫	\neModels	≃	\simeq
≻	\closedsucc	⪫	\nemodels	≻	\succ
:=	\coloneq	⁄	\neswline	≳	\succapprox
≅	\cong	//	\Neswline	⪰	\succcurlyeq
≼	\curlyeqprec	⪬	\neVdash	≥	\succeq
≽	\curlyeqsucc	⪦	\nevdash	≳	\succsim
≑	\Doteq	↖	\nwfootline	↙	\swfootline
≐	\doteq	↖	\nwfree	↙	\swfree
⊥	\downfootline	⪪	\nwmodels	⪫	\swModels
↓	\downfree	⪫	\nwModels	⪦	\swmodels
⫪	\downmodels	⫞	\nwsecrossing	⪧	\swVdash
⫫	\downModels	\	\Nwseline	↗	\swvdash
∝	\downpropto	\	\nwseline	≋	\triplesim
⊤	\downvdash	↘	\nwvdash	|	\updownline

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⊤	\downVdash	⩾	\nwVdash	‖	\Updownline
≒	\eqbump	≺	\prec	⊺	\upfootline
≖	\eqcirc	≾	\precapprox	↾	\upfree
≑	\eqdot	≼	\preccurlyeq	⫫	\upModels
≃	\eqsim	≤	\preceq	⫪	\upmodels
=	\equal	≲	\precsim	∝	\uppropto
⧈	\equalclosed	⟙	\rightfootline	⊥	\upvdash
≡	\equiv	⇁	\rightfree	⫠	\upVdash
⊟	\equivclosed	⊨	\rightmodels	⨯	\vcrossing
≒	\fallingdotseq	⊫	\rightModels	⊪	\Vvdash

MnSymbol additionally defines synonyms for some of the preceding symbols:

⊣	\dashv	(same as \leftvdash)
⧹	\diagdown	(same as \nwseline)
⧸	\diagup	(same as \neswline)
⟋	\divides	(same as \updownline)
≑	\doteqdot	(same as \Doteq)
⊨	\models	(same as \rightmodels)
‖	\parallel	(same as \Updownline)
⊥	\perp	(same as \upvdash)
∝	\propto	(same as \leftpropto)
—	\relbar	(same as \leftrightline)
═	\Relbar	(same as \Leftrightline)
∝	\varpropto	(same as \leftpropto)
⊨	\vDash	(same as \rightmodels)
⫤	\VDash	(same as \rightModels)
⊢	\vdash	(same as \rightvdash)
⫣	\Vdash	(same as \rightVdash)

TABLE 97: MnSymbol Negated Binary Relations

≉	\napprox	⊬	\nleftfootline	≱	\nrisingdotseq
≱	\napproxeq	↚	\nleftfree	⤩	\nsefootline
⋠	\nbackapprox	⊭	\nleftmodels	↘	\nsefree
⋡	\nbackapproxeq	⫤̸	\nleftModels	⪧̸	\nseModels
≌	\nbackcong	⋪	\nleftrightline	⪧̸	\nsemodels
≄	\nbackeqsim	⇍	\nLeftrightline	⊀	\nsevdash
≁	\nbacksim	⊮	\nleftvdash	⪧̸	\nseVdash
≋	\nbacksimeq	⫣̸	\nleftVdash	∤	\nshortmid
⋋	\nbacktriplesim	⤳̸	\nnefootline	∦	\nshortparallel
≠	\nbumpeq	↗	\nnefree	≁	\nsim
≠	\nBumpeq	⪧̸	\nnemodels	≄	\nsimeq
≗	\ncirceq	⪧̸	\nneModels	⊁	\nsucc
≠	\nclosedequal	⤳̸	\nneswline	⋡	\nsuccapprox
≇	\ncong	⤳̸	\nNeswline	⋡	\nsucccurlyeq
⋞	\ncurlyeqprec	⪧̸	\nneVdash	≱	\nsucceq
⋟	\ncurlyeqsucc	⊬	\nnevdash	≱	\nsuccsim

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≠̇	\ndoteq	⋖̸	\nnwfootline	⋙̸	\nswfootline
≠̈	\nDoteq	⋖̸	\nnwfree	⋙̸	\nswfree
⫞̸	\ndownfootline	⋘̸	\nnwmodels	⋘̸	\nswModels
⫞̸	\ndownfree	⋘̸	\nnwModels	⋘̸	\nswmodels
⫟̸	\ndownModels	⋖̸	\nNwseline	⋙̸	\nswvdash
⫟̸	\ndownmodels	⋖̸	\nnwseline	⋘̸	\nswVdash
⫠̸	\ndownVdash	⋖̸	\nnwvdash	≋̸	\ntriplesim
⫠̸	\ndownvdash	⋘̸	\nnwVdash	⫦̸	\nUpdownline
≠	\neqbump	⊀	\nprec	⫞̸	\nupdownline
≠	\neqcirc	⪯̸	\nprecapprox	⫞̸	\nupfootline
≠	\neqdot	⋠	\npreccurlyeq	⫟̸	\nupfree
≠	\neqsim	⪯̸	\npreceq	⫟̸	\nupModels
≠	\nequal	⋨̸	\nprecsim	⫟̸	\nupmodels
≠	\nequalclosed	⊬	\nrightfootline	⫠̸	\nupVdash
≠	\nequiv	⊬	\nrightfree	⫠̸	\nupvdash
≠	\nequivclosed	⊯	\nrightModels	⪹̸	\precnapprox
⤪	\neswcrossing	⊭	\nrightmodels	⪹̸	\precnsim
≒̸	\nfallingdotseq	⊮	\nrightvdash	⪺̸	\succnapprox
≠	\nhateq	⊯	\nrightVdash	⪺̸	\succnsim

MnSymbol additionally defines synonyms for some of the preceding symbols:

⊬	\ndashv	(same as \nleftvdash)
⋖̸	\ndiagdown	(same as \nnwseline)
⋠	\ndiagup	(same as \nneswline)
∤	\ndivides	(same as \nupdownline)
≠	\ne	(same as \nequal)
≠	\neq	(same as \nequal)
∤	\nmid	(same as \nupdownline)
⊭	\nmodels	(same as \nrightmodels)
∦	\nparallel	(same as \nUpdownline)
⫠̸	\nperp	(same as \nupvdash)
⊬	\nrelbar	(same as \nleftrightline)
⇏	\nRelbar	(same as \nLeftrightline)
⊭	\nvDash	(same as \nrightmodels)
⊬	\nvdash	(same as \nrightvdash)
⊯	\nVdash	(same as \nrightVdash)
⊯	\nVDash	(same as \nrightModels)

Table 98: fdsymbol Binary Relations

≈	\approx	≡	\equiv	⊨	\rightmodels
≅	\approxeq	≒	\fallingdotseq	⊩	\rightVdash
≌	\backcong	⌢	\frown	⊫	\rightVDash
⋍	\backpropto	≏	\frowneq	⊢	\rightvdash
∽	\backsim	⊂	\frownsmile	⊨	\rightvDash
⋍	\backsimeq	∈	\in	≓	\risingdotseq
≬	\between	⊣	\leftassert	∣	\shortmid

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⋈	\bowtie	⫤	\leftAssert	∥	\shortparallel
≏	\bumpeq	⊢	\leftfootline	∼	\sim
≎	\Bumpeq	⫣	\leftmodels	≃	\simeq
≗	\bumpeqq	⊣	\leftvdash	⌣	\smile
≗	\circeq	⫢	\leftvDash	≅	\smileeq
≔	\coloneq	⫤	\leftVdash	⌢	\smilefrown
≅	\cong	⫣	\leftVDash	≛	\stareq
×	\crossing	⟝	\longleftfootline	≻	\succ
⋞	\curlyeqprec	⟽	\Longmapsfrom	≿	\succapprox
⋟	\curlyeqsucc	⟻	\longmapsfrom	⋡	\succcurlyeq
⫣	\dashVv	⟞	\longrightfootline	≽	\succeq
⫳	\Ddashv	∣	\mid	⪴	\succeqq
≑	\dotcong	∋	\owns	≿	\succsim
≐	\doteq	∥	\parallel	≈	\thickapprox
≑	\Doteq	≺	\prec	∼	\thicksim
∺	\dotsminusdots	≾	\precapprox	≈	\triplesim
⫪	\downAssert	⋞	\preccurlyeq	⊥	\upassert
⊤	\downassert	⪯	\preceq	⫫	\upAssert
⫫	\downmodels	⪵	\preceqq	⫫	\upmodels
⫡	\downvDash	⪹	\precnapprox	⊥	\upvdash
⫪	\downVdash	⪵	\precneq	⫫	\upvDash
⊤	\downvdash	⪹	\precneqq	⫫	\upVdash
⫡	\downVDash	⋨	\precnsim	⫫	\upVDash
⧦	\eqcirc	≾	\precsim	⫢	\vDdash
≕	\eqcolon	∝	\propto	≚	\veeeq
≒	\eqdot	⊢	\rightassert	⫦	\Vvdash
≂	\eqsim	⫦	\rightAssert	≙	\wedgeq
=	\equal	⊣	\rightfootline		

fdsymbol defines synonyms for many of the preceding symbols:

≋	\approxident	⫣	\dashV	⊢	\shortrighttack
≗	\arceq	≑	\doteqdot	⊥	\shortuptack
⫦	\Assert	≕	\eqqcolon	⌢	\smallfrown
⊢	\assert	≙	\hateq	⌣	\smallsmile
≍	\asymp	⋈	\Join	∝	\varpropto
⫪	\Barv	⟞	\longdashv	⫫	\vBar
⫫	\barV	⊨	\models	⫫	\Vbar
⊂	\closure	∋	\ni	⊨	\vDash
≔	\coloneqq	⊥	\perp	⫤	\VDash
⊣	\dashv	∝	\propfrom	⫦	\Vdash
⫤	\DashV	⊤	\shortdowntack	⊢	\vdash
⫤	\Dashv	⊣	\shortlefttack	⟞	\vlongdash

TABLE 99: fdsymbol Negated Binary Relations

≨	\backsimneqq	∉	\nin	≁	\nsim
≉	\napprox	⫦̸	\nleftAssert	≠	\nsimeq
≱	\napproxeq	⊬	\nleftassert	⌿	\nsmile
≌	\nbackcong	⊷	\nleftfootline	≄	\nsmileeq
≁	\nbacksim	⊭	\nleftmodels	≆	\nsmilefrown
≋	\nbacksimeq	⊮	\nleftvDash	⋥	\nstareq
≎	\nbumpeq	⊬	\nleftvdash	⊁	\nsucc
≏	\nBumpeq	⫤̸	\nleftVdash	⋡	\nsuccapprox
≐	\nbumpeqq	⫥̸	\nleftVDash	⋩	\nsucccurlyeq
≗	\ncirceq	⟝̸	\nlongleftfootline	⋡	\nsucceq
≅	\ncong	⟽̸	\nLongmapsfrom	⋩	\nsucceqq
⋞	\ncurlyeqprec	⟻̸	\nlongmapsfrom	≿̸	\nsuccsim
⋟	\ncurlyeqsucc	⟞̸	\nlongrightfootline	≩	\ntriplesim
⊯	\ndashVv	∤	\nmid	⫫̸	\nupassert
⊮	\nDdashv	∌	\nowns	⫦̸	\nupAssert
≠	\ndoteq	∦	\nparallel	⫫̸	\nupmodels
≑	\nDoteq	⊀	\nprec	⫦̸	\nupVDash
⫟	\ndownassert	⋨	\nprecapprox	⫫̸	\nupvDash
⫠	\ndownAssert	⋞	\npreccurlyeq	⫤̸	\nupVdash
⫯	\ndownmodels	⪯̸	\npreceq	⫤̸	\nupvdash
⫞	\ndownvdash	⪵	\npreceqq	⊯	\nvDdash
⫡	\ndownVdash	⋨	\nprecsim	≢	\nveeeq
⫢	\ndownVDash	⊮	\nrightassert	⊯	\nVvdash
⫝	\ndownvDash	⫦̸	\nrightAssert	≩	\nwedgeq
≠	\neqcirc	⊣̸	\nrightfootline	⪯̸	\precneq
≑	\neqdot	⊭	\nrightmodels	⪵	\precneqq
≆	\neqsim	⊬	\nrightvdash	≆	\simneqq
≠	\nequal	⫤̸	\nrightVdash	⪺̸	\succnapprox
≢	\nequiv	⊯	\nrightvDash	⪰̸	\succneq
≒	\nfallingdotseq	⫥̸	\nrightVDash	⪺̸	\succneqq
≁	\nfrown	≑	\nrisingdotseq	≿̸	\succnsim
≉	\nfrowneq	∤	\nshortmid		
⊄	\nfrownsmile	∦	\nshortparallel		

fdsymbol defines synonyms for many of the preceding symbols:

≨	\napproxident	⊯	\ndashV	⊮	\nshortrighttack
≉	\narceq	≠	\ne	⫫̸	\nshortuptack
⫦̸	\nAssert	≠	\neq	≄	\nsime
⊮	\nassert	≉	\nhateq	≓̸	\nvBar
≭	\nasymp	⟝̸	\nlongdashv	⫪̸	\nVbar
⫡	\nBarv	⊭	\nmodels	⫤̸	\nVdash
⫝	\nbarV	∌	\nni	⊯	\nvDash
⊄	\nclosure	∉	\notin	⫥̸	\nVDash
⊯	\nDashV	⫫̸	\nperp	⊬	\nvdash
⊮	\nDashv	⫟	\nshortdowntack	⟝̸	\nvlongdash
⊯	\ndashv	⊮	\nshortlefttack		

TABLE 100: boisik Binary Relations

$\wr$	\ac	$\fatslash$	\fatslash	$\succ\!\!\sim$	\scurel
$\approxeq$	\approxeq	$\Subset$	\forkv	$\shortmid$	\shortmid
$\doteqdot$	\arceq	$\frown$	\frown	$\shortparallel$	\shortparallel
$\backsim$	\backsim	$\ggcurly$	\ggcurly	$\simrdots$	\simrdots
$\backsimeq$	\backsimeq	$\#$	\hash	$\smallfrown$	\smallfrown
$\Subset$	\bagmember	$\in\!\!+$	\inplus	$\smallsmile$	\smallsmile
$\because$	\because	$\wr\!\!\sim$	\kernelcontraction	$\smile$	\smile
$\between$	\between	$\ll\!\!\curlyvee$	\llcurly	$\succ\!\!-$	\strictfi
$\Bumpeq$	\bumpeq	$\multimap$	\multimap	$-\!\!\prec$	\strictif
$\Bumpeq$	\Bumpeq	$\multimapboth$	\multimapboth	$\succapprox$	\succapprox
$\circeq$	\circeq	$\multimapbothvert$	\multimapbothvert	$\succcurlyeq$	\succcurlyeq
$\circledcirc$	\CircledEq	$\multimapdot$	\multimapdot	$\succnapprox$	\succnapprox
$\cong$	\cong	$\multimapdotboth$	\multimapdotboth	$\succneqq$	\succneqq
$\corresponds$	\corresponds	$\multimapdotbothA$	\multimapdotbothA	$\succnsim$	\succnsim
$\curlyeqprec$	\curlyeqprec	$\multimapdotbothAvert$	\multimapdotbothAvert	$\succsim$	\succsim
$\curlyeqsucc$	\curlyeqsucc	$\multimapdotbothB$	\multimapdotbothB	$\therefore$	\therefore
$\dashV$	\dashV	$\multimapdotbothBvert$	\multimapdotbothBvert	$\thickapprox$	\thickapprox
$\Dashv$	\DashV	$\multimapdotbothvert$	\multimapdotbothvert	$\thicksim$	\thicksim
$\dashv$	\dashVv	$\multimapdotinv$	\multimapdotinv	$\topfork$	\topfork
$\dfourier$	\dfourier	$\multimapinv$	\multimapinv	$\trianglelefteq$	\triangleq
$\Dfourier$	\Dfourier	$\niplus$	\niplus	$\varhash$	\varhash
$\in$	\disin	$\nisd$	\nisd	$\varisins$	\varisins
$\doteq$	\doteq	$\Perp$	\Perp	$\varnis$	\varnis
$\doteqdot$	\doteqdot	$\pitchfork$	\pitchfork	$\varpropto$	\varpropto
$\dotminus$	\dotminus	$\precapprox$	\precapprox	$\Vdash$	\Vdash
$\sim$	\dotsim	$\preccurlyeq$	\preccurlyeq	$\vDash$	\vDash
$\eqbumped$	\eqbumped	$\precnapprox$	\precnapprox	$\VDash$	\VDash
$\eqcirc$	\eqcirc	$\precneqq$	\precneqq	$\veeeq$	\veeeq
$\eqsim$	\eqsim	$\precnsim$	\precnsim	$\Vvdash$	\Vvdash
$\#$	\equalparallel	$\precsim$	\precsim	$\ztransf$	\ztransf
$\fallingdotseq$	\fallingdotseq	$\prurel$	\prurel	$\Ztransf$	\Ztransf
$\fatbslash$	\fatbslash	$\risingdotseq$	\risingdotseq		

TABLE 101: boisik Negated Binary Relations

$\ncong$	\ncong	$\npreceq$	\npreceq	$\nVDash$	\nVDash
$\neq$	\neq	$\nshortmid$	\nshortmid	$\nVdash$	\nVdash
$\nequiv$	\nequiv	$\nshortparallel$	\nshortparallel	$\nvdash$	\nvdash
$\nmid$	\nmid	$\nsim$	\nsim	$\nvDash$	\nvDash
$\nparallel$	\nparallel	$\nsucc$	\nsucc		
$\nprec$	\nprec	$\nsucceq$	\nsucceq		

TABLE 102: stix Binary Relations

≈	\approx	⋕	\eqvparsl	⇁	\rightfishtail
≊	\approxeq	≒	\fallingdotseq	⟹	\rightimply
≋	\approxeqq	⋈	\fbowtie	⇀	\righttail
≈	\approxident	⫝	\forksnot	≓	\risingdotseq
≘	\arceq	⫛	\forkv	⌋	\rsqhook
⊢	\assert	⌢	\frown	⥹	\ruledelayed
≛	\asteq	⧢	\gleichstark	≻	\scurel
≍	\asymp	≋	\hatapprox	⊤	\shortdowntack
≌	\backcong	⊷	\imageof	⊣	\shortlefttack
∽	\backsim	∈	\in	∣	\shortmid
⋍	\backsimeq	⋵	\isindot	∥	\shortparallel
⧆	\bagmember	⋹	\isinE	⊥	\shortuptack
⫟	\Barv	⋿	\isinobar	∼	\sim
⫫	\barV	∊	\isins	≃	\simeq
≬	\between	⋸	\isinvb	≋	\simminussim
⫮	\bNot	≎	\kernelcontraction	≆	\simneqq
⋈	\bowtie	⇽	\leftdbltail	⥲	\simrdots
≑	\Bumpeq	↢	\leftfishtail	⌢	\smallfrown
≏	\bumpeq	≺	\lefttail	∊	\smallin
≗	\bumpeqq	⋈	\lfbowtie	∍	\smallni
⟟	\cirbot	⋉	\lftimes	⌣	\smallsmile
≗	\circeq	⟝	\longdashv	⋕	\smeparsl
⫯	\cirmid	⌊	\lsqhook	⌣	\smile
⟮	\closure	≞	\measeq	≛	\stareq
⩴	\Coloneq	∣	\mid	≻	\succ
≔	\coloneq	⫰	\midcir	≽	\Succ
≅	\cong	⫓	\mlcp	≿	\succapprox
≗	\congdot	⊨	\models	≽	\succcurlyeq
⋞	\curlyeqprec	⊸	\multimap	≻	\succeq
⋟	\curlyeqsucc	⧟	\multimapinv	≻	\succeqq
-:	\dashcolon	∋	\ni	≿	\succnapprox
⊣	\dashv	⋽	\niobar	⊁	\succneq
⫤	\dashV	∍	\nis	≱	\succneqq
⫣	\Dashv	⋺	\nisd	≿	\succnsim
⫥	\DashV	⫬	\Not	≿	\succsim
⫪	\DashVDash	/	\notchar	≈	\thickapprox
⫧	\dashVdash	⊶	\origof	∼	\thicksim
⩷	\ddotseq	∥	\parallel	⫚	\topfork
∈	\disin	⫲	\parsim	↾	\upfishtail
÷	\Doteq	⊥	\perp	⊎	\upin
≐	\doteq	⫛	\pitchfork	⋿	\varisinobar
≑	\doteqdot	≺	\prec	⋹	\varisins
≑	\dotequiv	≪	\Prec	⋽	\varniobar
∾	\dotsim	≾	\precapprox	∋	\varnis
∺	\dotsminusdots	≼	\preccurlyeq	∝	\varpropto
⊥	\downfishtail	≾	\preceq	⊩	\varVdash
⊶	\dualmap	≾	\preceqq	≐	\vBar
⋕	\eparsl	⋨	\precnapprox	⫨	\Vbar
≖	\eqcirc	⪹	\precneq	⫱	\vBarv
≕	\eqcolon	⋨	\precneqq	⊫	\Vdash
≝	\eqdef	⋨	\precnsim	⊢	\vdash
≒	\eqdot				

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==	\eqeq	≾	\precsim	⊨	\vDash
===	\eqeqeq	∝	\propto	⊫	\VDash
≋	\eqqsim	≺	\prurel	⊨	\vDdash
≃	\eqsim	⌟	\pullback	⋮	\vdots
⋕	\equalparallel	⌜	\pushout	≚	\veeeq
≡	\equiv	≟	\questeq	⩛	\veeonwedge
≣	\Equiv	⫞	\revnmid	|	\vertoverlay
≣	\equivDD	⋈	\rfbowtie	⟞	\vlongdash
⋕	\equivVert	⋊	\rftimes	⊪	\Vvdash
⋕	\equivVvert	⤛	\rightdbltail	≙	\wedgeq

stix defines \owns as a synonym for \ni and \doteqdot as a synonym for \Doteq.

Table 103: stix Negated Binary Relations

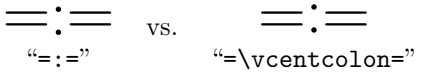
⋔	\forks	∦	\nhpar	≁	\nsime
≉	\napprox	∤	\nmid	⊁	\nsucc
≋̸	\napproxeqq	∌	\nni	⋡	\nsucccurlyeq
≭	\nasymp	∉	\notin	⪰̸	\nsucceq
≎̸	\nBumpeq	∦	\nparallel	∉	\nvarisinobar
≏̸	\nbumpeq	⊀	\nprec	∌	\nvarniobar
≇	\ncong	⋠	\npreccurlyeq	⊭	\nvDash
≇	\ncongdot	⪯̸	\npreceq	⊬	\nvdash
≠	\ne	∤	\nshortmid	⊯	\nVDash
≁	\neqsim	∦	\nshortparallel	⊮	\nVdash
≢	\nequiv	≁	\nsim		

stix defines \neq as a synonym for \ne, \nsimeq as a synonym for \nsime, and \nforksnot as a synonym for \forks.

Table 104: mathtools Binary Relations

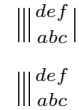
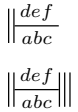
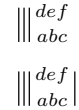
::≈	\Colonapprox	:−	\coloneq	−::	\Eqcolon
:≈	\colonapprox	:∼	\colonsim	=:	\eqqcolon
:=	\coloneqq	::∼	\Colonsim	=::	\Eqqcolon
::=	\Coloneqq	::	\dblcolon		
::−	\Coloneq	−:	\eqcolon		

Similar symbols can be defined using mathtools's \vcentcolon, which produces a colon centered on the font's math axis:



"=:=" "=\vcentcolon="

TABLE 105: turnstile Binary Relations

	\dddtstile{abc}{def}		\nntstile{abc}{def}		\stdtstile{abc}{def}
	\ddststile{abc}{def}		\nnttstile{abc}{def}		\stststile{abc}{def}
	\ddtstile{abc}{def}		\nsdtstile{abc}{def}		\sttstile{abc}{def}
	\ddttstile{abc}{def}		\nsststile{abc}{def}		\stttstile{abc}{def}
	\dndtstile{abc}{def}		\nststile{abc}{def}		\tddtstile{abc}{def}
	\dnststile{abc}{def}		\nsttstile{abc}{def}		\tdststile{abc}{def}
	\dntstile{abc}{def}		\ntdtstile{abc}{def}		\tdtstile{abc}{def}
	\dnttstile{abc}{def}		\ntststile{abc}{def}		\tdttstile{abc}{def}
	\dsdtstile{abc}{def}		\nttstile{abc}{def}		\tndtstile{abc}{def}
	\dsststile{abc}{def}		\ntttstile{abc}{def}		\tnststile{abc}{def}
	\dststile{abc}{def}		\sddtstile{abc}{def}		\tntstile{abc}{def}
	\dsttstile{abc}{def}		\sdststile{abc}{def}		\tnttstile{abc}{def}
	\dtdtstile{abc}{def}		\sdtstile{abc}{def}		\tsdtstile{abc}{def}
	\dtststile{abc}{def}		\sdttstile{abc}{def}		\tsststile{abc}{def}
	\dttstile{abc}{def}		\sndtstile{abc}{def}		\tststile{abc}{def}
	\dtttstile{abc}{def}		\snststile{abc}{def}		\tsttstile{abc}{def}
	\nddtstile{abc}{def}		\sntstile{abc}{def}		\ttdtstile{abc}{def}
	\ndststile{abc}{def}		\snttstile{abc}{def}		\ttststile{abc}{def}
	\ndtstile{abc}{def}		\ssdtstile{abc}{def}		\tttstile{abc}{def}
	\ndttstile{abc}{def}		\sssttstile{abc}{def}		\ttttstile{abc}{def}
	\nndtstile{abc}{def}		\sststile{abc}{def}		
	\nnststile{abc}{def}		\ssttstile{abc}{def}		

Each of the above takes an optional argument that controls the size of the upper and lower expressions. See the turnstile documentation for more information.

Table 106: trsym Binary Relations

⊷	\InversTransformHoriz	⊶	\TransformHoriz
⫰	\InversTransformVert	⫯	\TransformVert

Table 107: trfsigns Binary Relations

⟃	\dfourier	⟄	\Dfourier
⟈	\fourier	⟇	\Fourier
⧺	\laplace	⧻	\Laplace
⨟	\ztransf	⨠	\Ztransf

Table 108: cmll Binary Relations

⌔	\coh	⌒	\scoh
≍	\incoh	⌣	\sincoh
⫫	\Perp	⟘	\simperp
⊸	\multimapboth		

Table 109: colonequals Binary Relations

≈:	\approxcolon	::−	\coloncolonminus	=::	\equalscoloncolon
≈::	\approxcoloncolon	::∼	\coloncolonsim	−:	\minuscolon
:≈	\colonapprox	:=	\colonequals	−::	\minuscoloncolon
::	\coloncolon	:−	\colonminus	:	\ratio
::≈	\coloncolonapprox	:∼	\colonsim	∼:	\simcolon
::=	\coloncolonequals	=:	\equalscolon	∼::	\simcoloncolon

Table 110: fourier Binary Relations

⫽	\nparallelslant	⫻	\parallelslant

Table 111: Subset and Superset Relations

⊏	\sqsubset*	⊒	\sqsupseteq	⊃	\supset
⊑	\sqsubseteq	⊂	\subset	⊇	\supseteq
⊐	\sqsupset*	⊆	\subseteq		

* Not predefined by the LaTeX 2ε core. Use the latexsym package to expose this symbol.

TABLE 112: $\mathcal{AMS}$ Subset and Superset Relations

$\nsubseteq$	\nsubseteq	$\subseteqq$	\subseteqq	$\supsetneqq$	\supsetneqq
$\nsupseteq$	\nsupseteq	$\subsetneq$	\subsetneq	$\varsubsetneq$	\varsubsetneq
$\nsupseteqq$	\nsupseteqq	$\subsetneqq$	\subsetneqq	$\varsubsetneqq$	\varsubsetneqq
$\sqsubset$	\sqsubset	$\Supset$	\Supset	$\varsupsetneq$	\varsupsetneq
$\sqsupset$	\sqsupset	$\supseteqq$	\supseteqq	$\varsupsetneqq$	\varsupsetneqq
$\Subset$	\Subset	$\supsetneq$	\supsetneq		

TABLE 113: stmaryrd Subset and Superset Relations

$\subsetplus$	\subsetplus	$\supsetplus$	\supsetplus
$\subsetpluseq$	\subsetpluseq	$\supsetpluseq$	\supsetpluseq

TABLE 114: wasysym Subset and Superset Relations

$\sqsubset$	\sqsubset	$\sqsupset$	\sqsupset

TABLE 115: txfonts/pxfonts Subset and Superset Relations

$\nsqsubset$	\nsqsubset	$\nsqsupseteq$	\nsqsupseteq	$\nSupset$	\nSupset
$\nsqsubseteq$	\nsqsubseteq	$\nSubset$	\nSubset		
$\nsqsupset$	\nsqsupset	$\nsubseteqq$	\nsubseteqq		

TABLE 116: mathabx Subset and Superset Relations

$\nsqsubset$	\nsqsubset	$\nsupset$	\nsupset	$\sqsupseteq$	\sqsupseteq	$\supseteq$	\supseteq
$\nsqSubset$	\nsqSubset	$\nSupset$	\nSupset	$\sqsupseteqq$	\sqsupseteqq	$\supseteqq$	\supseteqq
$\nsqsubseteq$	\nsqsubseteq	$\nsupseteq$	\nsupseteq	$\sqsupsetneq$	\sqsupsetneq	$\supsetneq$	\supsetneq
$\nsqsubseteqq$	\nsqsubseteqq	$\nsupseteqq$	\nsupseteqq	$\sqsupsetneqq$	\sqsupsetneqq	$\supsetneqq$	\supsetneqq
$\nsqsupset$	\nsqsupset	$\sqsubset$	\sqsubset	$\subset$	\subset	$\varsqsubsetneq$	\varsqsubsetneq
$\nsqSupset$	\nsqSupset	$\sqSubset$	\sqSubset	$\Subset$	\Subset	$\varsqsubsetneqq$	\varsqsubsetneqq
$\nsqsupseteq$	\nsqsupseteq	$\sqsubseteq$	\sqsubseteq	$\subseteq$	\subseteq	$\varsqsupsetneq$	\varsqsupsetneq
$\nsqsupseteqq$	\nsqsupseteqq	$\sqsubseteqq$	\sqsubseteqq	$\subseteqq$	\subseteqq	$\varsqsupsetneqq$	\varsqsupsetneqq
$\nsubset$	\nsubset	$\sqsubsetneq$	\sqsubsetneq	$\subsetneq$	\subsetneq	$\varsubsetneq$	\varsubsetneq
$\nSubset$	\nSubset	$\sqsubsetneqq$	\sqsubsetneqq	$\subsetneqq$	\subsetneqq	$\varsubsetneqq$	\varsubsetneqq
$\nsubseteq$	\nsubseteq	$\sqSupset$	\sqSupset	$\supset$	\supset	$\varsupsetneq$	\varsupsetneq
$\nsubseteqq$	\nsubseteqq	$\sqsupset$	\sqsupset	$\Supset$	\Supset	$\varsupsetneqq$	\varsupsetneqq

Table 117: MnSymbol Subset and Superset Relations

⋤	\nSqsubset	⊈	\nsubseteq	⫋	\sqsubsetneq	⊆	\subseteq
⊄	\nsqsubset	⫅̸	\nsubseteqq	⫋	\sqsubsetneqq	⫅	\subseteqq
⋢	\nsqsubseteq	⫐	\nSupset	⫐	\Sqsupset	⊊	\subsetneq
⋣	\nsqsubseteqq	⊅	\nsupset	⊐	\sqsupset	⫌	\subsetneqq
⫐	\nSqsupset	⊉	\nsupseteq	⊒	\sqsupseteq	⫐	\Supset
⊅	\nsqsupset	⫆̸	\nsupseteqq	⫆	\sqsupseteqq	⊃	\supset
⋣	\nsqsupseteq	⊏	\Sqsubset	⫋	\sqsupsetneq	⊇	\supseteq
⫆̸	\nsqsupseteqq	⊏	\sqsubset	⫋	\sqsupsetneqq	⫆	\supseteqq
⋦	\nSubset	⊑	\sqsubseteq	⋐	\Subset	⊋	\supsetneq
⊄	\nsubset	⫅	\sqsubseteqq	⊂	\subset	⫌	\supsetneqq

MnSymbol additionally defines \varsubsetneq as a synonym for \subsetneq, \varsubsetneqq as a synonym for \subsetneqq, \varsupsetneq as a synonym for \supsetneq, and \varsupsetneqq as a synonym for \supsetneqq.

Table 118: fdsymbol Subset and Superset Relations

⊄	\nsqsubset	⊈	\nsubseteq	⫋	\sqsubsetneq	⊆	\subseteq
⋤	\nSqsubset	⫅̸	\nsubseteqq	⫋	\sqsubsetneqq	⫅	\subseteqq
⋢	\nsqsubseteq	⊅	\nsupset	⊐	\sqsupset	⊊	\subsetneq
⋣	\nsqsubseteqq	⫐	\nSupset	⫐	\Sqsupset	⫌	\subsetneqq
⊅	\nsqsupset	⊉	\nsupseteq	⊒	\sqsupseteq	⊃	\supset
⫐	\nSqsupset	⫆̸	\nsupseteqq	⫆	\sqsupseteqq	⫐	\Supset
⋣	\nsqsupseteq	⊏	\sqsubset	⫋	\sqsupsetneq	⊇	\supseteq
⫆̸	\nsqsupseteqq	⊏	\Sqsubset	⫋	\sqsupsetneqq	⫆	\supseteqq
⊄	\nsubset	⫅	\sqsubseteq	⊂	\subset	⊋	\supsetneq
⋦	\nSubset	⫅	\sqsubseteqq	⋐	\Subset	⫌	\supsetneqq

fdsymbol additionally defines \varsubsetneqq as a synonym for \subsetneqq, \varsubsetneq as a synonym for \subsetneq, \varsupsetneqq as a synonym for \supsetneqq, and \varsupsetneq as a synonym for \supsetneq.

Table 119: boisik Subset and Superset Relations

⊄	\nsubset	⊏	\sqSubset	⋐	\subsetplus	⫒	\supsetpluseq
⊊	\nsubseteq	⫐	\sqSupset	⫅	\subsetpluseq	⊊	\varsubsetneq
⫋	\nsubseteqq	⊐	\sqsupset	⫐	\Supset	⫋	\varsubsetneqq
⊅	\nsupset	⋐	\Subset	⫆	\supseteqq	⫌	\varsupsetneq
⊉	\nsupseteq	⫅	\subseteqq	⊋	\supsetneq	⫋	\varsupsetneqq
⫆̸	\nsupseteqq	⊊	\subsetneq	⫌	\supsetneqq		
⊏	\sqsubset	⫋	\subsetneqq	⫒	\supsetplus		

Table 120: stix Subset and Superset Relations

⊂	\bsolhsub	⊒	\sqsupseteq	⊃⊂	\suphsub
⊏	\csub	⊐̸	\sqsupsetneq	⥻	\suplarr
⫅	\csube	⫄	\subedot	⫃	\supmult
⊐	\csup	⫂	\submult	⋑	\Supset
⫆	\csupe	⥹	\subrarr	⊃	\supset
⥊	\leftarrowsubset	⋐	\Subset	⫈	\supsetapprox
⊄	\nsqsubset	⊂	\subset	⍟	\supsetcirc*
⊈	\nsqsubseteq	⫈	\subsetapprox	⫀	\supsetdot
⊅	\nsqsupset	⍟	\subsetcirc*	⊇	\supseteq
⊉	\nsqsupseteq	⫀	\subsetdot	⫆	\supseteqq
⊄	\nsubset	⊆	\subseteq	⫌	\supsetneq
⊈	\nsubseteq	⫅	\subseteqq	⫌̸	\supsetneqq
⫋̸	\nsubseteqq	⫋	\subsetneq	⫿	\supsetplus
⊅	\nsupset	⫋̸	\subsetneqq	≿	\supsim
⊉	\nsupseteq	⫿	\subsetplus	⫔	\supsub
⫆̸	\nsupseteqq	≿	\subsim	⫓	\supsup
⥲	\rightarrowsupset	⫕	\subsub	⫇	\varsubsetneq
⊏	\sqsubset	⫓	\subsup	⫋̸	\varsubsetneqq
⊑	\sqsubseteq	⋑⊂	\supdsub	⫌	\varsupsetneq
⋤	\sqsubsetneq	⫄̇	\supedot	⫌̸	\varsupsetneqq
⊐	\sqsupset	⊃/	\suphsol		

* Defined as an ordinary character, not as a binary relation.

Table 121: Inequalities

≥	\geq	≫	\gg	≤	\leq	≪	\ll	≠	\neq

Table 122: $\mathcal{AMS}$ Inequalities

⩾	\eqslantgtr	⪀	\gtrdot	⪋	\lesseqgtr	≱	\ngeq
⩽	\eqslantless	≷	\gtreqless	⪋	\lesseqqgtr	≱	\ngeqq
≧	\geqq	≷	\gtreqqless	≶	\lessgtr	⋡	\ngeqslant
⩾	\geqslant	≷	\gtrless	≲	\lesssim	≯	\ngtr
⋙	\ggg	≳	\gtrsim	⋘	\lll	≰	\nleq
⪈	\gnapprox	≩	\gvertneqq	⪅	\lnapprox	≰	\nleqq
≩	\gneq	≦	\leqq	≨	\lneq	⋠	\nleqslant
≩	\gneqq	⩽	\leqslant	≨	\lneqq	≮	\nless
≳	\gnsim	≲	\lessapprox	≲	\lnsim		
≳	\gtrapprox	⩿	\lessdot	≨	\lvertneqq		

Table 123: wasysym Inequalities

$\gtrapprox$	\apprge	$\lessapprox$	\apprle

Table 124: txfonts/pxfonts Inequalities

$\ggg$	\ngg	$\gtrsim$	\ngtrsim	$\lesssim$	\nlesssim
$\gtrapprox$	\ngtrapprox	$\lessapprox$	\nlessapprox	$\ll$	\nll
$\gtrless$	\ngtrless	$\lessgtr$	\nlessgtr		

Table 125: mathabx Inequalities

$\geqslant$	\eqslantgtr	$\gtreqless$	\gtreqless	$\lesssim$	\lesssim	$\ngtr$	\ngtr
$\leqslant$	\eqslantless	$\gtreqqless$	\gtreqqless	$\ll$	\ll	$\ngtrapprox$	\ngtrapprox
$\geqslant$	\geq	$\gtrless$	\gtrless	$\lll$	\lll	$\ngtrsim$	\ngtrsim
$\geqq$	\geqq	$\gtrsim$	\gtrsim	$\lnapprox$	\lnapprox	$\nleq$	\nleq
$\gg$	\gg	$\gvertneqq$	\gvertneqq	$\lneq$	\lneq	$\nleqq$	\nleqq
$\ggg$	\ggg	$\leqslant$	\leq	$\lneqq$	\lneqq	$\nless$	\nless
$\gnapprox$	\gnapprox	$\leqq$	\leqq	$\lnsim$	\lnsim	$\nlessapprox$	\nlessapprox
$\gneq$	\gneq	$\lessapprox$	\lessapprox	$\lvertneqq$	\lvertneqq	$\nlesssim$	\nlesssim
$\gneqq$	\gneqq	$\lessdot$	\lessdot	$\neqslantgtr$	\neqslantgtr	$\nvargeq$	\nvargeq
$\gnsim$	\gnsim	$\lesseqgtr$	\lesseqgtr	$\neqslantless$	\neqslantless	$\nvarleq$	\nvarleq
$\gtrapprox$	\gtrapprox	$\lesseqqgtr$	\lesseqqgtr	$\ngeq$	\ngeq	$\geqslant$	\vargeq
$\gtrdot$	\gtrdot	$\lessgtr$	\lessgtr	$\ngeqq$	\ngeqq	$\leqslant$	\varleq

mathabx defines \leqslant and \le as synonyms for \leq, \geqslant and \ge as synonyms for \geq, \nleqslant as a synonym for \nleq, and \ngeqslant as a synonym for \ngeq.

TABLE 126: MnSymbol Inequalities

$\geqslant$	\eqslantgtr	$\gtreqqless$	\gtreqqless	$\lesssim$	\lesssim	$\ngtreqless$	\ngtreqless
$\leqslant$	\eqslantless	$\gtrless$	\gtrless	$\ll$	\ll	$\ngtreqlessslant$	\ngtreqlessslant
$\geq$	\geq	$\gtrneqqless$	\gtrneqqless	$\lll$	\lll	$\ngtreqqless$	\ngtreqqless
$\trianglerighteq$	\geqclosed	$\gtrsim$	\gtrsim	$\lnapprox$	\lnapprox	$\ngtrless$	\ngtrless
$\geqdot$	\geqdot	$\leq$	\leq	$\lneqq$	\lneqq	$\nleq$	\nleq
$\geqq$	\geqq	$\trianglelefteq$	\leqclosed	$\lnsim$	\lnsim	$\nleqclosed$	\nleqclosed
$\geqslant$	\geqslant	$\leqslant$	\leqdot	$\neqslantgtr$	\neqslantgtr	$\nleqdot$	\nleqdot
$\geqslant$	\geqslantdot	$\leqq$	\leqq	$\neqslantless$	\neqslantless	$\nleqq$	\nleqq
$\gg$	\gg	$\leqslant$	\leqslant	$\ngeq$	\ngeq	$\nleqslant$	\nleqslant
$\ggg$	\ggg	$\leqslant$	\leqslantdot	$\ngeqclosed$	\ngeqclosed	$\nleqslantdot$	\nleqslantdot
$\gnapprox$	\gnapprox	$<$	\less	$\ngeqdot$	\ngeqdot	$\nless$	\nless
$\gneqq$	\gneqq	$\lessapprox$	\lessapprox	$\ngeqq$	\ngeqq	$\nlessclosed$	\nlessclosed
$\gnsim$	\gnsim	$\lessclosed$	\lessclosed	$\ngeqslant$	\ngeqslant	$\nlessdot$	\nlessdot
$>$	\gtr	$\lessdot$	\lessdot	$\ngeqslantdot$	\ngeqslantdot	$\nlesseqgtr$	\nlesseqgtr
$\gtrapprox$	\gtrapprox	$\lesseqgtr$	\lesseqgtr	$\ngg$	\ngg	$\nlesseqgtrslant$	\nlesseqgtrslant
$\trianglerighteq$	\gtrclosed	$\lesseqgtrslant$	\lesseqgtrslant	$\nggg$	\nggg	$\nlesseqqgtr$	\nlesseqqgtr
$\gtrdot$	\gtrdot	$\lesseqqgtr$	\lesseqqgtr	$\ngtr$	\ngtr	$\nlessgtr$	\nlessgtr
$\gtreqless$	\gtreqless	$\lessgtr$	\lessgtr	$\ngtrclosed$	\ngtrclosed	$\nll$	\nll
$\gtreqlessslant$	\gtreqlessslant	$\lessneqqgtr$	\lessneqqgtr	$\ngtrdot$	\ngtrdot	$\nlll$	\nlll

MnSymbol additionally defines synonyms for some of the preceding symbols:

$\ggg$	\gggtr	(same as \ggg)
$\gneqq$	\gvertneqq	(same as \gneqq)
$\lhd$	\lhd	(same as \lessclosed)
$\lll$	\llless	(same as \lll)
$\lneqq$	\lvertneqq	(same as \lneqq)
$\ntrianglelefteq$	\ntrianglelefteq	(same as \nleqclosed)
$\ntriangleleft$	\ntriangleleft	(same as \nlessclosed)
$\ntrianglerighteq$	\ntrianglerighteq	(same as \ngeqclosed)
$\ntriangleright$	\ntriangleright	(same as \ngtrclosed)
$\rhd$	\rhd	(same as \gtrclosed)
$\trianglelefteq$	\trianglelefteq	(same as \leqclosed)
$\trianglerighteq$	\trianglerighteq	(same as \geqclosed)
$\unlhd$	\unlhd	(same as \leqclosed)
$\unrhd$	\unrhd	(same as \geqclosed)
$\vartriangleleft$	\vartriangleleft	(same as \lessclosed)
$\vartriangleright$	\vartriangleright	(same as \gtrclosed)

TABLE 127: fdsymbol Inequalities

⩾	\eqslantgtr	⩽	\leqslantdot	⪶	\ngtrapprox
⩽	\eqslantless	⪡	\leqslcc	⪦	\ngtrcc
≥	\geq	<	\less	⪦	\ngtrclosed
⪰	\geqclosed	≲	\lessapprox	⪧	\ngtrdot
⩾	\geqdot	◁	\lesscc	⪶	\ngtreqless
≧	\geqq	◁	\lessclosed	⪶	\ngtreqqless
⩾	\geqslant	⩽	\lessdot	⪶	\ngtreqslantless
⩾	\geqslantdot	⪋	\lesseqgtr	⪶	\ngtrless
⪰	\geqslcc	⪋	\lesseqqgtr	⪶	\ngtrsim
≫	\gg	⪏	\lesseqslantgtr	⪵	\nleq
⋙	\ggg	≶	\lessgtr	⪵	\nleqclosed
⪊	\gnapprox	≲	\lesssim	⪵	\nleqdot
⪈	\gneq	≪	\ll	⪵	\nleqq
⪌	\gneqq	⋘	\lll	⪵	\nleqslant
⪊	\gnsim	⪉	\lnapprox	⪵	\nleqslantdot
>	\gtr	⪇	\lneq	⪵	\nleqslcc
≳	\gtrapprox	≨	\lneqq	≮	\nless
◁	\gtrcc	⪇	\lnsim	⪵	\nlessapprox
▷	\gtrclosed	⪯	\neqslantgtr	⪡	\nlesscc
⋗	\gtrdot	⪯	\neqslantless	⪡	\nlessclosed
⋛	\gtreqless	⩾	\ngeq	⪡	\nlessdot
⪌	\gtreqqless	⪰	\ngeqclosed	⪋	\nlesseqgtr
⪌	\gtreqslantless	⩾	\ngeqdot	⪋	\nlesseqqgtr
≷	\gtrless	⩾	\ngeqq	⪏	\nlesseqslantgtr
≳	\gtrsim	⩾	\ngeqslant	⪏	\nlessgtr
⩽	\leq	⩾	\ngeqslantdot	⪵	\nlesssim
⪯	\leqclosed	⪰	\ngeqslcc	≪	\nll
⩽	\leqdot	≯	\ngg	⋘	\nlll
≦	\leqq	⋙	\nggg		
⩽	\leqslant	≯	\ngtr		

fdsymbol defines synonyms for some of the preceding symbols:

≥	\ge	⩽	\lesdot	⪦	\ngtcc
⪰	\gescc	⪏	\lesg	⪶	\ngtreqlessslant
⩾	\gesdot	⪏	\lesseqgtrslant	⪵	\nlescc
⪌	\gesl	◁	\lhd	⪵	\nlesdot
⋙	\gggtr	⋘	\llless	⪏	\nlesg
▷	\gtcc	◁	\ltcc	⪏	\nlesseqgtrslant
⪌	\gtreqlessslant	≨	\lvertneqq	⪡	\nltcc
≩	\gvertneqq	⪵	\ngescc	▷	\rhd

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≤	\le	⩱	\ngesdot	⊴	\unlhd
⪡	\lescc	⩵	\ngesl	⊵	\unrhd

Table 128: boisik Inequalities

⩾	\eqslantgtr	⪩	\gtcir	⋚	\lesseqqgtr	≱	\ngeq
⩽	\eqslantless	≳	\gtrapprox	≶	\lessgtr	⩱	\ngeqq
≥	\geqq	≩	\gtreqless	≲	\lesssim	⩾	\ngeqslant
⩾	\geqslant	≩	\gtreqqless	⋘	\lll	≯	\ngtr
⋙	\ggg	≷	\gtrless	⪉	\lnapprox	≰	\nleq
≍	\glj	≳	\gtrsim	⪇	\lneq	⩱	\nleqq
⪊	\gnapprox	≑	\gvertneqq	≨	\lneqq	⩽	\nleqslant
⪈	\gneq	≤	\leqq	⋦	\lnsim	≮	\nless
≩	\gneqq	⩽	\leqslant	≪	\Lt		
⋧	\gnsim	≲	\lessapprox	⪧	\ltcir		
⩾	\Gt	⋚	\lesseqgtr	≑	\lvertneqq		

Table 129: stix Inequalities

⪖	\egsdot	⩼	\gtquest	⋦	\lnsim
⪕	\elsdot	≳	\gtrapprox	≦	\lsime
⩥	\eqgtr	⥸	\gtrarr	≶	\lsimg
⩤	\eqless	⪧	\gtrdot	⪡	\Lt
⩦	\eqqgtr	≩	\gtreqless	◁	\ltcc
⩣	\eqqless	≩	\gtreqqless	⪦	\ltcir
⪘	\eqqslantgtr	≷	\gtrless	⥶	\ltlarr
⪗	\eqqslantless	≳	\gtrsim	⩻	\ltquest
⩾	\eqslantgtr	≩	\gvertneqq	≦	\lvertneqq
⩽	\eqslantless	⪈	\lat	⪘	\neqslantgtr
≥	\geq	⪇	\late	⪗	\neqslantless
≧	\geqq	↚	\leftarrowless	≱	\ngeq
⪘	\geqqslant	≤	\leq	≱	\ngeqq
⩾	\geqslant	≦	\leqq	⩾	\ngeqslant
⪩	\gescc	⪗	\leqqslant	⋙	\ngg
⪀	\gesdot	⩽	\leqslant	≯	\ngtr
⪂	\gesdoto	⪡	\lescc	≹	\ngtrless
⪔	\gesdotol	⪦	\lesdot	≵	\ngtrsim

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⩌	\gesles	⪿	\lesdoto	≰	\nleq
≫	\gg	⪾	\lesdotor	≦̸	\nleqq
⋙	\ggg	⪓	\lesges	⩽̸	\nleqslant
⋙	\gggnest	≲	\lessapprox	≮	\nless
≷	\gla	⩿	\lessdot	≸	\nlessgtr
⪒	\glE	⋚	\lesseqgtr	≴	\nlesssim
⪥	\glj	⪋	\lesseqqgtr	⋘̸	\nll
⪊	\gnapprox	≶	\lessgtr	⩅	\partialmeetcontraction
≩	\gneq	≲	\lesssim	↣	\rightarrowgtr
≩	\gneqq	⪏	\lgE	⪰	\simgE
⋧	\gnsim	≪	\ll	≳	\simgtr
⪖	\gsime	⋘	\lll	⪜	\simlE
⪘	\gsiml	⋘	\lllnest	≲	\simless
⪢	\Gt	⪉	\lnapprox	⪕	\smt
⧁	\gtcc	≨	\lneq	⪔	\smte
⩺	\gtcir	≨	\lneqq		

stix defines \le as a synonym for \leq, \ge as a synonym for \geq, \llless as a synonym for \lll, \gggtr as a synonym for \ggg, \nle as a synonym for \nleq, and \nge as a synonym for \ngeq.

TABLE 130: $\mathcal{AMS}$ Triangle Relations

◀	\blacktriangleleft	⋫	\ntriangleright	⊵	\trianglerighteq
▶	\blacktriangleright	⋭	\ntrianglerighteq	◁	\vartriangleleft
⋪	\ntriangleleft	⊴	\triangleleft	▷	\vartriangleright
⋬	\ntriangleleft	≜	\triangleq		

TABLE 131: stmaryrd Triangle Relations

⧏	\trianglelefteqslant	⧐	\trianglerighteqslant
⧏̸	\ntrianglelefteqslant	⧐̸	\ntrianglerighteqslant

TABLE 132: mathabx Triangle Relations

⋪	\ntriangleleft	◁	\triangleleft	◁	\vartriangleleft
⋬	\ntriangleleft	⩡	\triangleleft	▷	\vartriangleright
⋫	\ntriangleright	▷	\triangleright		
⋭	\ntrianglerighteq	⩢	\trianglerighteq		

TABLE 133: MnSymbol Triangle Relations

▼	\filledmedtriangledown	△	\largetriangleup	▿	\smalltriangledown
◀	\filledmedtriangleleft	▽	\medtriangledown	◁	\smalltriangleleft
▶	\filledmedtriangleright	◁	\medtriangleleft	▷	\smalltriangleright
▲	\filledmedtriangleup	▷	\medtriangleright	▵	\smalltriangleup
▾	\filledtriangledown	△	\medtriangleup	≜	\triangleeq
◂	\filledtriangleleft	≠	\ntriangleeq	⊴	\trianglelefteq
▸	\filledtriangleright	⋪	\ntriangleleft	⊵	\trianglerighteq
▴	\filledtriangleup	⋬	\ntrianglelefteq	◁	\vartriangleleft
▽	\largetriangledown	⋫	\ntriangleright	▷	\vartriangleright
◁	\largetriangleleft	⋭	\ntrianglerighteq		
▷	\largetriangleright	⟁	\otriangle		

MnSymbol additionally defines synonyms for many of the preceding symbols: \triangleq is a synonym for \triangleeq; \lhd and \lessclosed are synonyms for \vartriangleleft; \rhd and \gtrclosed are synonyms for \vartriangleright; \unlhd and \leqclosed are synonyms for \trianglelefteq; \unrhd and \geqclosed are synonyms for \trianglerighteq; \blacktriangledown, \blacktriangleleft, \blacktriangleright, and \blacktriangle [*sic*] are synonyms for, respectively, \filledmedtriangledown, \filledmedtriangleleft, \filledmedtriangleright, and \filledmedtriangleup; \triangleright is a synonym for \medtriangleright; \triangle, \vartriangle, and \bigtriangleup are synonyms for \medtriangleup; \triangleleft is a synonym for \medtriangleleft; \triangledown and \bigtriangledown are synonyms for \medtriangledown; \nlessclosed is a synonym for \ntriangleleft; \ngtrclosed is a synonym for \ntriangleright; \nleqclosed is a synonym for \ntrianglelefteq; and \ngeqclosed is a synonym for \ntrianglerighteq.

The title "Triangle Relations" is a bit of a misnomer here as only \triangleeq and \ntriangleeq are defined as TEX relations (class 3 symbols). The \largetriangle... symbols are defined as TEX "ordinary" characters (class 0) and all of the remaining characters are defined as TEX binary operators (class 2).

Table 134: fdsymbol Triangle Relations

⊵	\geqclosed	▽	\medtriangledown	◂	\smallblacktriangleleft
▷	\gtrclosed	◁	\medtriangleleft	▸	\smallblacktriangleright
▽	\largetriangledown	▷	\medtriangleright	▴	\smallblacktriangleup
△	\largetriangleup	△	\medtriangleup	▿	\smalltriangledown
⊴	\leqclosed	⋪	\ngeqclosed	◁	\smalltriangleleft
◁	\lessclosed	⋫	\ngtrclosed	▷	\smalltriangleright
▼	\medblacktriangledown	⋬	\nleqclosed	△	\smalltriangleup
◀	\medblacktriangleleft	⋪	\nlessclosed	≜	\triangleeq
▶	\medblacktriangleright	⋭	\ntriangleeq		
▲	\medblacktriangleup	▼	\smallblacktriangledown		

fdsymbol defines synonyms for almost all of the preceding symbols:

▽	\bigtriangledown	⋬	\ntrianglelefteq	≜	\triangleq
△	\bigtriangleup	⋫	\ntriangleright	▷	\triangleright
▲	\blacktriangle	⋭	\ntrianglerighteq	⊵	\trianglerighteq
▼	\blacktriangledown	△	\triangle	△	\vartriangle
◀	\blacktriangleleft	▽	\triangledown	◁	\vartriangleleft
▶	\blacktriangleright	◁	\triangleleft	▷	\vartriangleright
⋪	\ntriangleleft	⊴	\trianglelefteq		

The title "Triangle Relations" is a bit of a misnomer here as only \triangleeq and \ntriangleeq are defined as TEX relations (class 3 symbols). The \largetriangle... symbols are defined as TEX "ordinary" characters (class 0) and all of the remaining characters are defined as TEX binary operators (class 2).

Table 135: boisik Triangle Relations

⋪	\ntriangleleft	⊴	\trianglelefteq	◿	\varlrtriangle
⋬	\ntrianglelefteq	⩡	\trianglelefteqslant	△	\vartriangle
⋫	\ntriangleright	▹	\triangleright	◁	\vartriangleleft
⋭	\ntrianglerighteq	⊵	\trianglerighteq	▷	\vartriangleright
◃	\triangleleft	⩢	\trianglerighteqslant		

Table 136: stix Triangle Relations

⧍	\lrtriangleeq	⋫	\nvartriangleright	△	\vartriangle
⧏	\ltrivb	⧐	\rtriltri	◁	\vartriangleleft
⋬	\ntrianglelefteq	⊴	\trianglelefteq	▷	\vartriangleright
⋭	\ntrianglerighteq	≜	\triangleq	⧐	\vbrtri
⋪	\nvartriangleleft	⊵	\trianglerighteq		

Table 137: Arrows

$\Downarrow$	`\Downarrow`	$\longleftarrow$	`\longleftarrow`	$\nwarrow$	`\nwarrow`
$\downarrow$	`\downarrow`	$\Longleftarrow$	`\Longleftarrow`	$\Rightarrow$	`\Rightarrow`
$\hookleftarrow$	`\hookleftarrow`	$\longleftrightarrow$	`\longleftrightarrow`	$\rightarrow$	`\rightarrow`
$\hookrightarrow$	`\hookrightarrow`	$\Longleftrightarrow$	`\Longleftrightarrow`	$\searrow$	`\searrow`
$\leadsto$	`\leadsto`*	$\longmapsto$	`\longmapsto`	$\swarrow$	`\swarrow`
$\leftarrow$	`\leftarrow`	$\Longrightarrow$	`\Longrightarrow`	$\uparrow$	`\uparrow`
$\Leftarrow$	`\Leftarrow`	$\longrightarrow$	`\longrightarrow`	$\Uparrow$	`\Uparrow`
$\Leftrightarrow$	`\Leftrightarrow`	$\mapsto$	`\mapsto`	$\updownarrow$	`\updownarrow`
$\leftrightarrow$	`\leftrightarrow`	$\nearrow$	`\nearrow`†	$\Updownarrow$	`\Updownarrow`

* Not predefined by the LaTeX 2_ε core. Use the latexsym package to expose this symbol.

† See the note beneath Table 236 for information about how to put a diagonal arrow across a mathematical expression (as in "$\not\nearrow^{0}_{\nabla \cdot \vec{B}}$") .

Table 138: Harpoons

$\leftharpoondown$	`\leftharpoondown`	$\rightharpoondown$	`\rightharpoondown`	$\rightleftharpoons$	`\rightleftharpoons`
$\leftharpoonup$	`\leftharpoonup`	$\rightharpoonup$	`\rightharpoonup`		

Table 139: textcomp Text-mode Arrows

$\downarrow$	`\textdownarrow`	$\rightarrow$	`\textrightarrow`
$\leftarrow$	`\textleftarrow`	$\uparrow$	`\textuparrow`

Table 140: $\mathcal{AMS}$ Arrows

$\circlearrowleft$	`\circlearrowleft`	$\leftleftarrows$	`\leftleftarrows`	$\rightleftarrows$	`\rightleftarrows`
$\circlearrowright$	`\circlearrowright`	$\leftrightarrows$	`\leftrightarrows`	$\rightrightarrows$	`\rightrightarrows`
$\curvearrowleft$	`\curvearrowleft`	$\leftrightsquigarrow$	`\leftrightsquigarrow`	$\rightsquigarrow$	`\rightsquigarrow`
$\curvearrowright$	`\curvearrowright`	$\Lleftarrow$	`\Lleftarrow`	$\Rsh$	`\Rsh`
$\dashleftarrow$	`\dashleftarrow`	$\looparrowleft$	`\looparrowleft`	$\twoheadleftarrow$	`\twoheadleftarrow`
$\dashrightarrow$	`\dashrightarrow`	$\looparrowright$	`\looparrowright`	$\twoheadrightarrow$	`\twoheadrightarrow`
$\downdownarrows$	`\downdownarrows`	$\Lsh$	`\Lsh`	$\upuparrows$	`\upuparrows`
$\leftarrowtail$	`\leftarrowtail`	$\rightarrowtail$	`\rightarrowtail`		

Table 141: $\mathcal{AMS}$ Negated Arrows

$\nLeftarrow$	`\nLeftarrow`	$\nLeftrightarrow$	`\nLeftrightarrow`	$\nRightarrow$	`\nRightarrow`
$\nleftarrow$	`\nleftarrow`	$\nleftrightarrow$	`\nleftrightarrow`	$\nrightarrow$	`\nrightarrow`

Table 142: $\mathcal{AMS}$ Harpoons

$\downharpoonleft$	`\downharpoonleft`	$\leftrightharpoons$	`\leftrightharpoons`	$\upharpoonleft$	`\upharpoonleft`
$\downharpoonright$	`\downharpoonright`	$\rightleftharpoons$	`\rightleftharpoons`	$\upharpoonright$	`\upharpoonright`

Table 143: stmaryrd Arrows

⇦	\leftarrowtriangle	⤇	\Mapsfrom	←	\shortleftarrow
⥈	\leftrightarroweq	↤	\mapsfrom	→	\shortrightarrow
⇿	\leftrightarrowtriangle	⤇	\Mapsto	↑	\shortuparrow
↯	\lightning	↗	\nnearrow	↘	\ssearrow
⟽	\Longmapsfrom	↖	\nnwarrow	↙	\sswarrow
⟻	\longmapsfrom	⇾	\rightarrowtriangle		
⟾	\Longmapsto	↓	\shortdownarrow		

Table 144: txfonts/pxfonts Arrows

⇦⊡	\boxdotLeft	⊙→	\circleddotright	←◇	\Diamondleft
←⊡	\boxdotleft	←○	\circleleft	◇→	\Diamondright
⊡→	\boxdotright	○→	\circleright	◇⇨	\DiamondRight
⊡⇨	\boxdotRight	⇿	\dashleftrightarrow	↜	\leftsquigarrow
⇦□	\boxLeft	⇦◇	\DiamonddotLeft	⇗	\Nearrow
←□	\boxleft	←◇	\Diamonddotleft	⇖	\Nwarrow
□→	\boxright	◇→	\Diamonddotright	⇛	\Rrightarrow
□⇨	\boxRight	◇⇨	\DiamonddotRight	⇘	\Searrow
←⊙	\circleddotleft	⇦◇	\DiamondLeft	⇙	\Swarrow

Table 145: mathabx Arrows

↺	\circlearrowleft	←	\leftarrow	↖	\nwarrow
↻	\circlearrowright	⇇	\leftleftarrows	↾	\restriction
↽	\curvearrowbotleft	↔	\leftrightarrow	→	\rightarrow
↭	\curvearrowbotleftright	⇆	\leftrightarrows	⇄	\rightleftarrows
⇁	\curvearrowbotright	↭	\leftrightsquigarrow	⇉	\rightrightarrows
↼	\curvearrowleft	↜	\leftsquigarrow	⇝	\rightsquigarrow
↼	\curvearrowleftright	↺	\lefttorightarrow	↻	\righttoleftarrow
⇀	\curvearrowright	↫	\looparrowdownleft	↱	\Rsh
↲	\dlsh	↬	\looparrowdownright	↘	\searrow
⇊	\downdownarrows	↫	\looparrowleft	↙	\swarrow
↺	\downtouparrow	↬	\looparrowright	↑↓	\updownarrows
↓↑	\downuparrows	↰	\Lsh	↺	\uptodownarrow
↳	\drsh	↗	\nearrow	↑↑	\upuparrows

Table 146: mathabx Negated Arrows

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

TABLE 147: mathabx Harpoons

⥋	\barleftharpoon	↼	\leftharpoonup	⇌	\rightleftharpoons
⥊	\barrightharpoon	⇇	\leftleftharpoons	⇉	\rightrightharpoons
⥥	\downdownharpoons	⇀	\leftrightharpoon	⥮	\updownharpoons
⥗	\downharpoonleft	⇋	\leftrightharpoons	↿	\upharpoonleft
⥖	\downharpoonright	⥤	\rightbarharpoon	↾	\upharpoonright
⥯	\downupharpoons	⇁	\rightharpoondown	⥣	\upupharpoons
⥌	\leftbarharpoon	⇀	\rightharpoonup		
↽	\leftharpoondown	⇄	\rightleftharpoon		

TABLE 148: MnSymbol Arrows

⤵	\curvearrowdownup	⟵	\longleftarrow	↙	\rhookswarrow
⤺	\curvearrowleftright	⟸	\Longleftarrow	↾	\rhookuparrow
⤿	\curvearrownesw	⟷	\longleftrightarrow	→	\rightarrow
⤾	\curvearrownwse	⟺	\Longleftrightarrow	⇒	\Rightarrow
⤻	\curvearrowrightleft	⟼	\longmapsto	↣	\rightarrowtail
⤹	\curvearrowsenw	⟶	\longrightarrow	⇄	\rightleftarrows
⤸	\curvearrowswne	⟹	\Longrightarrow	⇝	\rightlsquigarrow
⥀	\curvearrowupdown	↫	\looparrowleft	↦	\rightmapsto
⇣	\dasheddownarrow	↬	\looparrowright	⇉	\rightrightarrows
⇠	\dashedleftarrow	↰	\Lsh	⇝	\rightrsquigarrow
⇗	\dashednearrow	↗	\nearrow	⤇	\Rrightarrow
⇖	\dashednwarrow	⇗	\Nearrow	↱	\Rsh
⇢	\dashedrightarrow	↗	\nearrowtail	↘	\searrow
⇘	\dashedsearrow	↗	\nelsquigarrow	⇘	\Searrow
⇙	\dashedswarrow	⤢	\nemapsto	↘	\searrowtail
⇡	\dasheduparrow	⇗	\nenearrows	↘	\selsquigarrow
⇓	\Downarrow	↗	\nersquigarrow	↘	\semapsto
↓	\downarrow	↙	\neswarrow	⇘	\senwarrows
↣	\downarrowtail	⇙	\Neswarrow	↘	\sersquigarrow
⇊	\downdownarrows	⇙	\neswarrows	⇘	\sesearrows
⇂	\downlsquigarrow	↖	\nwarrow	↘	\squigarrowdownup
↧	\downmapsto	⇖	\Nwarrow	↭	\squigarrowleftright
⇂	\downrsquigarrow	↖	\nwarrowtail	⇜	\squigarrownesw
⇵	\downuparrows	↖	\nwlsquigarrow	⇝	\squigarrownwse
⟳	\lcirclearrowdown	↖	\nwmapsto	↭	\squigarrowrightleft
⟲	\lcirclearrowleft	⇖	\nwnwarrows	↘	\squigarrowsenw
⟳	\lcirclearrowright	↖	\nwrsquigarrow	⇗	\squigarrowswne
⟲	\lcirclearrowup	↖	\nwsearrow	⇝	\squigarrowupdown
⤶	\lcurvearrowdown	⇖	\Nwsearrow	↙	\swarrow
⤷	\lcurvearrowleft	⇗	\nwsearrows	⇙	\Swarrow
↷	\lcurvearrowne	⟲	\partialvardlcircleleftint*	↙	\swarrowtail
↶	\lcurvearrownw	⟳	\partialvardlcirclerightint*	↙	\swlsquigarrow
↷	\lcurvearrowright	⟲	\partialvardrcircleleftint*	↙	\swmapsto
↷	\lcurvearrowse	⟳	\partialvardrcirclerightint*	⇙	\swnearrows
↶	\lcurvearrowsw	⟲	\partialvartlcircleleftint*	↙	\swrsquigarrow
↶	\lcurvearrowup	⟳	\partialvartlcirclerightint*	⇙	\swswarrows
⇐	\Leftarrow	⟲	\partialvartrcircleleftint*	↡	\twoheaddownarrow

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←	\leftarrow	⟮	\partialvartrcirclerightint*	↞	\twoheadleftarrow
↢	\leftarrowtail	↶	\rcirclearrowdown	↗	\twoheadnearrow
⇇	\leftleftarrows	↺	\rcirclearrowleft	↖	\twoheadnwarrow
↜	\leftlsquigarrow	↷	\rcirclearrowright	↠	\twoheadrightarrow
↤	\leftmapsto	↻	\rcirclearrowup	↘	\twoheadsearrow
↔	\leftrightarrow	⤵	\rcurvearrowdown	↙	\twoheadswarrow
⇔	\Leftrightarrow	⤺	\rcurvearrowleft	↟	\twoheaduparrow
⇆	\leftrightarrows	⤻	\rcurvearrowne	↑	\uparrow
↭	\leftrsquigarrow	⤹	\rcurvearrownw	⇑	\Uparrow
↓	\lhookdownarrow	⤼	\rcurvearrowright	↥	\uparrowtail
↩	\lhookleftarrow	⤸	\rcurvearrowse	↕	\updownarrow
↗	\lhooknearrow	⤽	\rcurvearrowsw	⇕	\Updownarrow
↖	\lhooknwarrow	⤷	\rcurvearrowup	⇅	\updownarrows
↪	\lhookrightarrow	⇂	\rhookdownarrow	↿	\uplsquigarrow
↘	\lhooksearrow	↩	\rhookleftarrow	↥	\upmapsto
↙	\lhookswarrow	↗	\rhooknearrow	↾	\uprsquigarrow
↑	\lhookuparrow	↖	\rhooknwarrow	⇈	\upuparrows
↯	\lightning	↪	\rhookrightarrow		
⇐	\Lleftarrow	↘	\rhooksearrow		

MnSymbol additionally defines synonyms for some of the preceding symbols:

↻	\circlearrowleft	(same as \rcirclearrowup)
↺	\circlearrowright	(same as \lcirclearrowup)
⤺	\curvearrowleft	(same as \rcurvearrowleft)
⤻	\curvearrowright	(same as \lcurvearrowright)
⇠	\dashleftarrow	(same as \dashedleftarrow)
⇢	\dashrightarrow	(same as \dashedrightarrow)
↩	\hookleftarrow	(same as \rhookleftarrow)
↪	\hookrightarrow	(same as \lhookrightarrow)
⇝	\leadsto	(same as \rightlsquigarrow)
↭	\leftrightsquigarrow	(same as \squigarrowleftright)
↦	\mapsto	(same as \rightmapsto)
⇝	\rightsquigarrow	(same as \rightlsquigarrow)

* The \partialvar...int macros are intended to be used internally by MnSymbol to produce various types of integrals.

TABLE 149: MnSymbol Negated Arrows

⤭	\ncurvearrowdownup	↮	\nlhooknwarrow	⇄	\nrightleftarrows
↮	\ncurvearrowleftright	↛	\nlhookrightarrow	⇝	\nrightlsquigarrow
⤯	\ncurvearrownesw	↘	\nlhooksearrow	↦	\nrightmapsto
⤮	\ncurvearrownwse	↙	\nlhookswarrow	⇉	\nrightrightarrows
⤰	\ncurvearrowrightleft	↣	\nlhookuparrow	↛	\nrightrsquigarrow
⤫	\ncurvearrowsenw	⇍	\nLleftarrow	⇏	\nRrightarrow
⤬	\ncurvearrowswne	↗	\nnearrow	↘	\nSearrow
⤱	\ncurvearrowupdown	⇗	\nNearrow	↘	\nsearrow

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⇣	\ndasheddownarrow	⇗	\nnearrowtail	⇘	\nsearrowtail
⇠	\ndashedleftarrow	⇗	\nnelsquigarrow	⇝	\nselsquigarrow
⇡	\ndashednearrow	⇗	\nnemapsto	⇘	\nsemapsto
⇖	\ndashednwarrow	⇗	\nnenearrows	⇙	\nsenwarrows
⇢	\ndashedrightarrow	⇗	\nnersquigarrow	⇘	\nsersquigarrow
⇘	\ndashedsearrow	⇗	\nNeswarrow	⇙	\nsesearrows
⇙	\ndashedswarrow	⇗	\nneswarrow	⇅	\nsquigarrowdownup
⇡	\ndasheduparrow	⇗	\nneswarrows	⇎	\nsquigarrowleftright
⇣	\ndownarrow	⇖	\nNwarrow	⇎	\nsquigarrownesw
⇓	\nDownarrow	⇖	\nnwarrow	⇵	\nsquigarrownwse
⇣	\ndownarrowtail	⇖	\nnwarrowtail	⇗	\nsquigarrowrightleft
⇊	\ndowndownarrows	⇖	\nnwlsquigarrow	⇖	\nsquigarrowsenw
⇣	\ndownlsquigarrow	⇖	\nnwmapsto	⇗	\nsquigarrowswne
⇣	\ndownmapsto	⇖	\nnwnwarrows	⇵	\nsquigarrowupdown
⇣	\ndownrsquigarrow	⇖	\nnwrsquigarrow	⇙	\nswarrow
⇊	\ndownuparrows	⇘	\nnwsearrow	⇙	\nSwarrow
◌⃒	\nlcirclearrowdown	⇖	\nNwsearrow	⇙	\nswarrowtail
◌⃒	\nlcirclearrowleft	⇖	\nnwsearrows	⇙	\nswlsquigarrow
◌⃒	\nlcirclearrowright	◌⃒	\nrcirclearrowdown	⇙	\nswmapsto
◌⃒	\nlcirclearrowup	◌⃒	\nrcirclearrowleft	⇙	\nswnearrows
⇣	\nlcurvearrowdown	◌⃒	\nrcirclearrowright	⇜	\nswrsquigarrow
⇜	\nlcurvearrowleft	◌⃒	\nrcirclearrowup	⇙	\nswswarrows
⇝	\nlcurvearrowne	⇃	\nrcurvearrowdown	⇟	\ntwoheaddownarrow
⇜	\nlcurvearrownw	↜	\nrcurvearrowleft	↞	\ntwoheadleftarrow
⇝	\nlcurvearrowright	⇝	\nrcurvearrowne	⇗	\ntwoheadnearrow
⇝	\nlcurvearrowse	↖	\nrcurvearrownw	↖	\ntwoheadnwarrow
⇙	\nlcurvearrowsw	↛	\nrcurvearrowright	↠	\ntwoheadrightarrow
⇡	\nlcurvearrowup	↘	\nrcurvearrowse	↘	\ntwoheadsearrow
⇍	\nLeftarrow	⇂	\nrcurvearrowsw	↙	\ntwoheadswarrow
↚	\nleftarrow	↾	\nrcurvearrowup	↟	\ntwoheaduparrow
↚	\nleftarrowtail	↧	\nrhookdownarrow	↑	\nuparrow
⇇	\nleftleftarrows	↚	\nrhookleftarrow	⇑	\nUparrow
↚	\nleftlsquigarrow	↗	\nrhooknearrow	↟	\nuparrowtail
↚	\nleftmapsto	↖	\nrhooknwarrow	↕	\nupdownarrow
↮	\nleftrightarrow	↛	\nrhookrightarrow	⇕	\nUpdownarrow
⇎	\nLeftrightarrow	↘	\nrhooksearrow	⇅	\nupdownarrows
↭	\nleftrightarrows	↙	\nrhookswarrow	↿	\nuplsquigarrow
↚	\nleftrsquigarrow	↥	\nrhookuparrow	↥	\nupmapsto
↧	\nlhookdownarrow	↛	\nrightarrow	↿	\nuprsquigarrow
↚	\nlhookleftarrow	⇏	\nRightarrow	⇈	\nupuparrows
↗	\nlhooknearrow	↣	\nrightarrowtail		

MnSymbol additionally defines synonyms for some of the preceding symbols:

⃖	\ncirclearrowleft	(same as \nrcirclearrowup)
⃗	\ncirclearrowright	(same as \nlcirclearrowup)
↶	\ncurvearrowleft	(same as \nrcurvearrowleft)
↷	\ncurvearrowright	(same as \nlcurvearrowright)
-⇢	\ndasharrow	(same as \ndashedrightarrow)
⇠-	\ndashleftarrow	(same as \ndashedleftarrow)
-⇢	\ndashrightarrow	(same as \ndashedrightarrow)
↚	\ngets	(same as \nleftarrow)
↚	\nhookleftarrow	(same as \nrhookleftarrow)
↛	\nhookrightarrow	(same as \nlhookrightarrow)
⇝	\nleadsto	(same as \nrightlsquigarrow)
⇎	\nleftrightsquigarrow	(same as \nsquigarrowleftright)
↦	\nmapsto	(same as \nrightmapsto)
⇝	\nrightsquigarrow	(same as \nrightlsquigarrow)
↛	\nto	(same as \nrightarrow)

Table 150: MnSymbol Harpoons

↽	\downharpoonccw*	⥋	\neswharpoons	⇁	\seharpooncw
⇂	\downharpooncw*	⥊	\neswharpoonsenw	⥋	\senwharpoons
⥥	\downupharpoons	↖	\nwharpoonccw	↙	\swharpoonccw
↼	\leftharpoonccw*	↖	\nwharpooncw	↙	\swharpooncw
↼	\leftharpooncw*	⥊	\nwseharpoonnesw	⥊	\swneharpoons
⥊	\leftrightharpoondownup	⥍	\nwseharpoons	↿	\updownharpoonleftright
⇋	\leftrightharpoons	⥎	\nwseharpoonswne	↾	\updownharpoonrightleft
⥋	\leftrightharpoonupdown	⇀	\rightharpoonccw*	⥮	\updownharpoons
↗	\neharpoonccw	⇀	\rightharpooncw*	↿	\upharpoonccw*
↗	\neharpooncw	⇌	\rightleftharpoons	↾	\upharpooncw*
⥊	\neswharpoonnwse	↘	\seharpoonccw		

* Where marked, the "ccw" suffix can be replaced with "up" and the "cw" suffix can be replaced with "down". (In addition, \upharpooncw can be written as \restriction.)

Table 151: MnSymbol Negated Harpoons

↽	\ndownharpoonccw*	⥋	\nneswharpoons	⇁	\nseharpooncw
⇂	\ndownharpooncw*	⥊	\nneswharpoonsenw	⥋	\nsenwharpoons
⥥	\ndownupharpoons	↖	\nnwharpoonccw	↙	\nswharpoonccw
↼	\nleftharpoonccw*	↖	\nnwharpooncw	↙	\nswharpooncw
↼	\nleftharpooncw*	⥊	\nnwseharpoonnesw	⥊	\nswneharpoons
⥊	\nleftrightharpoondownup	⥍	\nnwseharpoons	↿	\nupdownharpoonleftright
⇋	\nleftrightharpoons	⥎	\nnwseharpoonswne	↾	\nupdownharpoonrightleft
⥋	\nleftrightharpoonupdown	⇀	\nrightharpoonccw*	⥮	\nupdownharpoons
↗	\nneharpoonccw	⇀	\nrightharpooncw*	↿	\nupharpoonccw*
↗	\nneharpooncw	⇌	\nrightleftharpoons	↾	\nupharpooncw*
⥊	\nneswharpoonnwse	↘	\nseharpoonccw		

* Where marked, the "ccw" suffix can be replaced with "up" and the "cw" suffix can be replaced with "down". (In addition, \nupharpooncw can be written as \nrestriction.)

TABLE 152: fdsymbol Arrows

↺	\acwcirclearrowdown	←	\leftarrow	⇉	\rightrightarrows
↺	\acwcirclearrowleft	↢	\leftarrowtail	⇝	\rightwavearrow
↺	\acwcirclearrowright	⇠	\leftbkarrow	⤇	\Rrightarrow
↺	\acwcirclearrowup	⇇	\leftleftarrows	↱	\Rsh
↳	\acwleftarcarrow	↤	\leftmapsto	↘	\searrow
↰	\acwnearcarrow	⇤	\Leftmapsto	⇘	\Searrow
↶	\acwnwarcarrow	⇔	\Leftrightarrow	↘	\searrowtail
↶	\acwoverarcarrow	↔	\leftrightarrow	↘	\sebkarrow
↱	\acwrightarcarrow	⇆	\leftrightarrows	⇘	\senwarrows
↷	\acwsearcarrow	↭	\leftrightwavearrow	⇘	\sesearrows
↷	\acwswarcarrow	↜	\leftwavearrow	⇙	\Swarrow
↷	\acwunderarcarrow	↯	\lightning	↙	\swarrow
↻	\bdleftarcarrow	⇚	\Lleftarrow	↙	\swarrowtail
↷	\bdnearcarrow	⟸	\Longleftarrow	↙	\swbkarrow
↶	\bdnwarcarrow	⟵	\longleftarrow	⇙	\swnearrows
↶	\bdoverarcarrow	⟷	\longleftrightarrow	⇙	\swswarrows
↻	\bdrightarcarrow	⟺	\Longleftrightarrow	↡	\twoheaddownarrow
↷	\bdsearcarrow	⇜	\longleftwavearrow	↞	\twoheadleftarrow
↷	\bdswarcarrow	⟽	\Longmapsfrom	↗	\twoheadnearrow
↶	\bdunderarcarrow	⟻	\longmapsfrom	↖	\twoheadnwarrow
↻	\cwcirclearrowdown	⟾	\Longmapsto	↠	\twoheadrightarrow
↻	\cwcirclearrowleft	⟼	\longmapsto	↘	\twoheadsearrow
↻	\cwcirclearrowright	⟶	\longrightarrow	↙	\twoheadswarrow
↻	\cwcirclearrowup	⟹	\Longrightarrow	↟	\twoheaduparrow
↱	\cwleftarcarrow	⇝	\longrightwavearrow	↑	\uparrow
↴	\cwnearcarrow	↫	\looparrowleft	⇑	\Uparrow
↱	\cwnwarcarrow	↬	\looparrowright	↥	\uparrowtail
↷	\cwoverarcarrow	↰	\Lsh	↾	\upbkarrow
↳	\cwrightarcarrow	↗	\nearrow	⇳	\Updownarrow
↴	\cwsearcarrow	⇗	\Nearrow	↕	\updownarrow
↶	\cwswarcarrow	↗	\nearrowtail	⇅	\updownarrows
↷	\cwunderarcarrow	↗	\nebkarrow	↕	\updownwavearrow
⤋	\Ddownarrow	⇗	\nenearrows	↥	\upmapsto
⇓	\Downarrow	⇗	\Neswarrow	⇯	\Upmapsto
↓	\downarrow	⤢	\neswarrow	↑↑	\upuparrows
↓	\downarrowtail	⇗	\neswarrows	↾	\upwavearrow
↓	\downbkarrow	⇖	\Nwarrow	⤊	\Uuparrow
⇊	\downdownarrows	↖	\nwarrow	↭	\vardownwavearrow
⇓	\Downmapsto	↖	\nwarrowtail	↧	\varhookdownarrow
↧	\downmapsto	↖	\nwbkarrow	↩	\varhookleftarrow
⇵	\downuparrows	⇖	\nwnwarrows	↗	\varhooknearrow
↭	\downwavearrow	⇖	\Nwsearrow	↖	\varhooknwarrow
↧	\hookdownarrow	↖	\nwsearrow	↪	\varhookrightarrow
↩	\hookleftarrow	⇖	\nwsearrows	↘	\varhooksearrow
↗	\hooknearrow	↳	\Rdsh	↙	\varhookswarrow
↖	\hooknwarrow	⇒	\Rightarrow	↥	\varhookuparrow
↪	\hookrightarrow	→	\rightarrow	↭	\varleftrightwavearrow
↘	\hooksearrow	↣	\rightarrowtail	↜	\varleftwavearrow
↙	\hookswarrow	⇢	\rightbkarrow	↝	\varrightwavearrow
↥	\hookuparrow	⇄	\rightleftarrows	↕	\varupdownwavearrow
↲	\Ldsh	⇨	\Rightmapsto	↾	\varupwavearrow

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⇐	\Leftarrow	↦	\rightmapsto

fdsymbol defines synonyms for most of the preceding symbols:

↻	\acwgapcirclearrow	↭	\leftrightsquigarrow	↖	\rhooknwarrow
↻	\acwopencirclearrow	↜	\leftrsquigarrow	↦	\rhookrightarrow
↺	\circlearrowleft	↜	\leftsquigarrow	↘	\rhooksearrow
↻	\circlearrowright	↰	\leftupcurvedarrow	↙	\rhookswarrow
↶	\curvearrowleft	↧	\lhookdownarrow	↥	\rhookuparrow
↷	\curvearrowright	↩	\lhookleftarrow	⇝	\rightcurvedarrow
↻	\cwgapcirclearrow	↗	\lhooknearrow	↳	\rightdowncurvedarrow
↻	\cwopencirclearrow	↖	\lhooknwarrow	⇝	\rightlcurvearrow
⇢	\dasharrow	↪	\lhookrightarrow	⇄	\rightleftcurvearrow
⇠	\dashleftarrow	↘	\lhooksearrow	↭	\rightleftsquigarrow
⇢	\dashrightarrow	↙	\lhookswarrow	⇝	\rightlsquigarrow
⤶	\downlcurvearrow	↥	\lhookuparrow	⇀	\rightrcurvearrow
↶	\downleftcurvedarrow	⟿	\longleadsto	⇝	\rightrsquigarrow
⇵	\downlsquigarrow	⟿	\longleftsquigarrow	⇝	\rightsquigarrow
⤵	\downrcurvearrow	⟿	\longrightsquigarrow	↱	\rightupcurvedarrow
⤵	\downrightcurvedarrow	↧	\mapsdown	⤵	\selcurvearrow
⇵	\downrsquigarrow	⤋	\Mapsdown	↰	\senwcurvearrow
⤷	\downupcurvearrow	↤	\mapsfrom	↳	\sercurvearrow
⇵	\downupsquigarrow	⇤	\Mapsfrom	↲	\swlcurvearrow
↯	\downzigzagarrow	↦	\mapsto	↱	\swnecurvearrow
←	\gets	⤇	\Mapsto	↶	\swrcurvearrow
↗	\hknearrow	↥	\mapsup	→	\to
↖	\hknwarrow	⤊	\Mapsup	↰	\updowncurvearrow
↘	\hksearrow	↱	\nelcurvearrow	↕	\updownsquigarrow
↙	\hkswarrow	↱	\nercurvearrow	↱	\uplcurvearrow
⇝	\leadsto	↱	\neswcurvearrow	↰	\upleftcurvedarrow
↞	\leftcurvedarrow	↰	\nwlcurvearrow	↾	\uplsquigarrow
↩	\leftdowncurvedarrow	↰	\nwrcurvearrow	↱	\uprcurvearrow
⇜	\leftlcurvearrow	↰	\nwsecurvearrow	↱	\uprightcurvearrow
⇜	\leftlsquigarrow	↴	\rhookdownarrow	↾	\uprsquigarrow
↰	\leftrcurvearrow	↩	\rhookleftarrow		
↭	\leftrightcurvearrow	↗	\rhooknearrow		

Table 153: fdsymbol Negated Arrows

↶	\nacwcirclearrowdown	↚	\nleftarrow	⇏	\nRrightarrow
↺	\nacwcirclearrowleft	⇍	\nLeftarrow	↘	\nsearrow
↻	\nacwcirclearrowright	↞	\nleftarrowtail	⇘	\nSearrow
↷	\nacwcirclearrowup	↚	\nleftbkarrow	↘	\nsearrowtail
↚	\nacwleftarcarrow	⇇	\nleftleftarrows	↘	\nsebkarrow
↖	\nacwnearcarrow	↮	\nleftmapsto	⇖	\nsenwarrows
↙	\nacwnwarcarrow	⇎	\nLeftmapsto	⇘	\nsesearrows
↶	\nacwoverarcarrow	↮	\nleftrightarrow	↙	\nswarrow

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$\nacwrightarrowarrow$	\nacwrightarrowarrow	$\nLeftrightarrow$	\nLeftrightarrow	$\nSwarrow$	\nSwarrow
$\nacwsearcarrow$	\nacwsearcarrow	$\nleftrightarrows$	\nleftrightarrows	$\nswarrowtail$	\nswarrowtail
$\nacwswarcarrow$	\nacwswarcarrow	$\nleftrightwavearrow$	\nleftrightwavearrow	$\nswbkarrow$	\nswbkarrow
$\nacwunderarcarrow$	\nacwunderarcarrow	$\nleftwavearrow$	\nleftwavearrow	$\nswnearrows$	\nswnearrows
$\nbdleftarcarrow$	\nbdleftarcarrow	$\nLleftarrow$	\nLleftarrow	$\nswswarrows$	\nswswarrows
$\nbdnearcarrow$	\nbdnearcarrow	$\nlongleftarrow$	\nlongleftarrow	$\ntwoheaddownarrow$	\ntwoheaddownarrow
$\nbdnwarcarrow$	\nbdnwarcarrow	$\nLongleftarrow$	\nLongleftarrow	$\ntwoheadleftarrow$	\ntwoheadleftarrow
$\nbdoverarcarrow$	\nbdoverarcarrow	$\nlongleftrightarrow$	\nlongleftrightarrow	$\ntwoheadnearrow$	\ntwoheadnearrow
$\nbdrightarcarrow$	\nbdrightarcarrow	$\nLongleftrightarrow$	\nLongleftrightarrow	$\ntwoheadnwarrow$	\ntwoheadnwarrow
$\nbdsearcarrow$	\nbdsearcarrow	$\nlongleftwavearrow$	\nlongleftwavearrow	$\ntwoheadrightarrow$	\ntwoheadrightarrow
$\nbdswarcarrow$	\nbdswarcarrow	$\nlongmapsfrom$	\nlongmapsfrom	$\ntwoheadsearrow$	\ntwoheadsearrow
$\nbdunderarcarrow$	\nbdunderarcarrow	$\nLongmapsfrom$	\nLongmapsfrom	$\ntwoheadswarrow$	\ntwoheadswarrow
$\ncwcirclearrowdown$	\ncwcirclearrowdown	$\nlongmapsto$	\nlongmapsto	$\ntwoheaduparrow$	\ntwoheaduparrow
$\ncwcirclearrowleft$	\ncwcirclearrowleft	$\nLongmapsto$	\nLongmapsto	$\nuparrow$	\nuparrow
$\ncwcirclearrowright$	\ncwcirclearrowright	$\nlongrightarrow$	\nlongrightarrow	$\nUparrow$	\nUparrow
$\ncwcirclearrowup$	\ncwcirclearrowup	$\nLongrightarrow$	\nLongrightarrow	$\nuparrowtail$	\nuparrowtail
$\ncwleftarcarrow$	\ncwleftarcarrow	$\nlongrightwavearrow$	\nlongrightwavearrow	$\nupbkarrow$	\nupbkarrow
$\ncwnearcarrow$	\ncwnearcarrow	$\nnearrow$	\nnearrow	$\nupdownarrow$	\nupdownarrow
$\ncwnwarcarrow$	\ncwnwarcarrow	$\nNearrow$	\nNearrow	$\nUpdownarrow$	\nUpdownarrow
$\ncwoverarcarrow$	\ncwoverarcarrow	$\nnearrowtail$	\nnearrowtail	$\nupdownarrows$	\nupdownarrows
$\ncwrightarcarrow$	\ncwrightarcarrow	$\nnebkarrow$	\nnebkarrow	$\nupdownwavearrow$	\nupdownwavearrow
$\ncwsearcarrow$	\ncwsearcarrow	$\nnenearrows$	\nnenearrows	$\nupmapsto$	\nupmapsto
$\ncwswarcarrow$	\ncwswarcarrow	$\nneswarrow$	\nneswarrow	$\nUpmapsto$	\nUpmapsto
$\ncwunderarcarrow$	\ncwunderarcarrow	$\nNeswarrow$	\nNeswarrow	$\nupuparrows$	\nupuparrows
$\nDdownarrow$	\nDdownarrow	$\nneswarrows$	\nneswarrows	$\nupwavearrow$	\nupwavearrow
$\ndownarrow$	\ndownarrow	$\nnwarrow$	\nnwarrow	$\nUuparrow$	\nUuparrow
$\nDownarrow$	\nDownarrow	$\nNwarrow$	\nNwarrow	$\nvardownwavearrow$	\nvardownwavearrow
$\ndownarrowtail$	\ndownarrowtail	$\nnwarrowtail$	\nnwarrowtail	$\nvarhookdownarrow$	\nvarhookdownarrow
$\ndownbkarrow$	\ndownbkarrow	$\nnwbkarrow$	\nnwbkarrow	$\nvarhookleftarrow$	\nvarhookleftarrow
$\ndowndownarrows$	\ndowndownarrows	$\nnwnwarrows$	\nnwnwarrows	$\nvarhooknearrow$	\nvarhooknearrow
$\ndownmapsto$	\ndownmapsto	$\nnwsearrow$	\nnwsearrow	$\nvarhooknwarrow$	\nvarhooknwarrow
$\nDownmapsto$	\nDownmapsto	$\nNwsearrow$	\nNwsearrow	$\nvarhookrightarrow$	\nvarhookrightarrow
$\ndownuparrows$	\ndownuparrows	$\nnwsearrows$	\nnwsearrows	$\nvarhooksearrow$	\nvarhooksearrow
$\ndownwavearrow$	\ndownwavearrow	$\nrightarrow$	\nrightarrow	$\nvarhookswarrow$	\nvarhookswarrow
$\nhookdownarrow$	\nhookdownarrow	$\nRightarrow$	\nRightarrow	$\nvarhookuparrow$	\nvarhookuparrow
$\nhookleftarrow$	\nhookleftarrow	$\nrightarrowtail$	\nrightarrowtail	$\nvarleftrightwavearrow$	\nvarleftrightwavearrow
$\nhooknearrow$	\nhooknearrow	$\nrightbkarrow$	\nrightbkarrow	$\nvarleftwavearrow$	\nvarleftwavearrow
$\nhooknwarrow$	\nhooknwarrow	$\nrightleftarrows$	\nrightleftarrows	$\nvarrightwavearrow$	\nvarrightwavearrow
$\nhookrightarrow$	\nhookrightarrow	$\nrightmapsto$	\nrightmapsto	$\nvarupdownwavearrow$	\nvarupdownwavearrow
$\nhooksearrow$	\nhooksearrow	$\nRightmapsto$	\nRightmapsto	$\nvarupwavearrow$	\nvarupwavearrow
$\nhookswarrow$	\nhookswarrow	$\nrightrightarrows$	\nrightrightarrows		
$\nhookuparrow$	\nhookuparrow	$\nrightwavearrow$	\nrightwavearrow		

fdsymbol defines synonyms for most of the preceding symbols:

$\nacwgapcirclearrow$	\nacwgapcirclearrow	$\nleftdowncurvedarrow$	\nleftdowncurvedarrow	$\nrightcurvedarrow$	\nrightcurvedarrow
$\nacwopencirclearrow$	\nacwopencirclearrow	$\nleftlcurvearrow$	\nleftlcurvearrow	$\nrightdowncurvedarrow$	\nrightdowncurvedarrow
$\ncirclearrowleft$	\ncirclearrowleft	$\nleftlsquigarrow$	\nleftlsquigarrow	$\nrightlcurvearrow$	\nrightlcurvearrow
$\ncirclearrowright$	\ncirclearrowright	$\nleftrcurvearrow$	\nleftrcurvearrow	$\nrightleftcurvearrow$	\nrightleftcurvearrow
$\ncurvearrowleft$	\ncurvearrowleft	$\nleftrightcurvearrow$	\nleftrightcurvearrow	$\nrightleftsquigarrow$	\nrightleftsquigarrow
$\ncurvearrowright$	\ncurvearrowright	$\nleftrightsquigarrow$	\nleftrightsquigarrow	$\nrightlsquigarrow$	\nrightlsquigarrow
$\ncwgapcirclearrow$	\ncwgapcirclearrow	$\nleftrsquigarrow$	\nleftrsquigarrow	$\nrightrcurvearrow$	\nrightrcurvearrow
$\ncwopencirclearrow$	\ncwopencirclearrow	$\nleftsquigarrow$	\nleftsquigarrow	$\nrightrsquigarrow$	\nrightrsquigarrow

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⇢	\ndasharrow	↰	\nleftupcurvedarrow	↛	\nrightsquigarrow
⇠	\ndashleftarrow	⇜	\nlongleadsto	↱	\nrightupcurvedarrow
⇢	\ndashrightarrow	⇜	\nlongleftsquigarrow	↘	\nselcurvearrow
↓	\ndownlcurvearrow	⇝	\nlongrightsquigarrow	↖	\nsenwcurvearrow
↓	\ndownleftcurvedarrow	↧	\nmapsdown	↘	\nsercurvearrow
⇣	\ndownlsquigarrow	⇩	\nMapsdown	↙	\nswlcurvearrow
↓	\ndownrcurvearrow	↤	\nmapsfrom	↙	\nswnecurvearrow
↓	\ndownrightcurvedarrow	⇍	\nMapsfrom	↙	\nswrcurvearrow
⇣	\ndownrsquigarrow	↦	\nmapsto	↛	\nto
↓	\ndownupcurvearrow	⇏	\nMapsto	↑	\nupdowncurvearrow
⇣	\ndownupsquigarrow	↥	\nmapsup	↟	\nupdownsquigarrow
↚	\ngets	⇑	\nMapsup	↿	\nuplcurvearrow
↗	\nhknearrow	↱	\nnelcurvearrow	↑	\nupleftcurvedarrow
↖	\nhknwarrow	↗	\nnercurvearrow	↟	\nuplsquigarrow
↘	\nhksearrow	↗	\nneswcurvearrow	↾	\nuprcurvearrow
↙	\nhkswarrow	↖	\nnwlcurvearrow	↗	\nuprightcurvearrow
↛	\nleadsto	↖	\nnwrcurvearrow	↟	\nuprsquigarrow
↚	\nleftcurvedarrow	↖	\nnwsecurvearrow		

Table 154: fdsymbol Harpoons

↓	\downharpoonleft	⇙	\neswharpoons	↘	\seharpoonsw
↓	\downharpoonright	↙	\neswharpoonsenw	⇖	\senwharpoons
⇃	\downupharpoons	↖	\nwharpoonne	↙	\swharpoonnw
↼	\leftharpoondown	↖	\nwharpoonsw	↙	\swharpoonse
↼	\leftharpoonup	↘	\nwseharpoonnesw	⇙	\swneharpoons
⇀	\leftrightharpoondownup	⇘	\nwseharpoons	↿	\updownharpoonleftright
⇋	\leftrightharpoons	↘	\nwseharpoonswne	↾	\updownharpoonrightleft
⇀	\leftrightharpoonupdown	⇀	\rightharpoondown	⇂	\updownharpoons
↗	\neharpoonnw	⇀	\rightharpoonup	↿	\upharpoonleft
↗	\neharpoonse	⇌	\rightleftharpoons	↾	\upharpoonright
↗	\neswharpoonnwse	↘	\seharpoonne		

fdsymbol defines \restriction as a synonym for \upharpoonright, \updownharpoonsleftright as a synonym for \updownharpoons, and \downupharpoonsleftright as a synonym for \downupharpoons.

Table 155: fdsymbol Negated Harpoons

⥥	\ndownharpoonleft	⤫	\nneswharpoons	⤬	\nseharpoonsw
⥦	\ndownharpoonright	⤭	\nneswharpoonsenw	⤮	\nsenwharpoons
⥮	\ndownupharpoons	⤪	\nnwharpoonne	⤭	\nswharpoonnw
⥢	\nleftharpoondown	⤪	\nnwharpoonsw	⤬	\nswharpoonse
⥣	\nleftharpoonup	⤩	\nnwseharpoonnesw	⤯	\nswneharpoons
⥤	\nleftrightharpoondownup	⤨	\nnwseharpoons	⥦	\nupdownharpoonleftright
⥧	\nleftrightharpoons	⤨	\nnwseharpoonswne	⥧	\nupdownharpoonrightleft
⥨	\nleftrightharpoonupdown	⥩	\nrightharpoondown	⥮	\nupdownharpoons
⤯	\nneharpoonnw	⥬	\nrightharpoonup	⥤	\nupharpoonleft
⤮	\nneharpoonse	⥯	\nrightleftharpoons	⥥	\nupharpoonright
⤯	\nneswharpoonnwse	⤬	\nseharpoonne		

fdsymbol defines \nrestriction as a synonym for \nupharpoonright, \ndownupharpoonsleftright as a synonym for \ndownupharpoons, and \nupdownharpoonsleftright as a synonym for \nupdownharpoons.

Table 156: boisik Arrows

⇤	\barleftarrow	↰	\Lsh
⇆	\barleftarrowrightarrowbar	↧	\mapsdown
⍐	\barovernorthwestarrow	⇐	\Mapsfrom
↵	\carriagereturn	↤	\mapsfrom
↺	\circlearrowleft	⇒	\Mapsto
↻	\circlearrowright	↦	\mapsto
⊎	\cupleftarrow	↥	\mapsup
⤵	\curlyveedownarrow	⇗	\Nearrow
⤴	\curlyveeuparrow	↘	\nearrowcorner
⥿	\curlywedgedownarrow	↗	\nnearrow
⥾	\curlywedgeuparrow	↖	\nnwarrow
↜	\curvearrowbotleft	⇖	\Nwarrow
⤼	\curvearrowbotleftright	⍇	\nwarrowcorner
⤽	\curvearrowbotright	⇥	\rightarrowbar
↶	\curvearrowleft	⇻	\rightarrowcircle
↷	\curvearrowleftright	↣	\rightarrowtail
↷	\curvearrowright	⭢	\rightarrowTriangle
↲	\dlsh	⇾	\rightarrowtriangle
⬇	\downblackarrow	➡	\rightblackarrow
⇣	\downdasharrow	⇢	\rightdasharrow
⇊	\downdownarrows	⇄	\rightleftarrows
⍗	\downtouparrow	⇉	\rightrightarrows
⇩	\downwhitearrow	⇝	\rightsquigarrow
↯	\downzigzagarrow	⇶	\rightthreearrows
↳	\drsh	⥱	\righttoleftarrow
⥰	\eqleftrightarrow	⇨	\rightwhitearrow
↩	\hookleftarrow	⇨	\rightwhiteroundarrow
↪	\hookrightarrow	⇛	\Rrightarrow
↢	\leftarrowtail	↱	\Rsh
⭠	\leftarrowTriangle	⇘	\Searrow

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⇠	\leftarrowtriangle	↘	\ssearrow
⬅	\leftblackarrow	↙	\sswarrow
⇠	\leftdasharrow	⇙	\Swarrow
⇇	\leftleftarrows	↡	\twoheaddownarrow
⇆	\leftrightarrowseq	↞	\twoheadleftarrow
⇆	\leftrightarrows	↠	\twoheadrightarrow
↔	\leftrightarrowTriangle	↟	\twoheaduparrow
⇿	\leftrightarrowtriangle	⇑	\twoheadwhiteuparrow
⬌	\leftrightblackarrow	⇮	\twoheadwhiteuparrowpedestal
↭	\leftrightsquigarrow	⬆	\upblackarrow
↜	\leftsquigarrow	⇡	\updasharrow
↺	\lefttorightarrow	↕	\updownarrowbar
⇦	\leftwhitearrow	⬍	\updownblackarrow
⇦	\leftwhiteroundarrow	⇕	\updownwhitearrow
↜	\leftzigzagarrow	↺	\uptodownarrow
↴	\linefeed	↑↑	\upuparrows
⇚	\Lleftarrow	⇧	\upwhitearrow
↫	\looparrowdownleft	⇪	\whitearrowupfrombar
↬	\looparrowdownright	⇮	\whitearrowuppedestal
↫	\looparrowleft	⇮	\whitearrowuppedestalhbar
↬	\looparrowright	⇯	\whitearrowuppedestalvbar

Many of these symbols are defined only if the arrows package option is specified.

TABLE 157: boisik Negated Arrows

⇟	\nHdownarrow	⇎	\nLeftrightarroW	⇏	\nRightarrow
⇞	\nHuparrow	↮	\nleftrightarrow	⇍	\nVleftarrow
⇍	\nLeftarrow	⇎	\nLeftrightarrow	⇏	\nVrightarrow
↚	\nleftarrow	↛	\nrightarrow		

Many of these symbols are defined only if the arrows package option is specified.

TABLE 158: boisik Harpoons

⇂	\downharpoonleft	⇋	\leftrightharpoons	↿	\upharpoonleft
⇃	\downharpoonright	⇁	\rightharpoondown	↾	\upharpoonright
↽	\leftharpoondown	⇀	\rightharpoonup		
↼	\leftharpoonup	⇌	\rightleftharpoons		

TABLE 159: stix Arrows

↻	\acwcirclearrow	⟼	\longmapsto
⟲	\acwgapcirclearrow	⟹	\Longmapsto
↼	\acwleftarcarrow	⟶	\longrightarrow
↶	\acwoverarcarrow	⟹	\Longrightarrow
↽	\acwunderarcarrow	⟿	\longrightsquigarrow
⇤	\barleftarrow	↫	\looparrowleft
⇆	\barleftarrowrightarrowbar*	↬	\looparrowright
↦	\barrightarrowdiamond	↰	\Lsh
⤒	\baruparrow	↧	\mapsdown
⇜	\bsimilarleftarrow	⇤	\Mapsfrom
⇝	\bsimilarrightarrow	↤	\mapsfrom
↵	\carriagereturn*	↦	\mapsto
↷	\ccwundercurvearrow	⇨	\Mapsto
↺	\circlearrowleft	↥	\mapsup
↻	\circlearrowright	⇗	\Nearrow
⇷	\circleonleftarrow	↗	\nearrow
⇸	\circleonrightarrow	⤫	\neovnwarrow*
↶	\curvearrowleft	⤭	\neovsearrow*
↶	\curvearrowleftplus	↙	\neswarrow
↷	\curvearrowright	↖	\nwarrow
↷	\curvearrowrightminus	⇖	\Nwarrow
↻	\cwcirclearrow	⤮	\nwovnearrow*
↻	\cwgapcirclearrow	⤡	\nwsearrow
⇂	\cwrightarcarrow	⤯	\rdiagovsearrow*
↷	\cwundercurvearrow	↳	\Rdsh
⇢	\dbkarow	⇒	\Rightarrow
⤋	\DDownarrow	→	\rightarrow
⤋	\Ddownarrow	⥲	\rightarrowapprox
⇠	\diamondleftarrow	⥷	\rightarrowbackapprox
⇤	\diamondleftarrowbar	⇥	\rightarrowbar
↓	\downarrow	⥱	\rightarrowbsimilar
⇓	\Downarrow	⇢	\rightarrowdiamond
⤓	\downarrowbar	⟴	\rightarrowonoplus
↡	\downarrowbarred	⥅	\rightarrowplus
⇣	\downdasharrow*	⥂	\rightarrowshortleftarrow
⇊	\downdownarrows	⥴	\rightarrowsimilar
⤵	\downrightcurvedarrow*	⇀	\rightarrowtail
⇵	\downuparrows	⇾	\rightarrowtriangle
⇩	\downwhitearrow*	⇻	\rightarrowx
↯	\downzigzagarrow	⇢	\rightbkarrow
➛	\draftingarrow*	⇝	\rightcurvedarrow
⤑	\drbkarow	⇢	\rightdasharrow*
⇐	\equalleftarrow	⇢	\rightdotarrow
⇒	\equalrightarrow	⤷	\rightdowncurvedarrow
⤫	\fdiagovnearrow*	⇄	\rightleftarrows
↗	\hknearrow	⇉	\rightrightarrows
↖	\hknwarrow	⇝	\rightsquigarrow
↘	\hksearow	⇶	\rightthreearrows
↙	\hkswarow	⇝	\rightwavearrow
↩	\hookleftarrow	⇨	\rightwhitearrow*
↪	\hookrightarrow	⤇	\RRightarrow
↲	\Ldsh	⇛	\Rrightarrow

(continued on next page)

(continued from previous page)

←	\leftarrow	↱	\Rsh
⇐	\Leftarrow	↘	\searrow
⇜	\leftarrowapprox	⇘	\Searrow
⇽	\leftarrowbackapprox	⤭	\seovnearrow*
⇦	\leftarrowbsimilar	⇄	\shortrightarrowleftarrow
⟴	\leftarrowonoplus	⇜	\similarleftarrow
↢	\leftarrowplus	⇝	\similarrightarrow
⇆	\leftarrowshortrightarrow	↙	\swarrow
⇜	\leftarrowsimilar	⇙	\Swarrow
↢	\leftarrowtail	⤮	\toea
↽	\leftarrowtriangle	⤫	\tona
↞	\leftarrowx	⤬	\tosa
⇠	\leftbkarrow	⤯	\towa
↶	\leftcurvedarrow	↡	\twoheaddownarrow
⇠	\leftdasharrow*	↞	\twoheadleftarrow
⇠	\leftdbkarrow	↢	\twoheadleftarrowtail
⇠	\leftdotarrow	⇠	\twoheadleftdbkarrow
↲	\leftdowncurvedarrow	↤	\twoheadmapsfrom
⇇	\leftleftarrows	↦	\twoheadmapsto
⇔	\Leftrightarrow	↠	\twoheadrightarrow
↔	\leftrightarrow	↣	\twoheadrightarrowtail
⇿	\leftrightarrowcircle	↟	\twoheaduparrow
⇆	\leftrightarrows	⇞	\twoheaduparrowcircle
↭	\leftrightarrowtriangle	↑	\uparrow
⇜	\leftrightsquigarrow	⇑	\Uparrow
⇜	\leftsquigarrow	↕	\uparrowbarred
⇇	\leftthreearrows	⇡	\updasharrow*
↜	\leftwavearrow	⇳	\Updownarrow
⇦	\leftwhitearrow*	↕	\updownarrow
↵	\linefeed*	↨	\updownarrowbar*
⇚	\LLeftarrow	⇅	\updownarrows
⇚	\Lleftarrow	⤴	\uprightcurvearrow*
⟵	\longleftarrow	⇈	\upuparrows
⟸	\Longleftarrow	⇧	\upwhitearrow*
⟺	\Longleftrightarrow	⟰	\UUparrow
⟷	\longleftrightarrow	⟰	\Uuparrow
⇜	\longleftsquigarrow	⏎	\varcarriagereturn*
⟽	\Longmapsfrom	⇪	\whitearrowupfrombar*
⟻	\longmapsfrom		

* Defined as an ordinary character, not as a binary relation.

stix defines `\acwopencirclearrow` as a synonym for `\circlearrowleft`, `\cwopencirclearrow` as a synonym for `\circlearrowright`, `\leadsto` as a synonym for `\rightsquigarrow`, `\dashleftarrow` as a synonym for `\leftdbkarrow`, and `\dashrightarrow` and `\dasharrow` as synonyms for `\dbkarow`.

Table 160: stix Negated Arrows

⇟	\nHdownarrow*	⇎	\nvLeftrightarrow
⇞	\nHuparrow*	↛	\nVrightarrow
↚	\nleftarrow†	⇏	\nvRightarrow
⇍	\nLeftarrow	↛	\nvrightarrow
↮	\nleftrightarrow	↣̸	\nVrightarrowtail
⇎	\nLeftrightarrow	↣̸	\nvrightarrowtail
⇏	\nRightarrow	↞̸	\nvtwoheadleftarrow
↛	\nrightarrow	↞̸	\nVtwoheadleftarrow
⇷	\nvleftarrow	↢̸	\nvtwoheadleftarrowtail
⇍	\nvLeftarrow	↢̸	\nVtwoheadleftarrowtail
⇹	\nVleftarrow	↠̸	\nVtwoheadrightarrow
↢̸	\nVleftarrowtail	↠̸	\nvtwoheadrightarrow
↢̸	\nvleftarrowtail	↣̸	\nvtwoheadrightarrowtail
⇿	\nvleftrightarrow	↣̸	\nVtwoheadrightarrowtail
⇹	\nVleftrightarrow		

* Defined as an ordinary character, not as a binary relation.

† stix defines \ngets as a synonym for \nleftarrow.

Table 161: stix Harpoons

⥷	\bardownharpoonleft	⥋	\leftrightharpoons
⥻	\bardownharpoonright	⥧	\leftrightharpoonsdown
⥊	\barleftharpoondown	⥤	\leftrightharpoonsup
⥪	\barleftharpoonup	⥎	\leftrightharpoonupdown
⥋	\barrightharpoondown	⥤	\leftrightharpoonupup
⥫	\barrightharpoonup	⇁	\rightharpoondown
⥡	\barupharpoonleft	⇁	\rightharpoondownbar
⥣	\barupharpoonright	⥰	\rightharpoonsupdown
⥥	\dashleftharpoondown	⇀	\rightharpoonup
⥭	\dashrightharpoondown	⇀	\rightharpoonupbar
⇃	\downharpoonleft	⥋	\rightharpoonupdash
⥖	\downharpoonleftbar	⇌	\rightleftharpoons
⇂	\downharpoonright	⥤	\rightleftharpoonsdown
⥗	\downharpoonrightbar	⥤	\rightleftharpoonsup
⥯	\downharpoonsleftright	⥑	\updownharpoonleftleft
⥏	\downupharpoonsleftright	⥘	\updownharpoonleftright
↽	\leftharpoondown	⥍	\updownharpoonrightleft
⥙	\leftharpoondownbar	⥐	\updownharpoonrightright
⥥	\leftharpoonsupdown	⥮	\updownharpoonsleftright
↼	\leftharpoonup	↿	\upharpoonleft
⥚	\leftharpoonupbar	⥠	\upharpoonleftbar
⥧	\leftharpoonupdash	↾	\upharpoonright*
⥊	\leftrightharpoondowndown	⥔	\upharpoonrightbar
⥎	\leftrightharpoondownup	⥮	\upharpoonsleftright

* stix defines \restriction as a synonym for \upharpoonright.

TABLE 162: harpoon Extensible Harpoons

$\overleftharp{abc}$	`\overleftharp{abc}`	$\overrightharpdown{abc}$	`\overrightharpdown{abc}`	$\underrightharp{abc}$	`\underrightharp{abc}`
$\overleftharpdown{abc}$	`\overleftharpdown{abc}`	$\underleftharp{abc}$	`\underleftharp{abc}`	$\underrightharpdown{abc}$	`\underrightharpdown{abc}`
$\overrightharp{abc}$	`\overrightharp{abc}`	$\underleftharpdown{abc}$	`\underleftharpdown{abc}`		

All of the harpoon symbols are implemented using the graphics package (specifically, graphics's `\resizebox` command). Consequently, only TEX backends that support graphical transformations (e.g., *not* Xdvi) can properly display these symbols.

TABLE 163: chemarrow Arrows

→	`\chemarrow`

TABLE 164: fge Arrows

⇻	`\fgerightarrow`	⇞	`\fgeuparrow`

TABLE 165: MnSymbol Spoons

	`\downfilledspoon`		`\nnespoon`		`\nwfilledspoon`
	`\downspoon`		`\nnwfilledspoon`		`\nwspoon`
	`\leftfilledspoon`		`\nnwspoon`		`\rightfilledspoon`
	`\leftspoon`		`\nrightfilledspoon`		`\rightspoon`*
	`\ndownfilledspoon`		`\nrightspoon`*		`\sefilledspoon`
	`\ndownspoon`		`\nsefilledspoon`		`\sespoon`
	`\nefilledspoon`		`\nsespoon`		`\swfilledspoon`
	`\nespoon`		`\nswfilledspoon`		`\swspoon`
	`\nleftfilledspoon`		`\nswspoon`		`\upfilledspoon`
	`\nleftspoon`		`\nupfilledspoon`		`\upspoon`
	`\nnefilledspoon`		`\nupspoon`		

* MnSymbol defines `\multimap` as a synonym for `\rightspoon` and `\nmultimap` as a synonym for `\nrightspoon`.

TABLE 166: MnSymbol Pitchforks

	`\downpitchfork`		`\nnwpitchfork`		`\rightpitchfork`
	`\leftpitchfork`		`\nrightpitchfork`		`\sepitchfork`
	`\ndownpitchfork`		`\nsepitchfork`		`\swpitchfork`
	`\nepitchfork`		`\nswpitchfork`		`\uppitchfork`
	`\nleftpitchfork`		`\nuppitchfork`		
	`\nnepitchfork`		`\nwpitchfork`		

* MnSymbol defines `\pitchfork` as a synonym for `\uppitchfork` and `\npitchfork` as a synonym for `\nuppitchfork`.

Table 167: MnSymbol Smiles and Frowns

	\doublefrown		\nsmileeq		\smileeq
	\doublefrowneq		\nsmileeqfrown		\smileeqfrown
	\doublesmile		\nsmilefrown		\smilefrown
	\doublesmileeq		\nsmilefrowneq		\smilefrowneq
	\eqfrown		\nsqdoublefrown		\sqdoublefrown
	\eqsmile		\nsqdoublefrowneq		\sqdoublefrowneq
	\frown		\nsqdoublesmile		\sqdoublesmile
	\frowneq		\nsqdoublesmileeq		\sqdoublesmileeq
	\frowneqsmile		\nsqeqfrown		\sqeqfrown
	\frownsmile		\nsqeqsmile		\sqeqsmile
	\frownsmileeq		\nsqfrown		\sqfrown
	\ndoublefrown		\nsqfrowneq		\sqfrowneq
	\ndoublefrowneq		\nsqfrowneqsmile		\sqfrowneqsmile
	\ndoublesmile		\nsqfrownsmile		\sqfrownsmile
	\ndoublesmileeq		\nsqsmile		\sqsmile
	\neqfrown		\nsqsmileeq		\sqsmileeq
	\neqsmile		\nsqsmileeqfrown		\sqsmileeqfrown
	\nfrown		\nsqsmilefrown		\sqsmilefrown
	\nfrowneq		\nsqtriplefrown		\sqtriplefrown
	\nfrowneqsmile		\nsqtriplesmile		\sqtriplesmile
	\nfrownsmile		\ntriplefrown		\triplefrown
	\nfrownsmileeq		\ntriplesmile		\triplesmile
	\nsmile		\smile		

* MnSymbol defines \smallsmile as a synonym for \smile, \smallfrown as a synonym for \frown, \asymp as a synonym for \smilefrown, and \nasymp as a synonym for \nsmilefrown.

Table 168: fdsymbol Spoons

	\blackwhitespoon		\ndownblackspoon		\nupblackspoon
	\downblackspoon		\ndownspoon		\nupspoon
	\downspoon		\nleftblackspoon		\nwhiteblackspoon
	\leftblackspoon		\nleftrightblackspoon		\rightblackspoon
	\leftrightblackspoon		\nleftrightspoon		\rightspoon
	\leftrightspoon		\nleftspoon		\upblackspoon
	\leftspoon		\nrightblackspoon		\upspoon
	\nblackwhitespoon		\nrightspoon		\whiteblackspoon

fdsymbol defines synonyms for many of the preceding symbols:

	\cirmid		\multimapinv		\nmultimap
	\dualmap		\ncirmid		\nmultimapinv
	\imageof		\ndualmap		\norigof
	\midcir		\nimageof		\origof
	\multimap		\nmidcir		

Table 169: fdsymbol Pitchforks

⋔	\downpitchfork	⋦	\nleftpitchfork	⋟	\rightpitchfork
⋋	\leftpitchfork	⋠	\nrightpitchfork	⋔	\uppitchfork
⋕	\ndownpitchfork	⋭	\nuppitchfork		

fdsymbol defines \npitchfork as a synonym for \nuppitchfork and \pitchfork as a synonym for \uppitchfork.

Table 170: fdsymbol Smiles and Frowns

⌢	\frown	≇	\nfrowneq	≁	\nsmilefrown
≌	\frowneq	⊄	\nfrownsmile	⌣	\smile
⊃	\frownsmile	⊀	\nsmile	≅	\smileeq
⊀	\nfrown	≇	\nsmileeq	≃	\smilefrown

fdsymbol defines \arceq as a synonym for \frowneq, \asymp as a synonym for \smilefrown, \closure as a synonym for \frownsmile, \narceq as a synonym for \nfrowneq, \nasymp as a synonym for \nsmilefrown, \nclosure as a synonym for \nfrownsmile, \smallfrown as a synonym for \frown, and \smallsmile as a synonym for \smile.

Table 171: ulsy Contradiction Symbols

↯	\blitza	↯	\blitzb	↯	\blitzc	↯	\blitzd	↯	\blitze

Table 172: Extension Characters

–	\relbar	=	\Relbar

Table 173: stmaryrd Extension Characters

⫽	\Arrownot	⤇	\Mapsfromchar	⤆	\Mapstochar
⫻	\arrownot	⤅	\mapsfromchar		

Table 174: txfonts/pxfonts Extension Characters

⤄	\Mappedfromchar	⤋	\Mmappedfromchar	⤊	\Mmapstochar
⤃	\mappedfromchar	⤉	\mmappedfromchar	⤈	\mmapstochar

Table 175: mathabx Extension Characters

⤅	\mapsfromchar	⤅	\mapstochar
⤇	\Mapsfromchar	⤇	\Mapstochar

Table 176: stix Extension Characters

⦏	\lhook	-	\relbar	≣	\RRelbar
⦆	\mapsfromchar	=	\Relbar	≣	\Rrelbar
⦆	\mapstochar	⦐	\rhook		

Table 177: 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

Calling the above "symbols" may be a bit misleading.[3] Each log-like symbol merely produces the eponymous textual equivalent, but with proper surrounding spacing. See Section 10.4 for more information about log-like symbols. As \bmod and \pmod are arguably not symbols we refer the reader to the Short Math Guide for LaTeX [Dow00] for samples.

Table 178: $\mathcal{AMS}$ Log-like Symbols

inj lim	\injlim	$\varinjlim$	\varinjlim	$\varlimsup$	\varlimsup
proj lim	\projlim	$\varliminf$	\varliminf	$\varprojlim$	\varprojlim

Load the amsmath package to get these symbols. See Section 10.4 for some additional comments regarding log-like symbols. As \mod and \pod are arguably not symbols we refer the reader to the Short Math Guide for LaTeX [Dow00] for samples.

Table 179: GIN A2e Number Sets

$\mathbb{C}$	\Complex	$\mathbb{Z}$	\Integer	$\mathbb{N}$	\Natural	$\mathbb{Q}$	\Rational	$\mathbb{R}$	\Real
$\mathbf{C}$	\COMPLEX	$\mathbf{Z}$	\INTEGER	$\mathbf{N}$	\NATURAL	$\mathbf{Q}$	\RATIONAL	$\mathbf{R}$	\REAL

[3] Michael J. Downes prefers the more general term, "atomic math objects".

Table 180: Greek Letters

α	\alpha	θ	\theta	o	o	τ	\tau
β	\beta	ϑ	\vartheta	π	\pi	υ	\upsilon
γ	\gamma	ι	\iota	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		

The remaining Greek majuscules can be produced with ordinary Latin letters. The symbol "M", for instance, is used for both an uppercase "m" and an uppercase "μ". To make available commands for *all* of the Greek majuscules, either use the mathspec package, which requires XeLaTeX, or copy `mathspec.sty`'s Greek-letter definitions to your document's preamble:

```
\DeclareMathSymbol{\Alpha}{\mathalpha}{operators}{"41}
\DeclareMathSymbol{\Beta}{\mathalpha}{operators}{"42}
\DeclareMathSymbol{\Epsilon}{\mathalpha}{operators}{"45}
\DeclareMathSymbol{\Zeta}{\mathalpha}{operators}{"5A}
\DeclareMathSymbol{\Eta}{\mathalpha}{operators}{"48}
\DeclareMathSymbol{\Iota}{\mathalpha}{operators}{"49}
\DeclareMathSymbol{\Kappa}{\mathalpha}{operators}{"4B}
\DeclareMathSymbol{\Mu}{\mathalpha}{operators}{"4D}
\DeclareMathSymbol{\Nu}{\mathalpha}{operators}{"4E}
\DeclareMathSymbol{\Omicron}{\mathalpha}{operators}{"4F}
\DeclareMathSymbol{\Rho}{\mathalpha}{operators}{"50}
\DeclareMathSymbol{\Tau}{\mathalpha}{operators}{"54}
\DeclareMathSymbol{\Chi}{\mathalpha}{operators}{"58}
\DeclareMathSymbol{\omicron}{\mathord}{letters}{"6F}
```

See Section 10.5 for examples of how to produce bold Greek letters.

The symbols in this table are intended to be used in mathematical typesetting. Greek body text can be typeset using the babel package's greek (or polutonikogreek) option—and, of course, a font that provides the glyphs for the Greek alphabet.

Table 181: $\mathcal{AMS}$ Greek Letters

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

Table 182: txfonts/pxfonts Upright Greek Letters

α	\alphaup	θ	\thetaup	π	\piup	ϕ	\phiup
β	\betaup	ϑ	\varthetaup	ϖ	\varpiup	φ	\varphiup
γ	\gammaup	ι	\iotaup	ρ	\rhoup	χ	\chiup
δ	\deltaup	κ	\kappaup	ϱ	\varrhoup	ψ	\psiup
ϵ	\epsilonup	λ	\lambdaup	σ	\sigmaup	ω	\omegaup
ε	\varepsilonup	μ	\muup	ς	\varsigmaup		
ζ	\zetaup	ν	\nuup	τ	\tauup		
η	\etaup	ξ	\xiup	υ	\upsilonup		

The symbols in this table are intended to be used sporadically throughout a document (e.g., to represent mathematical units or numerical quantities—"$\pi \approx 3.14159$"). In contrast, Greek body text can be typeset using the babel package's greek (or polutonikogreek) option—and, of course, a font that provides the glyphs for the Greek alphabet.

Table 183: upgreek Upright Greek Letters

$\upalpha$	\upalpha	$\uptheta$	\uptheta	$\uppi$	\uppi	$\upphi$	\upphi
$\upbeta$	\upbeta	$\upvartheta$	\upvartheta	$\upvarpi$	\upvarpi	$\upvarphi$	\upvarphi
$\upgamma$	\upgamma	$\upiota$	\upiota	$\uprho$	\uprho	$\upchi$	\upchi
$\updelta$	\updelta	$\upkappa$	\upkappa	$\upvarrho$	\upvarrho	$\uppsi$	\uppsi
$\upepsilon$	\upepsilon	$\uplambda$	\uplambda	$\upsigma$	\upsigma	$\upomega$	\upomega
$\upvarepsilon$	\upvarepsilon	$\upmu$	\upmu	$\upvarsigma$	\upvarsigma		
$\upzeta$	\upzeta	$\upnu$	\upnu	$\uptau$	\uptau		
$\upeta$	\upeta	$\upxi$	\upxi	$\upupsilon$	\upupsilon		
$\Upgamma$	\Upgamma	$\Uplambda$	\Uplambda	$\Upsigma$	\Upsigma	$\Uppsi$	\Uppsi
$\Updelta$	\Updelta	$\Upxi$	\Upxi	$\Upupsilon$	\Upupsilon	$\Upomega$	\Upomega
$\Uptheta$	\Uptheta	$\Uppi$	\Uppi	$\Upphi$	\Upphi		

upgreek utilizes upright Greek characters from either the PostScript Symbol font (depicted above) or Euler Roman. As a result, the glyphs may appear slightly different from the above. Contrast, for example, "$\Gamma\Delta\Theta\alpha\beta\gamma$" (Symbol) with "ΓΔΘαβγ" (Euler).

Unlike textgreek (Table 6 on page 14), upgreek works in math mode.

The symbols in this table are intended to be used sporadically throughout a document (e.g., to represent mathematical units or numerical quantities—"$\pi \approx 3.14159$"). In contrast, Greek body text can be typeset using the babel package's greek (or polutonikogreek) option—and, of course, a font that provides the glyphs for the Greek alphabet.

Table 184: fourier Variant Greek Letters

π	\pi	ρ	\rho
ϖ	\varpi	ϱ	\varrho
ϖ	\varvarpi	ϱ	\varvarrho

Table 185: txfonts/pxfonts Variant Latin Letters

g	\varg	v	\varv	w	\varw	y	\vary

Pass the varg option to txfonts/pxfonts to replace g, v, w, and y with g, v, w, and y in every mathematical expression in your document.

Table 186: boisik Variant Greek Letters

β	\varbeta	$\varkappa$	\varkappa	ϖ	\varpi	ς	\varsigma
ε	\varepsilon	φ	\varphi	ϱ	\varrho	ϑ	\vartheta

Table 187: boisik Variant Latin Letters

g	\varg

Table 188: stix Variant Greek Letters

ε	\varepsilon	φ	\varphi	ϱ	\varrho	ϑ	\vartheta
$\varkappa$	\varkappa	ϖ	\varpi	ς	\varsigma		

Table 189: stix Transformed Greek Letters

϶	\backepsilon	℩	\turnediota
℧	\mho	϶	\upbackepsilon

Table 190: AMS Hebrew Letters

ℶ	\beth	ℷ	\gimel	ℸ	\daleth

\aleph (ℵ) appears in Table 286 on page 112.

Table 191: MnSymbol Hebrew Letters

ℵ	\aleph	ℶ	\beth	ℷ	\gimel	ℸ	\daleth

Table 192: fdsymbol Hebrew Letters

ℵ	\aleph	ℶ	\beth	ℷ	\gimel	ℸ	\daleth

Table 193: boisik Hebrew Letters

ℶ	\beth	ℷ	\gimel	ℸ	\daleth

TABLE 194: stix Hebrew Letters

א	\aleph	ב	\beth	ג	\gimel	ד	\daleth

TABLE 195: Letter-like Symbols

$\bot$	\bot	$\forall$	\forall	$\imath$	\imath	$\ni$	\ni	$\top$	\top
ℓ	\ell	$\hbar$	\hbar	$\in$	\in	∂	\partial	$\wp$	\wp
$\exists$	\exists	$\Im$	\Im	$\jmath$	\jmath	$\Re$	\Re		

TABLE 196: $\mathcal{AMS}$ Letter-like Symbols

$\Bbbk$	\Bbbk	$\complement$	\complement	$\hbar$	\hbar
®	\circledR	$\Finv$	\Finv	$\hslash$	\hslash
Ⓢ	\circledS	$\Game$	\Game	$\nexists$	\nexists

TABLE 197: txfonts/pxfonts Letter-like Symbols

¢	\mathcent	£	\mathsterling*	∉	\notin	∌	\notni

* It's generally preferable to use the corresponding symbol from Table 3 on page 14 because the symbols in that table work properly in both text mode and math mode.

TABLE 198: mathabx Letter-like Symbols

$\barin$	\barin	$\in$	\in	$\nottop$	\nottop	$\varnotin$	\varnotin
$\complement$	\complement	$\nexists$	\nexists	$\ni$	\owns	$\varnotowner$	\varnotowner
$\exists$	\exists	$\notbot$	\notbot	$\supseteq$	\ownsbar		
$\Finv$	\Finv	$\notin$	\notin	∂	\partial		
$\Game$	\Game	$\notowner$	\notowner	$\partialslash$	\partialslash		

TABLE 199: MnSymbol Letter-like Symbols

$\bot$	\bot	$\in$	\in	$\nowns$*	\nowns*	$\top$	\top
$\exists$	\exists	$\nexists$	\nexists	$\ni$	\owns	$\wp$	\wp
$\forall$	\forall	$\notin$	\nin*	$\wp$	\powerset		

* MnSymbol provides synonyms \notin for \nin, \ni for \owns, and \intercal for \top.

TABLE 200: fdsymbol Letter-like Symbols

⊥	\bot	∀	\forall	∈	\in	∋	\owns
∁	\complement	⅁	\Game	∄	\nexists	⊤	\top
∃	\exists	ℏ	\hbar	∉	\nin	℘	\wp
ⅎ	\Finv	ℏ	\hslash	∌	\nowns		

fdsymbol provides synonyms \notin for \nin, \ni for \owns, and \nni for \nowns.

TABLE 201: boisik Letter-like Symbols

𝕜	\Bbbk	⅁	\Game	𝚤	\imath	∄	\nexists
∁	\complement	ℏ	\hbar	⊺	\intercal	℘	\wp
ⅎ	\Finv	ℏ	\hslash	𝚥	\jmath		

TABLE 202: stix Letter-like Symbols

Å	\Angstrom	Ɛ	\Eulerconst	𝚤	\imath	⊤	\top
𝕜	\Bbbk	∃	\exists	⊺	\intercal	⟙	\topbot
⊥	\bot	ⅎ	\Finv	𝚥	\jmath	℘	\wp
®	\circledR	∀	\forall	$	\mathdollar	⅄	\Yup
Ⓢ	\circledS	⅁	\Game	¶	\mathparagraph	ℨ	\Zbar
∁	\complement	ℏ	\hbar	£	\mathsterling		
ϝ	\digamma	ℏ	\hslash	∄	\nexists		
ℓ	\ell	ℑ	\Im	ℜ	\Re		

TABLE 203: trfsigns Letter-like Symbols

e	\e	j	\im

TABLE 204: mathdesign Letter-like Symbols

∈	\in	∋	\owns
∉	\notin	∈	\smallin
∉	\notsmallin	∋	\smallowns
∌	\notsmallowns		

The mathdesign package additionally provides versions of each of the letter-like symbols shown in Table 196 on the previous page.

TABLE 205: fge Letter-like Symbols

∀	\fgeA	ɡ	\fgeeszett	⊐	\fgeleftB	⅄	\fgeU
ɔ	\fgec	⅁	\fgeF	⊂	\fgeleftC		
ɒ	\fged	⅄	\fgef	⊐	\fgerightB		
ə	\fgee	ɓ	\fgelb*	f	\fges		

* The fge package defines \fgeeta, \fgeN, and \fgeoverU as synonyms for \fgelb.

Table 206: fourier Letter-like Symbols

∂	\partial	∂	\varpartialdiff

Table 207: cmll Letter-like Symbols

⫫	\Bot	⫫	\simbot

Table 208: AMS Delimiters

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

Table 209: stmaryrd Delimiters

⟅	\Lbag	⟆	\Rbag	⟅	\lbag	⟆	\rbag
⌈⌈	\llceil	⌉⌉	\rrceil	⌊⌊	\llfloor	⌋⌋	\rrfloor
⦅	\llparenthesis	⦆	\rrparenthesis				

Table 210: mathabx Delimiters

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

Table 211: boisik Delimiters

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

Table 212: stix Delimiters

⦑	\langledot	⦒	\rangledot	⦉	\llangle	⦊	\rrangle
⟅	\lbag	⟆	\rbag	⌞	\llcorner	⌟	\lrcorner
⦗	\lblkbrbrak	⦘	\rblkbrbrak	⦅	\llparenthesis	⦆	\rrparenthesis
⦏	\lbracklltick	⦐	\rbrackurtick	⦓	\Lparengtr	⦖	\Rparenless
⦋	\lbrackubar	⦌	\rbrackubar	⦓	\lparenless	⦔	\rparengtr
⦍	\lbrackultick	⦎	\rbracklrtick	⧘	\lvzigzag	⧙	\rvzigzag
⟬	\Lbrbrak	⟭	\Rbrbrak	⧚	\Lvzigzag	⧛	\Rvzigzag
⧼	\lcurvyangle	⧽	\rcurvyangle	⌜	\ulcorner	⌝	\urcorner

Table 213: nath Delimiters

⌞	\niv	⌟	\vin

TABLE 214: Variable-sized Delimiters

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

When used with `\left` and `\right`, these symbols expand to the height of the enclosed math expression. Note that `\vert` is a synonym for `|`, and `\Vert` is a synonym for `\|`.

ε-TEX provides a `\middle` analogue to `\left` and `\right`. `\middle` can be used, for example, to make an internal "|" expand to the height of the surrounding `\left` and `\right` symbols. (This capability is commonly needed when typesetting adjacent bras and kets in Dirac notation: "$\langle\phi|\psi\rangle$"). A similar effect can be achieved in conventional LATEX using the braket package.

TABLE 215: Large, Variable-sized Delimiters

∫	∫	\lmoustache	)	)	\rmoustache	(	(	\lgroup	)	)	\rgroup
⏐	⏐	\arrowvert	‖	‖	\Arrowvert	❙	❙	\bracevert			

These symbols *must* be used with `\left` and `\right`. The mathabx package, however, redefines `\lgroup` and `\rgroup` so that those symbols can work without `\left` and `\right`.

TABLE 216: $\mathcal{AMS}$ Variable-sized Delimiters

|	⏐	\lvert	|	⏐	\rvert
‖	‖	\lVert	‖	‖	\rVert

According to the amsmath documentation [AMS99], the preceding symbols are intended to be used as delimiters (e.g., as in "$|-z|$") while the `\vert` and `\Vert` symbols (Table 214) are intended to be used as operators (e.g., as in "$p|q$").

TABLE 217: stmaryrd Variable-sized Delimiters

⟦	⟦	\llbracket	⟧	⟧	\rrbracket

TABLE 218: mathabx Variable-sized Delimiters

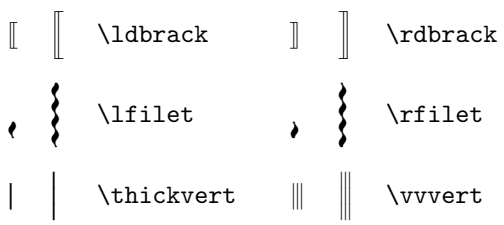
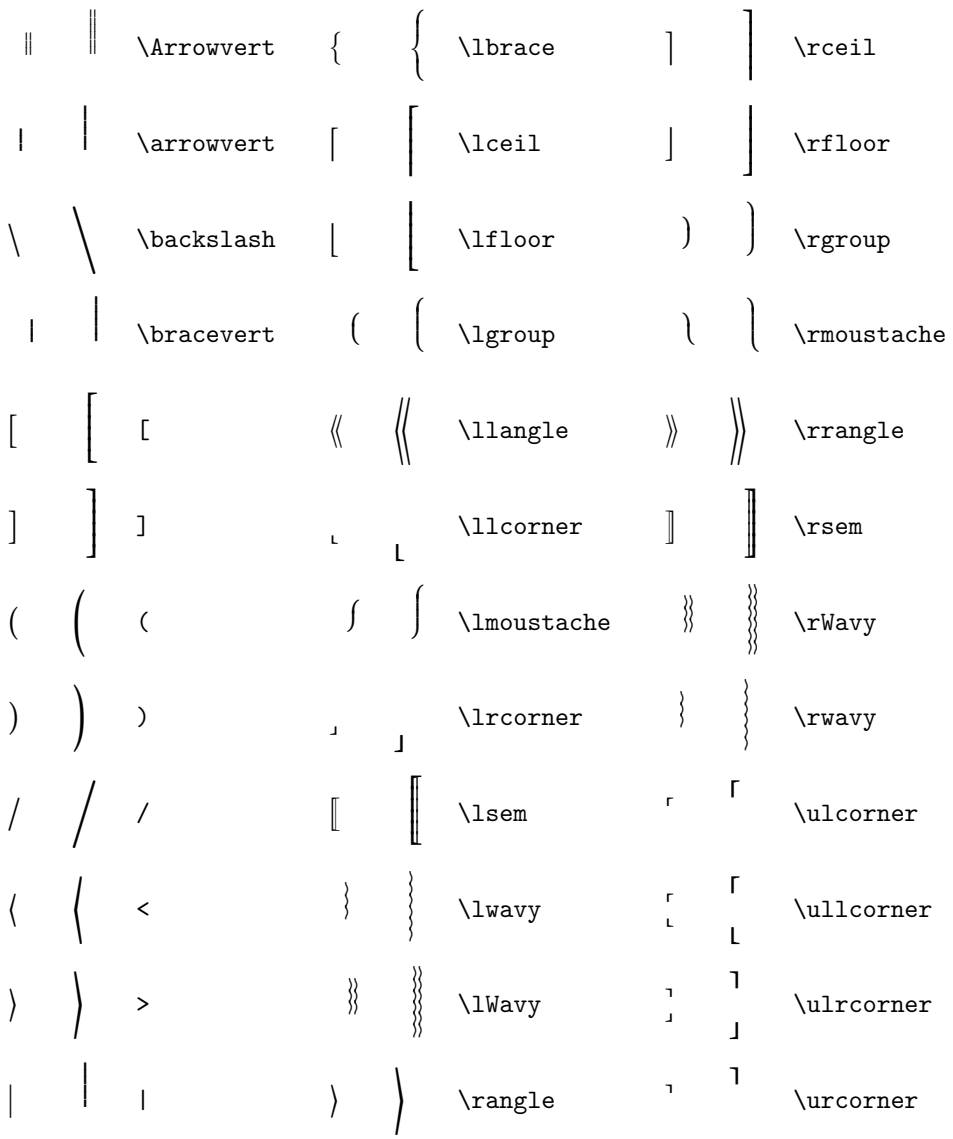


TABLE 219: MnSymbol Variable-sized Delimiters



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⟨	⟨	\langle	⟩	⟩	\ranglebar	‖	‖	\\|
⦉	⦉	\langlebar	}	}	\rbrace			

`\vert` is a synonym for `|`. `\Vert` is a synonym for `\|`. `\mid` and `\mvert` produce the same symbol as `\vert` but designated as math relations instead of ordinals. `\divides` produces the same symbol as `\vert` but designated as a binary operator instead of an ordinal. `\parallel` and `\mVert` produce the same symbol as `\Vert` but designated as math relations instead of ordinals.

TABLE 220: fdsymbol Variable-sized Delimiters

\	\	\backslash	⌟	⌟	\lrcorner	)	)	\rparen
↓	↓	\downarrow	|	|	\lvert	|	|	\rvert
⇓	⇓	\Downarrow	‖	‖	\lVert	‖	‖	\rVert
⟪	⟪	\lAngle	|||	|||	\lVvert	|||	|||	\rVvert
⟨	⟨	\langle	/	/	\mathslash	⌜	⌜	\ulcorner
⦑	⦑	\langledot	⟩	⟩	\rangle	⌜ ⌟	⌜	\ullcorner
{	{	\lbrace	⟫	⟫	\rAngle	⌝	⌝	\urlcorner
[	[	\lbrack	⦒	⦒	\rangledot	↑	↑	\uparrow
⟦	⟦	\lBrack	}	}	\rbrace	⇑	⇑	\Uparrow

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⌈	⌈	\lceil	⟧	⟧	\rBrack	↕	↕	\updownarrow
⌊	⌊	\lfloor	]	]	\rbrack	⇕	⇕	\Updownarrow
⦇	⦇	\lgroup	⌉	⌉	\rceil	⌝	⌝	\urcorner
⌞	⌞	\llcorner	⌋	⌋	\rfloor	|	|	\vert
⎰	⎰	\lmoustache	⦈	⦈	\rgroup	‖	‖	\Vert
(	⎛	\lparen	⌊	⌊	\rmoustache	⦀	⦀	\Vvert

fdsymbol defines "(" as a synonym for \lparen, ")" as a synonym for \rparen, "[" as a synonym for \lbrack, "]" as a synonym for \rbrack, "{" as a synonym for \lbrace, "}" as a synonym for \rbrace, "/" as a synonym for \mathslash, "|" as a synonym for \vert, "\|" as a synonym for \Vert, \lsem as a synonym for \lBrack, and \rsem as a synonym for \rBrack.

TABLE 221: stix Variable-sized Delimiters

⏐	⏐	\Arrowvert	⟪	⟪	\lAngle	⌉	⌉	\rceil
⏐	⏐	\arrowvert	{	{	\lbrace	⌋	⌋	\rfloor
\	\	\backslash	⦃	⦃	\lBrace	)	⦇	\rgroup
⤋	⤋	\Ddownarrow	⟦	⟦	\lBrack	⌊	⌊	\rmoustache
⤋	⤋	\DDownarrow	(	⦗	\lbrbrak	⦘	⦘	\rParen

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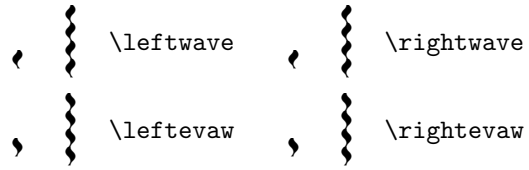
TABLE 222: mathdesign Variable-sized Delimiters



The definitions of these symbols include a preceding `\left` or `\right`. It is therefore an error to specify `\left` or `\right` explicitly. The internal, "primitive" versions of these symbols are called `\lwave`, `\rwave`, `\levaw`, and `\revaw`.

Table 223: nath Variable-sized Delimiters (Double)

⟪	⟪	\lAngle	⟫	⟫	\rAngle
⟦	⟦	\lBrack	⟧	⟧	\rBrack
⟘	⟘	\lCeil	⟙	⟙	\rCeil
⟚	⟚	\lFloor	⟛	⟛	\rFloor
‖	‖	\lVert*	‖	‖	\rVert*

* nath redefines all of the above to include implicit \left and \right commands. Hence, separate \lVert and \rVert commands are needed to disambiguate whether "|" is a left or right delimiter.

All of the symbols in Table 223 can also be expressed using the \double macro. See the nath documentation for examples and additional information.

Table 224: nath Variable-sized Delimiters (Triple)

⟪⟪	⟪⟪	\triple<	⟫⟫	⟫⟫	\triple>
⟦⟦	⟦⟦	\triple[	⟧⟧	⟧⟧	\triple]
⦀	⦀	\ltriple|*	⦀	⦀	\rtriple|*

* Similar to \lVert and \rVert in Table 223, \ltriple and \rtriple must be used instead of \triple to disambiguate whether "|" is a left or right delimiter.

Note that \triple—and the corresponding \double—is actually a macro that takes a delimiter as an argument.

Table 225: fourier Variable-sized Delimiters

⟦	⟦	\llbracket	⟧	⟧	\rrbracket
⦀	⦀	\VERT			

Table 226: textcomp Text-mode Delimiters

⟨	\textlangle	⟩	\textrangle
⟦	\textlbrackdbl	⟧	\textrbrackdbl
⦃	\textlquill	⦄	\textrquill

TABLE 227: metre Text-mode Delimiters

}	\alad	}	\Alad	†	\crux	†	\Crux
{	\alas	{	\Alas	‖	\quadrad	‖	\Quadrad
⟩	\angud	⟩	\Angud	⟦	\quadras	⟦	\Quadras
⟨	\angus	⟨	\Angus				

TABLE 228: Math-mode Accents

$\acute{a}$	\acute{a}	$\check{a}$	\check{a}	$\grave{a}$	\grave{a}	$\tilde{a}$	\tilde{a}
$\bar{a}$	\bar{a}*	$\ddot{a}$	\ddot{a}	$\hat{a}$	\hat{a}	$\vec{a}$	\vec{a}
$\breve{a}$	\breve{a}	$\dot{a}$	\dot{a}	$\mathring{a}$	\mathring{a}		

Note also the existence of \imath and \jmath, which produce dotless versions of "i" and "j". (See Table 286 on page 112.) These are useful when the accent is supposed to replace the dot. For example, "\hat{\imath}" produces a correct "$\hat{\imath}$", while "\hat{i}" would yield the rather odd-looking "$\hat{i}$".

* The \overline command (Table 236 on page 102) produces a wider accent than \bar: "$\overline{A}$" vs. "$\bar{A}$". However, unlike adjacent \bars, adjacent \overlines run together, which is often not desired: "$\overline{AB}$" vs. "$\bar{A}\bar{B}$". If wider bars than \bar are needed, the following code from Enrico Gregorio can be used to add the requisite inter-symbol spacing [Gre09]:

```
\newcommand{\closure}[2][3]{%
  {}\mkern#1mu\overline{\mkern-#1mu#2}}
```

With that definition, "\closure{A}\closure{B}" produces "$\overline{A}\overline{B}$", with a visible gap between the two accents. The optional argument can be used to fine-tune the spacing.

TABLE 229: $\mathcal{AMS}$ Math-mode Accents

$\dddot{a}$	\dddot{a}	$\ddddot{a}$	\ddddot{a}

These accents are also provided by the mathabx and accents packages and are redefined by the mathdots package if the amsmath and amssymb packages have previously been loaded. All of the variations except for the original $\mathcal{AMS}$ ones tighten the space between the dots (from $\ddot{\dot{a}}$ to $\dddot{a}$). The mathabx and mathdots versions also function properly within subscripts and superscripts ($x^{\dddot{a}}$ instead of $x^{\ddot{\dot{a}}}$) .

TABLE 230: MnSymbol Math-mode Accents

$\vec{a}$	\vec{a}

Table 231: fdsymbol Math-mode Accents

a	`\middlebar{a}`	$\not{a}$	`\strokethrough{a}`
a	`\middleslash{a}`	$\vec{a}$	`\vec{a}`

`\middlebar` and `\middleslash` are applied here to "a" for consistency with the rest of the document, but they generally look better when applied to taller lowercase characters.

Table 232: boisik Math-mode Accents

$\vec{a}$	`\vec{a}`

Table 233: stix Math-mode Accents

$\acute{a}$	`\acute{a}`	$\hat{a}$	`\hat{a}`
$\annuity{a}$	`\annuity{a}`	$\leftarrowaccent{a}$	`\leftarrowaccent{a}`
$\asteraccent{a}$	`\asteraccent{a}`	$\leftharpoonaccent{a}$	`\leftharpoonaccent{a}`
$\bar{a}$	`\bar{a}`	$\leftrightarrowaccent{a}$	`\leftrightarrowaccent{a}`
$\breve{a}$	`\breve{a}`	$\mathring{a}$	`\mathring{a}`
$\candra{a}$	`\candra{a}`	$\ocommatopright{a}$	`\ocommatopright{a}`
$\check{a}$	`\check{a}`	$\oturnedcomma{a}$	`\oturnedcomma{a}`
$\ddddot{a}$	`\ddddot{a}`	$\ovhook{a}$	`\ovhook{a}`
$\dddot{a}$	`\dddot{a}`	$\rightharpoonaccent{a}$	`\rightharpoonaccent{a}`
$\ddot{a}$	`\ddot{a}`	$\tilde{a}$	`\tilde{a}`
$\dot{a}$	`\dot{a}`	$\vec{a}$	`\vec{a}`
$\droang{a}$	`\droang{a}`	$\widebridgeabove{a}$	`\widebridgeabove{a}`
$\grave{a}$	`\grave{a}`		

Table 234: fge Math-mode Accents

Àå	`\spirituslenis{A}\spirituslenis{a}`*

* When fge is passed the crescent option, `\spirituslenis` instead uses a crescent accent as in "å".

Table 235: yhmath Math-mode Accents

$\mathring{a}$	`\ring{a}`

This symbol is largely obsolete, as standard LaTeX 2$_\varepsilon$ has supported `\mathring` (Table 228 on the previous page) since June 1998 [LaT98].

TABLE 236: Extensible Accents

$\widetilde{abc}$	`\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}`‡		

As demonstrated in a 1997 TUGboat article about typesetting long-division problems [Gib97], an extensible long-division sign ("$)\overline{abc}$") can be faked by putting a "`\big)`" in a `tabular` environment with an `\hline` or `\cline` in the preceding row. The article also presents a piece of code (uploaded to CTAN as `longdiv.tex`) that automatically solves and typesets—by putting an `\overline` atop "`\big)`" and the desired text—long-division problems. More recently, the STIX fonts include a true long-division sign. See `\longdivision` in Table 242 for a sample of this symbol. See also the polynom package, which automatically solves and typesets polynomial-division problems in a similar manner.

* These symbols are made more extensible by the MnSymbol package (Table 240 on the following page). and even more extensible by the yhmath package (Table 238).

† If you're looking for an extensible *diagonal* line or arrow to be used for canceling or reducing mathematical subexpressions (e.g., "$\cancel{x+=x}$" or "$\cancel{3+2}^{5}$") then consider using the cancel package.

‡ With an optional argument, `\sqrt` typesets nth roots. For example, "`\sqrt[3]{abc}`" produces "$\sqrt[3]{abc}$" and "`\sqrt[n]{abc}`" produces "$\sqrt[n]{abc}$".

TABLE 237: overrightarrow Extensible Accents

$\overRightarrow{abc}$	`\Overrightarrow{abc}`

TABLE 238: yhmath Extensible Accents

$\widehat{abc}$	`\widehat{abc}`	$\widetilde{abc}$	`\widetilde{abc}`
$\wideparen{abc}$	`\wideparen{abc}`	$\widetriangle{abc}$	`\widetriangle{abc}`
$\widering{abc}$	`\widering{abc}`		

TABLE 239: $\mathcal{AMS}$ Extensible Accents

$\overleftrightarrow{abc}$	`\overleftrightarrow{abc}`	$\underleftrightarrow{abc}$	`\underleftrightarrow{abc}`
$\underleftarrow{abc}$	`\underleftarrow{abc}`	$\underrightarrow{abc}$	`\underrightarrow{abc}`

Table 240: MnSymbol Extensible Accents

$\overbrace{abc}$	`\overbrace{abc}`	$\underbrace{abc}$	`\undergroup{abc}`
$\overbrace{abc}$	`\overgroup{abc}`	$\underline{abc}$	`\underlinesegment{abc}`
$\overleftarrow{abc}$	`\overleftharpoon{abc}`	$\widehat{abc}$	`\widehat{abc}`
$\overline{abc}$	`\overlinesegment{abc}`	$\widehat{abc}$	`\wideparen{abc}`
$\overrightarrow{abc}$	`\overrightharpoon{abc}`	$\widetilde{abc}$	`\widetilde{abc}`
$\underbrace{abc}$	`\underbrace{abc}`		

Table 241: fdsymbol Extensible Accents

$\overbrace{abc}$	`\overbrace{abc}`	$\underbrace{abc}$	`\undergroup{abc}`
$\overbrace{abc}$	`\overgroup{abc}`	$\underline{abc}$	`\underlinesegment{abc}`
$\overleftarrow{abc}$	`\overleftharpoon{abc}`	$\widehat{abc}$	`\widehat{abc}`
$\overline{abc}$	`\overlinesegment{abc}`	$\widehat{abc}$	`\wideparen{abc}`
$\overrightarrow{abc}$	`\overrightharpoon{abc}`	$\widetilde{abc}$	`\widetilde{abc}`
$\underbrace{abc}$	`\underbrace{abc}`		

Table 242: stix Extensible Accents

$\overline{)abc}$	`\longdivision{abc}`	$\underbrace{abc}$	`\underbracket{abc}`
$\overbrace{abc}$	`\overbrace{abc}`	$\underleftarrow{abc}$	`\underleftarrow{abc}`
$\overbrace{abc}$	`\overbracket{abc}`	$\underleftarrow{abc}$	`\underleftharpoon{abc}`
$\overleftarrow{abc}$	`\overleftarrow{abc}`	$\underleftrightarrow{abc}$	`\underleftrightarrow{abc}`
$\overleftarrow{abc}$	`\overleftharpoon{abc}`	$\underbrace{abc}$	`\underparen{abc}`
$\overleftrightarrow{abc}$	`\overleftrightarrow{abc}`	$\underrightarrow{abc}$	`\underrightarrow{abc}`
$\overbrace{abc}$	`\overparen{abc}`	$\underrightarrow{abc}$	`\underrightharpoon{abc}`
$\overrightarrow{abc}$	`\overrightarrow{abc}`	$\widecheck{abc}$	`\widecheck{abc}`
$\overrightarrow{abc}$	`\overrightharpoon{abc}`	$\widehat{abc}$	`\widehat{abc}`
$\sqrt{abc}$	`\sqrt{abc}`	$\widetilde{abc}$	`\widetilde{abc}`
$\underbrace{abc}$	`\underbrace{abc}`		

TABLE 243: mathtools Extensible Accents

$\overbrace{abc}$	`\overbrace{abc}`	$\underbrace{abc}$	`\underbrace{abc}`
$\overbracket{abc}$	`\overbracket{abc}`*	$\underbracket{abc}$	`\underbracket{abc}`*

* `\overbracket` and `\underbracket` accept optional arguments that specify the bracket height and thickness. See the mathtools documentation for more information.

TABLE 244: mathabx Extensible Accents

$\overbrace{abc}$	`\overbrace{abc}`	$\overline{abc}$	`\widebar{abc}`
$\overgroup{abc}$	`\overgroup{abc}`	$\widecheck{abc}$	`\widecheck{abc}`
$\underbrace{abc}$	`\underbrace{abc}`	$\wideparen{abc}$	`\wideparen{abc}`
$\undergroup{abc}$	`\undergroup{abc}`	$\widering{abc}$	`\widering{abc}`
$\widearrow{abc}$	`\widearrow{abc}`		

The braces shown for `\overbrace` and `\underbrace` appear in their minimum size. They can expand arbitrarily wide, however.

TABLE 245: fourier Extensible Accents

$\widearc{abc}$	`\widearc{abc}`	$\wideparen{abc}$	`\wideparen{abc}`
$\wideOarc{abc}$	`\wideOarc{abc}`	$\widering{abc}$	`\widering{abc}`

TABLE 246: esvect Extensible Accents

$\vec{abc}$	`\vv{abc}` with package option `a`
$\vec{abc}$	`\vv{abc}` with package option `b`
$\vec{abc}$	`\vv{abc}` with package option `c`
$\vec{abc}$	`\vv{abc}` with package option `d`
$\vec{abc}$	`\vv{abc}` with package option `e`
$\vec{abc}$	`\vv{abc}` with package option `f`
$\vec{abc}$	`\vv{abc}` with package option `g`
$\vec{abc}$	`\vv{abc}` with package option `h`

esvect also defines a `\vv*` macro which is used to typeset arrows over vector variables with subscripts. See the esvect documentation for more information.

TABLE 247: abraces Extensible Accents

$\overbrace{abc}$ `\aoverbrace{abc}` $\underbrace{abc}$ `\aunderbrace{abc}`

`\aoverbrace` and `\aunderbrace` accept optional arguments that provide a great deal of control over the braces' appearance. For example, these commands can produce braces with asymmetric endpoints, braces that span lines, dashed braces, and multicolored braces. See the abraces documentation for more information.

TABLE 248: undertilde Extensible Accents

$\underset{\sim}{abc}$ `\utilde{abc}`

Because `\utilde` is based on `\widetilde` it is also made more extensible by the yhmath package (Table 238 on page 102).

TABLE 249: ushort Extensible Accents

$\underline{\underline{abc}}$ `\ushortdw{abc}` $\underline{abc}$ `\ushortw{abc}`

`\ushortw` and `\ushortdw` are intended to be used with multi-character arguments ("words") while `\ushort`and `\ushortd` are intended to be used with single-character arguments.

The underlines produced by the ushort commands are shorter than those produced by the `\underline` command. Consider the output from the expression "`\ushort{x}\ushort{y}\underline{x}\underline{y}`", which looks like "$\underline{x}\underline{y}\underline{x}\underline{y}$".

TABLE 250: mdwmath Extensible Accents

$\surd abc$ `\sqrt*{abc}`

TABLE 251: actuarialangle Extensible Accents

$\overline{abc|}$ `\actuarialangle{abc}`

The actuarialangle package additionally defines `\angl` as `\actuarialangle` with a small amount of extra space to the right of the accented expression under the ⌝, `\angln` as `\angl{n}`, and `\anglr` as `\angl{r}`.

TABLE 252: $\mathcal{AMS}$ Extensible Arrows

$\xleftarrow{abc}$ `\xleftarrow{abc}` $\xrightarrow{abc}$ `\xrightarrow{abc}`

TABLE 253: mathtools Extensible Arrows

$\xhookleftarrow{abc}$	`\xhookleftarrow{abc}`	$\xleftrightharpoons{abc}$	`\xleftrightharpoons{abc}`
$\xhookrightarrow{abc}$	`\xhookrightarrow{abc}`	$\xmapsto{abc}$	`\xmapsto{abc}`
$\xLeftarrow{abc}$	`\xLeftarrow{abc}`	$\xRightarrow{abc}$	`\xRightarrow{abc}`
$\xleftharpoondown{abc}$	`\xleftharpoondown{abc}`	$\xrightharpoondown{abc}$	`\xrightharpoondown{abc}`
$\xleftharpoonup{abc}$	`\xleftharpoonup{abc}`	$\xrightharpoonup{abc}$	`\xrightharpoonup{abc}`
$\xleftrightarrow{abc}$	`\xleftrightarrow{abc}`	$\xrightleftharpoons{abc}$	`\xrightleftharpoons{abc}`
$\xLeftrightarrow{abc}$	`\xLeftrightarrow{abc}`		

TABLE 254: chemarr Extensible Arrows

$\xrightleftharpoons{abc}$	`\xrightleftharpoons{abc}`

TABLE 255: chemarrow Extensible Arrows

$\xleftarrow[def]{abc}$	`\autoleftarrow{abc}{def}`	$\xrightarrow[def]{abc}$	`\autorightarrow{abc}{def}`
$\xleftrightharpoons[def]{abc}$	`\autoleftrightharpoons{abc}{def}`	$\xrightleftharpoons[def]{abc}$	`\autorightleftharpoons{abc}{def}`

In addition to the symbols shown above, chemarrow also provides `\larrowfill`, `\rarrowfill`, `\leftrightharpoonsfill`, and `\rightleftharpoonsfill` macros. Each of these takes a length argument and produces an arrow of the specified length.

TABLE 256: extarrows Extensible Arrows

$\xLeftrightarrow{abc}$	`\xLeftrightarrow{abc}`	$\xLongleftrightarrow{abc}$	`\xLongleftrightarrow{abc}`
$\xleftrightarrow{abc}$	`\xleftrightarrow{abc}`	$\xlongleftrightarrow{abc}$	`\xlongleftrightarrow{abc}`
$\xlongequal{abc}$	`\xlongequal{abc}`	$\xLongrightarrow{abc}$	`\xLongrightarrow{abc}`
$\xLongleftarrow{abc}$	`\xLongleftarrow{abc}`	$\xlongrightarrow{abc}$	`\xlongrightarrow{abc}`
$\xlongleftarrow{abc}$	`\xlongleftarrow{abc}`		

Table 257: extpfeil Extensible Arrows

$\xlongequal{abc}$	`\xlongequal{abc}`	$\xtwoheadleftarrow{abc}$	`\xtwoheadleftarrow{abc}`
$\xmapsto{abc}$	`\xmapsto{abc}`	$\xtwoheadrightarrow{abc}$	`\xtwoheadrightarrow{abc}`
$\xtofrom{abc}$	`\xtofrom{abc}`		

The extpfeil package also provides a `\newextarrow` command to help you define your own extensible arrow symbols. See the extpfeil documentation for more information.

Table 258: DotArrow Extensible Arrows

$\dotarrow{a}$	`\dotarrow{a}`

The DotArrow package provides mechanisms for lengthening the arrow, adjusting the distance between the arrow and its symbol, and altering the arrowhead. See the DotArrow documentation for more information.

Table 259: trfsigns Extensible Transform Symbols

$\dft{a}$	`\dft{a}`	$\DFT{a}$	`\DFT{a}`

Table 260: holtpolt Non-commutative Division Symbols

$\holter{abc}{def}$	`\holter{abc}{def}`	$\polter{abc}{def}$	`\polter{abc}{def}`

Table 261: Dots

$\cdotp$	`\cdotp`	:	`\colon`*	.	`\ldotp`	$\vdots$	`\vdots`†
$\cdots$	`\cdots`	$\ddots$	`\ddots`†	$\ldots$	`\ldots`		

* While ":" is valid in math mode, `\colon` uses different surrounding spacing. See Section 10.4 and the Short Math Guide for LaTeX [Dow00] for more information on math-mode spacing.

† The mathdots package redefines `\ddots` and `\vdots` (Table 267) to make them scale properly with font size. (They normally scale horizontally but not vertically.) `\fixedddots` and `\fixedvdots` provide the original, fixed-height functionality of LaTeX 2$_\varepsilon$'s `\ddots` and `\vdots` macros.

Table 262: $\mathcal{AMS}$ Dots

⋱	\because*	⋯	\dotsi	∴	\therefore*
⋯	\dotsb	⋯	\dotsm		
…	\dotsc	…	\dotso		

* \because and \therefore are defined as binary relations and therefore also appear in Table 88 on page 47.

The $\mathcal{AMS}$ \dots_ symbols are named according to their intended usage: \dotsb between pairs of binary operators/relations, \dotsc between pairs of commas, \dotsi between pairs of integrals, \dotsm between pairs of multiplication signs, and \dotso between other symbol pairs.

Table 263: wasysym Dots

∴	\wasytherefore

Table 264: MnSymbol Dots

⋅	\cdot	⋰	\hdotdot	⋰	\udots
⋱	\ddotdot	⋯	\hdots	∴	\uptherefore
⋱	\ddots	⋰	\leftthere fore	⋮	\vdotdot
⋰	\diamonddots	⋱	\rightthere fore	⋮	\vdots
⋱	\downthere fore	⋮	\squaredots		
⋰	\fivedots	⋰	\udotdot		

MnSymbol defines \therefore as \uptherefore and \because as \downtherefore. Furthermore, \cdotp and \colon produce the same glyphs as \cdot and \vdotdot respectively but serve as TEX math punctuation (class 6 symbols) instead of TEX binary operators (class 2).

All of the above except \hdots and \vdots are defined as binary operators and therefore also appear in Table 56 on page 29.

Table 265: fdsymbol Dots

⋅	\cdot	⋯	\hdots	⋰	\udots
⋱	\ddotdot	⋰	\leftthere fore	∴	\uptherefore
⋱	\ddots	⋱	\rightthere fore	⋮	\vdotdot
⋱	\downthere fore	⋮	\squaredots		
⋰	\hdotdot	⋰	\udotdot		

fdsymbol defines \adots as a synonym for \udots; \because as a synonym for \downtherefore; \cdotp as a synonym for \cdot; \cdots as a synonym for \hdots; \Colon as a synonym for \squaredots; \colon, \mathcolon, and \mathratio as synonyms for \vdotdot; and \therefore as a synonym for \uptherefore. (Some of these serve different mathematical roles, such as relations versus binary operators.)

Table 266: stix Dots

⋰	`\adots`	⋯	`\cdots`	⋮	`\fourvdots`
∵	`\because`	::	`\Colon`	.	`\ldotp`
·	`\cdot`	⋱	`\ddots`	…	`\mathellipsis`
·	`\cdotp`	..	`\enleadertwodots`	∴	`\therefore`

stix defines `\centerdot` as a synonym for `\cdotp` and `\dotsb` and `\dotsm` as synonyms for `\cdots`.

Table 267: mathdots Dots

⋱	`\ddots`	⋰	`\iddots`	⋮	`\vdots`

Unlike the default definitions of the above (Table 261), mathdots's commands are designed to scale properly with the surrounding font size.

Table 268: yhmath Dots

⋰	`\adots`

Table 269: teubner Dots

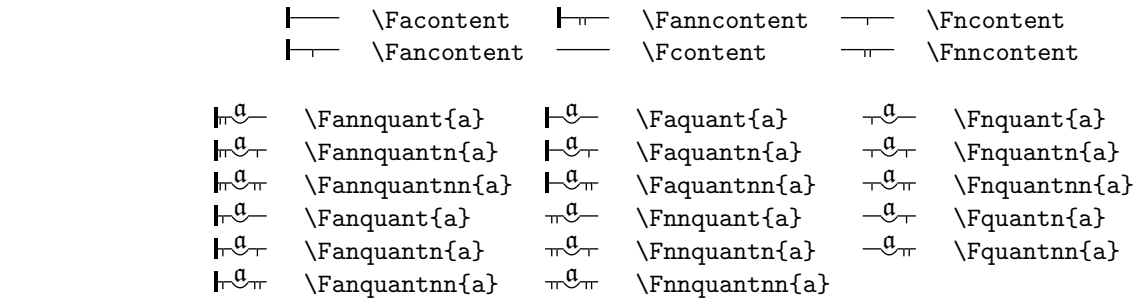
:	`\:`	⋮	`\;`	⁞	`\?`	::	`\antilabe`

Table 270: begriff Begriffsschrift Symbols

⊢	`\BGassert`	-	`\BGcontent`	¬	`\BGnot`
$\begin{matrix} b \\ a \end{matrix}$	`\BGconditional{a}{b}`	$\overset{\frown}{\mathfrak{a}}$	`\BGquant{a}`		

The begriff package contains additional commands for typesetting Frege's Begriffsschrift notation for second-order logic. See the begriff documentation for more information.

TABLE 271: frege Begriffsschrift Symbols



The frege package contains additional commands for typesetting Frege's Begriffsschrift notation for second-order logic. See the frege documentation for more information.

TABLE 272: mathcomp Math Symbols

℃	\tccentigrade	Ω	\tcohm	‰	\tcperthousand
µ	\tcmu	‱	\tcpertenthousand		

TABLE 273: marvosym Math Symbols

∢	\AngleSign	≥	\LargerOrEqual	×	\MVMultiplication
⇒	\Conclusion	≤	\LessOrEqual	.	\MVPeriod
≡	\Congruent	·	\MultiplicationDot	+	\MVPlus
≙	\Corresponds	,	\MVComma	→	\MVRightArrow
∕	\Divides	/	\MVDivision	)	\MVRightBracket
∤	\DividesNot	(	\MVLeftBracket	≢	\NotCongruent
⇔	\Equivalence	-	\MVMinus		

TABLE 274: marvosym Digits

0	\MVZero	2	\MVTwo	4	\MVFour	6	\MVSix	8	\MVEight
1	\MVOne	3	\MVThree	5	\MVFive	7	\MVSeven	9	\MVNine

TABLE 275: fge Digits

𝟘	\fgestruckzero	𝟙	\fgestruckone

TABLE 276: dozenal Base-12 Digits

↊	\x	↋	\e

TABLE 277: mathabx Mayan Digits

𝋠	\maya{0}	𝋡	\maya{2}	𝋢	\maya{4}
𝋡	\maya{1}	𝋢	\maya{3}	𝋣	\maya{5}

TABLE 278: stix Infinities

⧜	\acidfree	∞	\infty	⧝	\tieinfty
⧞	\iinfin	⧜	\nvinfty		

TABLE 279: stix Primes

′	\prime	‵	\backprime
″	\dprime	‶	\backdprime
‴	\trprime	‷	\backtrprime
⁗	\qprime		

TABLE 280: stix Empty Sets

∅	\emptyset	⦱	\emptysetobar	∅	\varnothing
⦳	\emptysetoarr	⦲	\emptysetocirc		
⦴	\emptysetoarrl	⦸	\revemptyset		

TABLE 281: $\mathcal{AMS}$ Angles

∠	\angle	∡	\measuredangle	∢	\sphericalangle

TABLE 282: MnSymbol Angles

∠	\angle	∡	\measuredangle	∢	\sphericalangle

TABLE 283: fdsymbol Angles

∠	\angle	⦡	\revangle	⦠	\sphericalangle
⦟	\measuredangle	⦣	\revmeasuredangle	⦢	\sphericalangledown
⊾	\measuredrightangle	∟	\rightangle	⦤	\sphericalangleleft
⊾	\measuredrightangledot	⦜	\rightanglesquare	⦥	\sphericalangleup

fdsymbol defines \measuredangleleft as a synonym for \revmeasuredangle; \revsphericalangle and \gtlpar as synonyms for \sphericalangleleft; \rightanglesqr as a synonym for \rightanglesquare; and \rightanglemdot as a synonym for \measuredrightangledot.

TABLE 284: boisik Angles

∠	\angle	∟	\rightangle	⦠	\sphericalangle
⦟	\measuredangle	⦜	\rightanglemdot		
⊾	\measuredrightangle	⦜	\rightanglesqr		

TABLE 285: stix Angles

⦟	\angdnr	⦇	\measanglerutone	⦜	\rightanglemdot
∠	\angle	⦈	\measangleultonw	⦜	\rightanglesqr
⦣	\angles	⦉	\measangleurtone	⦠	\sphericalangle
⦡	\angleubar	⦇	\measuredangle	⦢	\sphericalangleup
⦠	\gtlpar	⦊	\measuredangleleft	⦟	\threedangle
⦋	\measangledltosw	⦜	\measuredrightangle	⦞	\turnangle
⦌	\measangledrtose	⦡	\rangledownzigzagarrow	⦤	\wideangledown
⦍	\measangleldtosw	⦥	\revangle	⦣	\wideangleup
⦎	\measanglelutonw	⦥	\revangleubar		
⦏	\measanglerdtose	⦜	\rightangle		

TABLE 286: Miscellaneous LaTeX 2_ε Math Symbols

ℵ	\aleph	□	\Box*,†	∇	\nabla	△	\triangle
∅	\emptyset‡	◇	\Diamond*	¬	\neg		
∠	\angle	∞	\infty	′	\prime		
\	\backslash	℧	\mho*	√	\surd		

* Not predefined in LaTeX 2_ε. Use one of the packages latexsym, amsfonts, amssymb, txfonts, pxfonts, or wasysym. Note, however, that amsfonts and amssymb define \Diamond to produce the same glyph as \lozenge ("◊"); the other packages produce a squarer \Diamond as depicted above.

† To use \Box—or any other symbol—as an end-of-proof (Q.E.D.) marker, consider using the ntheorem package, which properly juxtaposes a symbol with the end of the proof text.

‡ Many people prefer the look of $\mathcal{AMS}$'s \varnothing ("∅", Table 287) to that of LaTeX's \emptyset.

TABLE 287: Miscellaneous $\mathcal{AMS}$ Math Symbols

‵	\backprime	▼	\blacktriangledown	℧	\mho
★	\bigstar	╲	\diagdown	□	\square
⧫	\blacklozenge	╱	\diagup	▽	\triangledown
■	\blacksquare	ð	\eth	∅	\varnothing
▲	\blacktriangle	◊	\lozenge	△	\vartriangle

TABLE 288: Miscellaneous wasysym Math Symbols

□ \Box ◇ \Diamond ℧ \mho* ∢ \varangle

* wasysym also defines an \agemO symbol, which is the same glyph as \mho but is intended for use in text mode.

TABLE 289: Miscellaneous txfonts/pxfonts Math Symbols

◆	\Diamondblack	ƛ	\lambdabar
⟐	\Diamonddot	ƛ	\lambdaslash

Table 290: Miscellaneous mathabx Math Symbols

○	\degree	⁗	\fourth	∡	\measuredangle	″	\second
⧹	\diagdown	#	\hash	⋔	\pitchfork	∢	\sphericalangle
⧸	\diagup	∞	\infty	∝	\propto	‴	\third
∅	\diameter	⋉	\leftthreetimes	⋌	\rightthreetimes	#	\varhash

Table 291: Miscellaneous MnSymbol Math Symbols

⌐	\backneg	∅	\diameter	⌐	\invneg	¬	\neg
∖	\backprime	∞	\infty	✠	\maltese	′	\prime
✓	\checkmark	⌙	\invbackneg	∇	\nabla	∫	\smallint

MnSymbol defines \emptyset and \varnothing as synonyms for \diameter; \lnot and \minushookdown as synonyms for \neg; \minushookup as a synonym for \invneg; \hookdownminus as a synonym for \backneg; and, \hookupminus as a synonym for \invbackneg.

Table 292: Miscellaneous Internal MnSymbol Math Symbols

⋯	\partialvardint	⋯	\partialvartint
⌣	\partialvardlanddownint	⌣	\partialvartlanddownint
⌢	\partialvardlandupint	⌢	\partialvartlandupint
↺	\partialvardlcircleleftint	↺	\partialvartlcircleleftint
↻	\partialvardlcirclerightint	↻	\partialvartlcirclerightint
○	\partialvardoiint	○	\partialvartoiint
○	\partialvardoint	○	\partialvartoint
↺	\partialvardrcircleleftint	↺	\partialvartrcircleleftint
↻	\partialvardrcirclerightint	↻	\partialvartrcirclerightint
⌒	\partialvardstrokedint	⌒	\partialvartstrokedint
∑	\partialvardsumint	Σ	\partialvartsumint

These symbols are intended to be used internally by MnSymbol to construct the integrals appearing in Table 79 on page 41 but can nevertheless be used in isolation.

Table 293: Miscellaneous fdsymbol Math Symbols

⌐	\backneg	∞	\infty	′	\prime
∖	\backprime	⌐	\invneg	⦸	\revemptyset
✓	\checkmark	✠	\maltese	▽	\sector
∅	\emptyset	¬	\neg	∫	\smallint

fdsymbol defines \hookdownminus as a synonym for \backneg; \invneg and \invnot as synonyms for \backneg; \lnot and \minushookdown as synonyms for \neg; \turnedbackneg as a synonym for \intprodr; \turnedneg as a synonym for \intprod; and \diameter and \varnothing as synonyms for \emptyset.

Table 294: Miscellaneous boisik Math Symbols

϶	\backepsilon	⊹	\hermitmatrix	⊥̸	\notbot
‵	\backprime	⧜	\iinfin	⊤̸	\nottop
✓	\checkmark	⌐	\invnot	℩	\riota
□	\dalambert	ƛ	\lambdabar	∼	\sinewave
╲	\diagdown	ƛ	\lambdaslash	∅	\varnothing
╱	\diagup	✠	\maltese		

Table 295: Miscellaneous stix Math Symbols

⏦	\accurrent	⊹	\hermitmatrix	⅊	\PropertyLine
\	\backslash	⁃	\hyphenbullet	∎	\QED
⎶	\bbrktbrk	⦚	\hzigzag	⁇	\Question
⟘	\bigbot	∆	\increment	╳	\rdiagovfdiag
⫼	\biginterleave	◘	\inversebullet	⟖	\rightouterjoin
⟙	\bigtop	⌐	\invnot	⅃	\sansLmirrored
☻	\blacksmiley	⨝	\Join	⅂	\sansLturned
⎪	\bracevert	⧠	\laplac	∿	\sinewave
‸	\caretinsert	⟕	\leftouterjoin	⏤	\strns
✓	\checkmark	◟	\llarc	⧧	\thermod
⌲	\conictaper	◞	\lrarc	⫱	\topcir
☡	\danger	✠	\maltese	⌙	\turnednot
╲	\diagdown	§	\mathsection	⏡	\ubrbrak
╱	\diagup	␣	\mathvisiblespace	◜	\ularc
⌀	\diameter	∇	\nabla	◝	\urarc
✽	\dingasterisk	¬	\neg*	⌗	\viewdata
⏧	\elinters	⏠	\obrbrak	⦙	\vzigzag
ð	\eth	⫡	\perps	¥	\yen
‼	\Exclam	〒	\postalmark	⨟	\zcmp
╳	\fdiagovrdiag	⌒	\profline	⨠	\zpipe
⟗	\fullouterjoin	⌓	\profsurf	↾	\zproject

* stix defines \lnot as a synonym for \neg.

Table 296: Miscellaneous textcomp Text-mode Math Symbols

°	\textdegree*	½	\textonehalf†	¾	\textthreequarters†
÷	\textdiv	¼	\textonequarter†	³	\textthreesuperior
/	\textfractionsolidus	¹	\textonesuperior	×	\texttimes
¬	\textlnot	±	\textpm	²	\texttwosuperior
−	\textminus	√	\textsurd		

* If you prefer a larger degree symbol you might consider defining one as "\ensuremath{^\circ}" ("°").

† nicefrac (part of the units package) or the newer xfrac package can be used to construct vulgar fractions like "1/2", "1/4", "3/4", and even "c/o".

Table 297: Miscellaneous fge Math Symbols

\	\fgebackslash	⌒	\fgecap	⌓	\fgecupacute	⌜	\fgelangle
⩡	\fgebaracute	⩱	\fgecapbar	⩲	\fgecupbar	⌟	\fgeupbracket
⩘	\fgebarcap	⌓	\fgecup	⧜	\fgeinfty		

Table 298: Miscellaneous mathdesign Math Symbols

⌞	\rightangle

TABLE 299: Math Alphabets

Font sample	Generating command	Required package
ABCdef123	`\mathrm{ABCdef123}`	*none*
ABCdef123	`\mathit{ABCdef123}`	*none*
ABCdef123	`\mathnormal{ABCdef123}`	*none*
$\mathcal{ABC}$	`\mathcal{ABC}`	*none*
$\mathscr{ABC}$	`\mathscr{ABC}`	mathrsfs
or	`\mathcal{ABC}`	calrsfs
$\mathcal{ABC}$	`\mathcal{ABC}`	euscript with the mathcal option
or	`\mathscr{ABC}`	euscript with the mathscr option
$\mathscr{ABC}$	`\mathcal{ABC}`	rsfso
or	`\mathscr{ABC}`	rsfso with the scr option
$\mathcal{ABC}$	`\mathcal{ABC}`	urwchancal*
or	`\mathscr{ABC}`	urwchancal* with the mathscr option
$\mathbb{ABC}$	`\mathbb{ABC}`	amsfonts,§ amssymb, txfonts, or pxfonts
$\varmathbb{ABC}$	`\varmathbb{ABC}`	txfonts or pxfonts
$\mathbb{ABC}\mathbb{def123}$	`\mathbb{ABCdef123}`	bbold or mathbbol†
$\mathbb{ABC}\mathbb{def123}$	`\mathbb{ABCdef123}`	mbboard†
$\mathbb{ABC}\mathbb{def12}$	`\mathbbm{ABCdef12}`	bbm
$\mathbb{ABC}\mathbb{def12}$	`\mathbbmss{ABCdef12}`	bbm
$\mathbb{ABC}\mathbb{def12}$	`\mathbbmtt{ABCdef12}`	bbm
$\mathbb{ABC1}$	`\mathds{ABC1}`	dsfont
$\mathbb{ABC1}$	`\mathds{ABC1}`	dsfont with the sans option
$\mathbb{ABC}$	`\symA\symB\symC`	china2e‡
$\mathfrak{ABCdef123}$	`\mathfrak{ABCdef123}`	eufrak
$\mathfrak{ABC}\mathfrak{def123}$	`\textfrak{ABCdef123}`	yfonts¶
$\mathfrak{ABCdef123}$	`\textswab{ABCdef123}`	yfonts¶
$\mathfrak{ABCdef123}$	`\textgoth{ABCdef123}`	yfonts¶

* urwchancal redefines `\mathcal` or `\mathscr` to use Zapf Chancery as the calligraphic or script font. However, like all `\mathcal` and `\mathscr` commands shown in Table 299, these support only uppercase letters. An alternative is to put "`\DeclareMathAlphabet{\mathpzc}{OT1}{pzc}{m}{it}`" in your document's preamble to make `\mathpzc` typeset a wider set of characters in Zapf Chancery. Unfortunately, with this technique accents, superscripts, and subscripts don't align as well as they do with urwchancal.

As a similar trick, you can typeset the Calligra font's script "$\mathcalligra{z}$" (or other calligraphic symbols) in math mode by loading the calligra package and putting "`\DeclareMathAlphabet{\mathcalligra}{T1}{calligra}{m}{n}`" in your document's preamble to make `\mathcalligra` typeset its argument in the Calligra font. (You may also want to specify "`\DeclareFontShape{T1}{calligra}{m}{n}{<->s*[2.2]callig15}{}`" to set Calligra at 2.2 times its design size for a better blend with typical body fonts.)

† The mathbbol package defines some additional blackboard bold characters: parentheses, square brackets, angle brackets, and—if the bbgreekl option is passed to mathbbol—Greek letters. For instance, "$\mathbb{\Langle\Lbrack\Lparen\bbalpha\bbbeta\bbgamma\Rparen\Rbrack\Rangle}$" is produced by "`\mathbb{\Langle\Lbrack\Lparen\bbalpha\bbbeta\bbgamma\Rparen\Rbrack\Rangle}`".

mbboard extends the blackboard bold symbol set significantly further. It supports not only the Greek alphabet—including "Greek-like" symbols such as `\bbnabla` ("$\mathbb{\nabla}$")—but also *all* punctuation marks, various currency symbols such as `\bbdollar` ("$\mathbb{\$}$") and `\bbeuro` ("$\mathbb{€}$"), and the Hebrew alphabet (e.g., "`\bbfinalnun\bbyod\bbqof\bbpe`" → "$\mathbb{\finalnun\byod\bbqof\bbpe}$").

‡ The `\sym...` commands provided by the GiNA2e package are actually text-mode commands. They are included in Table 299 because they resemble the blackboard-bold symbols that appear in the rest of the table. In addition to the 26 letters of the English alphabet, GiNA2e provides three umlauted blackboard-bold letters: `\symAE` ("$\mathbb{\symAE}$"), `\symOE` ("$\mathbb{\symOE}$"), and `\symUE` ("$\mathbb{\symUE}$"). Note that GiNA2e does provide math-mode commands for the most common number-set symbols. These are presented in Table 179 on page 87.

¶ As their `\text...` names imply, the fonts provided by the yfonts package are actually text fonts. They are included in Table 299 because they are frequently used in a mathematical context.

§ An older (i.e., prior to 1991) version of the $\mathcal{AMS}$'s fonts rendered $\mathbb{C}$, $\mathbb{N}$, $\mathbb{R}$, $\mathbb{S}$, and $\mathbb{Z}$ as $\mathbb{C}$, $\mathbb{N}$, $\mathbb{R}$, $\mathbb{S}$, and $\mathbb{Z}$. As some people prefer the older glyphs—much to the $\mathcal{AMS}$'s surprise—and because those glyphs fail to build under modern versions of METAFONT, Berthold Horn uploaded PostScript fonts for the older blackboard-bold glyphs to CTAN, to the `fonts/msym10` directory. As of this writing, however, there are no LaTeX 2_ε packages for utilizing the now-obsolete glyphs.

4 Science and technology symbols

This section lists symbols that are employed in various branches of science and engineering.

Table 300: gensymb Symbols Defined to Work in Both Math and Text Mode

℃	\celsius	µ	\micro	‰	\perthousand
°	\degree	Ω	\ohm		

Table 301: wasysym Electrical and Physical Symbols

∼	\AC	≋	\VHF	≁	\photon	F	\HF		\gluon

Table 302: ifsym Pulse Diagram Symbols

⌞	\FallingEdge	⌞⌟	\LongPulseLow	⌞⌜	\PulseLow	⌟	\ShortPulseHigh
⌟⌜⌞	\LongPulseHigh	⌟⌞	\PulseHigh	⌟	\RaisingEdge	⌜	\ShortPulseLow

In addition, within \textifsym{...}, the following codes are valid:

_	l	¯	m	‾	h	‾ _	d	〈	<	〉	>
__	L	—	M	‾‾	H	‾‾ __	D	〈	<<	〉	>>

This enables one to write "\textifsym{mm<DDD>mm}" to get "—⟨⟩—" or "\textifsym{L|H|L|H|L}" to get "_⌜⌟⌜⌟_". See also the timing package, which provides a wide variety of pulse-diagram symbols within an environment designed specifically for typesetting pulse diagrams.

Finally, \textifsym supports the display of segmented digits, as would appear on an LCD: "\textifsym{-123.456}" produces "- 123.456". "\textifsym{b}" outputs a blank with the same width as an "8".

Table 303: ar Aspect Ratio Symbol

Æ	\AR

Table 304: textcomp Text-mode Science and Engineering Symbols

℃	\textcelsius	℧	\textmho	µ	\textmu	Ω	\textohm

Table 305: steinmetz Extensible Phasor Symbol

$\underline{/abc}$ `\phase{abc}`

The `\phase` command uses the pict2e package to draw a horizontally and vertically scalable Steinmetz phasor symbol. Consequently, `\phase` works only with those TEX backends supported by pict2e. See the pict2e documentation for more information.

Table 306: wasysym Astronomical Symbols

☿	\mercury	♁	\earth	♃	\jupiter	♅	\uranus	♇	\pluto
♀	\venus	♂	\mars	♄	\saturn	♆	\neptune		
☉	\astrosun	○	\fullmoon	☾	\leftmoon	●	\newmoon	☽	\rightmoon
♈	\aries	♋	\cancer	♎	\libra	≈	\aquarius		
♉	\taurus	♌	\leo	♏	\scorpio	♑	\capricornus		
♊	\gemini	♍	\virgo	♐	\sagittarius	♓	\pisces		
☊	\ascnode	☋	\descnode	☌	\conjunction	☍	\opposition	♈	\vernal

Table 307: marvosym Astronomical Symbols

☿	\Mercury	♁	\Earth	♃	\Jupiter	♅	\Uranus	♇	\Pluto
♀	\Venus	♂	\Mars	♄	\Saturn	♆	\Neptune		
☽	\Moon	☉	\Sun						
♈	\Aries	♋	\Cancer	♎	\Libra	♑	\Capricorn		
♉	\Taurus	♌	\Leo	♏	\Scorpio	♒	\Aquarius		
♊	\Gemini	♍	\Virgo	♐	\Sagittarius	♓	\Pisces		

Note that `\Aries`...`\Pisces` can also be specified with `\Zodiac{1}`... `\Zodiac{12}`.

Table 308: fontawesome Astronomical Symbols

♂	\faMars	☾	\faMoonO	♀	\faVenus
☿	\faMercury	☼	\faSunO		

Table 309: mathabx Astronomical Symbols

☿	\Mercury	⊕	\Earth	♃	\Jupiter	♅	\Uranus	♇	\Pluto
♀	\Venus	♂	\Mars	♄	\Saturn	♆	\Neptune	♁	\varEarth
○	\fullmoon	☾	\leftmoon	●	\newmoon	☽	\rightmoon	⊙	\Sun
♈	\Aries	♉	\Taurus	♊	\Gemini				

mathabx also defines \girl as an alias for \Venus, \boy as an alias for \Mars, and \Moon as an alias for \leftmoon.

Table 310: stix Astronomical Symbols

⊙	\astrosun	☾	\leftmoon	☽	\rightmoon	☼	\sun

Table 311: starfont Astronomical Symbols

☿	\Mercury	♂	\Mars	♅	\Uranus	♁	\varTerra
♀	\Venus	♃	\Jupiter	♆	\Neptune	♁	\varUranus
⊕	\Terra	♄	\Saturn	♇	\Pluto	♇	\varPluto
⊙	\Sun	☽	\Moon	☾	\varMoon		
⚳	\Cupido	⚷	\Zeus	⚶	\Apollon	⚻	\Vulkanus
⚸	\Hades	⚵	\Kronos	⚺	\Admetos	⚹	\Poseidon
⚸	\Lilith	☊	\NorthNode	☋	\SouthNode		
⚱	\Amor	⚴	\Eros	⚵	\Juno	⚼	\Sappho
⚳	\Ceres	⚸	\Hidalgo	⚴	\Pallas	⚶	\Vesta
⚷	\Chiron	⚕	\Hygiea	⚵	\Psyche		
⊗	\Fortune						
♈	\Aries	♌	\Leo	♐	\Sagittarius	♑	\varCapricorn
♉	\Taurus	♍	\Virgo	♑	\Capricorn		
♊	\Gemini	♎	\Libra	♒	\Aquarius		
♋	\Cancer	♏	\Scorpio	♓	\Pisces		
☌	\Conjunction	□	\Square	⚺	\Semisextile		
☍	\Opposition	⚹	\Sextile	∠	\Semisquare		
△	\Trine	⚻	\Quincunx	⚼	\Sesquiquadrate		
A^{sc}	\ASC	E^{p}	\EastPoint	M^{c}	\MC		
D^{sc}	\DSC	I^{c}	\IC	V^{x}	\Vertex		
D^{t}	\Direct	R_{x}	\Retrograde	S^{t}	\Station		
🜁	\Air	🜃	\Earth	🜂	\Fire	🜄	\Water
N^{tl}	\Natal	⛤	\Pentagram	R^{ad}	\Radix		

Table 312: wasysym APL Symbols

⍞	\APLbox	⍩	\APLinv	⍟	\APLstar
⍝	\APLcomment	⍇	\APLleftarrowbox	⍋	\APLup
⍛	\APLdown	⍟	\APLlog	⍏	\APLuparrowbox
⍗	\APLdownarrowbox	¯	\APLminus	⍀	\notbackslash
⍞	\APLinput	⍈	\APLrightarrowbox	⌿	\notslash

$\APLcirc{a}$	\APLcirc{a}	$\APLnot{a}$	\APLnot{a}	$\APLvert{a}$	\APLvert{a}

Table 313: stix APL Symbols

⍰	\APLboxquestion	⍀	\APLnotbackslash
⍓	\APLboxupcaret	⌿	\APLnotslash

Table 314: apl APL Symbols

|	\AB	¨	\DD	⍫	\GD	⊢	\LK	⍱	\PD	↑	\UA	*G*	\ZG	*Q*	\ZQ
⍺	\AM	⊥	\DE	≥	\GE	○	\LO	⍞	\QQ	_	\US	*H*	\ZH	*R*	\ZR
\	\BL	⍫	\DL	→	\GO	⊃	\LU	}	\RB	∪	\UU	*I*	\ZI	*S*	\ZS
⍞	\BX	◇	\DM	⍋	\GU	≠	\NE	⊣	\RK	⍦	\XQ	*J*	\ZJ	*T*	\ZT
⍀	\CB	⍁	\DQ	⍳	\IB	¯	\NG	⍴	\RO	*A*	\ZA	*K*	\ZK	*U*	\ZU
⌈	\CE	∩	\DU	⍵	\IO	⍲	\NN	⊂	\RU	*B*	\ZB	*L*	\ZL	*V*	\ZV
⍃	\CO	⊤	\EN	{	\LB	⍱	\NR	⍬	\RV	*C*	\ZC	*M*	\ZM	*W*	\ZW
⍜	\CR	∈	\EP	⍙	\LD	~	\NT	∘	\SO	*D*	\ZD	*N*	\ZN	*X*	\ZX
⌿	\CS	⌊	\FL	≤	\LE	⍵	\OM	SS	\SS	*E*	\ZE	*O*	\ZO	*Y*	\ZY
↓	\DA	⍒	\FM	⍟	\LG	∨	\OR	⍉	\TR	*F*	\ZF	*P*	\ZP	*Z*	\ZZ

Table 315: marvosym Computer Hardware Symbols

	\ComputerMouse		\ParallelPort		\SerialInterface
	\Keyboard		\Printer		\SerialPort

TABLE 316: keystroke Computer Keys

Alt	\Alt	Enter	\Enter*	PrtSc	\PrtSc*
AltGr	\AltGr	Esc	\Esc*	→	\RArrow
Break	\Break*	Home	\Home*	↩	\Return
⟵	\BSpace†	Ins	\Ins*	Scroll	\Scroll*
Ctrl	\Ctrl*	←	\LArrow	Shift ⇑	\Shift*
↓	\DArrow	Num	\NumLock		\Spacebar
Del	\Del*	Page ↓	\PgDown*	⟷	\Tab†
End	\End*	Page ↑	\PgUp*	↑	\UArrow

* Changes based on the language option passed to the keystroke package. For example, the german option makes \Del produce " Entf " instead of " Del ".

† These symbols utilize the rotating package and therefore display improperly in most DVI viewers.

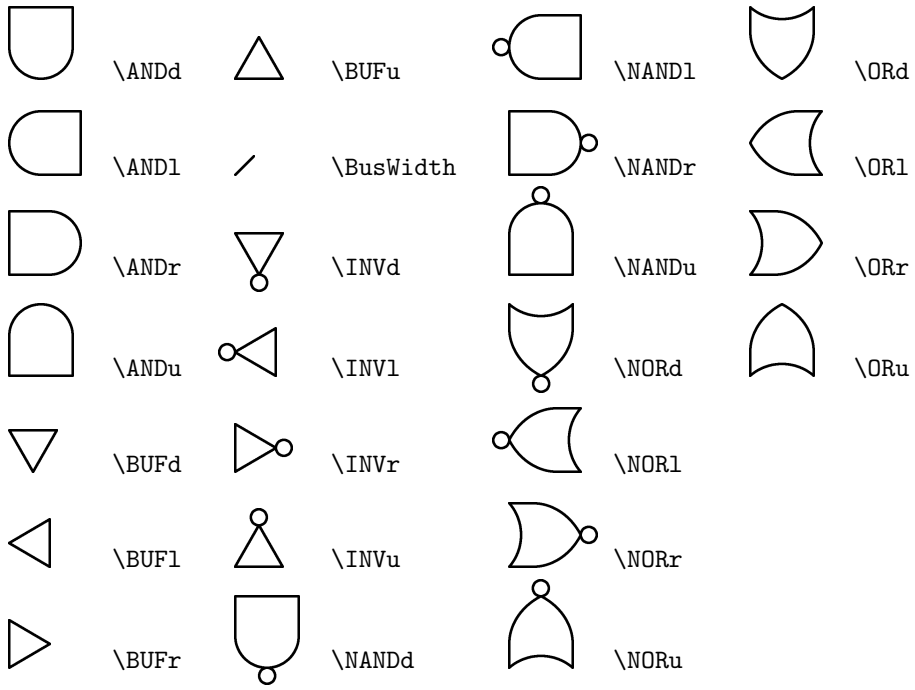
The \keystroke command draws a key with an arbitrary label. For example, "\keystroke{F7}" produces " F7 ".

TABLE 317: ascii Control Characters (CP437)

☺	\SOH	◘	\BS	☼	\SI	▬	\SYN	↔	\GS
☻	\STX	○	\HT	►	\DLE	↕	\ETB	▲	\RS
♥	\ETX	◙	\LF	◄	\DCa	↑	\CAN	_	\US
♦	\EOT	♂	\VT	↕	\DCb	↓	\EM		
♣	\ENQ	♀	\FF	‼	\DCc	→	\SUB		
♠	\ACK	♪	\CR	¶	\DCd	←	\ESC		
•	\BEL	◦	\SO	§	\NAK	└	\FS		
⌂	\DEL		\NBSP		\NUL	¦	\splitvert		

Code Page 437 (CP437), which was first utilized by the original IBM PC, uses the symbols \SOH through \US to depict ASCII characters 1–31 and \DEL to depict ASCII character 127. The \NUL symbol, not part of CP437, represents ASCII character 0. \NBSP, also not part of CP437, represents a nonbreaking space. \splitvert is merely the "|" character drawn as it was on the IBM PC.

Table 318: logic Logic Gates



The logic package implements the digital logic-gate symbols specified by the U.S. Department of Defense's MIL-STD-806 standard. Note that on CTAN, the package is *called* logic, but the package is *loaded* using `\usepackage{milstd}`. (There was already a—completely unrelated—milstd package on CTAN at the time of logic's release.) Consequently, package details are listed under milstd in Table 521 and Table 522 on page 226.

Table 319: marvosym Communication Symbols

🖃	\Email	FAX	\fax	🖷	\Faxmachine	🗲	\Lightning	⌕	\Pickup
🗲	\EmailCT	FAX	\FAX	✉	\Letter	🕭	\Mobilefone	☎	\Telefon

Table 320: marvosym Engineering Symbols

⚌	\Beam	↓	\Force	●	\Octosteel	I	\RoundedTTsteel
⏃	\Bearing	⬢	\Hexasteel	▯	\Rectpipe	▢	\Squarepipe
○	\Circpipe	↶	\Lefttorque	■	\Rectsteel	■	\Squaresteel
●	\Circsteel	⇈	\Lineload	↷	\Righttorque	T	\Tsteel
⏃	\Fixedbearing	⏃	\Loosebearing	L	\RoundedLsteel*	I	\TTsteel
▬	\Flatsteel	L	\Lsteel	T	\RoundedTsteel*		

* `\RoundedLsteel` and `\RoundedTsteel` seem to be swapped, at least in the 2000/05/01 version of marvosym.

Table 321: wasysym Biological Symbols

♀	\female	♂	\male

Table 322: stix Biological Symbols

♀	\female	♂	\male
⚥	\Hermaphrodite	⚲	\neuter

Table 323: marvosym Biological Symbols

⚭	\FEMALE	⚣	\FemaleMale	⚦	\Male	⚬	\Neutral
♀	\Female	⚥	\Hermaphrodite	⚷	\MALE		
⚢	\FemaleFemale	⚮	\HERMAPHRODITE	⚤	\MaleMale		

Table 324: fontawesome Biological Symbols

○	\faGenderless	⚧	\faMarsStrokeH	⚨	\faTransgenderAlt
♂	\faMars	⚧	\faMarsStrokeV	♀	\faVenus
⚩	\faMarsDouble	⚲	\faNeuter	⚢	\faVenusDouble
⚧	\faMarsStroke	⚥	\faTransgender	⚣	\faVenusMars

fontawesome defines \faIntersex as a synonym for \faTransgender

Table 325: marvosym Safety-related Symbols

☣	\Biohazard	CE	\CEsign	Ex	\Explosionsafe	☢	\Radioactivity
XEL	\BSEfree	⚠	\Estatically	✷—	\Laserbeam	STOP	\Stopsign

TABLE 326: feyn Feynman Diagram Symbols

	\bigbosonloop		\hfermion		\smallbosonloopV
	\bigbosonloopA		\shfermion		\wfermion
	\bigbosonloopV		\smallbosonloop		\whfermion
	\gvcropped		\smallbosonloopA		

	\feyn{a}		\feyn{fu}		\feyn{glS}		\feyn{hs}
	\feyn{c}		\feyn{fv}		\feyn{glu}		\feyn{hu}
	\feyn{f}		\feyn{g}		\feyn{gu}		\feyn{m}
	\feyn{fd}		\feyn{g1}		\feyn{gv}		\feyn{ms}
	\feyn{fl}		\feyn{gd}		\feyn{gvs}		\feyn{p}
	\feyn{flS}		\feyn{gl}		\feyn{h}		\feyn{P}
	\feyn{fs}		\feyn{glB}		\feyn{hd}		\feyn{x}

All other arguments to the \feyn command produce a "?" symbol.

The feyn package provides various commands for composing the preceding symbols into complete Feynman diagrams. See the feyn documentation for examples and additional information.

TABLE 327: svrsymbols Physics Ideograms

μ^+	\antimuon	$\mathbb{X}$	\experimentalsym	p^+	\proton
$\bar{\nu}$	\antineutrino	$\not{F}$	\fermion	q	\quark
$\bar{n}$	\antineutron	⬡	\graphene	b	\quarkb
p^-	\antiproton	h^+	\hole	c	\quarkc
$\bar{q}$	\antiquark	ⓘ	\ion	d	\quarkd
$\bar{b}$	\antiquarkb	$\mathbb{M}$	\method	s	\quarks
$\bar{c}$	\antiquarkc	μ^-	\muon	t	\quarkt
$\bar{d}$	\antiquarkd	ν	\neutrino	u	\quarku
$\bar{s}$	\antiquarks	n^0	\neutron	R	\reference
$\bar{t}$	\antiquarkt	⁘	\nucleus	⊞	\solid
$\bar{u}$	\antiquarku	⌔	\orbit	↟	\spin
★	\assumption	$\not{F}$	\phonon	↡	\spindown
⚛	\atom	f	\photon	↯	\surface
e^-	\electron	e	\plasmon	$\not{\gamma}$	\varphoton
Æ	\errorsym	$^-\ni\not{F}$	\polaron	●	\water
$^-\ni h^+$	\exciton	e^+	\positron		

5 Dingbats

Dingbats are symbols such as stars, arrows, and geometric shapes. They are commonly used as bullets in itemized lists or, more generally, as a means to draw attention to the text that follows.

The pifont dingbat package warrants special mention. Among other capabilities, pifont provides a LaTeX interface to the Zapf Dingbats font (one of the standard 35 PostScript fonts). However, rather than name each of the dingbats individually, pifont merely provides a single `\ding` command, which outputs the character that lies at a given position in the font. The consequence is that the pifont symbols can't be listed by name in this document's index, so be mindful of that fact when searching for a particular symbol.

Table 328: bbding Arrows

➥	`\ArrowBoldDownRight`	➧	`\ArrowBoldRightShort`	➦	`\ArrowBoldUpRight`
➲	`\ArrowBoldRightCircled`	➠	`\ArrowBoldRightStrobe`		

Table 329: pifont Arrows

➔	`\ding{212}`	→	`\ding{221}`	➦	`\ding{230}`	⇨	`\ding{239}`	➶	`\ding{249}`
→	`\ding{213}`	➞	`\ding{222}`	➧	`\ding{231}`	⇨	`\ding{241}`	➷	`\ding{250}`
↔	`\ding{214}`	➟	`\ding{223}`	➨	`\ding{232}`	➲	`\ding{242}`	➸	`\ding{251}`
↕	`\ding{215}`	➠	`\ding{224}`	⇨	`\ding{233}`	➳	`\ding{243}`	➹	`\ding{252}`
➘	`\ding{216}`	➡	`\ding{225}`	⇨	`\ding{234}`	➴	`\ding{244}`	➺	`\ding{253}`
➙	`\ding{217}`	➢	`\ding{226}`	⇦	`\ding{235}`	➵	`\ding{245}`	➻	`\ding{254}`
➚	`\ding{218}`	➢	`\ding{227}`	⇦	`\ding{236}`	➶	`\ding{246}`		
➛	`\ding{219}`	➤	`\ding{228}`	⇨	`\ding{237}`	➷	`\ding{247}`		
➜	`\ding{220}`	➥	`\ding{229}`	⇨	`\ding{238}`	➸	`\ding{248}`		

Table 330: adfsymbols Arrows

➵	`\adfarrowe1`	➶	`\adfarrowne1`	⇩	`\adfarrows1`	➷	`\adfarrowsw1`
→	`\adfarrowe2`	↗	`\adfarrowne2`	↓	`\adfarrows2`	↙	`\adfarrowsw2`
➙	`\adfarrowe3`	➚	`\adfarrowne3`	⇩	`\adfarrows3`	➘	`\adfarrowsw3`
➵	`\adfarrowe4`	➶	`\adfarrowne4`	⇩	`\adfarrows4`	➷	`\adfarrowsw4`
→	`\adfarrowe5`	↗	`\adfarrowne5`	↓	`\adfarrows5`	↙	`\adfarrowsw5`
➵	`\adfarrowe6`	➶	`\adfarrowne6`	⇩	`\adfarrows6`	➷	`\adfarrowsw6`
⇧	`\adfarrown1`	➴	`\adfarrownw1`	➴	`\adfarrowse1`	⇦	`\adfarroww1`
↑	`\adfarrown2`	↖	`\adfarrownw2`	↘	`\adfarrowse2`	←	`\adfarroww2`
⇧	`\adfarrown3`	➴	`\adfarrownw3`	➴	`\adfarrowse3`	⇦	`\adfarroww3`
⇧	`\adfarrown4`	➴	`\adfarrownw4`	➴	`\adfarrowse4`	⇦	`\adfarroww4`
↑	`\adfarrown5`	↖	`\adfarrownw5`	↘	`\adfarrowse5`	←	`\adfarroww5`
⇧	`\adfarrown6`	➴	`\adfarrownw6`	➴	`\adfarrowse6`	⇦	`\adfarroww6`

⇦	`\adfhalfarrowleft`	⇨	`\adfhalfarrowright`
⇦	`\adfhalfarrowleftsolid`	⇨	`\adfhalfarrowrightsolid`

Technically, the digit at the end of each `\adfarrow`⟨*dir*⟩⟨*digit*⟩ command is a macro argument, not part of the command name.

The preceding symbols can also be produced by passing a number or a style/direction pair to the `\adfarrow` command. For example, both `\adfarrow{19}` and `\adfarrow[comic]{east}` produce "➵". See the adfsymbols documentation for more information.

Table 331: adforn Arrows

⇜	\adfhalfleftarrow	➢	\adfhalfrightarrowhead
◅	\adfhalfleftarrowhead	◂	\adfleftarrowhead
⇝	\adfhalfrightarrow	▸	\adfrightarrowhead

Table 332: arev Arrows

➢	\arrowbullet

Table 333: fontawesome Arrows

	\faArrowCircleDown		\faArrowDown		\faLongArrowDown
	\faArrowCircleLeft		\faArrowLeft		\faLongArrowLeft
	\faArrowCircleODown		\faArrowRight		\faLongArrowRight
	\faArrowCircleOLeft		\faArrows		\faLongArrowUp
	\faArrowCircleORight		\faArrowsAlt		\faRepeat
	\faArrowCircleOUp		\faArrowsH		\faUndo
	\faArrowCircleRight		\faArrowsV		
	\faArrowCircleUp		\faArrowUp		

fontawesome defines \faRotateLeft as a synonym for \faUndo and \faRotateRight as a synonym for \faRepeat.

Table 334: fontawesome Chevrons

	\faChevronCircleDown		\faChevronCircleUp		\faChevronRight
	\faChevronCircleLeft		\faChevronDown		\faChevronUp
	\faChevronCircleRight		\faChevronLeft		

Table 335: marvosym Scissors

✂	\CutLeft	---	\CuttingLine	✁	\RightScissors
✁	\CutRight	✂	\LeftScissors		

Table 336: bbding Scissors

	\ScissorHollowLeft		\ScissorLeftBrokenTop
	\ScissorHollowRight		\ScissorRight
	\ScissorLeft		\ScissorRightBrokenBottom
	\ScissorLeftBrokenBottom		\ScissorRightBrokenTop

Table 337: pifont Scissors

✃	\ding{33}	✂	\ding{34}	✄	\ding{35}	✄	\ding{36}

TABLE 338: dingbat Pencils

 \largepencil  \smallpencil

TABLE 339: arev Pencils

 \pencil

TABLE 340: fontawesome Pencils

 \faPencil \faPencilSquare \faPencilSquareO

TABLE 341: bbding Pencils and Nibs

	\NibLeft		\PencilLeft		\PencilRightDown
	\NibRight		\PencilLeftDown		\PencilRightUp
	\NibSolidLeft		\PencilLeftUp		
	\NibSolidRight		\PencilRight		

TABLE 342: pifont Pencils and Nibs

 \ding{46} \ding{47} \ding{48} \ding{49} \ding{50}

TABLE 343: dingbat Fists

	\leftpointright		\rightpointleft		\rightpointright
	\leftthumbsdown		\rightthumbsdown		
	\leftthumbsup		\rightthumbsup		

TABLE 344: bbding Fists

	\HandCuffLeft		\HandCuffRightUp		\HandPencilLeft
	\HandCuffLeftUp		\HandLeft		\HandRight
	\HandCuffRight		\HandLeftUp		\HandRightUp

TABLE 345: pifont Fists

 \ding{42} \ding{43} \ding{44} \ding{45}

TABLE 346: fourier Fists

☞ \lefthand ☜ \righthand

TABLE 347: arev Fists

☞ \pointright

TABLE 348: fontawesome Fists

	\faHandLizardO		\faHandPaperO		\faHandSpockO
	\faHandODown		\faHandPeaceO		\faThumbsDown
	\faHandOLeft		\faHandPointerO		\faThumbsODown
	\faHandORight		\faHandRockO		\faThumbsOUp
	\faHandOUp		\faHandScissorsO		\faThumbsUp

fontawesome defines \faHandGrabO as a synonym for \faHandRockO and \faHandStopO as a synonym for \faHandPaperO.

TABLE 349: bbding Crosses and Plusses

†	\Cross	✞	\CrossOpenShadow	✙	\PlusOutline
✝	\CrossBoldOutline	✝	\CrossOutline	✛	\PlusThinCenterOpen
✣	\CrossClowerTips	✚	\Plus		
✠	\CrossMaltese	✜	\PlusCenterOpen		

TABLE 350: pifont Crosses and Plusses

✙	\ding{57}	✛	\ding{59}	†	\ding{61}	✝	\ding{63}
✚	\ding{58}	✜	\ding{60}	✞	\ding{62}	✠	\ding{64}

TABLE 351: adfsymbols Crosses and Plusses

✖	\adfbullet{4}	✖	\adfbullet{6}	✙	\adfbullet{8}	✙	\adfbullet{10}
✚	\adfbullet{5}	✚	\adfbullet{7}	✚	\adfbullet{9}		

TABLE 352: arev Crosses

☩ \eastcross ☨ \westcross

TABLE 353: bbding Xs and Check Marks

✓	\Checkmark	╳	\XSolid	✗	\XSolidBrush
✔	\CheckmarkBold	✖	\XSolidBold		

Table 354: pifont Xs and Check Marks

✓	\ding{51}	✕	\ding{53}	✗	\ding{55}
✔	\ding{52}	✖	\ding{54}	✘	\ding{56}

Table 355: wasysym Xs and Check Marks

☑	\CheckedBox	□	\Square	☒	\XBox

Table 356: marvosym Xs and Check Marks

☑	\Checkedbox	☒	\CrossedBox*	□	\HollowBox

* marvosym defines \Crossedbox as a synonym for \CrossedBox.

Table 357: arev Xs and Check Marks

✓	\ballotcheck	✗	\ballotx

Table 358: fontawesome Xs and Check Marks

✔	\faCheck	☑	\faCheckSquare	✪	\faTimesCircle
✔	\faCheckCircle	☑	\faCheckSquareO	✪	\faTimesCircleO
✔	\faCheckCircleO	✖	\faTimes*		

* fontawesome defines both \faClose and \faRemove as synonyms for \faTimes.

Table 359: pifont Circled Numerals

①	\ding{172}	❶	\ding{182}	①	\ding{192}	❶	\ding{202}
②	\ding{173}	❷	\ding{183}	②	\ding{193}	❷	\ding{203}
③	\ding{174}	❸	\ding{184}	③	\ding{194}	❸	\ding{204}
④	\ding{175}	❹	\ding{185}	④	\ding{195}	❹	\ding{205}
⑤	\ding{176}	❺	\ding{186}	⑤	\ding{196}	❺	\ding{206}
⑥	\ding{177}	❻	\ding{187}	⑥	\ding{197}	❻	\ding{207}
⑦	\ding{178}	❼	\ding{188}	⑦	\ding{198}	❼	\ding{208}
⑧	\ding{179}	❽	\ding{189}	⑧	\ding{199}	❽	\ding{209}
⑨	\ding{180}	❾	\ding{190}	⑨	\ding{200}	❾	\ding{210}
⑩	\ding{181}	❿	\ding{191}	⑩	\ding{201}	❿	\ding{211}

pifont (part of the psnfss package) provides a `dingautolist` environment which resembles `enumerate` but uses circled numbers as bullets.[4] See the psnfss documentation for more information.

[4] In fact, `dingautolist` can use any set of consecutive Zapf Dingbats symbols.

Table 360: wasysym Stars

✡	\davidsstar	⚹	\hexstar	✳	\varhexstar

Table 361: bbding Stars, Flowers, and Similar Shapes

✻	\Asterisk	✿	\FiveFlowerPetal	✢	\JackStar
✱	\AsteriskBold	★	\FiveStar	✤	\JackStarBold
✲	\AsteriskCenterOpen	☆	\FiveStarCenterOpen	❀	\SixFlowerAlternate
✽	\AsteriskRoundedEnds	✯	\FiveStarConvex	❋	\SixFlowerAltPetal
✳	\AsteriskThin	✰	\FiveStarLines	✼	\SixFlowerOpenCenter
✴	\AsteriskThinCenterOpen	☆	\FiveStarOpen	❀	\SixFlowerPetalDotted
✡	\DavidStar	✪	\FiveStarOpenCircled	✻	\SixFlowerPetalRemoved
✸	\DavidStarSolid	✯	\FiveStarOpenDotted	❀	\SixFlowerRemovedOpenPetal
✻	\EightAsterisk	✯	\FiveStarOutline	✶	\SixStar
❁	\EightFlowerPetal	✯	\FiveStarOutlineHeavy	✺	\SixteenStarLight
✼	\EightFlowerPetalRemoved	✰	\FiveStarShadow	❄	\Snowflake
✶	\EightStar	✢	\FourAsterisk	❄	\SnowflakeChevron
✷	\EightStarBold	❀	\FourClowerOpen	❆	\SnowflakeChevronBold
✵	\EightStarConvex	✤	\FourClowerSolid	✻	\Sparkle
✶	\EightStarTaper	✦	\FourStar	✤	\SparkleBold
❀	\FiveFlowerOpen	✧	\FourStarOpen	✹	\TwelweStar

Table 362: pifont Stars, Flowers, and Similar Shapes

✡	\ding{65}	✪	\ding{74}	✳	\ding{83}	✼	\ding{92}	❄	\ding{101}
✢	\ding{66}	☆	\ding{75}	✶	\ding{84}	✻	\ding{93}	❆	\ding{102}
✣	\ding{67}	✯	\ding{76}	✵	\ding{85}	✾	\ding{94}	✳	\ding{103}
✤	\ding{68}	✯	\ding{77}	✶	\ding{86}	✿	\ding{95}	✼	\ding{104}
✥	\ding{69}	✯	\ding{78}	✷	\ding{87}	❀	\ding{96}	❇	\ding{105}
✦	\ding{70}	✯	\ding{79}	✸	\ding{88}	❁	\ding{97}	✳	\ding{106}
✧	\ding{71}	✰	\ding{80}	✹	\ding{89}	✪	\ding{98}	✻	\ding{107}
★	\ding{72}	✱	\ding{81}	✺	\ding{90}	✻	\ding{99}		
☆	\ding{73}	✲	\ding{82}	✼	\ding{91}	❄	\ding{100}		

Table 363: adfsymbols Stars, Flowers, and Similar Shapes

⋄	\adfbullet{1}	⁕	\adfbullet{13}	⊛	\adfbullet{18}	⌖	\adfbullet{23}
⌖	\adfbullet{2}	✥	\adfbullet{14}	⊚	\adfbullet{19}	⌖	\adfbullet{24}
⁕	\adfbullet{3}	✵	\adfbullet{15}	⊙	\adfbullet{20}	⋆	\adfbullet{25}
◙	\adfbullet{11}	❁	\adfbullet{16}	✵	\adfbullet{21}	✪	\adfbullet{26}
✵	\adfbullet{12}	✪	\adfbullet{17}	⊛	\adfbullet{22}		

Table 364: adforn Stars

✵	\adfast{1}	✳	\adfast{3}	✵	\adfast{5}	✵	\adfast{7}	✵	\adfast{9}
✳	\adfast{2}	✵	\adfast{4}	✵	\adfast{6}	✵	\adfast{8}	✵	\adfast{10}

TABLE 365: fontawesome Stars

★	\faStar	⯪	\faStarHalf	⯪	\faStarHalfO	☆	\faStarO

fontawesome defines both \faStarHalfEmpty and \faStarHalfFull as synonyms for \faStarHalfO.

TABLE 366: fourier Fleurons and Flowers

	\aldine		\decoone		\floweroneright
	\aldineleft	✧	\decosix		\leafleft
	\aldineright		\decothreeleft		\leafNE
	\aldinesmall		\decothreeright		\leafright
	\decofourleft		\decotwo	✦	\starredbullet
	\decofourright		\floweroneleft		

TABLE 367: adforn Fleurons and Flowers

	\adfdownhalfleafleft		\adfdownhalfleafright
	\adfdownleafleft		\adfdownleafright
	\adfflatdownhalfleafleft		\adfflatdownhalfleafright
	\adfflatdownoutlineleafleft		\adfflatdownoutlineleafright
	\adfflatleafleft		\adfflatleafright
	\adfflatleafoutlineleft		\adfflatleafoutlineright
	\adfflatleafsolidleft		\adfflatleafsolidright
	\adfflowerleft		\adfflowerright
	\adfhalfleafleft		\adfhalfleafright
	\adfhangingflatleafleft		\adfhangingflatleafright
	\adfhangingleafleft		\adfhangingleafright
	\adfleafleft		\adfleafright
	\adfoutlineleafleft		\adfoutlineleafright
	\adfsmallhangingleafleft		\adfsmallhangingleafright
	\adfsmallleafleft		\adfsmallleafright
	\adfsolidleafleft		\adfsolidleafright

TABLE 368: wasysym Geometric Shapes

○	\Circle	◐	\LEFTcircle	◯	\octagon	◑	\RIGHTcircle
●	\CIRCLE	◖	\LEFTCIRCLE	⬠	\pentagon	◗	\RIGHTCIRCLE
⬡	\hexagon	◑	\Leftcircle	◗	\Rightcircle	⬡	\varhexagon

TABLE 369: MnSymbol Geometric Shapes

★	\filledlargestar	◊	\largelozenge	◊	\medlozenge
⧫	\filledlozenge	☆	\largepentagram	✡	\medstarofdavid
⧫	\filledmedlozenge	□	\largesquare	◊	\smalllozenge
◯	\largecircle	☆	\largestar		
◇	\largediamond	✡	\largestarofdavid		

MnSymbol defines \bigcirc as a synonym for \largecircle; \bigstar as a synonym for \filledlargestar; \lozenge as a synonym for \medlozenge; and, \blacklozenge as a synonym for \filledmedlozenge.

Table 370: fdsymbol Geometric Shapes

●	\largeblackcircle	▽	\largetriangledown	◊	\medlozenge
■	\largeblacksquare	△	\largetriangleup	⧫	\smallblacklozenge
★	\largeblackstar	☆	\largewhitestar	◊	\smalllozenge
○	\largecircle	⟠	\lozengeminus	✡	\starofdavid
□	\largesquare	⧫	\medblacklozenge		

fdsymbol defines synonyms for almost all of the preceding symbols:

○	\bigcirc	■	\lgblksquare	◊	\mdlgwhtlozenge
★	\bigstar	○	\lgwhtcircle	◊	\mdwhtlozenge
▽	\bigtriangledown	□	\lgwhtsquare	⧫	\smblklozenge
△	\bigtriangleup	◊	\lozenge	◊	\smwhtlozenge
⧫	\blacklozenge	⧫	\mdblklozenge		
●	\lgblkcircle	⧫	\mdlgblklozenge		

Table 371: boisik Geometric Shapes

★	\bigstar	⋄	\diamond	▽	\triangledown
⧫	\blacklozenge	◊	\lozenge	◁	\triangleleft
■	\blacksquare	◊	\lozengedot	▷	\triangleright
▲	\blacktriangle	□	\square	◿	\varlrttriangle
▼	\blacktriangledown	⋆	\star		

Table 372: stix Geometric Shapes

↺	\acwopencirclearrow	◥	\downtriangleleftblack	◁	\smalltriangleleft
↖	\barovernorthwestarrow	◥	\downtrianglerightblack	▷	\smalltriangleright
⌬	\benzenr	○	\enclosecircle	◆	\smblkdiamond
▼	\bigblacktriangledown	◇	\enclosediamond	⧫	\smblklozenge
▲	\bigblacktriangleup	□	\enclosesquare	■	\smblksquare
★	\bigstar	△	\enclosetriangle	☆	\smwhitestar
▽	\bigtriangledown	●	\errbarblackcircle	○	\smwhtcircle
◁	\bigtriangleleft	◆	\errbarblackdiamond	◇	\smwhtdiamond
△	\bigtriangleup	■	\errbarblacksquare	◊	\smwhtlozenge
☆	\bigwhitestar	○	\errbarcircle	▫	\smwhtsquare
●	\blackcircledownarrow	◇	\errbardiamond	▫	\sqlozenge
●	\blackcircledrightdot	□	\errbarsquare	▬	\squarebotblack
●	\blackcircledtwodots	◉	\fisheye	▩	\squarecrossfill
◕	\blackcircleulquadwhite	▱	\fltns	▤	\squarehfill
⧫	\blackdiamonddownarrow	⬡	\hexagon	▦	\squarehvfill
◈	\blackinwhitediamond	⬢	\hexagonblack	◧	\squareleftblack
▣	\blackinwhitesquare	⌂	\house	◣	\squarellblack
◖	\blacklefthalfcircle	▭	\hrectangle	◱	\squarellquad
⧫	\blacklozenge	▬	\hrectangleblack	◪	\squarelrblack
◄	\blackpointerleft	◙	\inversewhitecircle	◲	\squarelrquad
►	\blackpointerright	◡	\invwhitelowerhalfcircle	▨	\squareneswfill
◗	\blackrighthalfcircle	◠	\invwhiteupperhalfcircle	▧	\squarenwsefill

(continued on next page)

(continued from previous page)

▲	\blacktriangle	●	\lgblkcircle	◨	\squarerightblack
▼	\blacktriangledown	■	\lgblksquare	◓	\squaretopblack
◀	\blacktriangleleft	◯	\lgwhtcircle	◩	\squareulblack
▶	\blacktriangleright	□	\lgwhtsquare	◰	\squareulquad
⬬	\blkhorzoval	◣	\llblacktriangle	◪	\squareurblack
⬮	\blkvertoval	◺	\lltriangle	◳	\squareurquad
◡	\botsemicircle	◢	\lrblacktriangle	▥	\squarevfill
⧈	\boxonbox	◿	\lrtriangle	▢	\squoval
◎	\bullseye	●	\mdblkcircle	◠	\topsemicircle
∘	\circ	◆	\mdblkdiamond	⏢	\trapezium
◒	\circlebottomhalfblack	⧫	\mdblklozenge	◬	\trianglecdot
◉	\circledbullet	■	\mdblksquare	▽	\triangledown
⚲	\circledownarrow	●	\mdlgblkcircle	◭	\triangleleftblack
⊙	\circledrightdot	◆	\mdlgblkdiamond	△	\triangleodot
✪	\circledstar	■	\mdlgblksquare	◮	\triangleblack
⚇	\circledtwodots	◇	\mdlgwhtdiamond	Ⓢ	\triangles
◎	\circledwhitebullet	◊	\mdlgwhtlozenge	⟁	\triangleubar
◐	\circlelefthalfblack	□	\mdlgwhtsquare	◤	\ulblacktriangle
◵	\circlellquad	●	\mdsmblkcircle	◸	\ultriangle
◶	\circlelrquad	■	\mdsmblksquare	⟰	\uparrowoncircle
◑	\circlerighthalfblack	∘	\mdsmwhtcircle	◥	\urblacktriangle
◓	\circletophalfblack	□	\mdsmwhtsquare	◹	\urtriangle
◴	\circleulquad	○	\mdwhtcircle	⬡	\varhexagon
◷	\circleurquad	◇	\mdwhtdiamond	⬢	\varhexagonblack
◔	\circleurquadblack	◊	\mdwhtlozenge	⌬	\varhexagonlrbonds
⍾	\circlevertfill	□	\mdwhtsquare	◿	\varlrtriangle
⧂	\cirE	★	\medblackstar	✶	\varstar
⧁	\cirscir	☆	\medwhitestar	▯	\vrectangle
↻	\cwopencirclearrow	▱	\parallelogram	▮	\vrectangleblack
⬙	\diamondbotblack	▰	\parallelogramblack	▪	\vysmblksquare
⟐	\diamondcdot	⬠	\pentagon	▫	\vysmwhtsquare
⬖	\diamondleftblack	⬟	\pentagonblack	◬	\whiteinwhitetriangle
⬗	\diamondrightblack	⬠	\rightpentagon	◁	\whitepointerleft
⬘	\diamondtopblack	⬟	\rightpentagonblack	▷	\whitepointerright
◌	\dottedcircle	◂	\smallblacktriangleleft	⬭	\whthorzoval
⬚	\dottedsquare	▸	\smallblacktriangleright	⬯	\whtvertoval

stix defines \diamond as a synonym for \smwhtdiamond, \blacksquare as a synonym for \mdlgblksquare, \square and \Box as synonyms for \mdlgwhtsquare, \triangle and \varbigtriangleup as synonyms for \bigtriangleup, \rhd as a synonym for \vartriangleright, \varbigtriangledown as a synonym for \bigtriangledown, \lhd as a synonym for \vartriangleleft, \Diamond and \lozenge as synonyms for \mglgwhtlozenge, \bigcirc as a synonym for \mglgwhtcircle, \circ as a synonym for \smwhtcircle. and \mdlgblklozenge as a synonym for \blacklozenge.

TABLE 373: ifsym Geometric Shapes

○	\BigCircle	▶	\FilledBigTriangleRight	○	\SmallCircle
×	\BigCross	▲	\FilledBigTriangleUp	×	\SmallCross
◇	\BigDiamondshape	●	\FilledCircle	◇	\SmallDiamondshape
—	\BigHBar	◈	\FilledDiamondShadowA	–	\SmallHBar
◆	\BigLowerDiamond	◈	\FilledDiamondShadowC	◆	\SmallLowerDiamond
◆	\BigRightDiamond	◆	\FilledDiamondshape	◆	\SmallRightDiamond
□	\BigSquare	●	\FilledSmallCircle	□	\SmallSquare
▽	\BigTriangleDown	◆	\FilledSmallDiamondshape	▽	\SmallTriangleDown
◁	\BigTriangleLeft	■	\FilledSmallSquare	◁	\SmallTriangleLeft
▷	\BigTriangleRight	▼	\FilledSmallTriangleDown	▷	\SmallTriangleRight
△	\BigTriangleUp	◀	\FilledSmallTriangleLeft	△	\SmallTriangleUp
|	\BigVBar	▶	\FilledSmallTriangleRight	|	\SmallVBar
○	\Circle	▲	\FilledSmallTriangleUp	↓	\SpinDown
×	\Cross	■	\FilledSquare	↑	\SpinUp
◈	\DiamondShadowA	■	\FilledSquareShadowA	□	\Square
◈	\DiamondShadowB	■	\FilledSquareShadowC	▣	\SquareShadowA
◈	\DiamondShadowC	▼	\FilledTriangleDown	▣	\SquareShadowB
◇	\Diamondshape	◀	\FilledTriangleLeft	▣	\SquareShadowC
●	\FilledBigCircle	▶	\FilledTriangleRight	▽	\TriangleDown
◆	\FilledBigDiamondshape	▲	\FilledTriangleUp	◁	\TriangleLeft
■	\FilledBigSquare	—	\HBar	▷	\TriangleRight
▼	\FilledBigTriangleDown	◆	\LowerDiamond	△	\TriangleUp
◀	\FilledBigTriangleLeft	◆	\RightDiamond	|	\VBar

The ifsym documentation points out that one can use \rlap to combine some of the above into useful, new symbols. For example, \BigCircle and \FilledSmallCircle combine to give "◉". Likewise, \Square and \Cross combine to give "⊠". See Section 10.3 for more information about constructing new symbols out of existing symbols.

TABLE 374: bbding Geometric Shapes

○	\CircleShadow	▌	\Rectangle	▣	\SquareShadowTopLeft
●	\CircleSolid	▌	\RectangleBold	▣	\SquareShadowTopRight
◆	\DiamondSolid	|	\RectangleThin	■	\SquareSolid
⬭	\Ellipse	□	\Square	▼	\TriangleDown
⬭	\EllipseShadow	▣	\SquareCastShadowBottomRight	▲	\TriangleUp
⬭	\EllipseSolid	▣	\SquareCastShadowTopLeft		
◖	\HalfCircleLeft	▣	\SquareCastShadowTopRight		
◗	\HalfCircleRight	▣	\SquareShadowBottomRight		

TABLE 375: pifont Geometric Shapes

●	\ding{108}	❑	\ding{111}	❒	\ding{114}	◆	\ding{117}	❙	\ding{121}
❍	\ding{109}	❒	\ding{112}	▲	\ding{115}	◗	\ding{119}	▮	\ding{122}
■	\ding{110}	❑	\ding{113}	▼	\ding{116}	❘	\ding{120}		

TABLE 376: universa Geometric Shapes

●	\baucircle	■	\bausquare	▲	\bautriangle

TABLE 377: adfsymbols Geometric Shapes

•	\adfbullet{27}	▸	\adfbullet{32}	⋆	\adfbullet{43}	✦	\adfbullet{48}
●	\adfbullet{28}	▲	\adfbullet{33}	·	\adfbullet{44}	✧	\adfbullet{49}
▪	\adfbullet{29}	▾	\adfbullet{34}	⊙	\adfbullet{45}	✦	\adfbullet{50}
◆	\adfbullet{30}	⋆	\adfbullet{41}	▪	\adfbullet{46}	⋄	\adfbullet{51}
◂	\adfbullet{31}	⋆	\adfbullet{42}	▪	\adfbullet{47}	◦	\adfbullet{52}

TABLE 378: fontawesome Geometric Shapes

●	\faCircle	◯	\faCircleONotch	⊙	\faDotCircleO	▢	\faSquareO
○	\faCircleO	○	\faCircleThin	■	\faSquare		

TABLE 379: LaTeX 2_ε Playing-Card Suits

♣	\clubsuit	♢	\diamondsuit	♡	\heartsuit	♠	\spadesuit

TABLE 380: txfonts/pxfonts Playing-Card Suits

♧	\varclubsuit	♦	\vardiamondsuit	♥	\varheartsuit	♤	\varspadesuit

TABLE 381: MnSymbol Playing-Card Suits

♣	\clubsuit	♢	\diamondsuit	♡	\heartsuit	♠	\spadesuit

TABLE 382: fdsymbol Playing-Card Suits

♣	\clubsuit	♡	\heartsuit	♦	\vardiamondsuit
♢	\diamondsuit	♠	\spadesuit	♥	\varheartsuit

TABLE 383: boisik Playing-Card Suits

♣	\clubsuit	♢	\diamondsuit	♡	\heartsuit	♠	\spadesuit

Table 384: stix Playing-Card Suits

♣	\clubsuit	♡	\heartsuit	♧	\varclubsuit	♥	\varheartsuit
◇	\diamondsuit	♠	\spadesuit	♦	\vardiamondsuit	♤	\varspadesuit

Table 385: arev Playing-Card Suits

♧	\varclub	♦	\vardiamond	♥	\varheart	♤	\varspade

Table 386: adforn Flourishes

	\adfclosedflourishleft		\adfclosedflourishright
	\adfdoubleflourishleft		\adfdoubleflourishright
	\adfdoublesharpflourishleft		\adfdoublesharpflourishright
	\adfflourishleft		\adfflourishright
	\adfflourishleftdouble		\adfflourishrightdouble
	\adfopenflourishleft		\adfopenflourishright
	\adfsharpflourishleft		\adfsharpflourishright
	\adfsickleflourishleft		\adfsickleflourishright
	\adfsingleflourishleft		\adfsingleflourishright
	\adftripleflourishleft		\adftripleflourishright
	\adfwavesleft		\adfwavesright

Table 387: Miscellaneous dingbat Dingbats

⚓	\anchor	👁	\eye	▤	\Sborder
➲	\carriagereturn	❖	\filledsquarewithdots	⊡	\squarewithdots
✓	\checkmark		\satellitedish	▥	\Zborder

Table 388: Miscellaneous bbding Dingbats

✉	\Envelope	✌	\Peace	✆	\PhoneHandset	✪	\SunshineOpenCircled
❖	\OrnamentDiamondSolid	☎	\Phone	✈	\Plane	✇	\Tape

Table 389: Miscellaneous pifont Dingbats

☎	\ding{37}	✈	\ding{40}	❤	\ding{164}	❧	\ding{167}	♠	\ding{171}
✆	\ding{38}	✉	\ding{41}	❥	\ding{165}	♣	\ding{168}	♦	\ding{169}
✇	\ding{39}	❖	\ding{118}	❦	\ding{166}	♥	\ding{170}		

Table 390: Miscellaneous adforn Dingbats

•	\adfbullet	◇	\adfdiamond	ʃ	\adfgee	§	\adfS	▫	\adfsquare

6 Ancient languages

This section presents letters and ideograms from various ancient scripts. Some of these symbols may also be useful in other typesetting contexts because of their pictorial nature.

Table 391: phaistos Symbols from the Phaistos Disk

	\PHarrow		\PHeagle		\PHplumedHead
	\PHbee		\PHflute		\PHram
	\PHbeehive		\PHgaunlet		\PHrosette
	\PHboomerang		\PHgrater		\PHsaw
	\PHbow		\PHhelmet		\PHshield
	\PHbullLeg		\PHhide		\PHship
	\PHcaptive		\PHhorn		\PHsling
	\PHcarpentryPlane		\PHlid		\PHsmallAxe
	\PHcat		\PHlily		\PHstrainer
	\PHchild		\PHmanacles		\PHtattooedHead
	\PHclub		\PHmattock		\PHtiara
	\PHcolumn		\PHoxBack		\PHtunny
	\PHcomb		\PHpapyrus		\PHvine
	\PHdolium		\PHpedestrian		\PHwavyBand
	\PHdove		\PHplaneTree		\PHwoman

Table 392: protosem Proto-Semitic Characters

	\Aaleph		\AAhe		\Akaph		\Asamekh		\AAresh
	\AAaleph		\Azayin		\AAkaph		\Ape		\Ashin
	\Abeth		\Avav		\Alamed		\AApe		\Ahelmet
	\AAbeth		\Aheth		\AAlamed		\Asade		\AAhelmet
	\Agimel		\AAheth		\Amem		\AAsade		\Atav
	\Adaleth		\Ateth		\Anun		\Aqoph		
	\AAdaleth		\Ayod		\Aayin		\AAqoph		
	\Ahe		\AAyod		\AAayin		\Aresh		

The protosem package defines abbreviated control sequences for each of the above. In addition, single-letter shortcuts can be used within the argument to the \textproto command (e.g., "\textproto{Pakyn}" produces ""). See the protosem documentation for more information.

TABLE 393: hieroglf Hieroglyphics

	\HA		\HI		\Hn		\HT
	\Ha		\Hi		\HO		\Ht
	\HB		\Hibl		\Ho		\Htongue
	\Hb		\Hibp		\Hp		\HU
	\Hc		\Hibs		\HP		\Hu
	\HC		\Hibw		\Hplural		\HV
	\HD		\HJ		\Hplus		\Hv
	\Hd		\Hj		\HQ		\Hvbar
	\Hdual		\Hk		\Hq		\Hw
	\He		\HK		\Hquery		\HW
	\HE		\HL		\HR		\HX
	\Hf		\Hl		\Hr		\Hx
	\HF		\Hm		\Hs		\HY
	\HG		\HM		\HS		\Hy
	\Hg		\Hman		\Hscribe		\Hz
	\Hh		\Hms		\Hslash		\HZ
	\HH		\HN		\Hsv		
	\Hone		\Hhundred		\HXthousand		\Hmillion
	\Hten		\Hthousand		\HCthousand		

The hieroglf package defines alternate control sequences and single-letter shortcuts for each of the above which can be used within the argument to the `\textpmhg` command (e.g., "`\textpmhg{Pakin}`" produces ""). See the hieroglf documentation for more information.

TABLE 394: linearA Linear A Script

	\LinearAI		\LinearAXCIX		\LinearACXCVII		\LinearACCXCV
	\LinearAII		\LinearAC		\LinearACXCVIII		\LinearACCXCVI
	\LinearAIII		\LinearACI		\LinearACXCIX		\LinearACCXCVII
	\LinearAIV		\LinearACII		\LinearACC		\LinearACCXCVIII
	\LinearAV		\LinearACIII		\LinearACCI		\LinearACCXCIX
	\LinearAVI		\LinearACIV		\LinearACCII		\LinearACCC
	\LinearAVII		\LinearACV		\LinearACCIII		\LinearACCCI
	\LinearAVIII		\LinearACVI		\LinearACCIV		\LinearACCCII
	\LinearAIX		\LinearACVII		\LinearACCV		\LinearACCCIII
	\LinearAX		\LinearACVIII		\LinearACCVI		\LinearACCCIV
	\LinearAXI		\LinearACIX		\LinearACCVII		\LinearACCCV
	\LinearAXII		\LinearACX		\LinearACCVIII		\LinearACCCVI
	\LinearAXIII		\LinearACXI		\LinearACCIX		\LinearACCCVII

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\LinearAXIV	\LinearACXII	\LinearACCX	\LinearACCCVIII
\LinearAXV	\LinearACXIII	\LinearACCXI	\LinearACCCIX
\LinearAXVI	\LinearACXIV	\LinearACCXII	\LinearACCCX
\LinearAXVII	\LinearACXV	\LinearACCXIII	\LinearACCCXI
\LinearAXVIII	\LinearACXVI	\LinearACCXIV	\LinearACCCXII
\LinearAXIX	\LinearACXVII	\LinearACCXV	\LinearACCCXIII
\LinearAXX	\LinearACXVIII	\LinearACCXVI	\LinearACCCXIV
\LinearAXXI	\LinearACXIX	\LinearACCXVII	\LinearACCCXV
\LinearAXXII	\LinearACXX	\LinearACCXVIII	\LinearACCCXVI
\LinearAXXIII	\LinearACXXI	\LinearACCXIX	\LinearACCCXVII
\LinearAXXIV	\LinearACXXII	\LinearACCXX	\LinearACCCXVIII
\LinearAXXV	\LinearACXXIII	\LinearACCXXI	\LinearACCCXIX
\LinearAXXVI	\LinearACXXIV	\LinearACCXXII	\LinearACCCXX
\LinearAXXVII	\LinearACXXV	\LinearACCXXIII	\LinearACCCXXI
\LinearAXXVIII	\LinearACXXVI	\LinearACCXXIV	\LinearACCCXXII
\LinearAXXIX	\LinearACXXVII	\LinearACCXXV	\LinearACCCXXIII
\LinearAXXX	\LinearACXXVIII	\LinearACCXXVI	\LinearACCCXXIV
\LinearAXXXI	\LinearACXXIX	\LinearACCXXVII	\LinearACCCXXV
\LinearAXXXII	\LinearACXXX	\LinearACCXXVIII	\LinearACCCXXVI
\LinearAXXXIII	\LinearACXXXI	\LinearACCXXIX	\LinearACCCXXVII
\LinearAXXXIV	\LinearACXXXII	\LinearACCXXX	\LinearACCCXXVIII
\LinearAXXXV	\LinearACXXXIII	\LinearACCXXXI	\LinearACCCXXIX
\LinearAXXXVI	\LinearACXXXIV	\LinearACCXXXII	\LinearACCCXXX
\LinearAXXXVII	\LinearACXXXV	\LinearACCXXXIII	\LinearACCCXXXI
\LinearAXXXVIII	\LinearACXXXVI	\LinearACCXXXIV	\LinearACCCXXXII
\LinearAXXXIX	\LinearACXXXVII	\LinearACCXXXV	\LinearACCCXXXIII
\LinearAXL	\LinearACXXXVIII	\LinearACCXXXVI	\LinearACCCXXXIV
\LinearAXLI	\LinearACXXXIX	\LinearACCXXXVII	\LinearACCCXXXV
\LinearAXLII	\LinearACXL	\LinearACCXXXVIII	\LinearACCCXXXVI
\LinearAXLIII	\LinearACXLI	\LinearACCXXXIX	\LinearACCCXXXVII
\LinearAXLIV	\LinearACXLII	\LinearACCXL	\LinearACCCXXXVIII
\LinearAXLV	\LinearACXLIII	\LinearACCXLI	\LinearACCCXXXIX
\LinearAXLVI	\LinearACXLIV	\LinearACCXLII	\LinearACCCXL
\LinearAXLVII	\LinearACXLV	\LinearACCXLIII	\LinearACCCXLI
\LinearAXLVIII	\LinearACXLVI	\LinearACCXLIV	\LinearACCCXLII
\LinearAXLIX	\LinearACXLVII	\LinearACCXLV	\LinearACCCXLIII
\LinearAL	\LinearACXLVIII	\LinearACCXLVI	\LinearACCCXLIV
\LinearALI	\LinearACXLIX	\LinearACCXLVII	\LinearACCCXLV
\LinearALII	\LinearACL	\LinearACCXLVIII	\LinearACCCXLVI
\LinearALIII	\LinearACLI	\LinearACCXLIX	\LinearACCCXLVII
\LinearALIV	\LinearACLII	\LinearACCL	\LinearACCCXLVIII
\LinearALV	\LinearACLIII	\LinearACCLI	\LinearACCCXLIX
\LinearALVI	\LinearACLIV	\LinearACCLII	\LinearACCCL
\LinearALVII	\LinearACLV	\LinearACCLIII	\LinearACCCLI
\LinearALVIII	\LinearACLVI	\LinearACCLIV	\LinearACCCLII
\LinearALIX	\LinearACLVII	\LinearACCLV	\LinearACCCLIII
\LinearALX	\LinearACLVIII	\LinearACCLVI	\LinearACCCLIV
\LinearALXI	\LinearACLIX	\LinearACCLVII	\LinearACCCLV
\LinearALXII	\LinearACLX	\LinearACCLVIII	\LinearACCCLVI
\LinearALXIII	\LinearACLXI	\LinearACCLIX	\LinearACCCLVII
\LinearALXIV	\LinearACLXII	\LinearACCLX	\LinearACCCLVIII
\LinearALXV	\LinearACLXIII	\LinearACCLXI	\LinearACCCLIX
\LinearALXVI	\LinearACLXIV	\LinearACCLXII	\LinearACCCLX

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	\LinearALXVII		\LinearACLXV		\LinearACCLXIII		\LinearACCCLXI
	\LinearALXVIII		\LinearACLXVI		\LinearACCLXIV		\LinearACCCLXII
	\LinearALXIX		\LinearACLXVII		\LinearACCLXV		\LinearACCCLXIII
	\LinearALXX		\LinearACLXVIII		\LinearACCLXVI		\LinearACCCLXIV
	\LinearALXXI		\LinearACLXIX		\LinearACCLXVII		\LinearACCCLXV
	\LinearALXXII		\LinearACLXX		\LinearACCLXVIII		\LinearACCCLXVI
	\LinearALXXIII		\LinearACLXXI		\LinearACCLXIX		\LinearACCCLXVII
	\LinearALXXIV		\LinearACLXXII		\LinearACCLXX		\LinearACCCLXVIII
	\LinearALXXV		\LinearACLXXIII		\LinearACCLXXI		\LinearACCCLXIX
	\LinearALXXVI		\LinearACLXXIV		\LinearACCLXXII		\LinearACCCLXX
	\LinearALXXVII		\LinearACLXXV		\LinearACCLXXIII		\LinearACCCLXXI
	\LinearALXXVIII		\LinearACLXXVI		\LinearACCLXXIV		\LinearACCCLXXII
	\LinearALXXIX		\LinearACLXXVII		\LinearACCLXXV		\LinearACCCLXXIII
	\LinearALXXX		\LinearACLXXVIII		\LinearACCLXXVI		\LinearACCCLXXIV
	\LinearALXXXI		\LinearACLXXIX		\LinearACCLXXVII		\LinearACCCLXXV
	\LinearALXXXII		\LinearACLXXX		\LinearACCLXXVIII		\LinearACCCLXXVI
	\LinearALXXXIII		\LinearACLXXXI		\LinearACCLXXIX		\LinearACCCLXXVII
	\LinearALXXXIV		\LinearACLXXXII		\LinearACCLXXX		\LinearACCCLXXVIII
	\LinearALXXXV		\LinearACLXXXIII		\LinearACCLXXXI		\LinearACCCLXXIX
	\LinearALXXXVI		\LinearACLXXXIV		\LinearACCLXXXII		\LinearACCCLXXX
	\LinearALXXXVII		\LinearACLXXXV		\LinearACCLXXXIII		\LinearACCCLXXXI
	\LinearALXXXVIII		\LinearACLXXXVI		\LinearACCLXXXIV		\LinearACCCLXXXII
	\LinearALXXXIX		\LinearACLXXXVII		\LinearACCLXXXV		\LinearACCCLXXXIII
	\LinearALXXXX		\LinearACLXXXVIII		\LinearACCLXXXVI		\LinearACCCLXXXIV
	\LinearAXCI		\LinearACLXXXIX		\LinearACCLXXXVII		\LinearACCCLXXXV
	\LinearAXCII		\LinearACLXXXX		\LinearACCLXXXVIII		\LinearACCCLXXXVI
	\LinearAXCIII		\LinearACXCI		\LinearACCLXXXIX		\LinearACCCLXXXVII
	\LinearAXCIV		\LinearACXCII		\LinearACCLXXXX		\LinearACCCLXXXVIII
	\LinearAXCV		\LinearACXCIII		\LinearACCXCI		\LinearACCCLXXXIX
	\LinearAXCVI		\LinearACXCIV		\LinearACCXCII		
	\LinearAXCVII		\LinearACXCV		\LinearACCXCIII		
	\LinearAXCVIII		\LinearACXCVI		\LinearACCXCIV		

Table 395: linearb Linear B Basic and Optional Letters

𐀀	\Ba	𐀊	\Bja	𐀒	\Bmu	𐀔	\Bpte	𐀜	\Broii	𐀞	\Bto
𐀁	\Baii	𐀋	\Bje	𐀓	\Bna	𐀕	\Bpu	𐀝	\Bru	𐀟	\Btu
𐀂	\Baiii	𐀌	\Bjo	𐀔	\Bne	𐀖	\Bpuii	𐀠	\Bsa	𐀡	\Btwo
𐀃	\Bau	𐀍	\Bju	𐀕	\Bni	𐀗	\Bqa	𐀢	\Bse	𐀣	\Bu
𐀄	\Bda	𐀎	\Bka	𐀖	\Bno	𐀘	\Bqe	𐀤	\Bsi	𐀥	\Bwa
𐀅	\Bde	𐀏	\Bke	𐀗	\Bnu	𐀙	\Bqi	𐀦	\Bso	𐀧	\Bwe
𐀆	\Bdi	𐀐	\Bki	𐀘	\Bnwa	𐀚	\Bqo	𐀨	\Bsu	𐀩	\Bwi
𐀇	\Bdo	𐀑	\Bko	𐀙	\Bo	𐀛	\Bra	𐀪	\Bswa	𐀫	\Bwo
𐀈	\Bdu	𐀒	\Bku	𐀚	\Bpa	𐀜	\Braii	𐀬	\Bswi	𐀭	\Bza
𐀉	\Bdwe	𐀓	\Bma	𐀛	\Bpaiii	𐀝	\Braiii	𐀮	\Bta	𐀯	\Bze
𐀊	\Bdwo	𐀔	\Bme	𐀜	\Bpe	𐀞	\Bre	𐀰	\Btaii	𐀱	\Bzo
𐀋	\Be	𐀕	\Bmi	𐀝	\Bpi	𐀟	\Bri	𐀲	\Bte		
𐀌	\Bi	𐀖	\Bmo	𐀞	\Bpo	𐀠	\Bro	𐀳	\Bti		

These symbols must appear either within the argument to `\textlinb` or following the `\linbfamily` font-selection command within a scope. Single-character shortcuts are also supported: Both "`\textlinb{\Bpa\Bki\Bna}`" and "`\textlinb{pcn}`" produce "𐀚𐀎𐀓", for example. See the linearb documentation for more information.

Table 396: linearb Linear B Numerals

𐄇	\BNi	𐄋	\BNvii	𐄐	\BNxl	𐄙	\BNc	𐄣	\BNdcc
𐄈	\BNii	𐄌	\BNviii	𐄑	\BNl	𐄚	\BNcc	𐄤	\BNdccc
𐄉	\BNiii	𐄍	\BNix	𐄒	\BNlx	𐄛	\BNccc	𐄥	\BNcm
𐄊	\BNiv	𐄎	\BNx	𐄓	\BNlxx	𐄜	\BNcd	𐄦	\BNm
𐄋	\BNv	𐄏	\BNxx	𐄔	\BNlxxx	𐄝	\BNd		
𐄌	\BNvi	𐄐	\BNxxx	𐄕	\BNxc	𐄞	\BNdc		

These symbols must appear either within the argument to `\textlinb` or following the `\linbfamily` font-selection command within a scope.

Table 397: linearb Linear B Weights and Measures

𐄷	\BPtalent	𐄸	\BPvolb	𐄹	\BPvolcf	𐄺	\BPwtb	𐄻	\BPwtd
𐄶	\BPvola	𐄵	\BPvolcd	𐄴	\BPwta	𐄼	\BPwtc		

These symbols must appear either within the argument to `\textlinb` or following the `\linbfamily` font-selection command within a scope.

Table 398: linearb Linear B Ideograms

	\BPamphora		\BPchassis		\BPman		\BPwheat
	\BParrow		\BPcloth		\BPnanny		\BPwheel
	\BPbarley		\BPcow		\BPolive		\BPwine
	\BPbilly		\BPcup		\BPox		\BPwineiih
	\BPboar		\BPewe		\BPpig		\BPwineiiih
	\BPbronze		\BPfoal		\BPram		\BPwineivh
	\BPbull		\BPgoat		\BPsheep		\BPwoman
	\BPcauldroni		\BPgoblet		\BPsow		\BPwool
	\BPcauldronii		\BPgold		\BPspear		
	\BPchariot		\BPhorse		\BPsword		

These symbols must appear either within the argument to `\textlinb` or following the `\linbfamily` font-selection command within a scope.

Table 399: linearb Unidentified Linear B Symbols

	\BUi		\BUiv		\BUvii		\BUx		\Btwe
	\BUii		\BUv		\BUviii		\BUxi		
	\BUiii		\BUvi		\BUix		\BUxii		

These symbols must appear either within the argument to `\textlinb` or following the `\linbfamily` font-selection command within a scope.

Table 400: cypriot Cypriot Letters

	\Ca		\Cku		\Cmu		\Cpo		\Cso		\Cwi
	\Ce		\Cla		\Cna		\Cpu		\Csu		\Cwo
	\Cga		\Cle		\Cne		\Cra		\Cta		\Cxa
	\Ci		\Cli		\Cni		\Cre		\Cte		\Cxe
	\Cja		\Clo		\Cno		\Cri		\Cti		\Cya
	\Cjo		\Clu		\Cnu		\Cro		\Cto		\Cyo
	\Cka		\Cma		\Co		\Cru		\Ctu		\Cza
	\Cke		\Cme		\Cpa		\Csa		\Cu		\Czo
	\Cki		\Cmi		\Cpe		\Cse		\Cwa		
	\Cko		\Cmo		\Cpi		\Csi		\Cwe		

These symbols must appear either within the argument to `\textcypr` or following the `\cyprfamily` font-selection command within a scope. Single-character shortcuts are also supported: Both "`\textcypr{\Cpa\Cki\Cna}`" and "`\textcypr{pcn}`" produce "‡ ‡", for example. See the cypriot documentation for more information.

TABLE 401: sarabian South Arabian Letters

𐩠	\SAa	𐩷	\SAz	𐩭	\SAm	𐩹	\SAsd	𐩢	\SAdb
𐩡	\SAb	𐩮	\SAhd	𐩣	\SAn	𐩺	\SAq	𐩸	\SAtb
𐩫	\SAg	𐩻	\SAtd	𐩵	\SAs	𐩯	\SAr	𐩤	\SAga
𐩬	\SAd	𐩰	\SAy	𐩲	\SAf	𐩴	\SAsv	𐩼	\SAzd
𐩧	\SAh	𐩦	\SAk	𐩶	\SAlq	𐩱	\SAt	𐩽	\SAsa
𐩪	\SAw	𐩩	\SAl	𐩶	\SAo	𐩧𐩣	\SAhu	𐩥	\SAdd

These symbols must appear either within the argument to \textsarab or following the \sarabfamily font-selection command within a scope. Single-character shortcuts are also supported: Both "\textsarab{\SAb\SAk\SAn}" and "\textsarab{bkn}" produce "𐩡𐩦𐩣", for example. See the sarabian documentation for more information.

TABLE 402: teubner Archaic Greek Letters and Greek Numerals

Ϙ	\Coppa†	F	\Digamma*	ϡ	\sampi*	ϛ	\varstigma
ϙ	\coppa†	ϟ	\koppa*	Ϛ	\Stigma		
ϝ	\digamma*,‡	Ϡ	\Sampi	ϛ	\stigma*		

* Technically, these symbols do not require teubner; it is sufficient to load the babel package with the greek option (upon which teubner depends)—but use \qoppa for \koppa and \ddigamma for \digamma.

† For compatibility with other naming conventions teubner defines \Koppa as a synonym for \Coppa and \varcoppa as a synonym for \coppa.

‡ If both teubner and amssymb are loaded, teubner's \digamma replaces amssymb's \digamma, regardless of package-loading order.

TABLE 403: boisik Archaic Greek Letters and Greek Numerals

F	\Digamma	*ϙ*	\qoppa	*ϛ*	\stigma	*ϡ*	\varsampi
ϝ	\digamma	*Ϙ*	\Qoppa	*Ϛ*	\Stigma		
ϸ	\heta	*Ϡ*	\Sampi	*ϝ*	\vardigamma		
Ϸ	\Heta	*ϡ*	\sampi	*ϡ*	\Varsampi		

TABLE 404: epiolmec Epi-Olmec Script

	\EOafter		\EOMiddle		\EOStarWarrior
	\EOandThen		\EOmonster		\EOstep
	\EOAppear		\EOMountain		\EOSu
	\EOBeardMask		\EOmuu		\EOsu
	\EOBedeck		\EOna		\EOsun

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\EOBlood


\EObrace


\EObuilding

\EOBundle


\EOChop


\EOChronI


\EOCloth


\EODealWith

\EODeer


\EOeat


\EOflint


\EOflower


\EOFold


\EOGod


\EOGoUp

\EOgovernor


\EOGuise


\EOHallow


\EOja


\EOjaguar


\EOje


\EOji

\EOJI


\EOjo


\EOju


\EOkak

\EOke


\EOki


\EOkij

\EOKing


\EOknottedCloth


\EOne


\EOni


\EOnow


\EOnu


\EOnuu


\EOofficerI

\EOofficerII


\EOofficerIII


\EOofficerIV


\EOpa


\EOpak


\EOPatron


\EOPatronII


\EOpe

\EOpenis


\EOpi


\EOPierce


\EOPlant


\EOPlay


\EOpo


\EOpriest


\EOPrince


\EOpu


\EOpuu


\EOpuuk


\EORain


\EOSa


\EOsa


\EOsacrifice


\EOSaw


\EOScorpius


\EOsuu


\EOSuu


\EOta


\EOte


\EOthrone

\EOti


\EOtime

\EOTime


\EOTitle


\EOTitleII


\EOTitleIV


\EOto


\EOtu

\EOtuki


\EOtukpa


\EOturtle

\EOtuu


\EOtza


\EOtze


\EOtzetze


\EOtzi


\EOtzu


\EOtzuu


\EOundef

\EOvarBeardMask


\EOvarja


\EOvarji


\EOvarki


\EOvarkuu


\EOvarni


\EOvarpa

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	\EOknottedClothStraps		\EOset		\EOvarSi
	\EOko		\EOsi		\EOvarsi
	\EOku		\EOSi		\EOvartza
	\EOkuu		\EOsing		\EOvarwuu
	\EOLetBlood		\EOSini		\EOvarYear
	\EOloinCloth		\EOskin		\EOwa
	\EOlongLipII		\EOSky		\EOwe
	\EOLord		\EOskyAnimal		\EOwi
	\EOLose		\EOskyPillar		\EOwo
	\EOma		\EOsnake		\EOwuu
	\EOmacaw		\EOSo		\EOya
	\EOmacawI		\EOSpan		\EOyaj
	\EOme		\EOSprinkle		\EOye
	\EOmexNew		\EOstar		\EOYear
	\EOmi		\EOstarWarrior		\EOyuu

Table 405: epiolmec Epi-Olmec Numerals

	\EOzero		\EOvi		\EOxii		\EOxviii
	\EOi		\EOvii		\EOxiii		\EOxix
	\EOii		\EOviii		\EOxiv		\EOxx
	\EOiii		\EOix		\EOxv		
	\EOiv		\EOx		\EOxvi		
	\EOv		\EOxi		\EOxvii		

7 Musical symbols

The following symbols are used to typeset musical notation. The *lily*lypbs package provides a large subset of the symbols in this section. Note, however, that *lily*lypbs depends upon the fontspec package, OpenType (`.otf`) fonts, and some PDF graphics and therefore works only with LuaLaTeX or XeLaTeX.

Table 406: LaTeX 2_ε Musical Symbols

♭	`\flat`	♮	`\natural`	♯	`\sharp`

Table 407: textcomp Musical Symbols

♪	`\textmusicalnote`

Table 408: wasysym Musical Symbols

♪	`\eighthnote`	𝅗𝅥	`\halfnote`	♫	`\twonotes`	𝅝	`\fullnote`	♩	`\quarternote`

Table 409: MnSymbol Musical Symbols

♭	`\flat`	♮	`\natural`	♯	`\sharp`

Table 410: fdsymbol Musical Symbols

♭	`\flat`	♮	`\natural`	♯	`\sharp`

Table 411: boisik Musical Symbols

♭	`\flat`	♮	`\natural`	♯	`\sharp`

Table 412: stix Musical Symbols

♪	`\eighthnote`	♮	`\natural`	♯	`\sharp`
♭	`\flat`	♩	`\quarternote`	♫	`\twonotes`

Table 413: arev Musical Symbols

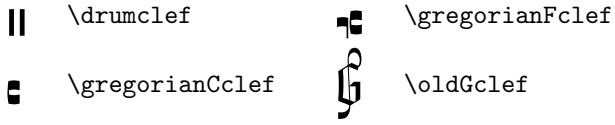
♩	`\quarternote`	♪	`\eighthnote`	♬	`\sixteenthnote`

TABLE 414: MusiXTEX Musical Symbols

𝄵	\allabreve	>	\lsf	𝆖	\shake
𝄡	\altoclef	v	\lsfz	𝆗	\Shake
𝄐	\backturn	𝄓	\maxima	𝆘	\Shakel
𝄢	\bassclef	+	\meterplus	𝆙	\Shakene
′	\caesura	𝆝	\mordent	𝆚	\Shakenw
𝄌	\coda	𝆞	\Mordent	𝆛	\Shakesw
𝄋	\Coda	𝄽	\PAUSe	𝄡	\smallaltoclef
✻	\Dep	𝄼	\PAuse	𝄢	\smallbassclef
▯	\doublethumb	𝄻	\pause	𝄞	\smalltrebleclef
⊓	\downbow	Ped.	\Ped	𝆮	\sPed
𝄋	\ds	𝄾	\qp	𝄞	\trebleclef
𝄷	\duevolte	𝄿	\qqs	~	\trill
𝄐	\fermatadown	𝄿	\qs	𝆔	\turn
𝄐	\fermataup	𝄪	\reverseallabreve	∨	\upbow
°	\flageolett	𝄡	\reverseC	>	\usf
𝄻	\hpause	✻	\sDep	^	\usfz
𝄿	\hs	𝄋	\Segno	𝄽	\wq
𝄺	\longa	𝄋	\segno	𝄼	\wqq

All of these symbols are intended to be used in the context of typesetting musical scores. See the MusiXTEX documentation for more information.

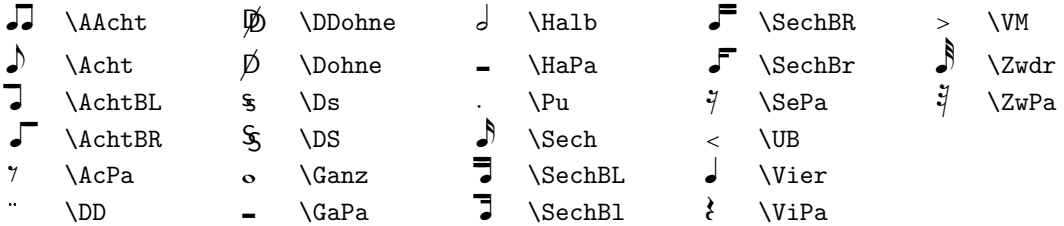
TABLE 415: MusiXTEX Alternative Clefs



\drumclef	\gregorianFclef
\gregorianCclef	\oldGclef

In addition to MusiXTEX, \drumclef requires the musixper package; \oldGclef requires the musixlit package; and both \gregorianCclef and \gregorianFclef require the musixgre package. Together with MusiXTEX, these packages provide a complete system for typesetting percussion notation (musixper), liturgical music (musixlit), and Gregorian chants (musixgre, including the staffs and all of the necessary neumes. See the MusiXTEX documentation for more information.

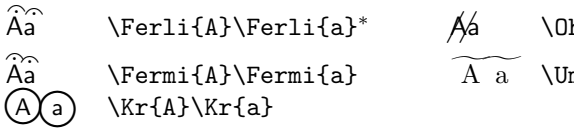
TABLE 416: harmony Musical Symbols



\AAcht	\DDohne	\Halb	\SechBR	>	\VM
\Acht	\Dohne	\HaPa	\SechBr		\Zwdr
\AchtBL	\Ds	\Pu	\SePa		\ZwPa
\AchtBR	\DS	\Sech	\UB		
\AcPa	\Ganz	\SechBL	\Vier		
\DD	\GaPa	\SechBl	\ViPa		

The MusiXTEX package must be installed to use harmony.

TABLE 417: harmony Musical Accents



\Ferli{A}\Ferli{a}*		\Ohne{A}\Ohne{a}*
\Fermi{A}\Fermi{a}	A a	\Umd{A}\Umd{a}*
\Kr{A}\Kr{a}		

* These symbols take an optional argument which shifts the accent either horizontally or vertically (depending on the command) by the given distance.

In addition to the accents shown above, \HH is a special accent command that accepts five period-separated characters and typesets them such that "\HH.X.a.b.c.d." produces "X_a^b". All arguments except the first can be omitted: "\HH.X....." produces "X". \Takt takes two arguments and composes them into a musical time signature. For example, "\Takt{12}{8}" produces "$\frac{12}{8}$". As two special cases, "\Takt{c}{0}" produces "𝄡" and "\Takt{c}{1}" produces "𝄢".

The MusiXTEX package must be installed to use harmony.

TABLE 418: *lily*lyp♭s Single Notes

♪	\eighthNote
♪.	\eighthNoteDotted
♪..	\eighthNoteDottedDouble
♪¨	\eighthNoteDottedDoubleDown
♪·	\eighthNoteDottedDown
♪	\eighthNoteDown
𝅗𝅥	\halfNote
𝅗𝅥.	\halfNoteDotted
𝅗𝅥..	\halfNoteDottedDouble
𝅗𝅥¨	\halfNoteDottedDoubleDown
𝅗𝅥·	\halfNoteDottedDown
𝅗𝅥	\halfNoteDown
♩	\quarterNote
♩.	\quarterNoteDotted
♩..	\quarterNoteDottedDouble
♩¨	\quarterNoteDottedDoubleDown
♩·	\quarterNoteDottedDown
♩	\quarterNoteDown
𝅘𝅥𝅯	\sixteenthNote
𝅘𝅥𝅯.	\sixteenthNoteDotted
𝅘𝅥𝅯..	\sixteenthNoteDottedDouble
𝅘𝅥𝅯¨	\sixteenthNoteDottedDoubleDown
𝅘𝅥𝅯·	\sixteenthNoteDottedDown
𝅘𝅥𝅯	\sixteenthNoteDown
𝅘𝅥𝅰	\thirtysecondNote
𝅘𝅥𝅰.	\thirtysecondNoteDotted
𝅘𝅥𝅰..	\thirtysecondNoteDottedDouble
𝅘𝅥𝅰¨	\thirtysecondNoteDottedDoubleDown
𝅘𝅥𝅰·	\thirtysecondNoteDottedDown
𝅘𝅥𝅰	\thirtysecondNoteDown
𝅝	\wholeNote
𝅝.	\wholeNoteDotted

*lily*lyp♭s defines synonyms for all of the preceding symbols:

♩	\crotchet
♩.	\crotchetDotted
♩..	\crotchetDottedDouble
♩¨	\crotchetDottedDoubleDown
♩·	\crotchetDottedDown
♩	\crotchetDown
𝅘𝅥𝅰	\demisemiquaver
𝅘𝅥𝅰.	\demisemiquaverDotted
𝅘𝅥𝅰..	\demisemiquaverDottedDouble
𝅘𝅥𝅰¨	\demisemiquaverDottedDoubleDown
𝅘𝅥𝅰·	\demisemiquaverDottedDown
𝅘𝅥𝅰	\demisemiquaverDown
𝅗𝅥	\minim
𝅗𝅥.	\minimDotted
𝅗𝅥..	\minimDottedDouble
𝅗𝅥¨	\minimDottedDoubleDown
𝅗𝅥·	\minimDottedDown
𝅗𝅥	\minimDown
♪	\quaver
♪.	\quaverDotted
♪..	\quaverDottedDouble
♪¨	\quaverDottedDoubleDown
♪·	\quaverDottedDown
♪	\quaverDown
𝅝	\semibreve
𝅝.	\semibreveDotted
𝅘𝅥𝅯	\semiquaver
𝅘𝅥𝅯.	\semiquaverDotted
𝅘𝅥𝅯..	\semiquaverDottedDouble
𝅘𝅥𝅯¨	\semiquaverDottedDoubleDown
𝅘𝅥𝅯·	\semiquaverDottedDown
𝅘𝅥𝅯	\semiquaverDown

TABLE 419: *lily*lyp♭s Beamed Notes

♫	\twoBeamedQuavers
♫	\threeBeamedQuavers
♫.	\threeBeamedQuaversI
♫.	\threeBeamedQuaversII
♫.	\threeBeamedQuaversIII

TABLE 420: *lily*𝄞ly*pbs* Clefs

𝄡	`\clefC`	𝄢	`\clefF`	𝄞	`\clefG`

Each of these symbols provides a smaller, "inline" form (`\clefCInline`, `\clefFInline`, and `\clefGInline`, respectively) intended for use within a paragraph. See the *lily*𝄞ly*pbs* documentation for more information.

TABLE 421: *lily*𝄞ly*pbs* Time Signatures

𝐂	`\lilyTimeC`	𝐂	`\lilyTimeCHalf`

lily𝄞ly*pbs* also provides a `\lilyTimeSignature` command that lets a user typeset single and compound time signatures by specifying a numerator and a denominator. See the *lily*𝄞ly*pbs* documentation for more information.

TABLE 422: *lily*𝄞ly*pbs* Accidentals

𝄪	`\doublesharp`	𝍯	`\sharpArrowdown`
♭	`\flat`	𝍮	`\sharpArrowup`
𝄫	`\flatflat`	𝍲	`\sharpSlashslashslashStem`
♮	`\natural`	𝍱	`\sharpSlashslashslashStemstem`
♯	`\sharp`	𝍰	`\sharpSlashslashStem`
𝍭	`\sharpArrowboth`	𝍳	`\sharpSlashslashStemstemstem`

TABLE 423: *lily*𝄞ly*pbs* Rests

𝄽	`\crotchetRest`	𝄾.	`\quaverRestDotted`
𝄽.	`\crotchetRestDotted`	𝄿	`\semiquaverRest`
𝄼	`\halfNoteRest`	𝄿.	`\semiquaverRestDotted`
𝄼.	`\halfNoteRestDotted`	𝄻	`\wholeNoteRest`
𝄾	`\quaverRest`	𝄻.	`\wholeNoteRestDotted`

Multiply dotted rests can be produced with the `\lilyPrintMoreDots` command. See the *lily*𝄞ly*pbs* documentation for more information.

TABLE 424: *lily*𝄞ly**pbs** Dynamics Letters

f	`\lilyDynamics{f}`	*r*	`\lilyDynamics{r}`
p	`\lilyDynamics{p}`	*s*	`\lilyDynamics{s}`
m	`\lilyDynamics{m}`	*z*	`\lilyDynamics{z}`
rf	`\lilyRF`	***rfz***	`\lilyRFZ`

These letters and the digits 0–9 are the only alphanumerics defined by *lily*𝄞ly**pbs**'s underlying Emmentaler fonts.

TABLE 425: *lily*𝄞ly**pbs** Dynamics Symbols

<	`\crescHairpin`	>	`\decrescHairpin`

TABLE 426: *lily*𝄞ly**pbs** Articulations

>	`\lilyAccent`	^	`\marcato`	'	`\staccatissimo`
<>	`\lilyEspressivo`	v	`\marcatoDown`	_	`\tenuto`
.	`\lilyStaccato`	-	`\portato`		
o	`\lilyThumb`	-	`\portatoDown`		

TABLE 427: *lily*𝄞ly**pbs** Scripts

𝄐	`\fermata`

TABLE 428: *lily*𝄞ly**pbs** Accordion Notation

𝄪	`\accordionBayanBass`	⊛	`\accordionOldEE`	⊜	`\accordionStdBass`
⊜	`\accordionDiscant`	⌝	`\accordionPull`		
⊖	`\accordionFreeBass`	〉	`\accordionPush`		

TABLE 429: *lily*𝄞ly***pbs*** Named Time Signatures

𝄵	\lilyGlyph{timesig.C22}	𝅘	\lilyGlyph{timesig.mensural98}
𝄡	\lilyGlyph{timesig.C44}	𝅜	\lilyGlyph{timesig.neomensural22}
𝅜	\lilyGlyph{timesig.mensural22}	𝅝	\lilyGlyph{timesig.neomensural24}
𝅝	\lilyGlyph{timesig.mensural24}	𝅗𝅥	\lilyGlyph{timesig.neomensural32}
𝅗𝅥	\lilyGlyph{timesig.mensural32}	𝅘𝅥	\lilyGlyph{timesig.neomensural34}
𝅘𝅥	\lilyGlyph{timesig.mensural34}	𝅘𝅥𝅮	\lilyGlyph{timesig.neomensural44}
𝅘𝅥𝅮	\lilyGlyph{timesig.mensural44}	𝅘𝅥𝅯	\lilyGlyph{timesig.neomensural48}
𝅘𝅥𝅯	\lilyGlyph{timesig.mensural48}	𝅘𝅥𝅰	\lilyGlyph{timesig.neomensural64}
𝅘𝅥𝅰	\lilyGlyph{timesig.mensural64}	𝅘𝅥𝅱	\lilyGlyph{timesig.neomensural68}
𝅘𝅥𝅱	\lilyGlyph{timesig.mensural68}	𝅘𝅥𝅲	\lilyGlyph{timesig.neomensural68alt}
𝅘𝅥𝅲	\lilyGlyph{timesig.mensural68alt}	𝅗𝅥	\lilyGlyph{timesig.neomensural94}
𝅗𝅥	\lilyGlyph{timesig.mensural94}	𝅝	\lilyGlyph{timesig.neomensural98}

lily𝄞ly***pbs*** defines shorter names for a few of these symbols. See Table 421.

TABLE 430: *lily*𝄞ly***pbs*** Named Scripts

𝆕	\lilyGlyph{scripts.arpeggio}	𝆖	\lilyGlyph{scripts.prallmordent}
𝆔	\lilyGlyph{scripts.arpeggio.arrow.1}	𝆗	\lilyGlyph{scripts.prallprall}
𝆔	\lilyGlyph{scripts.arpeggio.arrow.M1}	𝆘	\lilyGlyph{scripts.prallup}
𝅭	\lilyGlyph{scripts.augmentum}	𝆑	\lilyGlyph{scripts.rcomma}
𝆓	\lilyGlyph{scripts.barline.kievan}	𝆙	\lilyGlyph{scripts.reverseturn}
𝆺	\lilyGlyph{scripts.caesura.curved}	𝆑	\lilyGlyph{scripts.rvarcomma}
𝄪	\lilyGlyph{scripts.caesura.straight}	𝄋	\lilyGlyph{scripts.segno}
𝅭	\lilyGlyph{scripts.circulus}	𝆟	\lilyGlyph{scripts.sforzato}
𝆕	\lilyGlyph{scripts.coda}	𝆒	\lilyGlyph{scripts.snappizzicato}
𝅭	\lilyGlyph{scripts.daccentus}	𝅭	\lilyGlyph{scripts.staccato}
𝄐	\lilyGlyph{scripts.dfermata}	𝆞	\lilyGlyph{scripts.stopped}
𝄑	\lilyGlyph{scripts.dlongfermata}	𝆭	\lilyGlyph{scripts.tenuto}
𝆬	\lilyGlyph{scripts.dmarcato}	𝆛	\lilyGlyph{scripts.thumb}
𝆭	\lilyGlyph{scripts.downbow}	𝆜	\lilyGlyph{scripts.tickmark}
𝆖	\lilyGlyph{scripts.downmordent}	𝆮	\lilyGlyph{scripts.trilelement}
𝆗	\lilyGlyph{scripts.downprall}	𝆮𝆺	\lilyGlyph{scripts.trill}
∩	\lilyGlyph{scripts.dpedalheel}	~	\lilyGlyph{scripts.trill_element}
∧	\lilyGlyph{scripts.dpedaltoe}	𝆙	\lilyGlyph{scripts.turn}
𝆮	\lilyGlyph{scripts.dportato}	𝅭	\lilyGlyph{scripts.uaccentus}
𝅭	\lilyGlyph{scripts.dsemicirculus}	𝄐	\lilyGlyph{scripts.ufermata}
𝆯	\lilyGlyph{scripts.dshortfermata}	𝄑	\lilyGlyph{scripts.ulongfermata}
𝆋	\lilyGlyph{scripts.dsignumcongruentiae}	𝆬	\lilyGlyph{scripts.umarcato}
𝆸	\lilyGlyph{scripts.dstaccatissimo}	𝆭	\lilyGlyph{scripts.upbow}
𝄒	\lilyGlyph{scripts.dverylongfermata}	∪	\lilyGlyph{scripts.upedalheel}
<>	\lilyGlyph{scripts.espr}	∨	\lilyGlyph{scripts.upedaltoe}
○	\lilyGlyph{scripts.flageolet}	𝆖	\lilyGlyph{scripts.upmordent}
ø	\lilyGlyph{scripts.halfopen}	𝆮	\lilyGlyph{scripts.uportato}
ɸ	\lilyGlyph{scripts.halfopenvertical}	𝆗	\lilyGlyph{scripts.upprall}
𝅭	\lilyGlyph{scripts.ictus}	𝅭	\lilyGlyph{scripts.usemicirculus}
ʻ	\lilyGlyph{scripts.lcomma}	𝆯	\lilyGlyph{scripts.ushortfermata}

(continued on next page)

(continued from previous page)

	\lilyGlyph{scripts.lineprall}
	\lilyGlyph{scripts.lvarcomma}
	\lilyGlyph{scripts.mordent}
	\lilyGlyph{scripts.open}
	\lilyGlyph{scripts.prall}
	\lilyGlyph{scripts.pralldown}
	\lilyGlyph{scripts.usignumcongruentiae}
	\lilyGlyph{scripts.ustaccatissimo}
	\lilyGlyph{scripts.uverylongfermata}
	\lilyGlyph{scripts.varcoda}
	\lilyGlyph{scripts.varsegno}

lily𝄞ly***pbs*** defines `\fermata` as a shorter name for "𝄐" than `\lilyGlyph{scripts.ufermata}`. See Table 427.

TABLE 431: *lily*𝄞ly***pbs*** Named Rests

	\lilyGlyph{rests.0}
	\lilyGlyph{rests.0mensural}
	\lilyGlyph{rests.0neomensural}
	\lilyGlyph{rests.0o}
	\lilyGlyph{rests.1}
	\lilyGlyph{rests.1mensural}
	\lilyGlyph{rests.1neomensural}
	\lilyGlyph{rests.1o}
	\lilyGlyph{rests.2}
	\lilyGlyph{rests.2classical}
	\lilyGlyph{rests.2mensural}
	\lilyGlyph{rests.2neomensural}
	\lilyGlyph{rests.3}
	\lilyGlyph{rests.3mensural}
	\lilyGlyph{rests.3neomensural}
	\lilyGlyph{rests.4}
	\lilyGlyph{rests.4mensural}
	\lilyGlyph{rests.4neomensural}
	\lilyGlyph{rests.5}
	\lilyGlyph{rests.6}
	\lilyGlyph{rests.7}
	\lilyGlyph{rests.M1}
	\lilyGlyph{rests.M1mensural}
	\lilyGlyph{rests.M1neomensural}
	\lilyGlyph{rests.M1o}
	\lilyGlyph{rests.M2}
	\lilyGlyph{rests.M2mensural}
	\lilyGlyph{rests.M2neomensural}
	\lilyGlyph{rests.M3}
	\lilyGlyph{rests.M3mensural}
	\lilyGlyph{rests.M3neomensural}

lily𝄞ly***pbs*** defines shorter names for a few of these symbols. See Table 423.

TABLE 432: *lily*𝄞ly***pbs*** Named Pedals

	\lilyGlyph{pedal.*}
	\lilyGlyph{pedal..}
	\lilyGlyph{pedal.d}
	\lilyGlyph{pedal.e}
	\lilyGlyph{pedal.M}
	\lilyGlyph{pedal.P}
	\lilyGlyph{pedal.Ped}

TABLE 433: *lily*glyphs Named Flags

	\lilyGlyph{flags.d3}		\lilyGlyph{flags.mensuralu03}
	\lilyGlyph{flags.d4}		\lilyGlyph{flags.mensuralu04}
	\lilyGlyph{flags.d5}		\lilyGlyph{flags.mensuralu05}
	\lilyGlyph{flags.d6}		\lilyGlyph{flags.mensuralu06}
	\lilyGlyph{flags.d7}		\lilyGlyph{flags.mensuralu13}
	\lilyGlyph{flags.dgrace}		\lilyGlyph{flags.mensuralu14}
	\lilyGlyph{flags.mensurald03}		\lilyGlyph{flags.mensuralu15}
	\lilyGlyph{flags.mensurald04}		\lilyGlyph{flags.mensuralu16}
	\lilyGlyph{flags.mensurald05}		\lilyGlyph{flags.mensuralu23}
	\lilyGlyph{flags.mensurald06}		\lilyGlyph{flags.mensuralu24}
	\lilyGlyph{flags.mensurald13}		\lilyGlyph{flags.mensuralu25}
	\lilyGlyph{flags.mensurald14}		\lilyGlyph{flags.mensuralu26}
	\lilyGlyph{flags.mensurald15}		\lilyGlyph{flags.u3}
	\lilyGlyph{flags.mensurald16}		\lilyGlyph{flags.u4}
	\lilyGlyph{flags.mensurald23}		\lilyGlyph{flags.u5}
	\lilyGlyph{flags.mensurald24}		\lilyGlyph{flags.u6}
	\lilyGlyph{flags.mensurald25}		\lilyGlyph{flags.u7}
	\lilyGlyph{flags.mensurald26}		\lilyGlyph{flags.ugrace}

TABLE 434: *lily*glyphs Named Custodes

	\lilyGlyph{custodes.hufnagel.d0}		\lilyGlyph{custodes.mensural.d0}
	\lilyGlyph{custodes.hufnagel.d1}		\lilyGlyph{custodes.mensural.d1}
	\lilyGlyph{custodes.hufnagel.d2}		\lilyGlyph{custodes.mensural.d2}
	\lilyGlyph{custodes.hufnagel.u0}		\lilyGlyph{custodes.mensural.u0}
	\lilyGlyph{custodes.hufnagel.u1}		\lilyGlyph{custodes.mensural.u1}
	\lilyGlyph{custodes.hufnagel.u2}		\lilyGlyph{custodes.mensural.u2}
	\lilyGlyph{custodes.medicaea.d0}		\lilyGlyph{custodes.vaticana.d0}
	\lilyGlyph{custodes.medicaea.d1}		\lilyGlyph{custodes.vaticana.d1}
	\lilyGlyph{custodes.medicaea.d2}		\lilyGlyph{custodes.vaticana.d2}
	\lilyGlyph{custodes.medicaea.u0}		\lilyGlyph{custodes.vaticana.u0}
	\lilyGlyph{custodes.medicaea.u1}		\lilyGlyph{custodes.vaticana.u1}
	\lilyGlyph{custodes.medicaea.u2}		\lilyGlyph{custodes.vaticana.u2}

Table 435: *lily*𝄞ly*pbs* Named Clefs

	\lilyGlyph{clefs.blackmensural.c}
	\lilyGlyph{clefs.blackmensural.c_change}
	\lilyGlyph{clefs.C}
	\lilyGlyph{clefs.C_change}
	\lilyGlyph{clefs.F}
	\lilyGlyph{clefs.F_change}
	\lilyGlyph{clefs.G}
	\lilyGlyph{clefs.G_change}
	\lilyGlyph{clefs.hufnagel.do}
	\lilyGlyph{clefs.hufnagel.do.fa}
	\lilyGlyph{clefs.hufnagel.do.fa_change}
	\lilyGlyph{clefs.hufnagel.do_change}
	\lilyGlyph{clefs.hufnagel.fa}
	\lilyGlyph{clefs.hufnagel.fa_change}
	\lilyGlyph{clefs.kievan.do}
	\lilyGlyph{clefs.kievan.do_change}
	\lilyGlyph{clefs.medicaea.do}
	\lilyGlyph{clefs.medicaea.do_change}
	\lilyGlyph{clefs.medicaea.fa}
	\lilyGlyph{clefs.medicaea.fa_change}
	\lilyGlyph{clefs.mensural.c}
	\lilyGlyph{clefs.mensural.c_change}
	\lilyGlyph{clefs.mensural.f}
	\lilyGlyph{clefs.mensural.f_change}
	\lilyGlyph{clefs.mensural.g}
	\lilyGlyph{clefs.mensural.g_change}
	\lilyGlyph{clefs.neomensural.c}
	\lilyGlyph{clefs.neomensural.c_change}
	\lilyGlyph{clefs.percussion}
	\lilyGlyph{clefs.percussion_change}
	\lilyGlyph{clefs.petrucci.c1}
	\lilyGlyph{clefs.petrucci.c1_change}
	\lilyGlyph{clefs.petrucci.c2}
	\lilyGlyph{clefs.petrucci.c2_change}
	\lilyGlyph{clefs.petrucci.c3}
	\lilyGlyph{clefs.petrucci.c3_change}
	\lilyGlyph{clefs.petrucci.c4}
	\lilyGlyph{clefs.petrucci.c4_change}
	\lilyGlyph{clefs.petrucci.c5}
	\lilyGlyph{clefs.petrucci.c5_change}
	\lilyGlyph{clefs.petrucci.f}
	\lilyGlyph{clefs.petrucci.f_change}
	\lilyGlyph{clefs.petrucci.g}
	\lilyGlyph{clefs.petrucci.g_change}
	\lilyGlyph{clefs.tab}
	\lilyGlyph{clefs.tab_change}
	\lilyGlyph{clefs.vaticana.do}
	\lilyGlyph{clefs.vaticana.do_change}
	\lilyGlyph{clefs.vaticana.fa}
	\lilyGlyph{clefs.vaticana.fa_change}

lily𝄞ly*pbs* defines shorter names for a few of these symbols. See Table 420.

TABLE 436: *lily*𝄞*lyp♭s* Named Noteheads

𝅜	\lilyGlyph{noteheads.d0doFunk}
𝅜	\lilyGlyph{noteheads.d0fa}
𝅜	\lilyGlyph{noteheads.d0faFunk}
𝅜	\lilyGlyph{noteheads.d0faThin}
𝅜	\lilyGlyph{noteheads.d0miFunk}
𝅜	\lilyGlyph{noteheads.d0reFunk}
𝅜	\lilyGlyph{noteheads.d0tiFunk}
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𝅜	\lilyGlyph{noteheads.d2re}
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𝅜	\lilyGlyph{noteheads.d2reWalker}
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\lilyGlyph{noteheads.s0blackpetrucci}


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\lilyGlyph{noteheads.s0doThin}

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\lilyGlyph{noteheads.s0faWalker}

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\lilyGlyph{noteheads.s0laThin}

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\lilyGlyph{noteheads.s0petrucci}

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\lilyGlyph{noteheads.s0reThin}

\lilyGlyph{noteheads.s0reWalker}

\lilyGlyph{noteheads.s0slash}

\lilyGlyph{noteheads.s0sol}


\lilyGlyph{noteheads.s0solFunk}

\lilyGlyph{noteheads.s0ti}

\lilyGlyph{noteheads.s0tiThin}

\lilyGlyph{noteheads.s0tiWalker}

\lilyGlyph{noteheads.s0triangle}

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\lilyGlyph{noteheads.s1blackpetrucci}

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\lilyGlyph{noteheads.s1diamond}

\lilyGlyph{noteheads.s1kievan}

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\lilyGlyph{noteheads.s1laFunk}

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\lilyGlyph{noteheads.s1miWalker}

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\lilyGlyph{noteheads.s1solFunk}

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\lilyGlyph{noteheads.s2blackpetrucci}

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\lilyGlyph{noteheads.s2miFunk}

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\lilyGlyph{noteheads.s2petrucci}

\lilyGlyph{noteheads.s2slash}

\lilyGlyph{noteheads.s2sol}

\lilyGlyph{noteheads.s2solFunk}


\lilyGlyph{noteheads.s2xcircle}


\lilyGlyph{noteheads.shufnagel.lpes}

\lilyGlyph{noteheads.shufnagel.punctum}

\lilyGlyph{noteheads.shufnagel.virga}

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\lilyGlyph{noteheads.sM1double}

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\lilyGlyph{noteheads.sM1mensural}

\lilyGlyph{noteheads.sM1neomensural}


\lilyGlyph{noteheads.sM1semimensural}


\lilyGlyph{noteheads.sM2blackligmensural}


\lilyGlyph{noteheads.sM2kievan}


\lilyGlyph{noteheads.sM2ligmensural}


\lilyGlyph{noteheads.sM2semiligmensural}

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\lilyGlyph{noteheads.sM3semiligmensural}


\lilyGlyph{noteheads.smedicaea.inclinatum}


\lilyGlyph{noteheads.smedicaea.punctum}

\lilyGlyph{noteheads.smedicaea.rvirga}


\lilyGlyph{noteheads.smedicaea.virga}


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\lilyGlyph{noteheads.srM1neomensural}

\lilyGlyph{noteheads.srM1semimensural}

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\lilyGlyph{noteheads.srM2semiligmensural}

\lilyGlyph{noteheads.srM3ligmensural}

\lilyGlyph{noteheads.srM3semiligmensural}

\lilyGlyph{noteheads.ssolesmes.auct.asc}

\lilyGlyph{noteheads.ssolesmes.auct.desc}

\lilyGlyph{noteheads.ssolesmes.incl.auctum}

\lilyGlyph{noteheads.ssolesmes.incl.parvum}

\lilyGlyph{noteheads.ssolesmes.oriscus}

\lilyGlyph{noteheads.ssolesmes.stropha}

\lilyGlyph{noteheads.ssolesmes.stropha.aucta}

\lilyGlyph{noteheads.svaticana.cephalicus}

\lilyGlyph{noteheads.svaticana.epiphonus}

\lilyGlyph{noteheads.svaticana.inclinatum}

\lilyGlyph{noteheads.svaticana.inner.cephalicus}

\lilyGlyph{noteheads.svaticana.linea.punctum}

\lilyGlyph{noteheads.svaticana.linea.punctum.cavum}

\lilyGlyph{noteheads.svaticana.lpes}

\lilyGlyph{noteheads.svaticana.plica}

\lilyGlyph{noteheads.svaticana.punctum}

\lilyGlyph{noteheads.svaticana.punctum.cavum}

\lilyGlyph{noteheads.svaticana.quilisma}

\lilyGlyph{noteheads.svaticana.reverse.plica}

\lilyGlyph{noteheads.svaticana.reverse.vplica}

\lilyGlyph{noteheads.svaticana.upes}

\lilyGlyph{noteheads.svaticana.vepiphonus}

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\lilyGlyph{noteheads.svaticana.vplica}

\lilyGlyph{noteheads.svaticana.vupes}

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\lilyGlyph{noteheads.u0faFunk}

\lilyGlyph{noteheads.u0faThin}

\lilyGlyph{noteheads.u0miFunk}

\lilyGlyph{noteheads.u0reFunk}

\lilyGlyph{noteheads.u0tiFunk}

\lilyGlyph{noteheads.u1do}

\lilyGlyph{noteheads.u1doFunk}

\lilyGlyph{noteheads.u1doThin}

\lilyGlyph{noteheads.u1doWalker}

\lilyGlyph{noteheads.u1fa}

\lilyGlyph{noteheads.u1faFunk}

\lilyGlyph{noteheads.u1faThin}

\lilyGlyph{noteheads.u1faWalker}

\lilyGlyph{noteheads.u1miFunk}

\lilyGlyph{noteheads.u1re}

\lilyGlyph{noteheads.u1reFunk}

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\lilyGlyph{noteheads.u1reWalker}

\lilyGlyph{noteheads.u1ti}

\lilyGlyph{noteheads.u1tiFunk}

\lilyGlyph{noteheads.u1tiThin}

\lilyGlyph{noteheads.u1tiWalker}

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	\lilyGlyph{noteheads.u1triangle}
	\lilyGlyph{noteheads.u2do}
	\lilyGlyph{noteheads.u2doFunk}
	\lilyGlyph{noteheads.u2doThin}
	\lilyGlyph{noteheads.u2doWalker}
	\lilyGlyph{noteheads.u2fa}
	\lilyGlyph{noteheads.u2faFunk}
	\lilyGlyph{noteheads.u2faThin}
	\lilyGlyph{noteheads.u2faWalker}
	\lilyGlyph{noteheads.u2kievan}
	\lilyGlyph{noteheads.u2re}
	\lilyGlyph{noteheads.u2reFunk}
	\lilyGlyph{noteheads.u2reThin}
	\lilyGlyph{noteheads.u2reWalker}
	\lilyGlyph{noteheads.u2ti}
	\lilyGlyph{noteheads.u2tiFunk}
	\lilyGlyph{noteheads.u2tiThin}
	\lilyGlyph{noteheads.u2tiWalker}
	\lilyGlyph{noteheads.u2triangle}
	\lilyGlyph{noteheads.u3kievan}
	\lilyGlyph{noteheads.uM2}
	\lilyGlyph{noteheads.uM2blackmensural}
	\lilyGlyph{noteheads.uM2mensural}
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	\lilyGlyph{noteheads.uM2semimensural}
	\lilyGlyph{noteheads.uM3blackmensural}
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	\lilyGlyph{noteheads.uM3neomensural}
	\lilyGlyph{noteheads.uM3semimensural}
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	\lilyGlyph{noteheads.urM2semimensural}
	\lilyGlyph{noteheads.urM3mensural}
	\lilyGlyph{noteheads.urM3neomensural}
	\lilyGlyph{noteheads.urM3semimensural}

TABLE 437: *lily*𝄞ly***pbs*** Named Accordion Symbols

	\lilyGlyph{accordion.bayanbass}		\lilyGlyph{accordion.oldEE}
	\lilyGlyph{accordion.discant}		\lilyGlyph{accordion.pull}
.	\lilyGlyph{accordion.dot}	›	\lilyGlyph{accordion.push}
	\lilyGlyph{accordion.freebass}		\lilyGlyph{accordion.stdbass}

lily𝄞ly***pbs*** defines shorter names for all of these symbols except `\lilyGlyph{accordion.dot}`. See Table 428.

TABLE 438: *lily*𝄞ly***pbs*** Named Accidentals

𝄪	\lilyGlyph{accidentals.doublesharp}
𝄫	\lilyGlyph{accidentals.flat}
𝄭	\lilyGlyph{accidentals.flat.arrowboth}
𝄬	\lilyGlyph{accidentals.flat.arrowdown}
𝄮	\lilyGlyph{accidentals.flat.arrowup}
𝄬	\lilyGlyph{accidentals.flat.slash}
𝄬	\lilyGlyph{accidentals.flat.slashslash}
𝄫	\lilyGlyph{accidentals.flatflat}
𝄫	\lilyGlyph{accidentals.flatflat.slash}
𝄬	\lilyGlyph{accidentals.hufnagelM1}
𝄪	\lilyGlyph{accidentals.kievan1}
𝄬	\lilyGlyph{accidentals.kievanM1}
(	\lilyGlyph{accidentals.leftparen}
𝄬	\lilyGlyph{accidentals.medicaeaM1}
𝄪	\lilyGlyph{accidentals.mensural1}
𝄬	\lilyGlyph{accidentals.mensuralM1}
𝄬	\lilyGlyph{accidentals.mirroredflat}
𝄬	\lilyGlyph{accidentals.mirroredflat.backslash}
𝄬	\lilyGlyph{accidentals.mirroredflat.flat}
𝄮	\lilyGlyph{accidentals.natural}
𝄮	\lilyGlyph{accidentals.natural.arrowboth}
𝄮	\lilyGlyph{accidentals.natural.arrowdown}
𝄮	\lilyGlyph{accidentals.natural.arrowup}
)	\lilyGlyph{accidentals.rightparen}
♯	\lilyGlyph{accidentals.sharp}
𝄯	\lilyGlyph{accidentals.sharp.arrowboth}
𝄯	\lilyGlyph{accidentals.sharp.arrowdown}
𝄯	\lilyGlyph{accidentals.sharp.arrowup}
𝄯	\lilyGlyph{accidentals.sharp.slashslash.stem}
𝄯	\lilyGlyph{accidentals.sharp.slashslash.stemstemstem}
𝄯	\lilyGlyph{accidentals.sharp.slashslashslash.stem}
𝄯	\lilyGlyph{accidentals.sharp.slashslashslash.stemstem}
𝄪	\lilyGlyph{accidentals.vaticana0}
𝄬	\lilyGlyph{accidentals.vaticanaM1}

lily𝄞ly***pbs*** defines shorter names for a few of these symbols. See Table 422.

TABLE 439: *lily*𝄞ly***pbs*** Named Arrowheads

▸	\lilyGlyph{arrowheads.close.01}	▹	\lilyGlyph{arrowheads.open.01}
◂	\lilyGlyph{arrowheads.close.0M1}	◃	\lilyGlyph{arrowheads.open.0M1}
▴	\lilyGlyph{arrowheads.close.11}	▵	\lilyGlyph{arrowheads.open.11}
▾	\lilyGlyph{arrowheads.close.1M1}	▿	\lilyGlyph{arrowheads.open.1M1}

Table 440: *lily*𝄞ly**pbs** Named Alphanumerics and Punctuation

0	`\lilyGlyph{zero}`	**4**	`\lilyGlyph{four}`	**8**	`\lilyGlyph{eight}`
1	`\lilyGlyph{one}`	**5**	`\lilyGlyph{five}`	**9**	`\lilyGlyph{nine}`
2	`\lilyGlyph{two}`	**6**	`\lilyGlyph{six}`		
3	`\lilyGlyph{three}`	**7**	`\lilyGlyph{seven}`		
f	`\lilyGlyph{f}`	***p***	`\lilyGlyph{p}`	*s*	`\lilyGlyph{s}`
m	`\lilyGlyph{m}`	*r*	`\lilyGlyph{r}`	*z*	`\lilyGlyph{z}`
,	`\lilyGlyph{comma}`	.	`\lilyGlyph{period}`		
-	`\lilyGlyph{hyphen}`	+	`\lilyGlyph{plus}`		

See Table 424 for an alternative way to typeset dynamics letters. *lily*𝄞ly**pbs** additionally provides a `\lilyText` command that can be useful for typesetting groups of the preceding symbols. See the *lily*𝄞ly**pbs** documentation for more information.

Table 441: Miscellaneous *lily*𝄞ly**pbs** Named Musical Symbols

◝	`\lilyGlyph{brackettips.down}`	.	`\lilyGlyph{dots.dotvaticana}`
◜	`\lilyGlyph{brackettips.up}`	‿	`\lilyGlyph{ties.lyric.default}`
.	`\lilyGlyph{dots.dot}`	‿	`\lilyGlyph{ties.lyric.short}`
⬩	`\lilyGlyph{dots.dotkievan}`		

8 Other symbols

The following are all the symbols that didn't fit neatly or unambiguously into any of the previous sections. (Do weather symbols belong under "Science and technology"? Should dice be considered "mathematics"?) While some of the tables contain clearly related groups of symbols (e.g., symbols related to various board games), others represent motley assortments of whatever the font designer felt like drawing.

Table 442: textcomp Genealogical Symbols

⋆	\textborn	⚯	\textdivorced	⚭	\textmarried
†	\textdied		\textleaf		

Table 443: wasysym General Symbols

	\ataribox	◷	\clock	◀	\LEFTarrow	▶	\RIGHTarrow
	\bell	⌀	\diameter	↺	\leftturn	↻	\rightturn
☻	\blacksmiley	▼	\DOWNarrow	↯	\lightning	☺	\smiley
⋈	\Bowtie	☹	\frownie	☎	\phone	☼	\sun
¦	\brokenvert	⦸	\invdiameter	➪	\pointer	▲	\UParrow
✓	\checked	✠	\kreuz	⌕	\recorder	⌑	\wasylozenge

Table 444: manfnt Dangerous Bend Symbols

\dbend \lhdbend \reversedvideodbend

Note that these symbols descend far beneath the baseline. manfnt also defines non-descending versions, which it calls, correspondingly, \textdbend, \textlhdbend, and \textreversedvideodbend.

Table 445: Miscellaneous manfnt Symbols

	\manboldkidney		\manpenkidney
	\manconcentriccircles		\manquadrifolium
	\manconcentricdiamond		\manquartercircle
	\mancone		\manrotatedquadrifolium
	\mancube		\manrotatedquartercircle
	\manerrarrow		\manstar
	\manfilledquartercircle		\mantiltpennib
	\manhpennib	▼	\mantriangledown
	\manimpossiblecube	▸	\mantriangleright
	\mankidney	▲	\mantriangleup
	\manlhpenkidney		\manvpennib

Table 446: marvosym Media Control Symbols

▶	\Forward	▼	\MoveDown	⏮	\RewindToIndex	⤒	\ToTop
⏭	\ForwardToEnd	▲	\MoveUp	⏮	\RewindToStart		
⏭	\ForwardToIndex	◀	\Rewind	⤓	\ToBottom		

TABLE 447: marvosym Laundry Symbols

	\AtForty		\Handwash		\ShortNinetyFive
	\AtNinetyFive		\IroningI		\ShortSixty
	\AtSixty		\IroningII		\ShortThirty
	\Bleech		\IroningIII		\SpecialForty
	\CleaningA		\NoBleech		\Tumbler
	\CleaningF		\NoChemicalCleaning		\WashCotton
	\CleaningFF		\NoIroning		\WashSynthetics
	\CleaningP		\NoTumbler		\WashWool
	\CleaningPP		\ShortFifty		
	\Dontwash		\ShortForty		

TABLE 448: marvosym Information Symbols

	\Bicycle		\Gentsroom		\PointingHand
	\ClockLogo		\Industry		\Wheelchair
	\Coffeecup		\Info		\WritingHand
	\Football		\Ladiesroom		

TABLE 449: Other marvosym Symbols

†	\Ankh		\Bouquet	♡	\Heart		\PeaceDove
	\Bat		\Celtcross		\ManFace	☺	\Smiley
BO	\BOLogo		\CircledA		\MineSign		\WomanFace
Hochschule Bochum Bochum University of Applied Sciences BO	\BOLogoL	†	\Cross		\Mundus		\Yinyang
BO	\BOLogoP	☹	\Frowny	@	\MVAt		

TABLE 450: Miscellaneous universa Symbols

\bauforms \bauhead

TABLE 451: Miscellaneous fourier Symbols

	\bomb	☹	\grimace		\textthing*		\textxswup*
⚠	\danger	⛔	\noway		\textxswdown*		

* fourier defines math-mode synonyms for a few of the preceding symbols: \thething ("𝕋"), \xswordsup ("⚔"), and \xswordsdown ("⚔").

Table 452: ifsym Weather Symbols

	\Cloud		\Hail		\Sleet		\WeakRain
	\FilledCloud		\HalfSun		\Snow		\WeakRainCloud
	\FilledRainCloud		\Lightning		\SnowCloud		\FilledSnowCloud
	\FilledSunCloud		\NoSun		\Sun		
	\FilledWeakRainCloud		\Rain		\SunCloud		
	\Fog		\RainCloud		\ThinFog		

In addition, \Thermo{0}…\Thermo{6} produce thermometers that are between 0/6 and 6/6 full of mercury:

Similarly, \wind{⟨*sun*⟩}{⟨*angle*⟩}{⟨*strength*⟩} will draw wind symbols with a given amount of sun (0–4), a given angle (in degrees), and a given strength in km/h (0–100). For example, \wind{0}{0}{0} produces "", \wind{2}{0}{0} produces "", and \wind{4}{0}{100} produces "".

Table 453: ifsym Alpine Symbols

	\SummitSign		\Summit		\SurveySign		\HalfFilledHut
	\StoneMan		\Mountain		\Joch		\VarSummit
	\Hut		\IceMountain		\Flag		
	\FilledHut		\VarMountain		\VarFlag		
	\Village		\VarIceMountain		\Tent		

Table 454: ifsym Clocks

	\Interval		\StopWatchStart		\VarClock		\Wecker
	\StopWatchEnd		\Taschenuhr		\VarTaschenuhr		

ifsym also exports a \showclock macro. \showclock{⟨*hours*⟩}{⟨*minutes*⟩} outputs a clock displaying the corresponding time. For instance, "\showclock{5}{40}" produces "". ⟨*hours*⟩ must be an integer from 0 to 11, and ⟨*minutes*⟩ must be an integer multiple of 5 from 0 to 55.

Table 455: Other ifsym Symbols

	\FilledSectioningDiamond		\Letter		\Radiation
	\Fire		\PaperLandscape		\SectioningDiamond
	\Irritant		\PaperPortrait		\Telephone
	\Cube{1}		\Cube{3}		\Cube{5}
	\Cube{2}		\Cube{4}		\Cube{6}
	\StrokeOne		\StrokeThree		\StrokeFive
	\StrokeTwo		\StrokeFour		

Table 456: clock Clocks

\ClockStyle	\ClockFramefalse	\ClockFrametrue
0		
1		
2		
3		

The clock package provides a `\clock` command to typeset an arbitrary time on an analog clock (and `\clocktime` to typeset the document's build time). For example, the clocks in the above table were produced with `\clock{15}{41}`. Clock symbols are composed from a font of clock-face fragments using one of four values for `\ClockStyle` and either `\ClockFrametrue` or `\ClockFrametrue` as illustrated above. See the clock documentation for more information.

Table 457: epsdice Dice

	`\epsdice{1}`		`\epsdice{3}`		`\epsdice{5}`
	`\epsdice{2}`		`\epsdice{4}`		`\epsdice{6}`

Table 458: hhcount Dice

	`\fcdice{1}`		`\fcdice{3}`		`\fcdice{5}`
	`\fcdice{2}`		`\fcdice{4}`		`\fcdice{6}`

The `\fcdice` command accepts values larger than 6. For example, "`\fcdice{47}`" produces "  ".

Table 459: stix Dice

	`\dicei`		`\diceiii`		`\dicev`
	`\diceii`		`\diceiv`		`\dicevi`

Table 460: bullcntr Tally Markers

•	\bullcntr{⟨1⟩}	⁘	\bullcntr{⟨4⟩}	⁙	\bullcntr{⟨7⟩}
••	\bullcntr{⟨2⟩}	⁙	\bullcntr{⟨5⟩}	⁙	\bullcntr{⟨8⟩}
∴	\bullcntr{⟨3⟩}	⁘	\bullcntr{⟨6⟩}	⁙	\bullcntr{⟨9⟩}

The notation for \bullcntr used in the above bears explanation. \bullcntr does not take a number as its argument but rather a LaTeX counter, whose value it uses to typeset a tally marker. "\bullcntr{⟨3⟩}", for example, means to invoke \bullcntr with a counter whose value is 3. (\bullcntr usage is therefore akin to that of LaTeX's \fnsymbol.) The intention is to use \bullcntr indirectly via the bullenum package's bullenum environment, which is a variation on the enumerate environment that uses \bullcntr to typeset the labels.

To typeset individual tally markers, one can define a helper command:

```
\newcounter{bull}
\newcommand{\showbullcntr}[1]{%
  \setcounter{bull}{#1}%
  \bullcntr{bull}%
}
```

bullcntr's package options smallctrbull, largectrbull, and heartctrbull and corresponding commands \smallctrbull, \largectrbull, and \heartctrbull control the formatting of each tally marker:

	small	large	heart
\bullcntr{⟨5⟩}	⁙	⁙	♡◇♡◇♡

The default is smartctrbull (\smartctrbull), which maps counter values 1–5 to large pips and 6–9 to small pips. It is also possible to use arbitrary symbols for \bullcntr's pips. See the bullcntr documentation for more information.

Table 461: hhcount Tally Markers

𝍸	\fcscore{1}	𝍸𝍸	\fcscore{3}	𝍸𝍸𝍸	\fcscore{5}
𝍸𝍸	\fcscore{2}	𝍸𝍸𝍸𝍸	\fcscore{4}		

The \fcscore command accepts values larger than 5. For example, "\fcscore{47}" produces "𝍸𝍸𝍸𝍸𝍸𝍸𝍸𝍸𝍸𝍸𝍸𝍸𝍸𝍸𝍸".

Table 462: dozenal Tally Markers

𝈡	\tally{1}	𝈣	\tally{3}	𝈤	\tally{5}
𝈢	\tally{2}	𝈥	\tally{4}	𝈦	\tally{6}

Table 463: skull Symbols

☠	\skull

Table 464: Non-Mathematical mathabx Symbols

⸸	\rip

Table 465: skak Chess Informator Symbols

∓	\bbetter	♙	\doublepawns	○‥○	\seppawns
−+	\bdecisive	⊥	\ending	O-O	\shortcastling
⌓	\betteris	=	\equal	⊕	\timelimit
⧉	\bishoppair	⇔	\file	∞	\unclear
∓	\bupperhand	»	\kside	○○	\unitedpawns
×	\capturesymbol	O-O-O	\longcastling	R	\various
O	\castlingchar	✕	\markera	±	\wbetter
-	\castlinghyphen	O	\markerb	+−	\wdecisive
⊞	\centre	#	\mate	╳	\weakpt
+	\checksymbol	>	\morepawns	∟	\with
RR	\chesscomment	○	\moreroom	→	\withattack
‖	\chessetc	N	\novelty	△	\withidea
—	\chesssee	□	\onlymove	↑	\withinit
∞	\compensation	⧉	\opposbishops	⌋	\without
⇆	\counterplay	♙	\passedpawn	±	\wupperhand
↻	\devadvantage	«	\qside	⊙	\zugzwang
⇗	\diagonal	▞	\samebishops		

Table 466: skak Chess Pieces and Chessboard Squares

	\BlackBishopOnBlack		\BlackRookOnBlack		\WhiteKingOnBlack
	\BlackBishopOnWhite		\BlackRookOnWhite		\WhiteKingOnWhite
	\BlackEmptySquare		\symbishop		\WhiteKnightOnBlack
	\BlackKingOnBlack		\symking		\WhiteKnightOnWhite
	\BlackKingOnWhite		\symknight		\WhitePawnOnBlack
	\BlackKnightOnBlack		\sympawn		\WhitePawnOnWhite
	\BlackKnightOnWhite		\symqueen		\WhiteQueenOnBlack
	\BlackPawnOnBlack		\symrook		\WhiteQueenOnWhite
	\BlackPawnOnWhite		\WhiteBishopOnBlack		\WhiteRookOnBlack
	\BlackQueenOnBlack		\WhiteBishopOnWhite		\WhiteRookOnWhite
	\BlackQueenOnWhite		\WhiteEmptySquare		

The skak package also provides commands for drawing complete chessboards. See the skak documentation for more information.

Table 467: igo Go Symbols

◉	\blackstone[\igocircle]	◎	\whitestone[\igocircle]
⊗	\blackstone[\igocross]	⊗	\whitestone[\igocross]
●	\blackstone[\igonone]	○	\whitestone[\igonone]
▣	\blackstone[\igosquare]	▣	\whitestone[\igosquare]
▲	\blackstone[\igotriangle]	△	\whitestone[\igotriangle]

In addition to the symbols shown above, igo's \blackstone and \whitestone commands accept numbers from 1 to 99 and display them circled as ❶, ❷, ❸, . . . , ⓽⓽ and ①, ②, ③, . . . , ⑨⑨, respectively.

The igo package is intended to typeset complete Go boards (goban). See the igo documentation for more information.

Table 468: go Go Symbols

┴	`\botborder`	└	`\lftbotcorner`	┐	`\rttopcorner`
┼	`\empty`	┌	`\lfttopcorner`	▢	`\square`
┼	`\hoshi`	┤	`\rtborder`	┬	`\topborder`
├	`\lftborder`	┘	`\rtbotcorner`	△	`\triangle`

In addition to the board fragments and stones shown above, go's `\black` and `\white` commands accept numbers from 1 to 253 and display them circled as ❶, ❷, ❸, ..., (253) and ①, ②, ③, ..., (253), respectively. `\black` and `\white` additionally accept `\square` and `\triangle` as arguments, producing ■ and and ▲ for `\black` and ▢ and and △ for `\white`.

The go package is intended to typeset complete Go boards (goban). See the go documentation for more information.

Table 469: metre Metrical Symbols

×	`\a`		`\bBm`	‖	`\cc`		`\Mbb`	⋮	`\Pppp`	⊗	`\t`
	`\B`		`\bbm`	⦀	`\Ccc`		`\mbbx`	⋮	`\pppp`		`\tsbm`
⏑	`\b`		`\Bbm`	–	`\m`	∘∘	`\oo`	⋮	`\Ppppp`		`\tsmb`
	`\Bb`		`\bbmb`		`\M`	.	`\p`	⋮	`\ppppp`	⌴	`\tsmm`
	`\BB`		`\bbmx`		`\ma`		`\pm`	⌴⌴	`\ps`		`\vppm`
⏑⏑	`\bb`		`\bm`		`\Mb`	:	`\pp`	:	`\pxp`		`\vpppm`
	`\bB`		`\Bm`		`\mb`	:	`\Pp`	:	`\Pxp`	::	`\x`
	`\bba`	|	`\c`		`\mBb`		`\ppm`	∼	`\R`		
	`\bbb`	|	`\C`		`\mbB`	⋮	`\ppp`	∼	`\r`		
	`\BBm`	‖	`\Cc`		`\mbb`	⋮	`\Ppp`	⊗	`\T`		

The preceding symbols are valid only within the argument to the `metre` command.

Table 470: metre Small and Large Metrical Symbols

÷	`\anaclasis`	÷	`\Anaclasis`
<	`\antidiple`	<	`\Antidiple`
⋖	`\antidiple*`	⋖	`\Antidiple*`
⊃	`\antisigma`	⊃	`\Antisigma`
※	`\asteriscus`	※	`\Asteriscus`
∧	`\catalexis`	∧	`\Catalexis`
>	`\diple`	>	`\Diple`
⋗	`\diple*`	⋗	`\Diple*`
—	`\obelus`	—	`\Obelus`
÷	`\obelus*`	÷	`\Obelus*`
∼	`\respondens`	∼	`\Respondens`
⊗	`\terminus`	⊗	`\Terminus`
⊕	`\terminus*`	⊕	`\Terminus*`

Table 471: teubner Metrical Symbols

∞	\aeolicbii	⏑	\barbrevis	⁺	\ipercatal
∞∞	\aeolicbiii	⏑⏑	\bbrevis	‗	\longa
∞∞∞	\aeolicbiv	⏑	\brevis	⏑⏑	\ubarbbrevis
×	\anceps	^	\catal	⏑	\ubarbrevis
×̆	\ancepsdbrevis	⌒	\corona	⏑⏑	\ubarsbrevis
×̄	\banceps	⏑	\coronainv	⏑	\ubrevislonga
⏒	\barbbrevis	H	\hiatus		

The teubner package provides a \newmetrics command that helps users combine the preceding symbols as well as other teubner symbols. For example, the predefined \pentam symbol uses \newmetrics to juxtapose six \longas, two \barbbrevises, four \brevises, and a \dBar into "‗⏒‗⏒‗||‗⏑⏑‗⏑⏑‗". See the teubner documentation for more information.

Table 472: dictsym Dictionary Symbols

	\dsaeronautical		\dscommercial		\dsmedical
	\dsagricultural		\dsheraldical		\dsmilitary
	\dsarchitectural		\dsjuridical		\dsrailways
	\dsbiological		\dsliterary		\dstechnical
	\dschemical		\dsmathematical		

Table 473: simpsons Characters from *The Simpsons*


\Bart


\Homer


\Maggie


\SNPP


\Burns


\Lisa


\Marge

The location of the characters' pupils can be controlled with the \Goofy command. See *A METAFONT of 'Simpsons' characters* [Che97] for more information. Also, each of the above can be prefixed with \Left to make the character face left instead of right:


\Left\Bart

TABLE 474: pmboxdraw Box-Drawing Symbols

	\textblock	╒	\textSFli	╤	\textSFxli	╣	\textSFxxiii
	\textdkshade	╓	\textSFlii	╠	\textSFxlii	║	\textSFxxiv
	\textdnblock	╫	\textSFliii	═	\textSFxliii	╗	\textSFxxv
	\textlfblock	╪	\textSFliv	╬	\textSFxliv	╝	\textSFxxvi
	\textltshade	┼	\textSFv	╚	\textSFxlix	╜	\textSFxxvii
	\textrtblock	╥	\textSFvi	╧	\textSFxlv	╛	\textSFxxviii
┌	\textSFi	╨	\textSFvii	╩	\textSFxlvi	╓	\textSFxxxix
└	\textSFii	├	\textSFviii	╥	\textSFxlvii	╞	\textSFxxxvi
┐	\textSFiii	─	\textSFx	╦	\textSFxlviii	╟	\textSFxxxvii
┘	\textSFiv	│	\textSFxi	╫	\textSFxx	╚	\textSFxxxviii
┤	\textSFix	╡	\textSFxix	╦	\textSFxxi		\textshade
╘	\textSFl	╩	\textSFxl	╕	\textSFxxii		\textupblock

Code Page 437 (CP437), which was first utilized by the original IBM PC, contains the set of box-drawing symbols (sides, corners, and intersections of single- and double-ruled boxes) shown above in character positions 176–223. These symbols also appear in the Unicode Box Drawing and Block Element tables.

The pmboxdraw package draws the CP437 box-drawing symbols using TEX rules (specifically, `\vrule`) instead of with a font and thereby provides the ability to alter both rule width and the separation between rules. See the pmboxdraw documentation for more information.

TABLE 475: staves Magical Staves

	\staveI		\staveXXIV		\staveXLVII
	\staveII		\staveXXV		\staveXLVIII
	\staveIII		\staveXXVI		\staveXLIX
	\staveIV		\staveXXVII		\staveL
	\staveV		\staveXXVIII		\staveLI
	\staveVI		\staveXXIX		\staveLII
	\staveVII		\staveXXX		\staveLIII
	\staveVIII		\staveXXXI		\staveLIV
	\staveIX		\staveXXXII		\staveLV
	\staveX		\staveXXXIII		\staveLVI
	\staveXI		\staveXXXIV		\staveLVII

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	\staveXII		\staveXXXV		\staveLVIII
	\staveXIII		\staveXXXVI		\staveLIX
	\staveXIV		\staveXXXVII		\staveLX
	\staveXV		\staveXXXVIII		\staveLXI
	\staveXVI		\staveXXXIX		\staveLXII
	\staveXVII		\staveXL		\staveLXIII
	\staveXVIII		\staveXLI		\staveLXIV
	\staveXIX		\staveXLII		\staveLXV
	\staveXX		\staveXLIII		\staveLXVI
	\staveXXI		\staveXLIV		\staveLXVII
	\staveXXII		\staveXLV		\staveLXVIII
	\staveXXIII		\staveXLVI		

The meanings of these symbols are described on the Web site for the Museum of Icelandic Sorcery and Witchcraft at `http://www.galdrasyning.is/index.php?option=com_content&task=category&sectionid=5&id=18&Itemid=60` (TinyURL: `http://tinyurl.com/25979m`). For example, `\staveL` (“”) is intended to ward off ghosts and evil spirits.

Table 476: pigpen Cipher Symbols

⌟	{\pigpenfont A}	⌟·	{\pigpenfont J}	∨	{\pigpenfont S}
⌞	{\pigpenfont B}	⌞·	{\pigpenfont K}	>	{\pigpenfont T}
⌜	{\pigpenfont C}	⌜·	{\pigpenfont L}	<	{\pigpenfont U}
⌝	{\pigpenfont D}	⌝·	{\pigpenfont M}	∧	{\pigpenfont V}
□	{\pigpenfont E}	□·	{\pigpenfont N}	∨	{\pigpenfont W}
⊏	{\pigpenfont F}	⊏·	{\pigpenfont O}	>	{\pigpenfont X}
⌝	{\pigpenfont G}	⌝·	{\pigpenfont P}	<	{\pigpenfont Y}
⊓	{\pigpenfont H}	⊓·	{\pigpenfont Q}	∧	{\pigpenfont Z}
⌜	{\pigpenfont I}	⌜·	{\pigpenfont R}		

Table 477: GitHub2e Phases of the Moon

●	\MoonPha{1}	◗	\MoonPha{2}	☺	\MoonPha{3}	☾	\MoonPha{4}

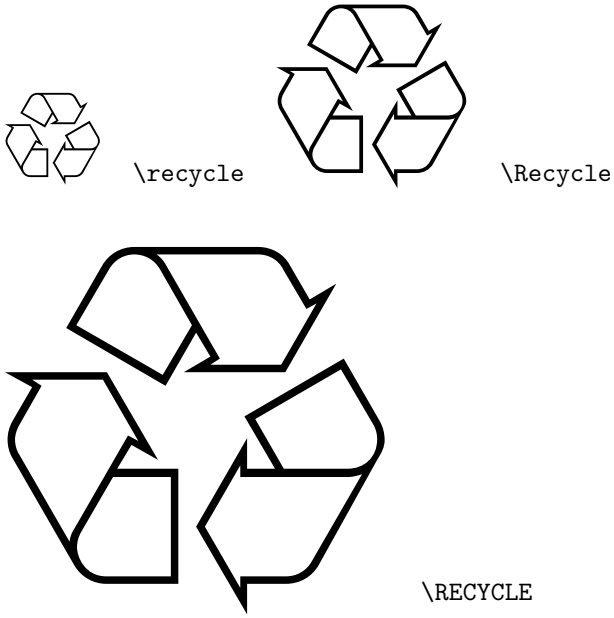
Table 478: GitHub2e Recycling Symbols

♻	\Greenpoint

TABLE 479: marvosym Recycling Symbols

\PackingWaste \Recycling

TABLE 480: recycle Recycling Symbols



The METAFONT code that implements the recycling symbols shown above is, in the words of its author, "awful code [that] doesn't even put the logo in a box (properly)". Expect to receive "`Inconsistent equation (off by` ⟨*number*⟩`)`" errors from METAFONT. Fortunately, if you tell METAFONT to proceed past those errors (e.g., by pressing Enter after each one or by specifying "`-interaction=nonstopmode`" on the METAFONT command line) it should produce a valid font.

The commands listed above should be used within a group (e.g., "`{\recycle}`") because they exhibit the side effect of *changing* the font to the recycle font.

TABLE 481: Other GiNA2e Symbols

\Info \Request
\Postbox \Telephone

TABLE 482: soyombo Soyombo Symbols

\Soyombo \sA* \sO*

* These symbols require that the Soyombo font be active ("`{\soyombo ... }`").

Table 483: knitting Knitting Symbols

	\textknit{!}		\textknit{[}		\textknit{Q}
	\textknit{"}		\textknit{]}		\textknit{q}
	\textknit{(}		\textknit{A}		\textknit{R}
	\textknit{)}		\textknit{a}		\textknit{r}
	\textknit{*}		\textknit{B}		\textknit{S}
	\textknit{-}		\textknit{b}		\textknit{s}
	\textknit{2}		\textknit{E}		\textknit{T}
	\textknit{3}		\textknit{F}		\textknit{t}
	\textknit{4}		\textknit{f}		\textknit{U}
	\textknit{5}		\textknit{H}		\textknit{u}
	\textknit{6}		\textknit{h}		\textknit{V}
	\textknit{7}		\textknit{I}		\textknit{v}
	\textknit{8}		\textknit{i}		\textknit{W}
	\textknit{9}		\textknit{J}		\textknit{w}
	\textknit{:}		\textknit{j}		\textknit{X}
	\textknit{;}		\textknit{L}		\textknit{x}
	\textknit{<}		\textknit{l}		\textknit{Y}
	\textknit{=}		\textknit{M}		\textknit{y}
	\textknit{>}		\textknit{m}		\textknit{Z}
	\textknit{@}		\textknit{O}		\textknit{z}

The knitting package is intended to typeset complete knitting charts. See the knitting documentation for more information.

Some symbols behave differently when used as part of a sequence. For example, contrast \textknit{1} (“ ”), \textknit{11} (“ ”), and \textknit{111} (“ ”). Similarly, contrast \textknit{"} (“ ”) and \textknit{""} (“ ”). Again, see the knitting documentation for more information.

Table 484: CountriesOfEurope Country Maps

	\Albania		\Latvia
	\Andorra		\Liechtenstein
	\Austria		\Lithuania
	\Belarus		\Luxembourg
	\Belgium		\Macedonia
	\Bosnia		\Malta

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\Bulgaria


\Croatia


\Czechia


\Denmark


\Estonia


\Finland


\France


\Germany


\GreatBritain


\Greece


\Moldova


\Montenegro


\Netherlands


\Norway


\Poland


\Portugal


\Romania


\Serbia


\Slovakia


\Slovenia

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The preceding commands work only when the CountriesOfEurope font family is active. For convenience, the package defines a `\CountriesOfEuropeFamily` command that switches to that font family.

By default, countries are drawn in the current font size. Hence, "`{\CountriesOfEuropeFamily\France}`" draws a nearly unrecognizable "⬟". For clarity of presentation, Table 484 scales each glyph to 72 pt. via an explicit `\fontsize{72}{72}`. An alternative is to specify the scaled package option to scale all country glyphs by a given factor of the font size.

TABLE 485: Miscellaneous arev Symbols

⚓	`\anchor`	☻	`\invsmileface`	☠	`\skull`	⚠	`\warning`
☣	`\biohazard`	☢	`\radiation`	☺	`\smileface`	☯	`\yinyang`
❝	`\heavyqtleft`	♻	`\recycle`	♨	`\steaming`		
❞	`\heavyqtright`	☹	`\sadface`	⚔	`\swords`		

TABLE 486: cookingsymbols Cooking Symbols

	`\Bottomheat`		`\Fork`		`\Knife`		`\Topbottomheat`
	`\Dish`		`\Gasstove`		`\Oven`		`\Topheat`
	`\Fanoven`		`\Gloves`		`\Spoon`		

TABLE 487: tikzsymbols Cooking Symbols

	\bakingplate		\eggbeater		\peeler		\trident
	\blender		\fryingpan		\pot		
	\bowl		\oven		\sieve		
	\cooker		\pan		\squeezer		

tikzsymbols defines German-language aliases for each of the above: \Backblech for \bakingplate, \Bratpfanne for \fryingpan, \Dreizack for \trident, \Herd for \cooker, \Kochtopf for \pot, \Ofen for \oven, \Pfanne for \pan, \Purierstab for \blender, \Saftpresse for \squeezer, \Schaler for \peeler, \Schneebesen for \eggbeater, \Schussel for \bowl, and \Sieb for \sieve.

All tikzsymbols symbols are implemented with Ti*k*Z graphics, not with a font.

TABLE 488: tikzsymbols Emoticons

	\Annoey		\Neutrey		\rWalley		\Vomey
	\Cat		\NiceReapey		\Sadey		\Walley
	\Cooley		\Ninja		\Sey		\Winkey
	\Innocey		\Nursey		\Smiley		\wInnocey
	\Laughey		\oldWinkey		\Tongey		\Xey

All tikzsymbols symbols are implemented with Ti*k*Z graphics, not with a font. Hence, symbols like \Ninja can include color. In fact, most of the commands shown above accept one or more color arguments for further customization. See the tikzsymbols documentation for more information.

TABLE 489: tikzsymbols 3D Emoticons

	\dAnnoey		\dNinja		\dSmiley		\dXey
	\dCooley		\dNursey		\dTongey		\olddWinkey
	\dInnocey		\drWalley		\dVomey		
	\dLaughey		\dSadey		\dWalley		
	\dNeutrey		\dSey		\dWinkey		

All tikzsymbols symbols are implemented with Ti*k*Z graphics, not with a font. Hence, all of the symbols shown above can include color. In fact, each command in Table 489 accepts one or more color arguments for further customization. See the tikzsymbols documentation for more information.

TABLE 490: tikzsymbols Trees

	\Autumntree		\Summertree		\WorstTree
	\Springtree		\Wintertree		

All tikzsymbols symbols are implemented with Ti*k*Z graphics, not with a font. Hence, all of the symbols shown above can include color. tikzsymbols additionally defines a \BasicTree command that supports customization of trunk and leaf colors. See the tikzsymbols documentation for more information.

TABLE 491: Miscellaneous tikzsymbols Symbols

	\Bed		\Chair		\Fire		\Snowman		\Tribar
	\Candle		\Coffeecup		\Moai		\Strichmaxerl		

All tikzsymbols symbols are implemented with Ti*k*Z graphics, not with a font. `\Tribar` supports customization of the fill color for each bar. `\Strichmaxerl` supports customization of the angles at which the stick figure's arms and legs are drawn. See the tikzsymbols documentation for more information.

TABLE 492: Miscellaneous bclogo Symbols

	\bcattention		\bcetoile		\bcpanchant
	\bcbombe		\bcfemme		\bcpeaceandlove
	\bcbook		\bcfeujaune		\bcpluie
	\bccalendrier		\bcfeurouge		\bcplume
	\bccle		\bcfeutricolore		\bcpoisson
	\bcclefa		\bcfeuvert		\bcquestion
	\bcclesol		\bcfleur		\bcrecyclage
	\bccoeur		\bchomme		\bcrosevents
	\bccrayon		\bchorloge		\bcsmbh
	\bccube		\bcicosaedre		\bcsmmh
	\bcdallemagne		\bcinfo		\bcsoleil
	\bcdanger		\bcinterdit		\bcspadesuit
	\bcdautriche		\bclampe		\bcstop
	\bcdbelgique		\bcloupe		\bctakecare
	\bcdbulgarie		\bcneige		\bctetraedre
	\bcdfrance		\bcnote		\bctrefle
	\bcditalie		\bcnucleaire		\bctrombone
	\bcdluxembourg		\bcoctaedre		\bcvaletcoeur
	\bcdodecaedre		\bcoeil		\bcvelo

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(continued from previous page)

 \bcdpaysbas
 \bcdz
 \bceclaircie
 \bcorne
 \bcours
 \bcoutil
 \bcyin

All bclogo symbols are implemented with Ti*k*Z (or alternatively, PSTricks) graphics, not with a font. This is how the symbols shown above can include color.

TABLE 493: fontawesome Web-Related Icons

5oo	\fa500px		\faFemale		\faPlane
	\faAdjust		\faFighterJet		\faPlay
	\faAdn		\faFile		\faPlayCircle
	\faAlignCenter		\faFileArchiveO		\faPlayCircleO
	\faAlignJustify		\faFileAudioO		\faPlug
	\faAlignLeft		\faFileCodeO		\faPlus
	\faAlignRight		\faFileExcelO		\faPlusCircle
	\faAmazon		\faFileImageO		\faPlusSquare
	\faAmbulance		\faFileO		\faPlusSquareO
	\faAnchor		\faFilePdfO		\faPowerOff
	\faAndroid		\faFilePowerpointO		\faPrint
	\faAngellist		\faFilesO		\faPuzzlePiece
	\faAngleDoubleDown		\faFileText		\faQq
	\faAngleDoubleLeft		\faFileTextO		\faQrcode
	\faAngleDoubleRight		\faFileVideoO	?	\faQuestion
	\faAngleDoubleUp		\faFileWordO		\faQuestionCircle
	\faAngleDown		\faFilm		\faQuoteLeft
	\faAngleLeft		\faFilter		\faQuoteRight
	\faAngleRight		\faFire		\faRandom
	\faAngleUp		\faFireExtinguisher		\faRebel
	\faApple		\faFirefox		\faRecycle
	\faArchive		\faFlag		\faReddit
	\faAreaChart		\faFlagCheckered		\faRedditSquare
	\faAsterisk		\faFlagO		\faRefresh
@	\faAt		\faFlask		\faRenren
	\faBackward		\faFlickr		\faReply
	\faBalanceScale		\faFloppyO		\faReplyAll
	\faBan		\faFolder		\faRetweet
	\faBarChart		\faFolderO		\faRoad
	\faBarcode		\faFolderOpen		\faRocket
	\faBars		\faFolderOpenO		\faRss
	\faBatteryEmpty	A	\faFont		\faRssSquare
	\faBatteryFull		\faFonticons		\faSafari
	\faBatteryHalf		\faForumbee		\faScissors
	\faBatteryQuarter		\faForward		\faSearch
	\faBatteryThreeQuarters		\faFoursquare		\faSearchMinus

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\faBed
\faBeer
\faBehance
\faBehanceSquare
\faBell
\faBellO
\faBellSlash
\faBellSlashO
\faBicycle
\faBinoculars
\faBirthdayCake
\faBitbucket
\faBitbucketSquare
\faBlackTie
\faBold
\faBolt
\faBomb
\faBook
\faBookmark
\faBookmarkO
\faBriefcase
\faBug
\faBuilding
\faBuildingO
\faBullhorn
\faBullseye
\faBus
\faBuysellads
\faCalculator
\faCalendar
\faCalendarCheckO
\faCalendarMinusO
\faCalendarO
\faCalendarPlusO
\faCalendarTimesO
\faCamera
\faCameraRetro
\faCar
\faCaretDown
\faCaretLeft
\faCaretRight
\faCaretSquareODown
\faCaretSquareOLeft
\faCaretSquareORight
\faCaretSquareOUp
\faCaretUp
\faCartArrowDown
\faCartPlus
\faCc
\faCcAmex
\faCcDinersClub
\faCcDiscover
\faCcJcb

\faFrownO
\faFutbolO
\faGamepad
\faGavel
\faGetPocket
\faGg
\faGgCircle
\faGift
\faGit
\faGithub
\faGithubAlt
\faGithubSquare
\faGitSquare
\faGlass
\faGlobe
\faGoogle
\faGooglePlus
\faGooglePlusSquare
\faGoogleWallet
\faGraduationCap
\faGratipay
\faHackerNews
\faHddO
\faHeader
\faHeadphones
\faHeart
\faHeartbeat
\faHeartO
\faHistory
\faHome
\faHospitalO
\faHourglass
\faHourglassEnd
\faHourglassHalf
\faHourglassO
\faHourglassStart
\faHouzz
\faHSquare
\faHtml5
\faICursor
\faInbox
\faIndent
\faIndustry
\faInfo
\faInfoCircle
\faInstagram
\faInternetExplorer
\faIoxhost
\faItalic
\faJoomla
\faJsfiddle
\faKey
\faKeyboardO

\faSearchPlus
\faSellsy
\faServer
\faShare
\faShareAlt
\faShareAltSquare
\faShareSquare
\faShareSquareO
\faShield
\faShip
\faShirtsinbulk
\faShoppingCart
\faSignal
\faSignIn
\faSignOut
\faSimplybuilt
\faSitemap
\faSkyatlas
\faSkype
\faSlack
\faSliders
\faSlideshare
\faSmileO
\faSort
\faSortAlphaAsc
\faSortAlphaDesc
\faSortAmountAsc
\faSortAmountDesc
\faSortAsc
\faSortDesc
\faSortNumericAsc
\faSortNumericDesc
\faSoundcloud
\faSpaceShuttle
\faSpinner
\faSpoon
\faSpotify
\faStackExchange
\faStackOverflow
\faSteam
\faSteamSquare
\faStepBackward
\faStepForward
\faStethoscope
\faStickyNote
\faStickyNoteO
\faStop
\faStreetView
\faStrikethrough
\faStumbleupon
\faStumbleuponCircle
\faSubscript
\faSubway

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\faCcMastercard
\faCcPaypal
\faCcStripe
\faCcVisa
\faCertificate
\faChainBroken
\faChild
\faChrome
\faClipboard
\faClockO
\faClone
\faCloud
\faCloudDownload
\faCloudUpload
\faCode
\faCodeFork
\faCodepen
\faCoffee
\faCog
\faCogs
\faColumns
\faComment
\faCommenting
\faCommentingO
\faCommentO
\faComments
\faCommentsO
\faCompass
\faCompress
\faConnectdevelop
\faContao
\faCreditCard
\faCrop
\faCrosshairs
\faCss3
\faCube
\faCubes
\faCutlery
\faDashcube
\faDatabase
\faDelicious
\faDesktop
\faDeviantart
\faDiamond
\faDigg
\faDownload
\faDribbble
\faDropbox
\faDrupal
\faEject
\faEllipsisH
\faEllipsisV
\faEmpire
\faLanguage
\faLaptop
\faLastfm
\faLastfmSquare
\faLeaf
\faLeanpub
\faLemonO
\faLevelDown
\faLevelUp
\faLifeRing
\faLightbulbO
\faLineChart
\faLink
\faLinkedin
\faLinkedinSquare
\faLinux
\faList
\faListAlt
\faListOl
\faListUl
\faLocationArrow
\faLock
\faMagic
\faMagnet
\faMale
\faMap
\faMapMarker
\faMapO
\faMapPin
\faMapSigns
\faMaxcdn
\faMeanpath
\faMedium
\faMedkit
\faMehO
\faMicrophone
\faMicrophoneSlash
\faMinus
\faMinusCircle
\faMinusSquare
\faMinusSquareO
\faMobile
\faMoney
\faMotorcycle
\faMousePointer
\faMusic
\faNewspaperO
\faObjectGroup
\faObjectUngroup
\faOdnoklassniki
\faOdnoklassnikiSquare
\faOpencart
\faOpenid
\faSuitcase
\faSuperscript
\faTable
\faTablet
\faTachometer
\faTag
\faTags
\faTasks
\faTaxi
\faTelevision
\faTencentWeibo
\faTerminal
\faTextHeight
\faTextWidth
\faTh
\faThLarge
\faThList
\faThumbTack
\faTicket
\faTint
\faToggleOff
\faToggleOn
\faTrain
\faTrash
\faTrashO
\faTree
\faTrello
\faTripadvisor
\faTrophy
\faTruck
\faTty
\faTumblr
\faTumblrSquare
\faTwitch
\faTwitter
\faTwitterSquare
\faUmbrella
\faUnderline
\faUniversity
\faUnlock
\faUnlockAlt
\faUpload
\faUser
\faUserMd
\faUserPlus
\faUsers
\faUserSecret
\faUserTimes
\faVideoCamera
\faVimeo
\faVimeoSquare
\faVine
\faVk

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\faEnvelope
\faEnvelopeO
\faEnvelopeSquare
\faEraser
\faExchange
\faExclamation
\faExclamationCircle
\faExclamationTriangle
\faExpand
\faExpeditedssl
\faExternalLink
\faExternalLinkSquare
\faEye
\faEyedropper
\faEyeSlash
\faFacebook
\faFacebookOfficial
\faFacebookSquare
\faFastBackward
\faFastForward
\faFax
\faOpera
\faOptinMonster
\faOutdent
\faPagelines
\faPaintBrush
\faPaperclip
\faPaperPlane
\faPaperPlaneO
\faParagraph
\faPause
\faPaw
\faPaypal
\faPhone
\faPhoneSquare
\faPictureO
\faPieChart
\faPiedPiper
\faPiedPiperAlt
\faPinterest
\faPinterestP
\faPinterestSquare
\faVolumeDown
\faVolumeOff
\faVolumeUp
\faWeibo
\faWeixin
\faWhatsapp
\faWheelchair
\faWifi
\faWikipediaW
\faWindows
\faWordpress
\faWrench
\faXing
\faXingSquare
\faYahoo
\faYCombinator
\faYelp
\faYoutube
\faYoutubePlay
\faYoutubeSquare

fontawesome defines synonyms for many of the preceding symbols:

\faAutomobile
\faBank
\faBarChartO
\faBatteryO
\faBattery1
\faBattery2
\faBattery3
\faBattery4
\faCab
\faChain
\faCopy
\faCut
\faDashboard
\faDedent
\faEdit
\faFacebookF
\faFeed
\faFileMovieO
\faFilePhotoO
\faFilePictureO
\faFileSoundO
\faFileZipO
\faFlash
\faGe
\faGear
\faGears
\faGittip
\faGroup
\faHotel
\faImage
\faInstitution
\faLegal
\faLifeBouy
\faLifeSaver
\faMailForward
\faMailReply
\faMailReplyAll
\faMobilePhone
\faMortarBoard
\faNavicon
\faPaste
\faPhoto
\faRa
\faReorder
\faSave
\faSend
\faSendO
\faSoccerBallO
\faSortDown
\faSortUp
\faSupport
\faToggleDown
\faToggleLeft
\faToggleRight
\faToggleUp
\faTv
\faUnlink
\faUnsorted
\faWarning
\faWechat
\faYc
\faYCombinatorSquare
\faYcSquare

TABLE 494: rubikcube Rubik's Cube Rotations

	\rrhD		\rrhF		\rrhLw		\rrhRw		\rrhU
	\rrhDa		\rrhFp		\rrhLwp		\rrhRwp		\rrhUa
	\rrhDap		\rrhFw		\rrhM		\rrhSd		\rrhUap
	\rrhDp		\rrhFwp		\rrhMp		\rrhSdp		\rrhUp
	\rrhDs		\rrhL		\rrhR		\rrhSl		\rrhUs
	\rrhDsp		\rrhLa		\rrhRa		\rrhSlp		\rrhUsp
	\rrhDw		\rrhLap		\rrhRap		\rrhSr		\rrhUw
	\rrhDwp		\rrhLp		\rrhRp		\rrhSrp		\rrhUwp
	\rrhE		\rrhLs		\rrhRs		\rrhSu		
	\rrhEp		\rrhLsp		\rrhRsp		\rrhSup		

All rubikcube symbols are implemented with Ti*k*Z graphics, not with a font. In addition to the symbols shown above, the rubikcube package defines commands for combinations of textual and graphical representations of rotations (e.g., `\textRubikUa` produces "**Ua**  ") as well as commands that produce colored illustrations of Rubik's Cube configurations and rotations. See the rubikcube documentation for more information.

9 Fonts with minimal LaTeX support

The symbol fonts shown in this section are provided without a corresponding LaTeX 2$_\varepsilon$ style file that assigns a convenient name to each glyph. Consequently, each glyph must be accessed by number. To help with this, the pifont package defines a `\Pisymbol` command that typesets a specified character by number from a specified LaTeX font family. Alas, most of the fonts in this section do not even define a LaTeX font family. Hence, except where otherwise specified, a document will need to include code like the following in its preamble:

```
\usepackage{pifont}
\DeclareFontFamily{U}{⟨name⟩}{}
\DeclareFontShape{U}{⟨name⟩}{m}{n}{<-> ⟨font⟩}{}
```

where ⟨*font*⟩ is the name of the `.tfm` font file (or `.mf` font file, from which a `.tfm` font file can be generated automatically), and ⟨*name*⟩ is a name to use to refer to that font. It's generally good practice to use the name of the font file for ⟨*name*⟩, as in the following:

```
\usepackage{pifont}
\DeclareFontFamily{U}{hands}{}
\DeclareFontShape{U}{hands}{m}{n}{<-> hands}{}
```

Table 495: hands Fists

☞	`\Pisymbol{hands}{65}`	☞	`\Pisymbol{hands}{67}`
☜	`\Pisymbol{hands}{66}`	☜	`\Pisymbol{hands}{68}`

Table 496: greenpoint Recycling Symbols

☯	`\Pisymbol{greenpoint}{71}`

Table 497: nkarta Map Symbols

○	`\Pisymbol{nkarta}{33}`		`\Pisymbol{nkarta}{96}`	●	`\Pisymbol{nkarta}{193}`
⬡	`\Pisymbol{nkarta}{34}`		`\Pisymbol{nkarta}{97}`	□	`\Pisymbol{nkarta}{194}`
△	`\Pisymbol{nkarta}{35}`		`\Pisymbol{nkarta}{98}`		`\Pisymbol{nkarta}{195}`
◇	`\Pisymbol{nkarta}{36}`		`\Pisymbol{nkarta}{99}`		`\Pisymbol{nkarta}{196}`
⬭	`\Pisymbol{nkarta}{37}`		`\Pisymbol{nkarta}{100}`		`\Pisymbol{nkarta}{197}`
✸	`\Pisymbol{nkarta}{38}`	★	`\Pisymbol{nkarta}{101}`		`\Pisymbol{nkarta}{198}`
⊙	`\Pisymbol{nkarta}{39}`		`\Pisymbol{nkarta}{102}`	↘	`\Pisymbol{nkarta}{199}`
❙	`\Pisymbol{nkarta}{40}`		`\Pisymbol{nkarta}{103}`	➔	`\Pisymbol{nkarta}{200}`
❙	`\Pisymbol{nkarta}{41}`		`\Pisymbol{nkarta}{104}`	△	`\Pisymbol{nkarta}{201}`
✸	`\Pisymbol{nkarta}{42}`		`\Pisymbol{nkarta}{105}`	◆	`\Pisymbol{nkarta}{202}`
∴	`\Pisymbol{nkarta}{43}`		`\Pisymbol{nkarta}{106}`		`\Pisymbol{nkarta}{203}`
	`\Pisymbol{nkarta}{44}`		`\Pisymbol{nkarta}{107}`	■	`\Pisymbol{nkarta}{204}`
	`\Pisymbol{nkarta}{45}`	□	`\Pisymbol{nkarta}{108}`		`\Pisymbol{nkarta}{205}`
	`\Pisymbol{nkarta}{46}`		`\Pisymbol{nkarta}{109}`		`\Pisymbol{nkarta}{206}`
	`\Pisymbol{nkarta}{47}`		`\Pisymbol{nkarta}{110}`		`\Pisymbol{nkarta}{207}`
0	`\Pisymbol{nkarta}{48}`	○	`\Pisymbol{nkarta}{111}`		`\Pisymbol{nkarta}{208}`
1	`\Pisymbol{nkarta}{49}`	◇	`\Pisymbol{nkarta}{112}`		`\Pisymbol{nkarta}{209}`

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2	\Pisymbol{nkarta}{50}		\Pisymbol{nkarta}{113}		\Pisymbol{nkarta}{210}
3	\Pisymbol{nkarta}{51}		\Pisymbol{nkarta}{114}		\Pisymbol{nkarta}{211}
4	\Pisymbol{nkarta}{52}		\Pisymbol{nkarta}{115}		\Pisymbol{nkarta}{212}
5	\Pisymbol{nkarta}{53}		\Pisymbol{nkarta}{116}		\Pisymbol{nkarta}{213}
6	\Pisymbol{nkarta}{54}		\Pisymbol{nkarta}{117}		\Pisymbol{nkarta}{214}
7	\Pisymbol{nkarta}{55}		\Pisymbol{nkarta}{118}		\Pisymbol{nkarta}{215}
8	\Pisymbol{nkarta}{56}		\Pisymbol{nkarta}{119}		\Pisymbol{nkarta}{216}
9	\Pisymbol{nkarta}{57}		\Pisymbol{nkarta}{120}		\Pisymbol{nkarta}{217}
	\Pisymbol{nkarta}{58}		\Pisymbol{nkarta}{121}		\Pisymbol{nkarta}{218}
	\Pisymbol{nkarta}{59}		\Pisymbol{nkarta}{122}		\Pisymbol{nkarta}{219}
	\Pisymbol{nkarta}{60}		\Pisymbol{nkarta}{123}		\Pisymbol{nkarta}{220}
	\Pisymbol{nkarta}{61}		\Pisymbol{nkarta}{124}		\Pisymbol{nkarta}{221}
	\Pisymbol{nkarta}{62}		\Pisymbol{nkarta}{125}		\Pisymbol{nkarta}{222}
	\Pisymbol{nkarta}{63}		\Pisymbol{nkarta}{126}		\Pisymbol{nkarta}{223}
	\Pisymbol{nkarta}{64}		\Pisymbol{nkarta}{161}		\Pisymbol{nkarta}{224}
	\Pisymbol{nkarta}{65}		\Pisymbol{nkarta}{162}		\Pisymbol{nkarta}{225}
	\Pisymbol{nkarta}{66}		\Pisymbol{nkarta}{163}		\Pisymbol{nkarta}{226}
	\Pisymbol{nkarta}{67}		\Pisymbol{nkarta}{164}		\Pisymbol{nkarta}{227}
	\Pisymbol{nkarta}{68}		\Pisymbol{nkarta}{165}		\Pisymbol{nkarta}{228}
	\Pisymbol{nkarta}{69}		\Pisymbol{nkarta}{166}		\Pisymbol{nkarta}{229}
	\Pisymbol{nkarta}{70}		\Pisymbol{nkarta}{167}		\Pisymbol{nkarta}{230}
	\Pisymbol{nkarta}{71}		\Pisymbol{nkarta}{168}		\Pisymbol{nkarta}{231}
	\Pisymbol{nkarta}{72}		\Pisymbol{nkarta}{169}		\Pisymbol{nkarta}{232}
	\Pisymbol{nkarta}{73}		\Pisymbol{nkarta}{170}		\Pisymbol{nkarta}{233}
	\Pisymbol{nkarta}{74}		\Pisymbol{nkarta}{171}		\Pisymbol{nkarta}{234}
	\Pisymbol{nkarta}{75}		\Pisymbol{nkarta}{172}		\Pisymbol{nkarta}{235}
	\Pisymbol{nkarta}{76}		\Pisymbol{nkarta}{173}		\Pisymbol{nkarta}{236}
	\Pisymbol{nkarta}{77}		\Pisymbol{nkarta}{174}		\Pisymbol{nkarta}{237}
	\Pisymbol{nkarta}{78}		\Pisymbol{nkarta}{175}		\Pisymbol{nkarta}{238}
	\Pisymbol{nkarta}{79}		\Pisymbol{nkarta}{176}		\Pisymbol{nkarta}{239}
	\Pisymbol{nkarta}{80}		\Pisymbol{nkarta}{177}		\Pisymbol{nkarta}{240}
	\Pisymbol{nkarta}{81}		\Pisymbol{nkarta}{178}		\Pisymbol{nkarta}{241}
	\Pisymbol{nkarta}{82}		\Pisymbol{nkarta}{179}		\Pisymbol{nkarta}{242}
	\Pisymbol{nkarta}{83}		\Pisymbol{nkarta}{180}		\Pisymbol{nkarta}{243}
	\Pisymbol{nkarta}{84}		\Pisymbol{nkarta}{181}		\Pisymbol{nkarta}{244}
	\Pisymbol{nkarta}{85}		\Pisymbol{nkarta}{182}		\Pisymbol{nkarta}{245}
	\Pisymbol{nkarta}{86}		\Pisymbol{nkarta}{183}		\Pisymbol{nkarta}{246}
	\Pisymbol{nkarta}{87}		\Pisymbol{nkarta}{184}		\Pisymbol{nkarta}{247}
	\Pisymbol{nkarta}{88}		\Pisymbol{nkarta}{185}		\Pisymbol{nkarta}{248}
	\Pisymbol{nkarta}{89}		\Pisymbol{nkarta}{186}		\Pisymbol{nkarta}{249}
	\Pisymbol{nkarta}{90}		\Pisymbol{nkarta}{187}		\Pisymbol{nkarta}{250}
	\Pisymbol{nkarta}{91}		\Pisymbol{nkarta}{188}		\Pisymbol{nkarta}{251}
	\Pisymbol{nkarta}{92}		\Pisymbol{nkarta}{189}		\Pisymbol{nkarta}{252}
	\Pisymbol{nkarta}{93}	×	\Pisymbol{nkarta}{190}		\Pisymbol{nkarta}{253}
	\Pisymbol{nkarta}{94}		\Pisymbol{nkarta}{191}		\Pisymbol{nkarta}{254}
	\Pisymbol{nkarta}{95}		\Pisymbol{nkarta}{192}		

TABLE 498: moonphase Astronomical Symbols

	`\Pisymbol{moonphase}{0}`		`\Pisymbol{moonphase}{2}`
	`\Pisymbol{moonphase}{1}`		`\Pisymbol{moonphase}{3}`

TABLE 499: astrosym Astronomical Symbols

	`\Pisymbol{astrosym}{0}`		`\Pisymbol{astrosym}{132}`
	`\Pisymbol{astrosym}{1}`		`\Pisymbol{astrosym}{133}`
	`\Pisymbol{astrosym}{2}`		`\Pisymbol{astrosym}{134}`
	`\Pisymbol{astrosym}{3}`		`\Pisymbol{astrosym}{135}`
	`\Pisymbol{astrosym}{4}`		`\Pisymbol{astrosym}{136}`
	`\Pisymbol{astrosym}{5}`		`\Pisymbol{astrosym}{137}`
	`\Pisymbol{astrosym}{6}`		`\Pisymbol{astrosym}{138}`
	`\Pisymbol{astrosym}{7}`		`\Pisymbol{astrosym}{139}`
	`\Pisymbol{astrosym}{8}`		`\Pisymbol{astrosym}{140}`
	`\Pisymbol{astrosym}{9}`		`\Pisymbol{astrosym}{141}`
	`\Pisymbol{astrosym}{10}`		`\Pisymbol{astrosym}{142}`
	`\Pisymbol{astrosym}{11}`		`\Pisymbol{astrosym}{143}`
	`\Pisymbol{astrosym}{12}`		`\Pisymbol{astrosym}{144}`
	`\Pisymbol{astrosym}{13}`		`\Pisymbol{astrosym}{145}`
	`\Pisymbol{astrosym}{14}`		`\Pisymbol{astrosym}{146}`
	`\Pisymbol{astrosym}{15}`		`\Pisymbol{astrosym}{147}`
	`\Pisymbol{astrosym}{16}`		`\Pisymbol{astrosym}{148}`
	`\Pisymbol{astrosym}{17}`		`\Pisymbol{astrosym}{149}`
	`\Pisymbol{astrosym}{18}`		`\Pisymbol{astrosym}{150}`
	`\Pisymbol{astrosym}{19}`		`\Pisymbol{astrosym}{151}`
	`\Pisymbol{astrosym}{20}`		`\Pisymbol{astrosym}{152}`
	`\Pisymbol{astrosym}{21}`		`\Pisymbol{astrosym}{153}`
	`\Pisymbol{astrosym}{22}`		`\Pisymbol{astrosym}{154}`
	`\Pisymbol{astrosym}{23}`		`\Pisymbol{astrosym}{155}`
	`\Pisymbol{astrosym}{24}`		`\Pisymbol{astrosym}{156}`
	`\Pisymbol{astrosym}{25}`		`\Pisymbol{astrosym}{157}`
	`\Pisymbol{astrosym}{26}`		`\Pisymbol{astrosym}{158}`
	`\Pisymbol{astrosym}{27}`		`\Pisymbol{astrosym}{159}`
	`\Pisymbol{astrosym}{28}`		`\Pisymbol{astrosym}{160}`
	`\Pisymbol{astrosym}{29}`		`\Pisymbol{astrosym}{161}`
	`\Pisymbol{astrosym}{30}`		`\Pisymbol{astrosym}{162}`
	`\Pisymbol{astrosym}{31}`		`\Pisymbol{astrosym}{163}`
	`\Pisymbol{astrosym}{32}`		`\Pisymbol{astrosym}{164}`

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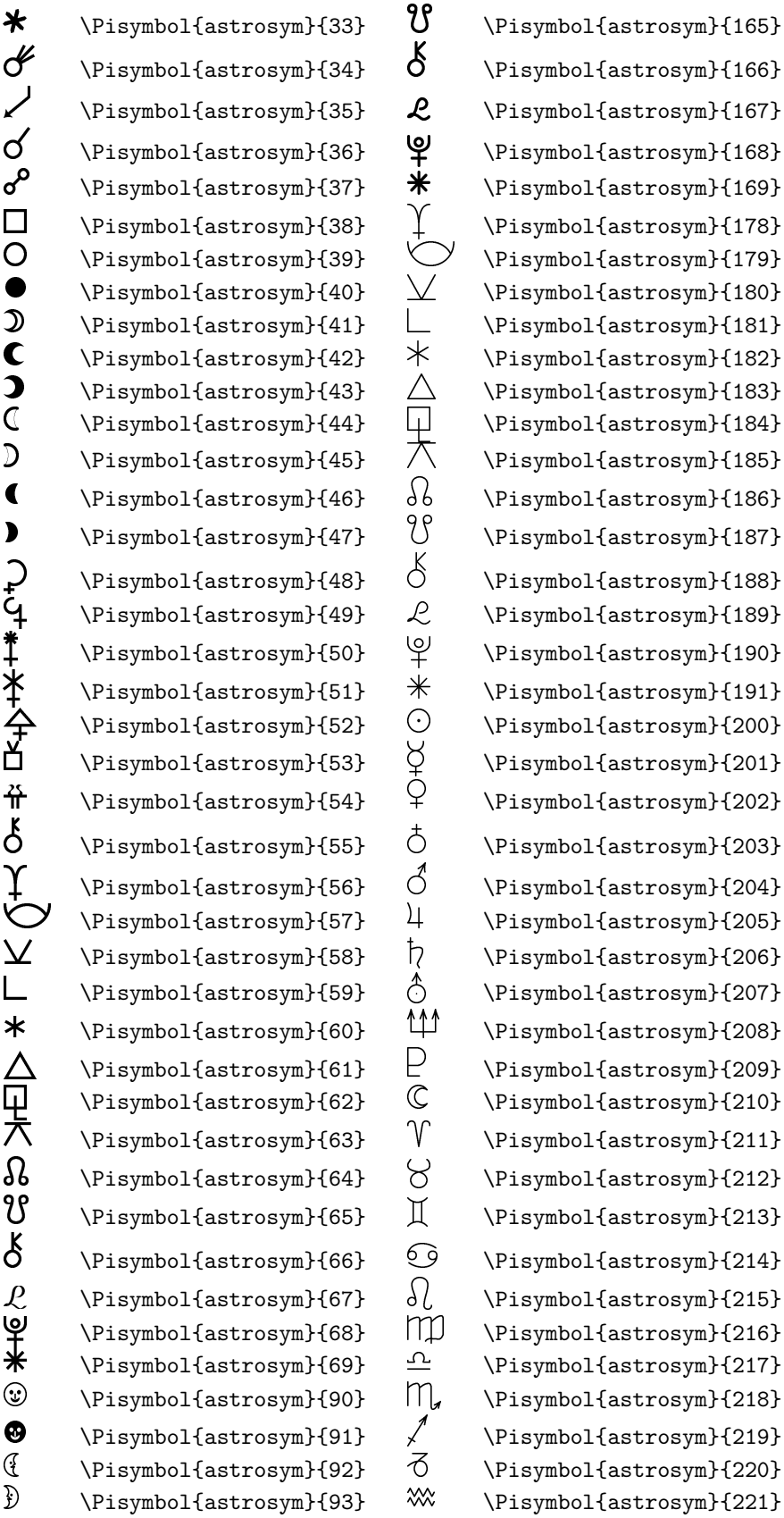

\Pisymbol{astrosym}{33}	\Pisymbol{astrosym}{165}
\Pisymbol{astrosym}{34}	\Pisymbol{astrosym}{166}
\Pisymbol{astrosym}{35}	\Pisymbol{astrosym}{167}
\Pisymbol{astrosym}{36}	\Pisymbol{astrosym}{168}
\Pisymbol{astrosym}{37}	\Pisymbol{astrosym}{169}
\Pisymbol{astrosym}{38}	\Pisymbol{astrosym}{178}
\Pisymbol{astrosym}{39}	\Pisymbol{astrosym}{179}
\Pisymbol{astrosym}{40}	\Pisymbol{astrosym}{180}
\Pisymbol{astrosym}{41}	\Pisymbol{astrosym}{181}
\Pisymbol{astrosym}{42}	\Pisymbol{astrosym}{182}
\Pisymbol{astrosym}{43}	\Pisymbol{astrosym}{183}
\Pisymbol{astrosym}{44}	\Pisymbol{astrosym}{184}
\Pisymbol{astrosym}{45}	\Pisymbol{astrosym}{185}
\Pisymbol{astrosym}{46}	\Pisymbol{astrosym}{186}
\Pisymbol{astrosym}{47}	\Pisymbol{astrosym}{187}
\Pisymbol{astrosym}{48}	\Pisymbol{astrosym}{188}
\Pisymbol{astrosym}{49}	\Pisymbol{astrosym}{189}
\Pisymbol{astrosym}{50}	\Pisymbol{astrosym}{190}
\Pisymbol{astrosym}{51}	\Pisymbol{astrosym}{191}
\Pisymbol{astrosym}{52}	\Pisymbol{astrosym}{200}
\Pisymbol{astrosym}{53}	\Pisymbol{astrosym}{201}
\Pisymbol{astrosym}{54}	\Pisymbol{astrosym}{202}
\Pisymbol{astrosym}{55}	\Pisymbol{astrosym}{203}
\Pisymbol{astrosym}{56}	\Pisymbol{astrosym}{204}
\Pisymbol{astrosym}{57}	\Pisymbol{astrosym}{205}
\Pisymbol{astrosym}{58}	\Pisymbol{astrosym}{206}
\Pisymbol{astrosym}{59}	\Pisymbol{astrosym}{207}
\Pisymbol{astrosym}{60}	\Pisymbol{astrosym}{208}
\Pisymbol{astrosym}{61}	\Pisymbol{astrosym}{209}
\Pisymbol{astrosym}{62}	\Pisymbol{astrosym}{210}
\Pisymbol{astrosym}{63}	\Pisymbol{astrosym}{211}
\Pisymbol{astrosym}{64}	\Pisymbol{astrosym}{212}
\Pisymbol{astrosym}{65}	\Pisymbol{astrosym}{213}
\Pisymbol{astrosym}{66}	\Pisymbol{astrosym}{214}
\Pisymbol{astrosym}{67}	\Pisymbol{astrosym}{215}
\Pisymbol{astrosym}{68}	\Pisymbol{astrosym}{216}
\Pisymbol{astrosym}{69}	\Pisymbol{astrosym}{217}
\Pisymbol{astrosym}{90}	\Pisymbol{astrosym}{218}
\Pisymbol{astrosym}{91}	\Pisymbol{astrosym}{219}
\Pisymbol{astrosym}{92}	\Pisymbol{astrosym}{220}
\Pisymbol{astrosym}{93}	\Pisymbol{astrosym}{221}

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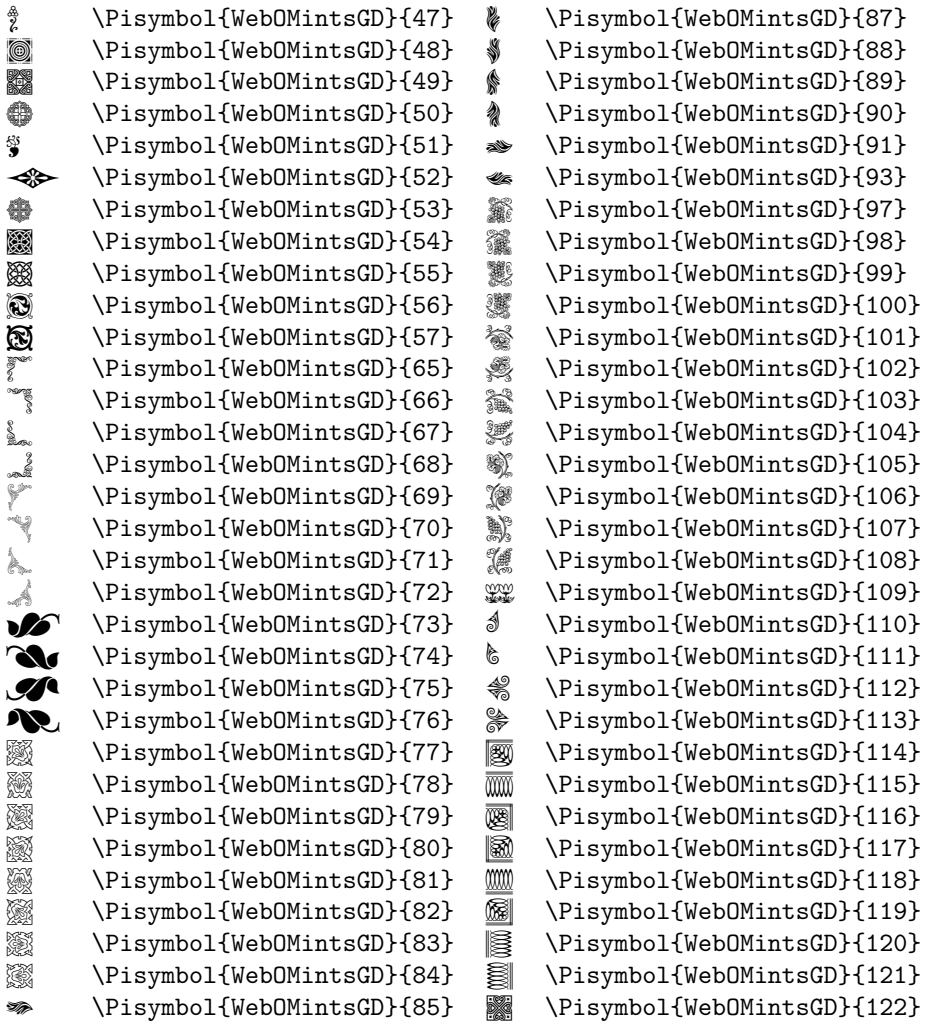
☾	\Pisymbol{astrosym}{94}	♓	\Pisymbol{astrosym}{222}
☽	\Pisymbol{astrosym}{95}	♆	\Pisymbol{astrosym}{223}
☉	\Pisymbol{astrosym}{100}	♇	\Pisymbol{astrosym}{224}
☿	\Pisymbol{astrosym}{101}	♑	\Pisymbol{astrosym}{225}
♀	\Pisymbol{astrosym}{102}	♐	\Pisymbol{astrosym}{226}
♁	\Pisymbol{astrosym}{103}	♒	\Pisymbol{astrosym}{227}
♂	\Pisymbol{astrosym}{104}	♒	\Pisymbol{astrosym}{228}
♃	\Pisymbol{astrosym}{105}	⊕	\Pisymbol{astrosym}{229}
♄	\Pisymbol{astrosym}{106}	♂	\Pisymbol{astrosym}{230}
♅	\Pisymbol{astrosym}{107}	♇	\Pisymbol{astrosym}{231}
♆	\Pisymbol{astrosym}{108}	♑	\Pisymbol{astrosym}{232}
♇	\Pisymbol{astrosym}{109}	✳	\Pisymbol{astrosym}{233}
☾	\Pisymbol{astrosym}{110}	☌	\Pisymbol{astrosym}{234}
♈	\Pisymbol{astrosym}{111}	↙	\Pisymbol{astrosym}{235}
♉	\Pisymbol{astrosym}{112}	☍	\Pisymbol{astrosym}{236}
♊	\Pisymbol{astrosym}{113}	☍	\Pisymbol{astrosym}{237}
♋	\Pisymbol{astrosym}{114}	□	\Pisymbol{astrosym}{238}
♌	\Pisymbol{astrosym}{115}	○	\Pisymbol{astrosym}{239}
♍	\Pisymbol{astrosym}{116}	●	\Pisymbol{astrosym}{240}
♎	\Pisymbol{astrosym}{117}	☽	\Pisymbol{astrosym}{241}
♏	\Pisymbol{astrosym}{118}	☾	\Pisymbol{astrosym}{242}
♐	\Pisymbol{astrosym}{119}	☽	\Pisymbol{astrosym}{243}
♑	\Pisymbol{astrosym}{120}	☾	\Pisymbol{astrosym}{244}
♒	\Pisymbol{astrosym}{121}	☽	\Pisymbol{astrosym}{245}
♓	\Pisymbol{astrosym}{122}	☾	\Pisymbol{astrosym}{246}
♆	\Pisymbol{astrosym}{123}	☽	\Pisymbol{astrosym}{247}
♇	\Pisymbol{astrosym}{124}	☽	\Pisymbol{astrosym}{248}
♑	\Pisymbol{astrosym}{125}	☿	\Pisymbol{astrosym}{249}
♐	\Pisymbol{astrosym}{126}	☨	\Pisymbol{astrosym}{250}
♒	\Pisymbol{astrosym}{127}	☨	\Pisymbol{astrosym}{251}
♒	\Pisymbol{astrosym}{128}	☥	\Pisymbol{astrosym}{252}
⊕	\Pisymbol{astrosym}{129}	☐	\Pisymbol{astrosym}{253}
♂	\Pisymbol{astrosym}{130}	♓	\Pisymbol{astrosym}{254}
♇	\Pisymbol{astrosym}{131}	♑	\Pisymbol{astrosym}{255}

TABLE 500: webomints Decorative Borders

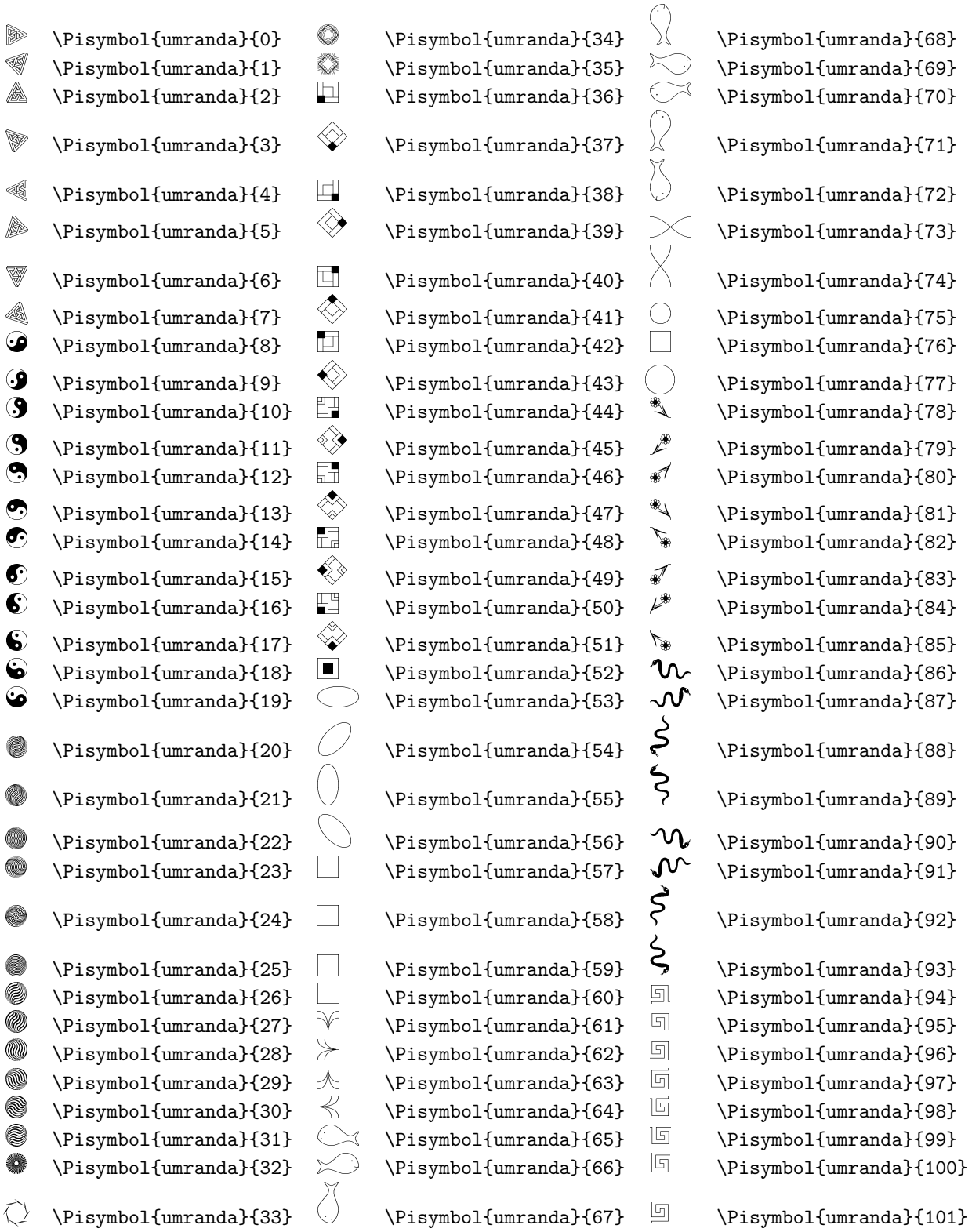


\Pisymbol{WebOMintsGD}{47}	\Pisymbol{WebOMintsGD}{87}
\Pisymbol{WebOMintsGD}{48}	\Pisymbol{WebOMintsGD}{88}
\Pisymbol{WebOMintsGD}{49}	\Pisymbol{WebOMintsGD}{89}
\Pisymbol{WebOMintsGD}{50}	\Pisymbol{WebOMintsGD}{90}
\Pisymbol{WebOMintsGD}{51}	\Pisymbol{WebOMintsGD}{91}
\Pisymbol{WebOMintsGD}{52}	\Pisymbol{WebOMintsGD}{93}
\Pisymbol{WebOMintsGD}{53}	\Pisymbol{WebOMintsGD}{97}
\Pisymbol{WebOMintsGD}{54}	\Pisymbol{WebOMintsGD}{98}
\Pisymbol{WebOMintsGD}{55}	\Pisymbol{WebOMintsGD}{99}
\Pisymbol{WebOMintsGD}{56}	\Pisymbol{WebOMintsGD}{100}
\Pisymbol{WebOMintsGD}{57}	\Pisymbol{WebOMintsGD}{101}
\Pisymbol{WebOMintsGD}{65}	\Pisymbol{WebOMintsGD}{102}
\Pisymbol{WebOMintsGD}{66}	\Pisymbol{WebOMintsGD}{103}
\Pisymbol{WebOMintsGD}{67}	\Pisymbol{WebOMintsGD}{104}
\Pisymbol{WebOMintsGD}{68}	\Pisymbol{WebOMintsGD}{105}
\Pisymbol{WebOMintsGD}{69}	\Pisymbol{WebOMintsGD}{106}
\Pisymbol{WebOMintsGD}{70}	\Pisymbol{WebOMintsGD}{107}
\Pisymbol{WebOMintsGD}{71}	\Pisymbol{WebOMintsGD}{108}
\Pisymbol{WebOMintsGD}{72}	\Pisymbol{WebOMintsGD}{109}
\Pisymbol{WebOMintsGD}{73}	\Pisymbol{WebOMintsGD}{110}
\Pisymbol{WebOMintsGD}{74}	\Pisymbol{WebOMintsGD}{111}
\Pisymbol{WebOMintsGD}{75}	\Pisymbol{WebOMintsGD}{112}
\Pisymbol{WebOMintsGD}{76}	\Pisymbol{WebOMintsGD}{113}
\Pisymbol{WebOMintsGD}{77}	\Pisymbol{WebOMintsGD}{114}
\Pisymbol{WebOMintsGD}{78}	\Pisymbol{WebOMintsGD}{115}
\Pisymbol{WebOMintsGD}{79}	\Pisymbol{WebOMintsGD}{116}
\Pisymbol{WebOMintsGD}{80}	\Pisymbol{WebOMintsGD}{117}
\Pisymbol{WebOMintsGD}{81}	\Pisymbol{WebOMintsGD}{118}
\Pisymbol{WebOMintsGD}{82}	\Pisymbol{WebOMintsGD}{119}
\Pisymbol{WebOMintsGD}{83}	\Pisymbol{WebOMintsGD}{120}
\Pisymbol{WebOMintsGD}{84}	\Pisymbol{WebOMintsGD}{121}
\Pisymbol{WebOMintsGD}{85}	\Pisymbol{WebOMintsGD}{122}
\Pisymbol{WebOMintsGD}{86}	

webomints provides a `uwebo.fd` font-definition file. Instead of using pifont and `\Pisymbol` to typeset a glyph, a document can select the webomints font directly. For example, `{\usefont{U}{webo}{xl}{n}\char73\char74}`—alternatively, `{\usefont{U}{webo}{xl}{n}IJ}`—will typeset "  ". This can be useful for typesetting a number of webomints glyphs in a row.

The niceframe package can be used to typeset decorative frames using fonts such as webomints.

TABLE 501: umranda Decorative Borders



The niceframe package can be used to typeset decorative frames using fonts such as umranda.

TABLE 502: umrandb Decorative Borders

The niceframe package can be used to typeset decorative frames using fonts such as umrandb.

TABLE 503: dingbat Decorative Borders

\Pisymbol{dingbat}{69}		\Pisymbol{dingbat}{97}	
\Pisymbol{dingbat}{70}		\Pisymbol{dingbat}{98}	
\Pisymbol{dingbat}{71}		\Pisymbol{dingbat}{99}	
\Pisymbol{dingbat}{72}		\Pisymbol{dingbat}{100}	
\Pisymbol{dingbat}{74}		\Pisymbol{dingbat}{101}	
\Pisymbol{dingbat}{75}		\Pisymbol{dingbat}{102}	
\Pisymbol{dingbat}{76}		\Pisymbol{dingbat}{103}	
\Pisymbol{dingbat}{77}		\Pisymbol{dingbat}{104}	

The preceding table is incomplete in that it includes only unnamed dingbat symbols. Named symbols are included in Table 343 and Table 387 (both intermixed with symbols from the ark10 font).

The dingbat package includes a udingbat.fd file so a document does not need to specify the \DeclareFontFamily and \DeclareFontShape commands list at the beginning of Section 9.

The niceframe package can be used to typeset decorative frames using fonts such as dingbat.

TABLE 504: knot Celtic Knots

\Pisymbol{knot1}{48}		\Pisymbol{knot1}{68}		\Pisymbol{knot1}{84}	
\Pisymbol{knot1}{49}		\Pisymbol{knot1}{69}		\Pisymbol{knot1}{85}	
\Pisymbol{knot1}{50}		\Pisymbol{knot1}{70}		\Pisymbol{knot1}{86}	
\Pisymbol{knot1}{51}		\Pisymbol{knot1}{71}		\Pisymbol{knot1}{87}	
\Pisymbol{knot1}{52}		\Pisymbol{knot1}{72}		\Pisymbol{knot1}{88}	
\Pisymbol{knot1}{53}		\Pisymbol{knot1}{73}		\Pisymbol{knot1}{96}	
\Pisymbol{knot1}{58}		\Pisymbol{knot1}{74}		\Pisymbol{knot1}{97}	
\Pisymbol{knot1}{59}		\Pisymbol{knot1}{75}		\Pisymbol{knot1}{98}	
\Pisymbol{knot1}{60}		\Pisymbol{knot1}{76}		\Pisymbol{knot1}{99}	
\Pisymbol{knot1}{61}		\Pisymbol{knot1}{77}		\Pisymbol{knot1}{100}	

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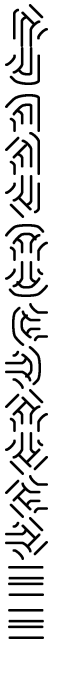
\Pisymbol{knot1}{62}
\Pisymbol{knot1}{63}
\Pisymbol{knot1}{64}
\Pisymbol{knot1}{65}
\Pisymbol{knot1}{66}
\Pisymbol{knot1}{67}

\Pisymbol{knot1}{78}
\Pisymbol{knot1}{79}
\Pisymbol{knot1}{80}
\Pisymbol{knot1}{81}
\Pisymbol{knot1}{82}
\Pisymbol{knot1}{83}

\Pisymbol{knot1}{101}
\Pisymbol{knot1}{102}
\Pisymbol{knot1}{103}
\Pisymbol{knot1}{104}
\Pisymbol{knot1}{105}

\Pisymbol{knot2}{48}
\Pisymbol{knot2}{49}
\Pisymbol{knot2}{50}
\Pisymbol{knot2}{51}
\Pisymbol{knot2}{52}
\Pisymbol{knot2}{53}
\Pisymbol{knot2}{58}
\Pisymbol{knot2}{59}
\Pisymbol{knot2}{60}
\Pisymbol{knot2}{61}
\Pisymbol{knot2}{62}
\Pisymbol{knot2}{63}
\Pisymbol{knot2}{64}
\Pisymbol{knot2}{65}
\Pisymbol{knot2}{66}
\Pisymbol{knot2}{67}

\Pisymbol{knot2}{68}
\Pisymbol{knot2}{69}
\Pisymbol{knot2}{70}
\Pisymbol{knot2}{71}
\Pisymbol{knot2}{72}
\Pisymbol{knot2}{73}
\Pisymbol{knot2}{74}
\Pisymbol{knot2}{75}
\Pisymbol{knot2}{76}
\Pisymbol{knot2}{77}
\Pisymbol{knot2}{78}
\Pisymbol{knot2}{79}
\Pisymbol{knot2}{80}
\Pisymbol{knot2}{81}
\Pisymbol{knot2}{82}
\Pisymbol{knot2}{83}



\Pisymbol{knot2}{84}
\Pisymbol{knot2}{85}
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\Pisymbol{knot2}{88}
\Pisymbol{knot2}{96}
\Pisymbol{knot2}{97}
\Pisymbol{knot2}{98}
\Pisymbol{knot2}{99}
\Pisymbol{knot2}{100}
\Pisymbol{knot2}{101}
\Pisymbol{knot2}{102}
\Pisymbol{knot2}{103}
\Pisymbol{knot2}{104}
\Pisymbol{knot2}{105}

\Pisymbol{knot3}{48}
\Pisymbol{knot3}{49}
\Pisymbol{knot3}{50}
\Pisymbol{knot3}{51}
\Pisymbol{knot3}{52}
\Pisymbol{knot3}{53}
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\Pisymbol{knot3}{74}
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\Pisymbol{knot3}{104}
\Pisymbol{knot3}{105}

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\Pisymbol{knot3}{67}


\Pisymbol{knot3}{83}


\Pisymbol{knot4}{48}
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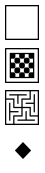
\Pisymbol{knot6}{48}
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\Pisymbol{knot6}{50}
\Pisymbol{knot6}{51}


\Pisymbol{knot6}{68}
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\Pisymbol{knot6}{70}
\Pisymbol{knot6}{71}


\Pisymbol{knot6}{84}
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\Pisymbol{knot6}{86}
\Pisymbol{knot6}{87}

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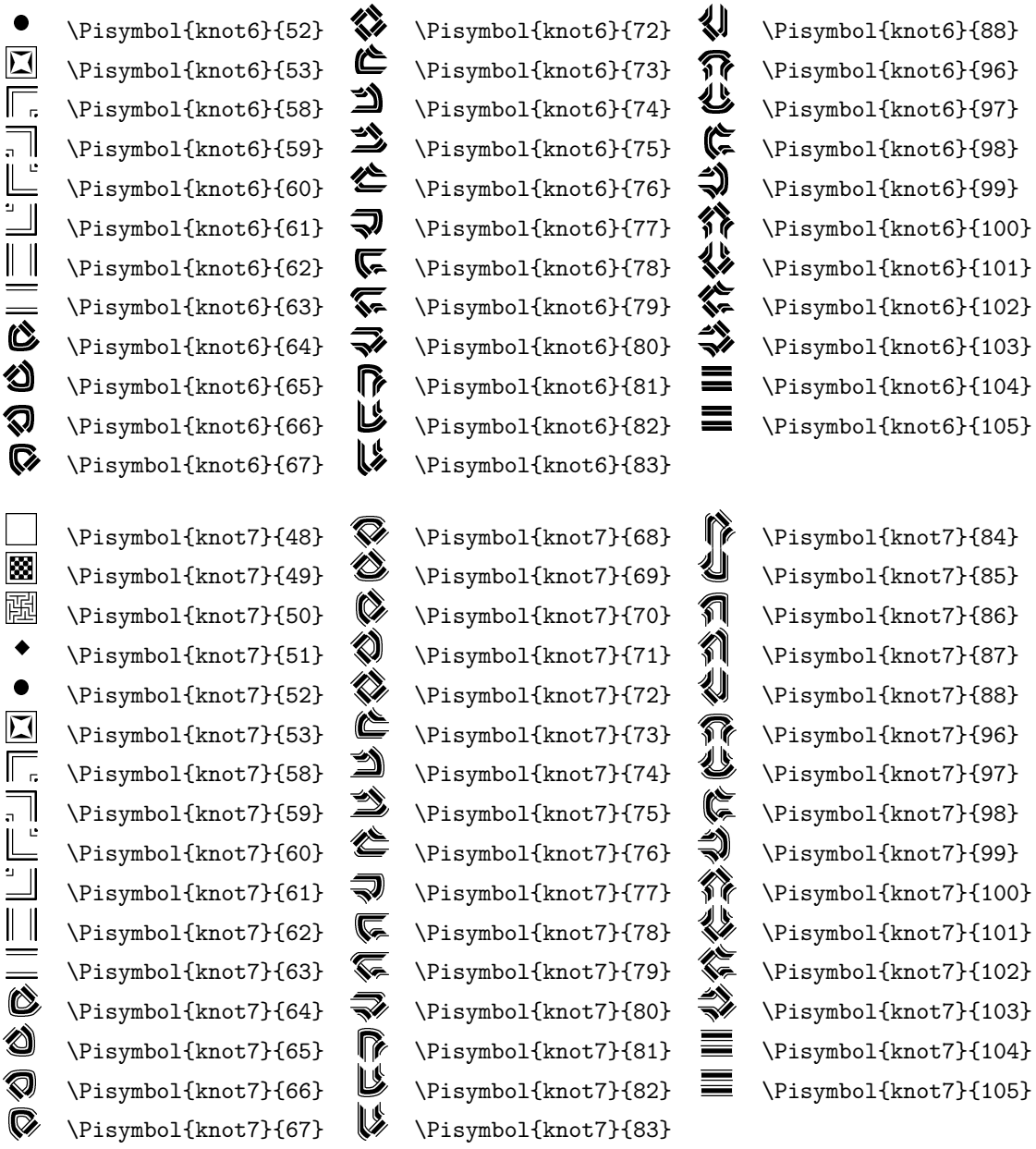
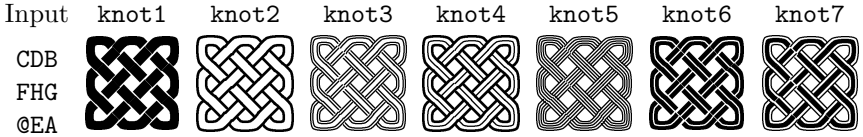


The following is an example of a basic knot, using `\usefont{U}{knot⟨number⟩}{m}{n}` to change fonts for multiple characters instead of `\Pisymbol` to typeset one character at a time. Note that all of the characters in the knot fonts lie conveniently within the range of printable ASCII characters.



The niceframe package can be used to typeset decorative frames using fonts such as knot, especially using characters 48–63 of each font variant.

TABLE 505: dancers Dancing Men

\Pisymbol{dancers}{0}	\Pisymbol{dancers}{86}	\Pisymbol{dancers}{172}
\Pisymbol{dancers}{1}	\Pisymbol{dancers}{87}	\Pisymbol{dancers}{173}
\Pisymbol{dancers}{2}	\Pisymbol{dancers}{88}	\Pisymbol{dancers}{174}
\Pisymbol{dancers}{3}	\Pisymbol{dancers}{89}	\Pisymbol{dancers}{175}
\Pisymbol{dancers}{4}	\Pisymbol{dancers}{90}	\Pisymbol{dancers}{176}
\Pisymbol{dancers}{5}	\Pisymbol{dancers}{91}	\Pisymbol{dancers}{177}
\Pisymbol{dancers}{6}	\Pisymbol{dancers}{92}	\Pisymbol{dancers}{178}
\Pisymbol{dancers}{7}	\Pisymbol{dancers}{93}	\Pisymbol{dancers}{179}
\Pisymbol{dancers}{8}	\Pisymbol{dancers}{94}	\Pisymbol{dancers}{180}
\Pisymbol{dancers}{9}	\Pisymbol{dancers}{95}	\Pisymbol{dancers}{181}
\Pisymbol{dancers}{10}	\Pisymbol{dancers}{96}	\Pisymbol{dancers}{182}
\Pisymbol{dancers}{11}	\Pisymbol{dancers}{97}	\Pisymbol{dancers}{183}
\Pisymbol{dancers}{12}	\Pisymbol{dancers}{98}	\Pisymbol{dancers}{184}
\Pisymbol{dancers}{13}	\Pisymbol{dancers}{99}	\Pisymbol{dancers}{185}
\Pisymbol{dancers}{14}	\Pisymbol{dancers}{100}	\Pisymbol{dancers}{186}
\Pisymbol{dancers}{15}	\Pisymbol{dancers}{101}	\Pisymbol{dancers}{187}
\Pisymbol{dancers}{16}	\Pisymbol{dancers}{102}	\Pisymbol{dancers}{188}
\Pisymbol{dancers}{17}	\Pisymbol{dancers}{103}	\Pisymbol{dancers}{189}
\Pisymbol{dancers}{18}	\Pisymbol{dancers}{104}	\Pisymbol{dancers}{190}
\Pisymbol{dancers}{19}	\Pisymbol{dancers}{105}	\Pisymbol{dancers}{191}
\Pisymbol{dancers}{20}	\Pisymbol{dancers}{106}	\Pisymbol{dancers}{192}
\Pisymbol{dancers}{21}	\Pisymbol{dancers}{107}	\Pisymbol{dancers}{193}
\Pisymbol{dancers}{22}	\Pisymbol{dancers}{108}	\Pisymbol{dancers}{194}
\Pisymbol{dancers}{23}	\Pisymbol{dancers}{109}	\Pisymbol{dancers}{195}
\Pisymbol{dancers}{24}	\Pisymbol{dancers}{110}	\Pisymbol{dancers}{196}
\Pisymbol{dancers}{25}	\Pisymbol{dancers}{111}	\Pisymbol{dancers}{197}
\Pisymbol{dancers}{26}	\Pisymbol{dancers}{112}	\Pisymbol{dancers}{198}
\Pisymbol{dancers}{27}	\Pisymbol{dancers}{113}	\Pisymbol{dancers}{199}
\Pisymbol{dancers}{28}	\Pisymbol{dancers}{114}	\Pisymbol{dancers}{200}
\Pisymbol{dancers}{29}	\Pisymbol{dancers}{115}	\Pisymbol{dancers}{201}
\Pisymbol{dancers}{30}	\Pisymbol{dancers}{116}	\Pisymbol{dancers}{202}
\Pisymbol{dancers}{31}	\Pisymbol{dancers}{117}	\Pisymbol{dancers}{203}
\Pisymbol{dancers}{32}	\Pisymbol{dancers}{118}	\Pisymbol{dancers}{204}
\Pisymbol{dancers}{33}	\Pisymbol{dancers}{119}	\Pisymbol{dancers}{205}

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\Pisymbol{dancers}{69}	\Pisymbol{dancers}{155}	\Pisymbol{dancers}{241}
\Pisymbol{dancers}{70}	\Pisymbol{dancers}{156}	\Pisymbol{dancers}{242}
\Pisymbol{dancers}{71}	\Pisymbol{dancers}{157}	\Pisymbol{dancers}{243}
\Pisymbol{dancers}{72}	\Pisymbol{dancers}{158}	\Pisymbol{dancers}{244}
\Pisymbol{dancers}{73}	\Pisymbol{dancers}{159}	\Pisymbol{dancers}{245}
\Pisymbol{dancers}{74}	\Pisymbol{dancers}{160}	\Pisymbol{dancers}{246}
\Pisymbol{dancers}{75}	\Pisymbol{dancers}{161}	\Pisymbol{dancers}{247}
\Pisymbol{dancers}{76}	\Pisymbol{dancers}{162}	\Pisymbol{dancers}{248}
\Pisymbol{dancers}{77}	\Pisymbol{dancers}{163}	\Pisymbol{dancers}{249}
\Pisymbol{dancers}{78}	\Pisymbol{dancers}{164}	\Pisymbol{dancers}{250}
\Pisymbol{dancers}{79}	\Pisymbol{dancers}{165}	\Pisymbol{dancers}{251}
\Pisymbol{dancers}{80}	\Pisymbol{dancers}{166}	\Pisymbol{dancers}{252}
\Pisymbol{dancers}{81}	\Pisymbol{dancers}{167}	\Pisymbol{dancers}{253}
\Pisymbol{dancers}{82}	\Pisymbol{dancers}{168}	\Pisymbol{dancers}{254}
\Pisymbol{dancers}{83}	\Pisymbol{dancers}{169}	\Pisymbol{dancers}{255}
\Pisymbol{dancers}{84}	\Pisymbol{dancers}{170}	
\Pisymbol{dancers}{85}	\Pisymbol{dancers}{171}	

Fans of Sherlock Holmes mysteries will recognize these glyphs as forming the substitution cipher featured in Sir Arthur Conan Doyle's *The Adventure of the Dancing Men* (1903).

TABLE 506: semaphor Semaphore Alphabet

	\Pisymbol{smfpr10}{34}		\Pisymbol{smfpr10}{116}		\Pisymbol{smfpr10}{184}
	\Pisymbol{smfpr10}{35}		\Pisymbol{smfpr10}{117}		\Pisymbol{smfpr10}{185}
	\Pisymbol{smfpr10}{36}		\Pisymbol{smfpr10}{118}		\Pisymbol{smfpr10}{186}
	\Pisymbol{smfpr10}{42}		\Pisymbol{smfpr10}{119}		\Pisymbol{smfpr10}{187}
	\Pisymbol{smfpr10}{46}		\Pisymbol{smfpr10}{120}		\Pisymbol{smfpr10}{192}
	\Pisymbol{smfpr10}{48}		\Pisymbol{smfpr10}{121}		\Pisymbol{smfpr10}{193}
	\Pisymbol{smfpr10}{49}		\Pisymbol{smfpr10}{122}		\Pisymbol{smfpr10}{194}
	\Pisymbol{smfpr10}{50}		\Pisymbol{smfpr10}{126}		\Pisymbol{smfpr10}{195}
	\Pisymbol{smfpr10}{51}		\Pisymbol{smfpr10}{128}		\Pisymbol{smfpr10}{196}
	\Pisymbol{smfpr10}{52}		\Pisymbol{smfpr10}{129}		\Pisymbol{smfpr10}{197}
	\Pisymbol{smfpr10}{53}		\Pisymbol{smfpr10}{130}		\Pisymbol{smfpr10}{199}
	\Pisymbol{smfpr10}{54}		\Pisymbol{smfpr10}{131}		\Pisymbol{smfpr10}{200}
	\Pisymbol{smfpr10}{55}		\Pisymbol{smfpr10}{132}		\Pisymbol{smfpr10}{201}
	\Pisymbol{smfpr10}{56}		\Pisymbol{smfpr10}{133}		\Pisymbol{smfpr10}{202}
	\Pisymbol{smfpr10}{57}		\Pisymbol{smfpr10}{134}		\Pisymbol{smfpr10}{203}

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	\Pisymbol{smfpr10}{65}
	\Pisymbol{smfpr10}{66}
	\Pisymbol{smfpr10}{67}
	\Pisymbol{smfpr10}{68}
	\Pisymbol{smfpr10}{69}
	\Pisymbol{smfpr10}{70}
	\Pisymbol{smfpr10}{71}
	\Pisymbol{smfpr10}{72}
	\Pisymbol{smfpr10}{73}
	\Pisymbol{smfpr10}{74}
	\Pisymbol{smfpr10}{75}
	\Pisymbol{smfpr10}{76}
	\Pisymbol{smfpr10}{77}
	\Pisymbol{smfpr10}{78}
	\Pisymbol{smfpr10}{79}
	\Pisymbol{smfpr10}{80}
	\Pisymbol{smfpr10}{81}
	\Pisymbol{smfpr10}{82}
	\Pisymbol{smfpr10}{83}
	\Pisymbol{smfpr10}{84}
	\Pisymbol{smfpr10}{85}
	\Pisymbol{smfpr10}{86}
	\Pisymbol{smfpr10}{87}
	\Pisymbol{smfpr10}{88}
	\Pisymbol{smfpr10}{89}
	\Pisymbol{smfpr10}{90}
	\Pisymbol{smfpr10}{97}
	\Pisymbol{smfpr10}{98}
	\Pisymbol{smfpr10}{99}
	\Pisymbol{smfpr10}{100}
	\Pisymbol{smfpr10}{101}
	\Pisymbol{smfpr10}{102}
	\Pisymbol{smfpr10}{103}
	\Pisymbol{smfpr10}{104}
	\Pisymbol{smfpr10}{105}
	\Pisymbol{smfpr10}{106}
	\Pisymbol{smfpr10}{107}
	\Pisymbol{smfpr10}{108}
	\Pisymbol{smfpr10}{109}
	\Pisymbol{smfpr10}{110}
	\Pisymbol{smfpr10}{111}
	\Pisymbol{smfpr10}{112}
	\Pisymbol{smfpr10}{113}
	\Pisymbol{smfpr10}{114}
	\Pisymbol{smfpr10}{115}
	\Pisymbol{smfpr10}{135}
	\Pisymbol{smfpr10}{136}
	\Pisymbol{smfpr10}{137}
	\Pisymbol{smfpr10}{138}
	\Pisymbol{smfpr10}{139}
	\Pisymbol{smfpr10}{140}
	\Pisymbol{smfpr10}{142}
	\Pisymbol{smfpr10}{143}
	\Pisymbol{smfpr10}{144}
	\Pisymbol{smfpr10}{145}
	\Pisymbol{smfpr10}{146}
	\Pisymbol{smfpr10}{147}
	\Pisymbol{smfpr10}{148}
	\Pisymbol{smfpr10}{149}
	\Pisymbol{smfpr10}{150}
	\Pisymbol{smfpr10}{151}
	\Pisymbol{smfpr10}{152}
	\Pisymbol{smfpr10}{153}
	\Pisymbol{smfpr10}{154}
	\Pisymbol{smfpr10}{155}
	\Pisymbol{smfpr10}{157}
	\Pisymbol{smfpr10}{158}
	\Pisymbol{smfpr10}{160}
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	\Pisymbol{smfpr10}{165}
	\Pisymbol{smfpr10}{166}
	\Pisymbol{smfpr10}{167}
	\Pisymbol{smfpr10}{168}
	\Pisymbol{smfpr10}{169}
	\Pisymbol{smfpr10}{170}
	\Pisymbol{smfpr10}{171}
	\Pisymbol{smfpr10}{172}
	\Pisymbol{smfpr10}{174}
	\Pisymbol{smfpr10}{175}
	\Pisymbol{smfpr10}{176}
	\Pisymbol{smfpr10}{177}
	\Pisymbol{smfpr10}{178}
	\Pisymbol{smfpr10}{179}
	\Pisymbol{smfpr10}{180}
	\Pisymbol{smfpr10}{181}
	\Pisymbol{smfpr10}{182}
	\Pisymbol{smfpr10}{183}
	\Pisymbol{smfpr10}{204}
	\Pisymbol{smfpr10}{205}
	\Pisymbol{smfpr10}{206}
	\Pisymbol{smfpr10}{207}
	\Pisymbol{smfpr10}{209}
	\Pisymbol{smfpr10}{210}
	\Pisymbol{smfpr10}{211}
	\Pisymbol{smfpr10}{212}
	\Pisymbol{smfpr10}{213}
	\Pisymbol{smfpr10}{214}
	\Pisymbol{smfpr10}{216}
	\Pisymbol{smfpr10}{217}
	\Pisymbol{smfpr10}{218}
	\Pisymbol{smfpr10}{219}
	\Pisymbol{smfpr10}{220}
	\Pisymbol{smfpr10}{221}
	\Pisymbol{smfpr10}{224}
	\Pisymbol{smfpr10}{225}
	\Pisymbol{smfpr10}{226}
	\Pisymbol{smfpr10}{227}
	\Pisymbol{smfpr10}{228}
	\Pisymbol{smfpr10}{229}
	\Pisymbol{smfpr10}{231}
	\Pisymbol{smfpr10}{232}
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	\Pisymbol{smfpr10}{245}
	\Pisymbol{smfpr10}{246}
	\Pisymbol{smfpr10}{248}
	\Pisymbol{smfpr10}{249}
	\Pisymbol{smfpr10}{250}
	\Pisymbol{smfpr10}{251}
	\Pisymbol{smfpr10}{252}
	\Pisymbol{smfpr10}{253}

semaphor provides a `semaf.fd` font-definition file. Instead of using pifont and `\Pisymbol` to typeset a glyph, a document can select the semaphor fonts directly, although this does require putting `\input{semaf.fd}` in the document's preamble. For example, `{\usefont{OT1}{smfp}{m}{n}Hello}` will typeset "". This can be useful for typesetting complete messages. Roman, bold, monospace, slanted, and bold+slanted styles are all supported.

In addition, semaphor provides three variations of each font: a "person" version (`smfpr10`), which is what is illustrated in the preceding table, a "pillar" version (`smfr10`), which shows the flags on a pillar rather than being held by a person, and an "empty" version (`smfer10`), which shows only the flags and no pillar or person. Contrast these variations of the letter "H":

Table 507: cryst Crystallography Symbols

◦	\Pisymbol{cryst}{0}		\Pisymbol{cryst}{63}		\Pisymbol{cryst}{138}
	\Pisymbol{cryst}{2}		\Pisymbol{cryst}{64}		\Pisymbol{cryst}{139}
▲	\Pisymbol{cryst}{3}		\Pisymbol{cryst}{65}		\Pisymbol{cryst}{140}
◆	\Pisymbol{cryst}{4}		\Pisymbol{cryst}{66}		\Pisymbol{cryst}{141}
	\Pisymbol{cryst}{5}		\Pisymbol{cryst}{75}		\Pisymbol{cryst}{142}
⬢	\Pisymbol{cryst}{6}		\Pisymbol{cryst}{77}		\Pisymbol{cryst}{143}
	\Pisymbol{cryst}{7}		\Pisymbol{cryst}{78}		\Pisymbol{cryst}{145}
	\Pisymbol{cryst}{8}		\Pisymbol{cryst}{79}		\Pisymbol{cryst}{147}
	\Pisymbol{cryst}{9}		\Pisymbol{cryst}{80}		\Pisymbol{cryst}{148}
◦	\Pisymbol{cryst}{10}		\Pisymbol{cryst}{81}		\Pisymbol{cryst}{149}
	\Pisymbol{cryst}{12}		\Pisymbol{cryst}{82}		\Pisymbol{cryst}{155}
⬟	\Pisymbol{cryst}{15}		\Pisymbol{cryst}{83}		\Pisymbol{cryst}{157}
	\Pisymbol{cryst}{20}		\Pisymbol{cryst}{84}		\Pisymbol{cryst}{158}
	\Pisymbol{cryst}{21}		\Pisymbol{cryst}{85}		\Pisymbol{cryst}{159}
⬬	\Pisymbol{cryst}{22}		\Pisymbol{cryst}{87}		\Pisymbol{cryst}{175}
	\Pisymbol{cryst}{24}		\Pisymbol{cryst}{88}		\Pisymbol{cryst}{177}
	\Pisymbol{cryst}{25}		\Pisymbol{cryst}{89}		\Pisymbol{cryst}{178}
	\Pisymbol{cryst}{27}		\Pisymbol{cryst}{95}		\Pisymbol{cryst}{179}
	\Pisymbol{cryst}{28}		\Pisymbol{cryst}{97}		\Pisymbol{cryst}{185}
	\Pisymbol{cryst}{29}		\Pisymbol{cryst}{98}		\Pisymbol{cryst}{187}
▵	\Pisymbol{cryst}{30}		\Pisymbol{cryst}{99}		\Pisymbol{cryst}{188}
	\Pisymbol{cryst}{31}		\Pisymbol{cryst}{102}		\Pisymbol{cryst}{189}
	\Pisymbol{cryst}{32}		\Pisymbol{cryst}{103}		\Pisymbol{cryst}{195}
	\Pisymbol{cryst}{35}		\Pisymbol{cryst}{104}		\Pisymbol{cryst}{197}
	\Pisymbol{cryst}{36}		\Pisymbol{cryst}{105}		\Pisymbol{cryst}{198}
	\Pisymbol{cryst}{37}		\Pisymbol{cryst}{107}		\Pisymbol{cryst}{199}
	\Pisymbol{cryst}{38}		\Pisymbol{cryst}{108}		\Pisymbol{cryst}{202}
	\Pisymbol{cryst}{39}		\Pisymbol{cryst}{109}		\Pisymbol{cryst}{203}
◇	\Pisymbol{cryst}{40}		\Pisymbol{cryst}{112}		\Pisymbol{cryst}{204}
	\Pisymbol{cryst}{41}		\Pisymbol{cryst}{113}		\Pisymbol{cryst}{210}
	\Pisymbol{cryst}{42}		\Pisymbol{cryst}{120}		\Pisymbol{cryst}{212}
	\Pisymbol{cryst}{43}		\Pisymbol{cryst}{121}		\Pisymbol{cryst}{213}

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■	\Pisymbol{cryst}{44}		\Pisymbol{cryst}{123}		\Pisymbol{cryst}{220}
	\Pisymbol{cryst}{45}		\Pisymbol{cryst}{124}		\Pisymbol{cryst}{221}
	\Pisymbol{cryst}{47}		\Pisymbol{cryst}{125}		\Pisymbol{cryst}{223}
	\Pisymbol{cryst}{48}		\Pisymbol{cryst}{127}		\Pisymbol{cryst}{224}
	\Pisymbol{cryst}{49}		\Pisymbol{cryst}{128}		\Pisymbol{cryst}{230}
	\Pisymbol{cryst}{50}		\Pisymbol{cryst}{129}		\Pisymbol{cryst}{231}
	\Pisymbol{cryst}{55}		\Pisymbol{cryst}{130}		\Pisymbol{cryst}{232}
	\Pisymbol{cryst}{57}		\Pisymbol{cryst}{131}		\Pisymbol{cryst}{233}
	\Pisymbol{cryst}{58}		\Pisymbol{cryst}{132}		\Pisymbol{cryst}{236}
	\Pisymbol{cryst}{59}		\Pisymbol{cryst}{133}		\Pisymbol{cryst}{240}
	\Pisymbol{cryst}{60}		\Pisymbol{cryst}{135}		\Pisymbol{cryst}{241}
	\Pisymbol{cryst}{61}		\Pisymbol{cryst}{136}		\Pisymbol{cryst}{242}
	\Pisymbol{cryst}{62}		\Pisymbol{cryst}{137}		\Pisymbol{cryst}{243}

TABLE 508: dice Dice

⚀	\Pisymbol{dice3d}{49}		\Pisymbol{dice3d}{101}		\Pisymbol{dice3d}{111}
⚁	\Pisymbol{dice3d}{50}		\Pisymbol{dice3d}{102}		\Pisymbol{dice3d}{112}
⚂	\Pisymbol{dice3d}{51}		\Pisymbol{dice3d}{103}		\Pisymbol{dice3d}{113}
⚃	\Pisymbol{dice3d}{52}		\Pisymbol{dice3d}{104}		\Pisymbol{dice3d}{114}
⚄	\Pisymbol{dice3d}{53}		\Pisymbol{dice3d}{105}		\Pisymbol{dice3d}{115}
⚅	\Pisymbol{dice3d}{54}		\Pisymbol{dice3d}{106}		\Pisymbol{dice3d}{116}
	\Pisymbol{dice3d}{97}		\Pisymbol{dice3d}{107}		\Pisymbol{dice3d}{117}
	\Pisymbol{dice3d}{98}		\Pisymbol{dice3d}{108}		\Pisymbol{dice3d}{118}
	\Pisymbol{dice3d}{99}		\Pisymbol{dice3d}{109}		\Pisymbol{dice3d}{119}
	\Pisymbol{dice3d}{100}		\Pisymbol{dice3d}{110}		\Pisymbol{dice3d}{120}

dice defines its symbols at a very small design size. The glyphs shown above were scaled up by a factor of four using `\DeclareFontShape{U}{dice3d}{m}{n}{<-> s*[4] dice3d}{}`.

An alternative to using `\Pisymbol` to select a die rotation is to rely on some cleverness in the kerning tables provided by the dice font. The individual digits "1" through "6" each produce the corresponding (2D) die face: `{\usefont{U}{dice3d}{m}{n}2 2 1}` produces "⚁ ⚁ ⚀", for example. When followed by a letter "a" through "d", those pairs are kerned to produce a 3D die rotation with the digit specifying by the top face and the letter specifying one of the four possible front faces, sorted by increasing value. For example, `{\usefont{U}{dice3d}{m}{n}2a 2b 1d}` produces "".

TABLE 509: magic Trading Card Symbols

⓪	`\Pisymbol{magic}{48}`	⑥	`\Pisymbol{magic}{54}`	❷	`\Pisymbol{magic}{82}`
①	`\Pisymbol{magic}{49}`	⑦	`\Pisymbol{magic}{55}`	⛐	`\Pisymbol{magic}{84}`
②	`\Pisymbol{magic}{50}`	⑧	`\Pisymbol{magic}{56}`	❶	`\Pisymbol{magic}{85}`
③	`\Pisymbol{magic}{51}`	⑨	`\Pisymbol{magic}{57}`	❸	`\Pisymbol{magic}{87}`
④	`\Pisymbol{magic}{52}`	❽	`\Pisymbol{magic}{66}`	ⓧ	`\Pisymbol{magic}{88}`
⑤	`\Pisymbol{magic}{53}`	❼	`\Pisymbol{magic}{71}`	⑩	`\Pisymbol{magic}{90}`

The preceding symbols resemble those from Wizards of the Coast's *Magic: The Gathering* trading-card game. An alternative to entering symbols numerically using `\Pisymbol` is to switch to the magic font with `\usefont{U}{magic}{m}{n}` and employ the following mnemonic characters:

⓪–⑨	0–9	Circled numerals 0–9
❽	B	Black magic symbol
❼	G	Green magic symbol
❷	R	Red magic symbol
⛐	T	Tap symbol (tilted "T" in a circle)
❶	U	Blue magic symbol
❸	W	White magic symbol
ⓧ	X	Circled "X" (for mana cost, e.g., Fireball)
⑩	Z	Circled "10" (for mana cost, e.g., Aladdin's Lamp)

TABLE 510: bartel-chess-fonts Chess Pieces and Chessboard Squares

♙	`\Pisymbol{fselch}{0}`	♳	`\Pisymbol{fselch}{55}`	♷	`\Pisymbol{fselch}{110}`
♘	`\Pisymbol{fselch}{1}`	♴	`\Pisymbol{fselch}{56}`	♸	`\Pisymbol{fselch}{111}`
♗	`\Pisymbol{fselch}{2}`	♵	`\Pisymbol{fselch}{57}`	♹	`\Pisymbol{fselch}{112}`
♖	`\Pisymbol{fselch}{3}`	♶	`\Pisymbol{fselch}{58}`	♺	`\Pisymbol{fselch}{113}`
♕	`\Pisymbol{fselch}{4}`	♷	`\Pisymbol{fselch}{59}`	♻	`\Pisymbol{fselch}{114}`
♔	`\Pisymbol{fselch}{5}`	♸	`\Pisymbol{fselch}{60}`	♼	`\Pisymbol{fselch}{115}`
♙	`\Pisymbol{fselch}{6}`	♹	`\Pisymbol{fselch}{61}`	♽	`\Pisymbol{fselch}{116}`
♘	`\Pisymbol{fselch}{7}`	♺	`\Pisymbol{fselch}{62}`	♾	`\Pisymbol{fselch}{117}`
♗	`\Pisymbol{fselch}{8}`	♻	`\Pisymbol{fselch}{63}`	♿	`\Pisymbol{fselch}{118}`
♖	`\Pisymbol{fselch}{9}`	♼	`\Pisymbol{fselch}{64}`	🀀	`\Pisymbol{fselch}{119}`
♕	`\Pisymbol{fselch}{10}`	♽	`\Pisymbol{fselch}{65}`	🀁	`\Pisymbol{fselch}{120}`
♔	`\Pisymbol{fselch}{11}`	♾	`\Pisymbol{fselch}{66}`	🀂	`\Pisymbol{fselch}{121}`
♟	`\Pisymbol{fselch}{12}`	♿	`\Pisymbol{fselch}{67}`	🀃	`\Pisymbol{fselch}{122}`
♞	`\Pisymbol{fselch}{13}`	🀀	`\Pisymbol{fselch}{68}`	🀄	`\Pisymbol{fselch}{123}`
♝	`\Pisymbol{fselch}{14}`	🀁	`\Pisymbol{fselch}{69}`	🀅	`\Pisymbol{fselch}{124}`
♜	`\Pisymbol{fselch}{15}`	🀂	`\Pisymbol{fselch}{70}`	🀆	`\Pisymbol{fselch}{125}`
♛	`\Pisymbol{fselch}{16}`	🀃	`\Pisymbol{fselch}{71}`	🀇	`\Pisymbol{fselch}{126}`
♚	`\Pisymbol{fselch}{17}`	🀄	`\Pisymbol{fselch}{72}`	🀈	`\Pisymbol{fselch}{127}`
♙	`\Pisymbol{fselch}{18}`	🀅	`\Pisymbol{fselch}{73}`	🀉	`\Pisymbol{fselch}{128}`
♘	`\Pisymbol{fselch}{19}`	🀆	`\Pisymbol{fselch}{74}`	🀊	`\Pisymbol{fselch}{129}`

(continued on next page)

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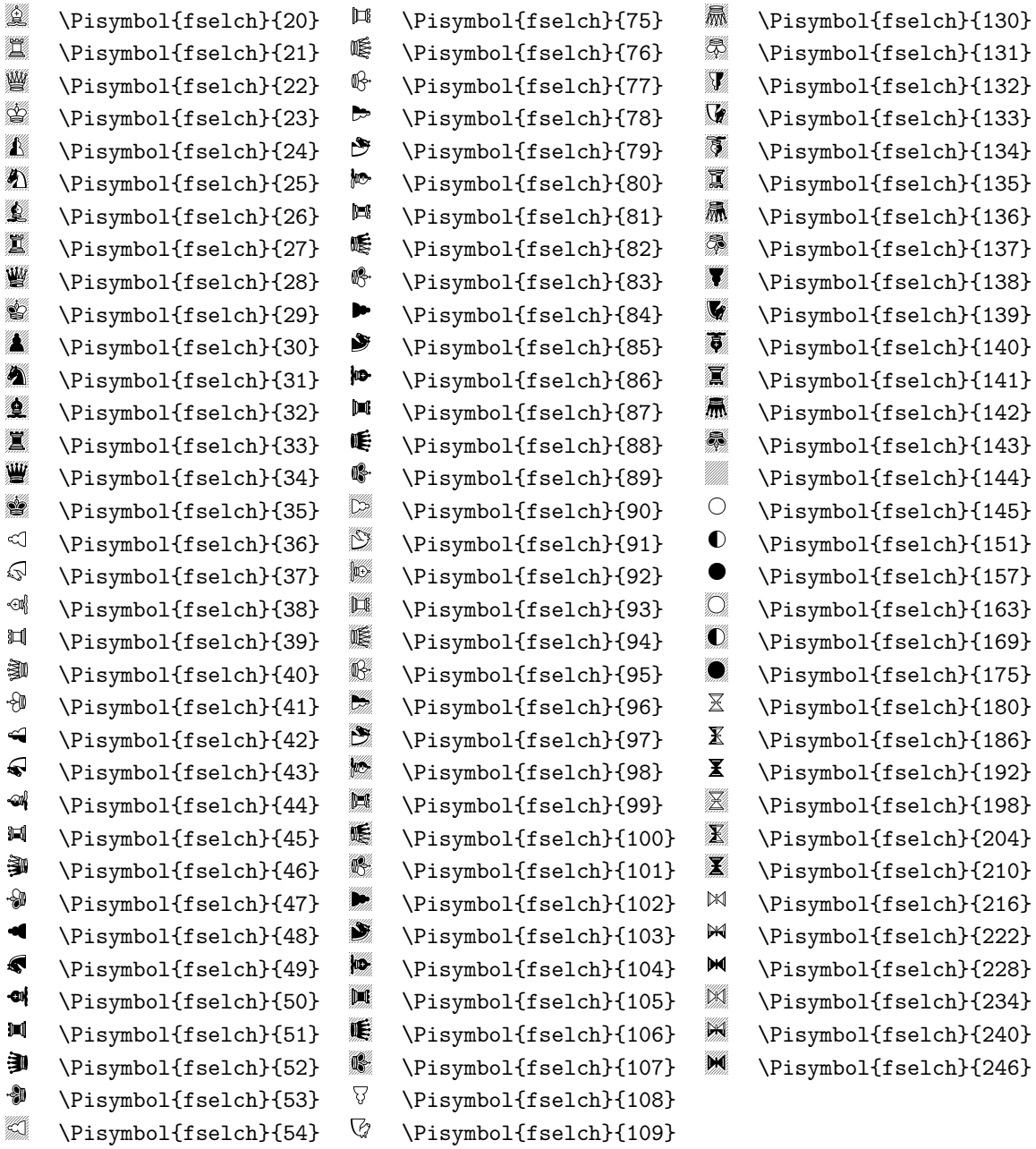


\Pisymbol{fselch}{20}	\Pisymbol{fselch}{75}	\Pisymbol{fselch}{130}
\Pisymbol{fselch}{21}	\Pisymbol{fselch}{76}	\Pisymbol{fselch}{131}
\Pisymbol{fselch}{22}	\Pisymbol{fselch}{77}	\Pisymbol{fselch}{132}
\Pisymbol{fselch}{23}	\Pisymbol{fselch}{78}	\Pisymbol{fselch}{133}
\Pisymbol{fselch}{24}	\Pisymbol{fselch}{79}	\Pisymbol{fselch}{134}
\Pisymbol{fselch}{25}	\Pisymbol{fselch}{80}	\Pisymbol{fselch}{135}
\Pisymbol{fselch}{26}	\Pisymbol{fselch}{81}	\Pisymbol{fselch}{136}
\Pisymbol{fselch}{27}	\Pisymbol{fselch}{82}	\Pisymbol{fselch}{137}
\Pisymbol{fselch}{28}	\Pisymbol{fselch}{83}	\Pisymbol{fselch}{138}
\Pisymbol{fselch}{29}	\Pisymbol{fselch}{84}	\Pisymbol{fselch}{139}
\Pisymbol{fselch}{30}	\Pisymbol{fselch}{85}	\Pisymbol{fselch}{140}
\Pisymbol{fselch}{31}	\Pisymbol{fselch}{86}	\Pisymbol{fselch}{141}
\Pisymbol{fselch}{32}	\Pisymbol{fselch}{87}	\Pisymbol{fselch}{142}
\Pisymbol{fselch}{33}	\Pisymbol{fselch}{88}	\Pisymbol{fselch}{143}
\Pisymbol{fselch}{34}	\Pisymbol{fselch}{89}	\Pisymbol{fselch}{144}
\Pisymbol{fselch}{35}	\Pisymbol{fselch}{90}	\Pisymbol{fselch}{145}
\Pisymbol{fselch}{36}	\Pisymbol{fselch}{91}	\Pisymbol{fselch}{151}
\Pisymbol{fselch}{37}	\Pisymbol{fselch}{92}	\Pisymbol{fselch}{157}
\Pisymbol{fselch}{38}	\Pisymbol{fselch}{93}	\Pisymbol{fselch}{163}
\Pisymbol{fselch}{39}	\Pisymbol{fselch}{94}	\Pisymbol{fselch}{169}
\Pisymbol{fselch}{40}	\Pisymbol{fselch}{95}	\Pisymbol{fselch}{175}
\Pisymbol{fselch}{41}	\Pisymbol{fselch}{96}	\Pisymbol{fselch}{180}
\Pisymbol{fselch}{42}	\Pisymbol{fselch}{97}	\Pisymbol{fselch}{186}
\Pisymbol{fselch}{43}	\Pisymbol{fselch}{98}	\Pisymbol{fselch}{192}
\Pisymbol{fselch}{44}	\Pisymbol{fselch}{99}	\Pisymbol{fselch}{198}
\Pisymbol{fselch}{45}	\Pisymbol{fselch}{100}	\Pisymbol{fselch}{204}
\Pisymbol{fselch}{46}	\Pisymbol{fselch}{101}	\Pisymbol{fselch}{210}
\Pisymbol{fselch}{47}	\Pisymbol{fselch}{102}	\Pisymbol{fselch}{216}
\Pisymbol{fselch}{48}	\Pisymbol{fselch}{103}	\Pisymbol{fselch}{222}
\Pisymbol{fselch}{49}	\Pisymbol{fselch}{104}	\Pisymbol{fselch}{228}
\Pisymbol{fselch}{50}	\Pisymbol{fselch}{105}	\Pisymbol{fselch}{234}
\Pisymbol{fselch}{51}	\Pisymbol{fselch}{106}	\Pisymbol{fselch}{240}
\Pisymbol{fselch}{52}	\Pisymbol{fselch}{107}	\Pisymbol{fselch}{246}
\Pisymbol{fselch}{53}	\Pisymbol{fselch}{108}	
\Pisymbol{fselch}{54}	\Pisymbol{fselch}{109}	

In addition to the `fselch` font showcased above, bartel-chess-fonts also provides a `pkelch` font which includes the same symbol set (minus some of the higher-numbered characters) but drawn in a slightly different style.

bartel-chess-fonts provides the `fselch` and `pkelch` fonts in various sizes (optically scaled). See "LaTeX 2_ε Font Selection" [LAT00] for advice on how to expose these sorts of fonts to LaTeX using `\DeclareFontFamily` and `\DeclareFontShape`.

10 Additional Information

Unlike the previous sections of this document, Section 10 does not contain new symbol tables. Rather, it provides additional help in using the Comprehensive LaTeX Symbol List. First, it draws attention to symbol names used by multiple packages. Next, it provides some guidelines for finding symbols and gives some examples regarding how to construct missing symbols out of existing ones. Then, it comments on the spacing surrounding symbols in math mode. After that, it presents an ASCII and Latin 1 quick-reference guide, showing how to enter all of the standard ASCII/Latin 1 symbols in LaTeX. And finally, it lists some statistics about this document itself.

10.1 Symbol Name Clashes

Unfortunately, a number of symbol names are not unique; they appear in more than one package. Depending on how the symbols are defined in each package, LaTeX will either output an error message or replace an earlier-defined symbol with a later-defined symbol. Table 511 on the next page presents a selection of name clashes that appear in this document.

Using multiple symbols with the same name in the same document—or even merely loading conflicting symbol packages—can be tricky but, as evidenced by the existence of Table 511, not impossible. The general procedure is to load the first package, rename the conflicting symbols, and then load the second package. Examine the LaTeX source for this document (`symbols.tex`) for examples of this and other techniques for handling symbol conflicts. Note that `symbols.tex`'s `\savesymbol` and `\restoresymbol` macros have been extracted into the savesym package, which can be downloaded from CTAN.

txfonts and pxfonts redefine a huge number of symbols—essentially, all of the symbols defined by latexsym, textcomp, the various $\mathcal{AMS}$ symbol sets, and LaTeX 2_ε itself. Similarly, mathabx redefines a vast number of math symbols in an attempt to improve their look. The txfonts, pxfonts, and mathabx conflicts are not listed in Table 511 because they are designed to be compatible with the symbols they replace. Table 512 on page 208 illustrates what "compatible" means in this context.

To use the new txfonts/pxfonts symbols without altering the document's main font, merely reset the default font families back to their original values after loading one of those packages:

```
\renewcommand\rmdefault{cmr}
\renewcommand\sfdefault{cmss}
\renewcommand\ttdefault{cmtt}
```

10.2 Resizing symbols

Mathematical symbols listed in this document as "variable-sized" are designed to stretch vertically. Each variable-sized symbol comes in one or more basic sizes plus a variation comprising both stretchable and nonstretchable segments. Table 513 on page 208 presents the symbols `\}` and `\uparrow` in their default size, in their `\big`, `\Big`, `\bigg`, and `\Bigg` sizes, in an even larger size achieved using `\left`/`\right`, and—for contrast—in a large size achieved by changing the font size using LaTeX 2_ε's `\fontsize` command. Because the symbols shown belong to the Computer Modern family, the type1cm package needs to be loaded to support font sizes larger than 24.88 pt.

Note how `\fontsize` makes the symbol wider and thicker. (The graphicx package's `\scalebox` or `\resizebox` commands would produce a similar effect.) Also, the `\fontsize`-enlarged symbol is vertically centered relative to correspondingly large text, unlike the symbols enlarged using `\big` et al. or `\left`/`\right`, which all use the same math axis regardless of symbol size. However, `\fontsize` is not limited to mathematical delimiters. Also, `\scalebox` and `\resizebox` are more robust to poorly composed symbols (e.g., two symbols made to overlap by backspacing a fixed distance) but do not work with every TeX backend and will produce jagged symbols when scaling a bitmapped font.

All variable-sized delimiters are defined (by the corresponding `.tfm` file) in terms of up to five segments, as illustrated by Figure 1 on page 208. The top, middle, and bottom segments are of a fixed size. The top-middle and middle-bottom segments (which are constrained to be the same character) are repeated as many times as necessary to achieve the desired height.

10.3 Where can I find the symbol for . . . ?

If you can't find some symbol you're looking for in this document, there are a few possible explanations:

TABLE 511: Symbol Name Clashes

Symbol	LaTeX 2ε	AMS	stmaryrd	wasysym	mathabx	marvosym	bbding	ifsym	dingbat	wsuipa
\baro			ϕ							ɵ
\bigtriangledown	▽		▽							
\bigtriangleup	△		△							
\checkmark		✓							✓	
\Circle				○				○		
\Cross						†	†	×		
\ggg		⋙			⋙					
\Letter						✉		✉		
\lightning			↯	↯						
\Lightning						🗲		🗲		
\lll		⋘			⋘					
\Square				□			□	□		
\Sun					⊙	🌣		☼		
\TriangleDown							▼	▽		
\TriangleUp							▲	△		

Table 512: Example of a Benign Name Clash

Symbol	Default (Computer Modern)	txfonts (Times Roman)
`R`	R	R
`\textrecipe`	℞	℞

Table 513: Sample resized delimiters

Symbol	Default size	`\big`	`\Big`	`\bigg`	`\Bigg`	`\left` / `\right`	`\fontsize`
`\}`	$\}$	$\big\}$	$\Big\}$	$\bigg\}$	$\Bigg\}$	$\}$	$\}$
`\uparrow`	$\uparrow$	$\big\uparrow$	$\Big\uparrow$	$\bigg\uparrow$	$\Bigg\uparrow$	$\uparrow$	$\uparrow$

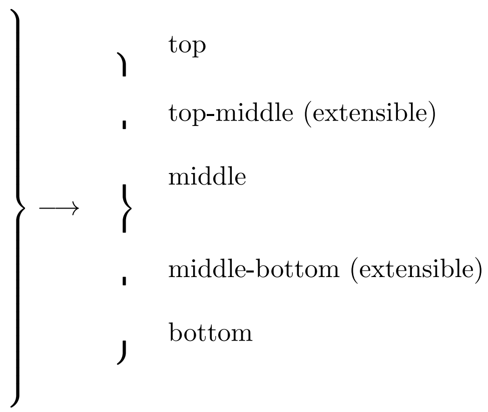


Figure 1: Implementation of variable-sized delimiters

- The symbol isn't intuitively named. As a few examples, the ifsym command to draw dice is "`\Cube`"; a plus sign with a circle around it ("exclusive or" to computer engineers) is "`\oplus`"; and lightning bolts in fonts designed by German speakers may have "blitz" in their names as in the ulsy package. The moral of the story is to be creative with synonyms when searching the index.
- The symbol is defined by some package that I overlooked (or deemed unimportant). If there's some symbol package that you think should be included in the Comprehensive LaTeX Symbol List, please send me e-mail at the address listed on the title page.
- The symbol isn't defined in any package whatsoever.

Even in the last case, all is not lost. Sometimes, a symbol exists in a font, but there is no LaTeX binding for it. For example, the PostScript Symbol font contains a "↵" symbol, which may be useful for representing a carriage return, but there is no package (as far as I know) for accessing that symbol. To produce an unnamed symbol, you need to switch to the font explicitly with LaTeX 2_ε's low-level font commands [LaT00] and use TeX's primitive `\char` command [Knu86a] to request a specific character number in the font. For example, one can define a command to typeset a long s ("ſ") using character 115 from the Latin Modern fonts in the TS1 font encoding:

```
\newcommand{\textlongs}{{%
  \fontencoding{TS1}\fontfamily{lmr}\selectfont\char115%
}}
```

Then, "`\textlongs ucce\textlongs sful`" will produce "fuccefsful"—in the current font style (roman, italic, bold, etc.)

In fact, `\char` is not strictly necesssary in all cases; the character can often be entered symbolically. For example, the symbol for an impulse train or Tate-Shafarevich group ("Ш") is actually an uppercase *sha* in the Cyrillic alphabet. (Cyrillic is supported by the OT2 font encoding, for instance). While a *sha* can be defined numerically as "`{\fontencoding{OT2}\selectfont\char88}`" it may be more intuitive to use the OT2 font encoding's "SH" ligature: "`{\fontencoding{OT2}\selectfont SH}`". Another possibility is to use the T2A font encoding's `\CYRSH` command: "`{\fontencoding{T2A}\selectfont \CYRSH}`".

For the specific case of the U font encoding, which is used for symbol or "pi" fonts, the pifont package defines a convenient `\Pisymbol` command. `\Pisymbol` typesets a specified character (by number) in a specified font family. For example, "`\Pisymbol{psy}{191}`" produces the aforementioned "↵" symbol by typesetting character number 191 in the `psy` (PostScript Symbol) font family.

Reflecting and rotating existing symbols

A common request on `comp.text.tex` is for a reversed or rotated version of an existing symbol. As a last resort, these effects can be achieved with the graphicx (or graphics) package's `\reflectbox` and `\rotatebox` macros. For example, `\textsuperscript{\reflectbox{?}}` produces an irony mark ("⸮"), and `\rotatebox[origin=c]{180}{$\iota$}` produces the definite-description operator ("℩"). As noted by Marc Olschok in a July 2011 post on `comp.text.tex`, Project Gutenberg uses `\reflectbox` to typeset the part ("⊇") and whole ("⊆") relations used in Dedekind's set notation:

```
\newcommand\partof{\mathrel{\raisebox{0.45ex}{$\mathfrak{3}$}}}
\newcommand\wholeof{\mathrel{\reflectbox{$\partof$}}}
```

The disadvantage of the graphicx/graphics approach is that not every TeX backend handles graphical transformations.[5] Far better is to find a suitable font that contains the desired symbol in the correct orientation. For instance, if the phonetic package is available, then `\textit{\riota}` will yield a backend-independent "℩". Similarly, tipa's `\textrevepsilon` ("ɜ") or wsuipa's `\revepsilon` ("ɜ") may be used to express the mathematical notion of "such that" in a cleaner manner than with `\reflectbox` or `\rotatebox`.[6]

[5] As an example, Xdvi ignores both `\reflectbox` and `\rotatebox`.

[6] More common symbols for representing "such that" include "`|`", "`:`", and "`s.t.`".

Joining and overlapping existing symbols

Symbols that do not exist in any font can sometimes be fabricated out of existing symbols. The LaTeX 2$_\varepsilon$ source file `fontdef.dtx` contains a number of such definitions. For example, `\models` (see Table 87 on page 46) is defined in that file with:

```
\def\models{\mathrel|\joinrel=}
```

where `\mathrel` and `\joinrel` are used to control the horizontal spacing. `\def` is the TeX primitive upon which LaTeX's `\newcommand` is based. See The TeXbook [Knu86a] for more information on all three of those commands.

With some simple pattern-matching, one can easily define a backward `\models` sign ("=|"):

```
\def\ismodeledby{=\joinrel\mathrel|}
```

In general, arrows/harpoons, horizontal lines ("=", "-", "`\relbar`", and "`\Relbar`"), and the various math-extension characters can be combined creatively with miscellaneous other characters to produce a variety of new symbols. Of course, new symbols can be composed from *any* set of existing characters. For instance, LaTeX defines `\hbar` ("$\hbar$") as a "$^-$" character (`\mathchar'26`) followed by a backspace of 9 math units (`\mkern-9mu`), followed by the letter "h":

```
\def\hbar{{\mathchar'26\mkern-9muh}}
```

We can just as easily define other barred letters:

```
\def\bbar{{\mathchar'26\mkern-9mu b}}
\def\dbar{{\mathchar'26\mkern-12mu d}}
```

(The space after the "mu" is optional but is added for clarity.) `\bbar` and `\dbar` define "$\bar{b}$" and "$\bar{d}$", respectively. Note that `\dbar` requires a greater backward math kern than `\bbar`; a -9 mu kern would have produced the less-attractive "$\bar{d}$" glyph.

The amsmath package provides `\overset` and `\underset` commands for placing one symbol respectively above or below another. For example, `\overset{G}{\sim}`[7] produces "$\overset{G}{\sim}$" (sometimes used for "equidecomposable with respect to G").

Sometimes an ordinary `tabular` environment can be co-opted into juxtaposing existing symbols into a new symbol. Consider the following definition of `\asterism` ("⁂") from a June 2007 post to `comp.text.tex` by Peter Flynn:

```
\newcommand{\asterism}{\smash{%
   \raisebox{-.5ex}{%
     \setlength{\tabcolsep}{-.5pt}%
     \begin{tabular}{@{}cc@{}}%
       \multicolumn2c*\\[-2ex]*&*%
     \end{tabular}}}}
```

Note how the space between columns (`\tabcolsep`) and rows (`\\[...]`) is made negative to squeeze the asterisks closer together.

There is a TeX primitive called `\mathaccent` that centers one mathematical symbol atop another. For example, one can define `\dotcup` ("$\dot\cup$")—the composition of a `\cup` and a `\cdot`—as follows:

```
\newcommand{\dotcup}{\ensuremath{\mathaccent\cdot\cup}}
```

The catch is that `\mathaccent` requires the accent to be a "math character". That is, it must be a character in a math font as opposed to a symbol defined in terms of other symbols. See The TeXbook [Knu86a] for more information.

Another TeX primitive that is useful for composing symbols is `\vcenter`. `\vcenter` is conceptually similar to "`\begin{tabular}{l}`" in LaTeX but takes a list of vertical material instead of `\\`-separated rows. Also, it vertically centers the result on the math axis. (Many operators, such as "+" and "−" are also vertically centered on the math axis.) Enrico Gregorio posted the following symbol definition to `comp.text.tex` in March 2004 in response to a query about an alternate way to denote equivalence:

[7] LaTeX's `\stackrel` command is similar but is limited to placing a symbol above a binary relation.

```
\newcommand*{\threesim}{%
  \mathrel{\vcenter{\offinterlineskip
  \hbox{$\sim$}\vskip-.35ex\hbox{$\sim$}\vskip-.35ex\hbox{$\sim$}}}}
```

The `\threesim` symbol, which vertically centers three `\sim` ("∼") symbols with 0.35 x-heights of space between them, is rendered as "≋". `\offinterlineskip` is a macro that disables implicit interline spacing. Without it, `\threesim` would have a full line of vertical spacing between each `\sim`. Because of `\vcenter`, `\threesim` aligns properly with other math operators: $a \div b \threesim c \times d$.

A related LaTeX command, borrowed from Plain TeX, is `\ooalign`. `\ooalign` vertically overlaps symbols and works both within and outside of math mode. Essentially, it creates a single-column `tabular` environment with zero vertical distance between rows. However, because it is based directly on TeX's `\ialign` primitive, `\ooalign` uses TeX's tabular syntax instead of LaTeX's (i.e., with `\cr` as the row terminator instead of `\\`). The following example of `\ooalign`, a macro that defines a standard-state symbol (`\stst`, "⊖") as a superscripted Plimsoll line (`\barcirc`, "⊖"),[8] is due to an October 2007 `comp.text.tex` post by Donald Arseneau:

```
\makeatletter
\providecommand\barcirc{\mathpalette\@barred\circ}
\def\@barred#1#2{\ooalign{\hfil$#1-$\hfil\cr\hfil$#1#2$\hfil\cr}}
\newcommand\stst{^{\protect\barcirc}}
\makeatother
```

In the preceding code, note the `\ooalign` call's use of `\hfil` to horizontally center a minus sign ("−") and a `\circ` ("∘").

As another example of `\ooalign`, consider the following code (due to Enrico Gregorio in a June 2007 post to `comp.text.tex`) that overlaps a `\ni` ("∋") and two minus signs ("−") to produce "∋", an obscure variation on the infrequently used "϶" symbol for "such that" discussed on page 209:

```
\newcommand{\suchthat}{%
  \mathrel{\ooalign{$\ni$\cr\kern-1pt$-$\kern-6.5pt$-$}}}
```

The slashed package, although originally designed for producing Feynman slashed-character notation, in fact facilitates the production of *arbitrary* overlapped symbols. The default behavior is to overwrite a given character with "/". For example, `\slashed{D}` produces "$\not{D}$". However, the `\declareslashed` command provides the flexibility to specify the mathematical context of the composite character (operator, relation, punctuation, etc., as will be discussed in Section 10.4), the overlapping symbol, horizontal and vertical adjustments in symbol-relative units, and the character to be overlapped. Consider, for example, the symbol for reduced quadrupole moment ("$\not{I}$"). This can be declared as follows:

```
\newcommand{\rqm}{{%
  \declareslashed{}{\text{-}}{0.04}{0}{I}\slashed{I}}}
```

`\declareslashed{·}{·}{·}{·}{I}` affects the meaning of all subsequent `\slashed{I}` commands in the same scope. The preceding definition of `\rqm` therefore uses an extra set of curly braces to limit that scope to a single `\slashed{I}`. In addition, `\rqm` uses amstext's `\text` macro (described on page 213) to make `\declareslashed` use a text-mode hyphen ("-") instead of a math-mode minus sign ("−") and to ensure that the hyphen scales properly in size in subscripts and superscripts. See slashed's documentation (located in `slashed.sty` itself) for a detailed usage description of the `\slashed` and `\declareslashed` commands.

Somewhat simpler than slashed is the centernot package. centernot provides a single command, `\centernot`, which, like `\not`, puts a slash over the subsequent mathematical symbol. However, instead of putting the slash at a fixed location, `\centernot` centers the slash over its argument. `\centernot` might be used, for example, to create a "does not imply" symbol:

$$\not\Longrightarrow \quad \texttt{\textbackslash not\textbackslash Longrightarrow}$$

vs.

$$\centernot\Longrightarrow \quad \texttt{\textbackslash centernot\textbackslash Longrightarrow}$$

See the centernot documentation for more information.

[8] While `\barcirc` illustrates how to combine symbols using `\ooalign`, the stmaryrd package's `\minuso` command (Table 52 on page 28) provides a similar glyph ("⊖") as a single, indivisible symbol.

Making new symbols work in superscripts and subscripts

To make composite symbols work properly within subscripts and superscripts, you may need to use TEX's `\mathchoice` primitive. `\mathchoice` evaluates one of four expressions, based on whether the current math style is display, text, script, or scriptscript. (See The TEXbook [Knu86a] for a more complete description.) For example, the following LATEX code—posted to `comp.text.tex` by Torsten Bronger—composes a sub/superscriptable "⊥" symbol out of `\top` and `\bot` ("⊤" and "⊥"):

```
\def\topbotatom#1{\hbox{\hbox to 0pt{$#1\bot$\hss}$#1\top$}}
\newcommand*{\topbot}{\mathrel{\mathchoice{\topbotatom\displaystyle}
                                  {\topbotatom\textstyle}
                                  {\topbotatom\scriptstyle}
                                  {\topbotatom\scriptscriptstyle}}}
```

The following is another example that uses `\mathchoice` to construct symbols in different math modes. The code defines a principal value integral symbol, which is an integral sign with a line through it.

```
\def\Xint#1{\mathchoice
   {\XXint\displaystyle\textstyle{#1}}%
   {\XXint\textstyle\scriptstyle{#1}}%
   {\XXint\scriptstyle\scriptscriptstyle{#1}}%
   {\XXint\scriptscriptstyle\scriptscriptstyle{#1}}%
   \!\int}
\def\XXint#1#2#3{{\setbox0=\hbox{$#1{#2#3}{\int}$}
     \vcenter{\hbox{$#2#3$}}\kern-.5\wd0}}
\def\ddashint{\Xint=}
\def\dashint{\Xint-}
```

(The preceding code was taken verbatim from the UK TEX Users' Group FAQ at `http://www.tex.ac.uk/faq`.) `\dashint` produces a single-dashed integral sign ("⨍"), while `\ddashint` produces a double-dashed one ("⨎"). The `\Xint` macro defined above can also be used to generate a wealth of new integrals: "∳" (`\Xint\circlearrowright`), "∲" (`\Xint\circlearrowleft`), "⨏" (`\Xint\subset`), "⨐" (`\Xint\infty`), and so forth.

LATEX 2ε provides a simple wrapper for `\mathchoice` that sometimes helps produce terser symbol definitions. The macro is called `\mathpalette` and it takes two arguments. `\mathpalette` invokes the first argument, passing it one of "`\displaystyle`", "`\textstyle`", "`\scriptstyle`", or "`\scriptscriptstyle`", followed by the second argument. `\mathpalette` is useful when a symbol macro must know which math style is currently in use (e.g., to set it explicitly within an `\mbox`). Donald Arseneau posted the following `\mathpalette`-based definition of a probabilistic-independence symbol ("⫫") to `comp.text.tex` in June 2000:

```
\newcommand\independent{\protect\mathpalette{\protect\independenT}{\perp}}
\def\independenT#1#2{\mathrel{\rlap{$#1#2$}\mkern2mu{#1#2}}}
```

The `\independent` macro uses `\mathpalette` to pass the `\independenT` helper macro both the current math style and the `\perp` symbol. `\independenT` typesets `\perp` in the current math style, moves two math units to the right, and finally typesets a second—overlapping—copy of `\perp`, again in the current math style. `\rlap`, which enables text overlap, is described on the next page.

Some people like their square-root signs with a trailing "hook" (i.e., "$\sqrt{\ }$") as this helps visually distinguish expressions like "$\sqrt{3x}$" from those like "$\sqrt{3}x$". In March 2002, Dan Luecking posted a `\mathpalette`-based definition of a hooked square-root symbol to `comp.text.tex`. This code was subsequently refined by Max Dohse and Scott Pakin into the version shown below, which accepts a root as an optional argument, for consistency with `\sqrt`.

```
\newcommand{\hksqrt}[2][]{\mathpalette\DHLhksqrt{[#1]{#2\,}}}
\def\DHLhksqrt#1#2{\setbox0=\hbox{$#1\sqrt#2$}\dimen0=\ht0
  \advance\dimen0-0.2\ht0
  \setbox2=\hbox{\vrule height\ht0 depth -\dimen0}%
  {\box0\lower0.4pt\box2}}
```

Notice how `\hksqrt` uses `\mathpalette` to pass the current math style (`\displaystyle`, `\textstyle`, etc.) to `\DHLhksqrt` as argument `#1`. `\DHLhksqrt` subsequently uses that style within an `\hbox`. The rest of the code is simply using TEX primitives to position a hook of height 0.2 times the `\sqrt` height at the right of the `\sqrt`. See The TEXbook [Knu86a] for more understanding of TEX "boxes" and "dimens".

Sometimes, however, amstext's `\text` macro is all that is necessary to make composite symbols appear correctly in subscripts and superscripts, as in the following definitions of `\neswarrow` ("↙") and `\nwsearrow` ("↖"):[9]

```
\newcommand{\neswarrow}{\mathrel{\text{$\nearrow$\llap{$\swarrow$}}}}
\newcommand{\nwsearrow}{\mathrel{\text{$\nwarrow$\llap{$\searrow$}}}}
```

`\text` resembles LATEX's `\mbox` command but shrinks its argument appropriately when used within a subscript or superscript. `\llap` ("left overlap") and its counterpart, `\rlap` ("right overlap"), appear frequently when creating composite characters. `\llap` outputs its argument to the left of the current position, overlapping whatever text is already there. Similarly, `\rlap` overlaps whatever text would normally appear to the right of its argument. For example, "`A\llap{B}`" and "`\rlap{A}B`" each produce "AB". However, the result of the former is the width of "A", and the result of the latter is the width of "B"—`\llap{...}` and `\rlap{...}` take up zero space.

In a June 2002 post to `comp.text.tex`, Donald Arseneau presented a general macro for aligning an arbitrary number of symbols on their horizontal centers and vertical baselines:

```
\makeatletter
  \def\moverlay{\mathpalette\mov@rlay}
  \def\mov@rlay#1#2{\leavevmode\vtop{%
     \baselineskip\z@skip \lineskiplimit-\maxdimen
     \ialign{\hfil$#1##$\hfil\cr#2\crcr}}}
\makeatother
```

The `\makeatletter` and `\makeatother` commands are needed to coerce LATEX into accepting "`@`" as part of a macro name. `\moverlay` takes a list of symbols separated by `\cr` (TEX's equivalent of LATEX's `\\`). For example, the `\topbot` command defined on the previous page could have been expressed as "`\moverlay{\top\cr\bot}`" and the `\neswarrow` command defined above could have been expressed as "`\moverlay{\nearrow\cr\swarrow}`".

The basic concept behind `\moverlay`'s implementation is that `\moverlay` typesets the given symbols in a table that utilizes a zero `\baselineskip`. This causes every row to be typeset at the same vertical position. See The TEXbook [Knu86a] for explanations of the TEX primitives used by `\moverlay`.

Modifying LATEX-generated symbols

Oftentimes, symbols composed in the LATEX 2_ε source code can be modified with minimal effort to produce useful variations. For example, `fontdef.dtx` composes the `\ddots` symbol (see Table 261 on page 107) out of three periods, raised 7 pt., 4 pt., and 1 pt., respectively:

```
\def\ddots{\mathinner{\mkern1mu\raise7\p@
    \vbox{\kern7\p@\hbox{.}}\mkern2mu
    \raise4\p@\hbox{.}\mkern2mu\raise\p@\hbox{.}\mkern1mu}}
```

`\p@` is a LATEX 2_ε shortcut for "`pt`" or "`1.0pt`". The remaining commands are defined in The TEXbook [Knu86a]. To draw a version of `\ddots` with the dots going along the opposite diagonal, we merely have to reorder the `\raise7\p@`, `\raise4\p@`, and `\raise\p@`:

```
\makeatletter
  \def\revddots{\mathinner{\mkern1mu\raise\p@
    \vbox{\kern7\p@\hbox{.}}\mkern2mu
    \raise4\p@\hbox{.}\mkern2mu\raise7\p@\hbox{.}\mkern1mu}}
\makeatother
```

`\revddots` is essentially identical to the mathdots package's `\iddots` command or the yhmath package's `\adots` command.

[9] Note that if your goal is to typeset commutative diagrams or pushout/pullback diagrams, then you should probably be using XY-pic.

Producing complex accents

Accents are a special case of combining existing symbols to make new symbols. While various tables in this document show how to add an accent to an existing symbol, some applications, such as transliterations from non-Latin alphabets, require *multiple* accents per character. For instance, the creator of pdfTEX writes his name as "Hàn Thế Thành". The dblaccnt package enables LATEX to stack accents, as in "`H\‘an Th\’{\^e} Th\‘anh`" (albeit not in the OT1 font encoding). In addition, the wsuipa package defines `\diatop` and `\diaunder` macros for putting one or more diacritics or accents above or below a given character. For example, `\diaunder[{\diatop[\’|\=]}|\textsubdot{r}]` produces "$\acute{\underset{\cdot}{\bar{\mathrm{r}}}}$". See the wsuipa documentation for more information.

The accents package facilitates the fabrication of accents in math mode. Its `\accentset` command enables *any* character to be used as an accent. For instance, `\accentset{\star}{f}` produces "$\overset{\star}{f}$" and `\accentset{e}{X}` produces "$\overset{e}{X}$". `\underaccent` does the same thing, but places the accent beneath the character. This enables constructs like `\underaccent{\tilde}{V}`, which produces "$\underset{\sim}{V}$". accents provides other accent-related features as well; see the documentation for more information.

Creating extensible symbols

A relatively simple example of creating extensible symbols stems from a `comp.text.tex` post by Donald Arseneau (June 2003). The following code defines an equals sign that extends as far to the right as possible, just like LATEX's `\hrulefill` command:

```
\makeatletter
\def\equalsfill{$\m@th\mathord=\mkern-7mu
  \cleaders\hbox{$\!\mathord=\!$}\hfill
  \mkern-7mu\mathord=$}
\makeatother
```

TEX's `\cleaders` and `\hfill` primitives are the key to understanding `\equalsfill`'s extensibility. Essentially, `\equalsfill` repeats a box containing "=" plus some negative space until it fills the maximum available horizontal space. `\equalsfill` is intended to be used with LATEX's `\stackrel` command, which stacks one mathematical expression (slightly reduced in size) atop another. Hence, "`\stackrel{a}{\rightarrow}`" produces "$\stackrel{a}{\rightarrow}$" and "X `\stackrel{\text{definition}}{\hbox{\equalsfill}}` Y" produces "$X \stackrel{\text{definition}}{=\!=\!=\!=\!=\!=\!=} Y$".

If all that needs to extend are horizontal and vertical lines—as opposed to repeated symbols such as the "=" in the previous example—LATEX's `array` or `tabular` environments may suffice. Consider the following code (due to a February 1999 `comp.text.tex` post by Donald Arseneau and subsequent modifications by Billy Yu and Scott Pakin) for typesetting annuity and life-insurance symbols:

```
\DeclareRobustCommand{\actuarial}[2][]{%
  \def\arraystretch{0}%
  \setlength\arraycolsep{0.5pt}%
  \setlength\arrayrulewidth{0.5pt}%
  \setbox0=\hbox{$\scriptstyle#1#2$}%
  \begin{array}[b]{*2{@{}>{\scriptstyle}c}|}
    \cline{2-2}%
    \rule[1.25pt]{0pt}{\ht0}%
    #1 & #2%
  \end{array}%
}
```

Using the preceding definition, one can type, e.g., "`$a_{\actuarial{n}}$`" to produce "$a_{\overline{n}|}$" and "`$a_{\actuarial[x:]{n}}$`" to produce "$a_{x:\overline{n}|}$". This is similar in concept to how the actuarialangle package defines its `\actuarialangle` command (Table 251).

A more complex example of composing accents is the following definition of extensible `\overbracket`, `\underbracket`, `\overparenthesis`, and `\underparenthesis` symbols, taken from a May 2002 `comp.text.tex` post by Donald Arseneau:

```
\makeatletter
\def\overbracket#1{\mathop{\vbox{\ialign{##\crcr\noalign{\kern3\p@}
```

```
      \downbracketfill\crcr\noalign{\kern3\p@\nointerlineskip}
      $\hfil\displaystyle{#1}\hfil$\crcr}}}\limits}
\def\underbracket#1{\mathop{\vtop{\ialign{##\crcr
      $\hfil\displaystyle{#1}\hfil$\crcr\noalign{\kern3\p@\nointerlineskip}
      \upbracketfill\crcr\noalign{\kern3\p@}}}}\limits}
\def\overparenthesis#1{\mathop{\vbox{\ialign{##\crcr\noalign{\kern3\p@}
      \downparenthfill\crcr\noalign{\kern3\p@\nointerlineskip}
      $\hfil\displaystyle{#1}\hfil$\crcr}}}\limits}
\def\underparenthesis#1{\mathop{\vtop{\ialign{##\crcr
      $\hfil\displaystyle{#1}\hfil$\crcr\noalign{\kern3\p@\nointerlineskip}
      \upparenthfill\crcr\noalign{\kern3\p@}}}}\limits}
\def\downparenthfill{$\m@th\braceld\leaders\vrule\hfill\bracerd$}
\def\upparenthfill{$\m@th\bracelu\leaders\vrule\hfill\braceru$}
\def\upbracketfill{$\m@th\makesm@sh{\llap{\vrule\@height3\p@\@width.7\p@}}%
  \leaders\vrule\@height.7\p@\hfill
  \makesm@sh{\rlap{\vrule\@height3\p@\@width.7\p@}}$}
\def\downbracketfill{$\m@th
  \makesm@sh{\llap{\vrule\@height.7\p@\@depth2.3\p@\@width.7\p@}}%
  \leaders\vrule\@height.7\p@\hfill
  \makesm@sh{\rlap{\vrule\@height.7\p@\@depth2.3\p@\@width.7\p@}}$}
\makeatother
```

Table 514 showcases these accents. The TEXbook [Knu86a] or another book on TEX primitives is indispensible for understanding how the preceding code works. The basic idea is that `\downparenthfill`, `\upparenthfill`, `\downbracketfill`, and `\upbracketfill` do all of the work; they output a left symbol (e.g., `\braceld` [“⎧”] for `\downparenthfill`), a horizontal rule that stretches as wide as possible, and a right symbol (e.g., `\bracerd` [“⎫”] for `\downparenthfill`). `\overbracket`, `\underbracket`, `\overparenthesis`, and `\underparenthesis` merely create a table whose width is determined by the given text, thereby constraining the width of the horizontal rules.

Table 514: Manually Composed Extensible Accents

$\overbracket{abc}$	`\overbracket{abc}`	$\overparenthesis{abc}$	`\overparenthesis{abc}`
$\underbracket{abc}$	`\underbracket{abc}`	$\underparenthesis{abc}$	`\underparenthesis{abc}`

Note that the simplewick package provides mechanisms for typesetting Wick contractions, which utilize `\overbracket`- and `\underbracket`-like brackets of variable width *and* height (or depth). For example, “`\acontraction{}{A}{B}{C}\acontraction[2ex]{A}{B}{C}{D}\bcontraction{}{A}{BC}{D}ABCD`” produces

$$\overbracket{A\overbracket{B\underbracket{C}D}}$$.

See the simplewick documentation for more information.

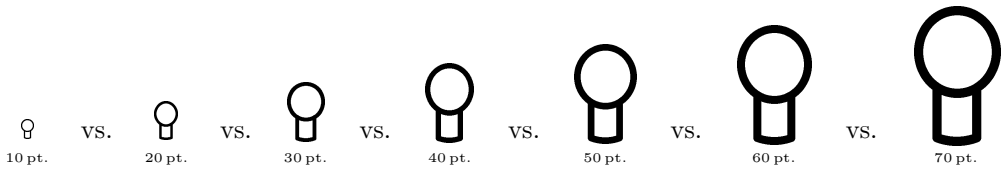
Developing new symbols from scratch

Sometimes is it simply not possible to define a new symbol in terms of existing symbols. Fortunately, most, if not all, TEX distributions are shipped with a tool called METAFONT which is designed specifically for creating fonts to be used with TEX. The METAFONTbook [Knu86b] is the authoritative text on METAFONT. If you plan to design your own symbols with METAFONT, The METAFONTbook is essential reading. You may also want to read the freely available METAFONT primer located at `http://metafont.tutorial.free.fr/`. The following is an extremely brief tutorial on how to create a new LATEX symbol using METAFONT. Its primary purpose is to cover the LATEX-specific operations not mentioned in The METAFONTbook and to demonstrate that symbol-font creation is not necessarily a difficult task.

Suppose we need a symbol to represent a light bulb (“💡”).[10] The first step is to draw this in METAFONT. It is common to separate the font into two files: a size-dependent file, which specifies the design

[10] I'm not a very good artist; you'll have to pretend that “💡” looks like a light bulb.

size and various font-specific parameters that are a function of the design size; and a size-independent file, which draws characters in the given size. Figure 2 shows the METAFONT code for `lightbulb10.mf`. `lightbulb10.mf` specifies various parameters that produce a 10 pt. light bulb then loads `lightbulb.mf`. Ideally, one should produce `lightbulb`⟨*size*⟩`.mf` files for a variety of ⟨*size*⟩s. This is called "optical scaling". It enables, for example, the lines that make up the light bulb to retain the same thickness at different font sizes, which looks much nicer than the alternative—and default—"mechanical scaling". When a `lightbulb`⟨*size*⟩`.mf` file does not exist for a given size ⟨*size*⟩, the computer mechanically produces a wider, taller, thicker symbol:




```
font_identifier := "LightBulb10";                    % Name the font.
font_size 10pt#;                                     % Specify the design size.

em# := 10pt#;                                        % "M" width is 10 points.
cap# := 7pt#;                                        % Capital letter height is 7 points above the baseline.
sb# := 1/4pt#;                                       % Leave this much space on the side of each character.
o# := 1/16pt#;                                       % Amount that curves overshoot borders.

input lightbulb                                      % Load the file that draws the actual glyph.
```

Figure 2: Sample METAFONT size-specific file (`lightbulb10.mf`)

`lightbulb.mf`, shown in Figure 3, draws a light bulb using the parameters defined in `lightbulb10.mf`. Note that the the filenames "`lightbulb10.mf`" and "`lightbulb.mf`" do not follow the Berry font-naming scheme [Ber01]; the Berry font-naming scheme is largely irrelevant for symbol fonts, which generally lack bold, italic, small-caps, slanted, and other such variants.

The code in Figures Figure 2 and Figure 3 is heavily commented and should demonstrate some of the basic concepts behind METAFONT usage: declaring variables, defining points, drawing lines and curves, and preparing to debug or fine-tune the output. Again, The METAFONTbook [Knu86b] is the definitive reference on METAFONT programming.

METAFONT can produce "proofs" of fonts—large, labeled versions that showcase the logical structure of each character. In fact, proof mode is METAFONT's default mode. To produce a proof of `lightbulb10.mf`, issue the following commands at the operating-system prompt:

```
prompt> mf lightbulb10.mf                    ⇐ Produces lightbulb10.2602gf
prompt> gftodvi lightbulb10.2602gf           ⇐ Produces lightbulb10.dvi
```

You can then view `lightbulb10.dvi` with any DVI viewer. The result is shown in Figure 4. Observe how the grid defined with *makegrid* at the bottom of Figure 3 draws vertical lines at positions 0, *sb*, $w/2$, and $w - sb$ and horizontal lines at positions 0, $-1pt$, y_2, and h. Similarly, observe how the *penlabels* command labels all of the important coordinates: $z_1, z_2, \ldots, z_8$ and z_{67}, which `lightbulb.mf` defines to lie between z_6 and z_7.

Most, if not all, TEX distributions include a Plain TEX file called `testfont.tex` that is useful for testing new fonts in a variety of ways. One useful routine produces a table of all of the characters in the font:

```
prompt> tex testfont
This is TeX, Version 3.14159 (Web2C 7.3.1)
(/usr/share/texmf/tex/plain/base/testfont.tex
Name of the font to test = lightbulb10
Now type a test command (\help for help):)
*\table

*\bye
```

```
mode_setup;                                          % Target a given printer.

define_pixels(em, cap, sb);                          % Convert to device-specific units.
define_corrected_pixels(o);                          % Same, but add a device-specific fudge factor.

%% Define a light bulb at the character position for "A"
%% with width 1/2em#, height cap#, and depth 1pt#.
beginchar("A", 1/2em#, cap#, 1pt#); "A light bulb";
    pickup pencircle scaled 1/2pt;                   % Use a pen with a small, circular tip.

    %% Define the points we need.
    top z1 = (w/2, h + o);                           % z1 is at the top of a circle.
    rt z2 = (w + sb + o - x4, y4);                   % z2 is at the same height as z4 but the opposite side.
    bot z3 = (z1 - (0, w - sb - o));                 % z3 is at the bottom of the circle.
    lft z4 = (sb - o, 1/2[y1, y3]);                  % z4 is on the left of the circle.
    path bulb;                                       % Define a path for the bulb itself.
    bulb = z1 .. z2 .. z3 .. z4 .. cycle;            % The bulb is a closed path.

    z5 = point 2 - 1/3 of bulb;                      % z5 lies on the bulb, a little to the right of z3.
    z6 = (x5, 0);                                    % z6 is at the bottom, directly under z5.
    z7 = (x8, 0);                                    % z7 is at the bottom, directly under z8.
    z8 = point 2 + 1/3 of bulb;                      % z8 lies on the bulb, a little to the left of z3.
    bot z67 = (1/2[x6, x7], pen_bot - o - 1/8pt);    % z67 lies halfway between z6 and z7 but a jot
lower.

    %% Draw the bulb and the base.
    draw bulb;                                       % Draw the bulb proper.
    draw z5 -- z6 .. z67 .. z7 -- z8;                % Draw the base of the bulb.

    %% Display key positions and points to help us debug.
    makegrid(0, sb, w/2, w - sb)(0, -1pt, y2, h);    % Label "interesting" x and y coordinates.
    penlabels(1, 2, 3, 4, 5, 6, 67, 7, 8);           % Label control points for debugging.
endchar;
end
```

Figure 3: Sample METAFONT size-independent file (`lightbulb.mf`)

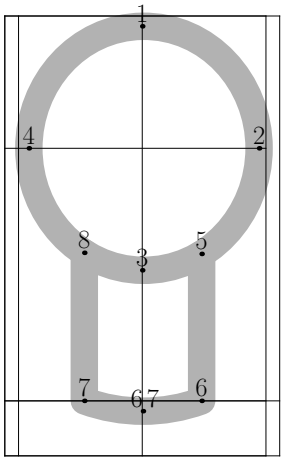


Figure 4: Proof diagram of `lightbulb10.mf`

```
[1]
Output written on testfont.dvi (1 page, 1516 bytes).
Transcript written on testfont.log.
```

The resulting table, stored in `testfont.dvi` and illustrated in Figure 5, shows every character in the font. To understand how to read the table, note that the character code for "A"—the only character defined by `lightbulb10.mf`—is 41 in hexadecimal (base 16) and 101 in octal (base 8).

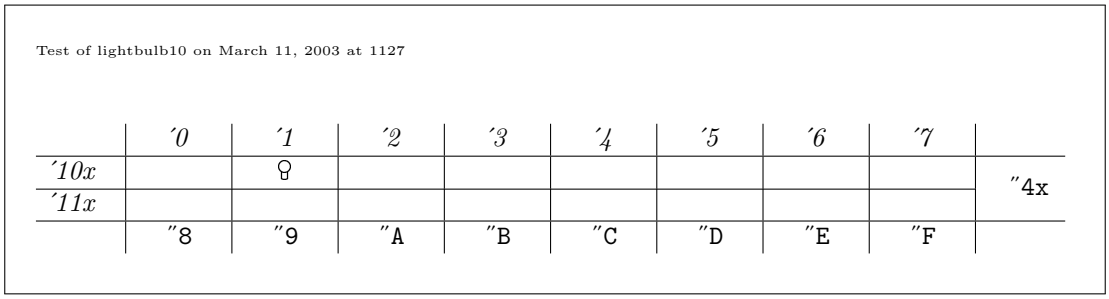


Figure 5: Font table produced by `testfont.tex`

The LightBulb10 font is now usable by TEX. LATEX 2ε, however, needs more information before documents can use the font. First, we create a font-description file that tells LATEX 2ε how to map fonts in a given font family and encoding to a particular font in a particular font size. For symbol fonts, this mapping is fairly simple. Symbol fonts almost always use the "U" ("Unknown") font encoding and frequently occur in only one variant: normal weight and non-italicized. The filename for a font-description file important; it must be of the form "⟨*encoding*⟩⟨*family*⟩`.fd`", where ⟨*encoding*⟩ is the lowercase version of the encoding name (typically "u" for symbol fonts) and ⟨*family*⟩ is the name of the font family. For LightBulb10, let's call this "bulb". Figure 6 lists the contents of `ubulb.fd`. The document "LATEX 2ε Font Selection" [LAT00] describes `\DeclareFontFamily` and `\DeclareFontShape` in detail, but the gist of `ubulb.fd` is first to declare a `U`-encoded version of the `bulb` font family and then to specify that a LATEX 2ε request for a `U`-encoded version of `bulb` with a (`m`)edium font series (as opposed to, e.g., bold) and a (`n`)ormal font shape (as opposed to, e.g., italic) should translate into a TEX request for `lightbulb10.tfm` mechanically scaled to the current font size.

```
\DeclareFontFamily{U}{bulb}{}
\DeclareFontShape{U}{bulb}{m}{n}{<-> lightbulb10}{}
```

Figure 6: LATEX 2ε font-description file (`ubulb.fd`)

The final step is to write a LATEX 2ε style file that defines a name for each symbol in the font. Because we have only one symbol our style file, `lightbulb.sty` (Figure 7), is rather trivial. Note that instead of typesetting "`A`" we could have had `\lightbulb` typeset "`\char65`", "`\char"41`", or "`\char'101`" (respectively, decimal, hexadecimal, and octal character offsets into the font). For a simple, one-character symbol font such as LightBulb10 it would be reasonable to merge `ubulb.fd` into `lightbulb.sty` instead of maintaining two separate files. In either case, a document need only include "`\usepackage{lightbulb}`" to make the `\lightbulb` symbol available.

```
\newcommand{\lightbulb}{{\usefont{U}{bulb}{m}{n}A}}
```

Figure 7: LATEX 2ε style file (`lightbulb.sty`)

METAFONT normally produces bitmapped fonts. However, it is also possible, with the help of some external tools, to produce PostScript Type 1 fonts. These have the advantages of rendering better in Adobe® Acrobat® (at least in versions prior to 6.0) and of being more memory-efficient when handled by a PostScript interpreter. See `http://www.tex.ac.uk/cgi-bin/texfaq2html?label=textrace` for pointers to tools that can produce Type 1 fonts from METAFONT.

10.4 Math-mode spacing

Terms such as "binary operators", "relations", and "punctuation" in Section 3 primarily regard the surrounding spacing. (See the Short Math Guide for LaTeX [Dow00] for a nice exposition on the subject.) To use a symbol for a different purpose, you can use the TeX commands `\mathord`, `\mathop`, `\mathbin`, `\mathrel`, `\mathopen`, `\mathclose`, and `\mathpunct`. For example, if you want to use `\downarrow` as a variable (an "ordinary" symbol) instead of a delimiter, you can write "`$3 x + \mathord{\downarrow}$`" to get the properly spaced "$3x+\downarrow$" rather than the awkward-looking "$3x+ \downarrow$". Similarly, to create a dotted-union symbol ("$\dot\cup$") that spaces like the ordinary set-union symbol (`\cup`) it must be defined with `\mathbin`, just as `\cup` is. Contrast "`$A \dot{\cup} B$`" ("$A\dot\cup B$") with "`$A \mathbin{\dot{\cup}} B$`" ("$A \mathbin{\dot\cup} B$"). See The TeXbook [Knu86a] for the definitive description of math-mode spacing.

The purpose of the "log-like symbols" in Table 177 and Table 178 is to provide the correct amount of spacing around and within multiletter function names. Table 515 contrasts the output of the log-like symbols with various, naïve alternatives. In addition to spacing, the log-like symbols also handle subscripts properly. For example, "`\max_{p \in P}`" produces "$\max_{p\in P}$" in text, but "$\max\limits_{p\in P}$" as part of a displayed formula.

Table 515: Spacing Around/Within Log-like Symbols

LaTeX expression	Output	
`$r \sin \theta$`	$r \sin \theta$	(best)
`$r sin \theta$`	$r sin \theta$	
`$r \mbox{sin} \theta$`	$r\mbox{sin}\theta$	
`$r \mathrm{sin} \theta$`	$r\mathrm{sin}\theta$	

The amsmath package makes it straightforward to define new log-like symbols:

```
\DeclareMathOperator{\atan}{atan}
\DeclareMathOperator*{\lcm}{lcm}
```

The difference between `\DeclareMathOperator` and `\DeclareMathOperator*` involves the handling of subscripts. With `\DeclareMathOperator*`, subscripts are written beneath log-like symbols in display style and to the right in text style. This is useful for limit operators (e.g., `\lim`) and functions that tend to map over a set (e.g., `\min`). In contrast, `\DeclareMathOperator` tells TeX that subscripts should always be displayed to the right of the operator, as is common for functions that take a single parameter (e.g., `\log` and `\cos`). Table 516 contrasts symbols declared with `\DeclareMathOperator` and `\DeclareMathOperator*` in both text style (`$...$`) and display style (`\[...\]`).[11]

Table 516: Defining new log-like symbols

Declaration function	`$\newlogsym_{p \in P}$`	`\[ \newlogsym_{p \in P} \]`
`\DeclareMathOperator`	$\mathrm{newlogsym}_{p\in P}$	$\mathrm{newlogsym}_{p\in P}$
`\DeclareMathOperator*`	$\mathrm{newlogsym}_{p\in P}$	$\mathrm{newlogsym}\limits_{p\in P}$

It is common to use a thin space (`\,`) between the words of a multiword operators, as in "`\DeclareMathOperator*{\argmax}{arg\,max}`". `\liminf`, `\limsup`, and all of the log-like symbols shown in Table 178 utilize this spacing convention.

10.5 Bold mathematical symbols

LaTeX does not normally use bold symbols when typesetting mathematics. However, bold symbols are occasionally needed, for example when naming vectors. Any of the approaches described at

[11] Note that `\displaystyle` can be used to force display style within `$...$` and `\textstyle` can be used to force text style within `\[...\]`.

`http://www.tex.ac.uk/cgi-bin/texfaq2html?label=boldgreek` can be used to produce bold mathematical symbols. Table 517 contrasts the output produced by these various techniques. As the table illustrates, these techniques exhibit variation in their formatting of Latin letters (upright vs. italic), formatting of Greek letters (bold vs. normal), formatting of operators and relations (bold vs. normal), and spacing.

TABLE 517: Producing bold mathematical symbols

Package	Code	Output	
none	`$\alpha + b = \Gamma \div D$`	$\alpha + b = \Gamma \div D$	(no bold)
none	`$\mathbf{\alpha + b = \Gamma \div D}$`	$\alpha + \mathbf{b} = \mathbf{\Gamma \div D}$	
none	`\boldmath$\alpha + b = \Gamma \div D$`	$\boldsymbol{\alpha + b = \Gamma \div D}$	
amsbsy	`$\pmb{\alpha + b = \Gamma \div D}$`	$\boldsymbol{\alpha + b = \Gamma \div D}$	(faked bold)
amsbsy	`$\boldsymbol{\alpha + b = \Gamma \div D}$`	$\boldsymbol{\alpha + b = \Gamma \div D}$	
bm	`$\bm{\alpha + b = \Gamma \div D}$`	$\boldsymbol{\alpha + b = \Gamma \div D}$	
fixmath	`$\mathbold{\alpha + b = \Gamma \div D}$`	$\boldsymbol{\alpha + b = \Gamma \div D}$	

10.6 ASCII and Latin 1 quick reference

Table 518 amalgamates data from various other tables in this document into a convenient reference for LaTeX 2ε typesetting of ASCII characters, i.e., the characters available on a typical U.S. computer keyboard. The first two columns list the character's ASCII code in decimal and hexadecimal. The third column shows what the character looks like. The fourth column lists the LaTeX 2ε command to typeset the character as a text character. And the fourth column lists the LaTeX 2ε command to typeset the character within a `\texttt{...}` command (or, more generally, when `\ttfamily` is in effect).

TABLE 518: LaTeX 2ε ASCII Table

Dec	Hex	Char	Body text	\texttt
33	21	!	!	!
34	22	"	\textquotedbl	"
35	23	#	\#	\#
36	24	$	\$	\$
37	25	%	\%	\%
38	26	&	\&	\&
39	27	’	’	’
40	28	(	(	(
41	29	)	)	)
42	2A	*	*	*
43	2B	+	+	+
44	2C	,	,	,
45	2D	-	-	-
46	2E	.	.	.
47	2F	/	/	/
48	30	0	0	0
49	31	1	1	1
50	32	2	2	2
⋮	⋮	⋮	⋮	⋮
57	39	9	9	9
58	3A	:	:	:
59	3B	;	;	;
60	3C	<	\textless	<
61	3D	=	=	=
62	3E	>	\textgreater	>
63	3F	?	?	?
64	40	@	@	@
65	41	A	A	A
66	42	B	B	B
67	43	C	C	C
⋮	⋮	⋮	⋮	⋮
90	5A	Z	Z	Z
91	5B	[	[	[
92	5C	\	\textbackslash	\char‘\\
93	5D	]	]	]
94	5E	^	\^{}	\^{}
95	5F	_	_	\char‘_
96	60	‘	‘	‘
97	61	a	a	a
98	62	b	b	b
99	63	c	c	c
⋮	⋮	⋮	⋮	⋮
122	7A	z	z	z
123	7B	{	\{	\char‘\{
124	7C	|	\textbar	|
125	7D	}	\}	\char‘\}
126	7E	~	\~{}	\~{}

The following are some additional notes about the contents of Table 518:

- "" is not available in the OT1 font encoding.
- Table 518 shows a close quote for character 39 for consistency with the open quote shown for character 96. A straight quote can be typeset using `\textquotesingle` (cf. Table 46).
- The characters "`<`", "`>`", and "`|`" do work as expected in math mode, although they produce, respectively, "¡", "¿", and "—" in text mode when using the OT1 font encoding.[12] The following are some alternatives for typesetting "<", ">", and "|":
  - Specify a document font encoding other than OT1 (as described on page 11).
  - Use the appropriate symbol commands from Table 2 on page 13, viz. `\textless`, `\textgreater`, and `\textbar`.
  - Enter the symbols in math mode instead of text mode, i.e., `$<$`, `$>$`, and `$|$`.

  Note that for typesetting metavariables many people prefer `\textlangle` and `\textrangle` to `\textless` and `\textgreater`; i.e., "⟨*filename*⟩" instead of "<*filename*>".
- Although "/" does not require any special treatment, LaTeX additionally defines a `\slash` command which outputs the same glyph but permits a line break afterwards. That is, "`increase/decrease`" is always typeset as a single entity while "`increase\slash{}decrease`" may be typeset with "increase/" on one line and "decrease" on the next.
- `\textasciicircum` can be used instead of `\^{}`, and `\textasciitilde` can be used instead of `\~{}`. Note that `\textasciitilde` and `\~{}` produce raised, diacritic tildes. "Text" (i.e., vertically centered) tildes can be generated with either the math-mode `\sim` command (shown in Table 87 on page 46), which produces a somewhat wide "∼", or the textcomp package's `\texttildelow` (shown in Table 46 on page 26), which produces a vertically centered "~" in most fonts but a baseline-oriented "˜" in Computer Modern, txfonts, pxfonts, and various other fonts originating from the TeX world. If your goal is to typeset tildes in URLs or Unix filenames, your best bet is to use the url package, which has a number of nice features such as proper line-breaking of such names.
- The various `\char` commands within `\texttt` are necessary only in the OT1 font encoding. In other encodings (e.g., T1), commands such as `\{`, `\}`, `\_`, and `\textbackslash` all work properly.
- The code page 437 (IBM PC) version of ASCII characters 1 to 31 can be typeset using the ascii package. See Table 317 on page 122.
- To replace "‘" and "’" with the more computer-like (and more visibly distinct) "`" and "'" within a `verbatim` environment, use the upquote package. Outside of `verbatim`, you can use `\char18` and `\char13` to get the modified quote characters. (The former is actually a grave accent.)

Similar to Table 518, Table 519 on the following page is an amalgamation of data from other tables in this document. While Table 518 shows how to typeset the 7-bit ASCII character set, Table 519 shows the Latin 1 (Western European) character set, also known as ISO-8859-1.

The following are some additional notes about the contents of Table 519:

- A "(tc)" after a symbol name means that the textcomp package must be loaded to access that symbol. A "(T1)" means that the symbol requires the T1 font encoding. The fontenc package can change the font encoding document-wide.
- Many of the `\text...` accents can also be produced using the accent commands shown in Table 18 on page 19 plus an empty argument. For instance, `\={}` is essentially the same as `\textasciimacron`.
- The commands in the "LaTeX 2_ε" columns work both in body text and within a `\texttt{...}` command (or, more generally, when `\ttfamily` is in effect).

[12] Donald Knuth didn't think such symbols were important outside of mathematics so he omitted them from his text fonts.

TABLE 519: LaTeX 2_ε Latin 1 Table

Dec	Hex	Char	LaTeX 2_ε	
161	A1	¡	!‘	
162	A2	¢	\textcent	(tc)
163	A3	£	\pounds	
164	A4	¤	\textcurrency	(tc)
165	A5	¥	\textyen	(tc)
166	A6	¦	\textbrokenbar	(tc)
167	A7	§	\S	
168	A8	¨	\textasciidieresis	(tc)
169	A9	©	\textcopyright	
170	AA	ª	\textordfeminine	
171	AB	«	\guillemotleft	(T1)
172	AC	¬	\textlnot	(tc)
173	AD	-	\-	
174	AE	®	\textregistered	
175	AF	¯	\textasciimacron	(tc)
176	B0	°	\textdegree	(tc)
177	B1	±	\textpm	(tc)
178	B2	²	\texttwosuperior	(tc)
179	B3	³	\textthreesuperior	(tc)
180	B4	´	\textasciiacute	(tc)
181	B5	µ	\textmu	(tc)
182	B6	¶	\P	
183	B7	·	\textperiodcentered	
184	B8	¸	\c{}	
185	B9	¹	\textonesuperior	(tc)
186	BA	º	\textordmasculine	
187	BB	»	\guillemotright	(T1)
188	BC	¼	\textonequarter	(tc)
189	BD	½	\textonehalf	(tc)
190	BE	¾	\textthreequarters	(tc)
191	BF	¿	?‘	
192	C0	À	\‘{A}	
193	C1	Á	\’{A}	
194	C2	Â	\^{A}	
195	C3	Ã	\~{A}	
196	C4	Ä	\"{A}	
197	C5	Å	\AA	
198	C6	Æ	\AE	
199	C7	Ç	\c{C}	
200	C8	È	\‘{E}	
201	C9	É	\’{E}	
202	CA	Ê	\^{E}	
203	CB	Ë	\"{E}	
204	CC	Ì	\‘{I}	
205	CD	Í	\’{I}	
206	CE	Î	\^{I}	
207	CF	Ï	\"{I}	
208	D0	Đ	\DH	(T1)

Dec	Hex	Char	LaTeX 2_ε	
209	D1	Ñ	\~{N}	
210	D2	Ò	\‘{O}	
211	D3	Ó	\’{O}	
212	D4	Ô	\^{O}	
213	D5	Õ	\~{O}	
214	D6	Ö	\"{O}	
215	D7	×	\texttimes	(tc)
216	D8	Ø	\O	
217	D9	Ù	\‘{U}	
218	DA	Ú	\’{U}	
219	DB	Û	\^{U}	
220	DC	Ü	\"{U}	
221	DD	Ý	\’{Y}	
222	DE	Þ	\TH	(T1)
223	DF	ß	\ss	
224	E0	à	\‘{a}	
225	E1	á	\’{a}	
226	E2	â	\^{a}	
227	E3	ã	\~{a}	
228	E4	ä	\"{a}	
229	E5	å	\aa	
230	E6	æ	\ae	
231	E7	ç	\c{c}	
232	E8	è	\‘{e}	
233	E9	é	\’{e}	
234	EA	ê	\^{e}	
235	EB	ë	\"{e}	
236	EC	ì	\‘{ı}	
237	ED	í	\’{ı}	
238	EE	î	\^{ı}	
239	EF	ï	\"{ı}	
240	F0	ð	\dh	(T1)
241	F1	ñ	\~{n}	
242	F2	ò	\‘{o}	
243	F3	ó	\’{o}	
244	F4	ô	\^{o}	
245	F5	õ	\~{o}	
246	F6	ö	\"{o}	
247	F7	÷	\textdiv	(tc)
248	F8	ø	\o	
249	F9	ù	\‘{u}	
250	FA	ú	\’{u}	
251	FB	û	\^{u}	
252	FC	ü	\"{u}	
253	FD	ý	\’{y}	
254	FE	þ	\th	(T1)
255	FF	ÿ	\"{y}	

- The "£" and "$" glyphs occupy the same slot (36) of the OT1 font encoding, with "£" appearing in italic fonts and "$" appearing in roman fonts. A problem with LaTeX's default handling of this double-mapping is that "`{\sffamily\slshape\pounds}`" produces "*$*", not "*£*". Other font encodings use separate slots for the two characters and are therefore robust to the problem of "£"/"$" conflicts. Authors who use `\pounds` should select a font encoding other than OT1 (as explained on page 11) or use the textcomp package, which redefines `\pounds` to use the TS1 font encoding.
- Character 173, `\-`, is shown as "-" but is actually a discretionary hyphen; it appears only at the end of a line.

Microsoft® Windows® normally uses a superset of Latin 1 called "Code Page 1252" or "CP1252" for short. CP1252 introduces symbols in the Latin 1 "invalid" range (characters 128–159). Table 520 presents the characters with which CP1252 augments the standard Latin 1 table.

TABLE 520: LaTeX 2_ε Code Page 1252 Table

Dec	Hex	Char	LaTeX 2_ε		Dec	Hex	Char	LaTeX 2_ε	
128	80	€	`\texteuro`	(tc)	145	91	‘	`	
130	82	‚	`\quotesinglbase`	(T1)	146	92	’	'	
131	83	*f*	`\textit{f}`		147	93	“	``	
132	84	„	`\quotedblbase`	(T1)	148	94	”	''	
133	85	…	`\dots`		149	95	•	`\textbullet`	
134	86	†	`\dag`		150	96	–	`--`	
135	87	‡	`\ddag`		151	97	—	`---`	
136	88	ˆ	`\textasciicircum`		152	98	˜	`\textasciitilde`	
137	89	‰	`\textperthousand`	(tc)	153	99	™	`\texttrademark`	
138	8A	Š	`\v{S}`		154	9A	š	`\v{s}`	
139	8B	‹	`\guilsinglleft`	(T1)	155	9B	›	`\guilsinglright`	(T1)
140	8C	Œ	`\OE`		156	9C	œ	`\oe`	
142	8E	Ž	`\v{Z}`		158	9E	ž	`\v{z}`	
					159	9F	Ÿ	`\"{Y}`	

The following are some additional notes about the contents of Table 520:

- As in Table 519, a "(tc)" after a symbol name means that the textcomp package must be loaded to access that symbol. A "(T1)" means that the symbol requires the T1 font encoding. The fontenc package can change the font encoding document-wide.
- Not all characters in the 128–159 range are defined.
- Look up "euro signs" in the index for alternatives to `\texteuro`.

While too large to incorporate into this document, a listing of ISO 8879:1986 SGML/XML character entities and their LaTeX equivalents is available from `http://www.bitjungle.com/isoent/`. Some of the characters presented there make use of isoent, a LaTeX 2_ε package (available from the same URL) that fakes some of the missing ISO glyphs using the LaTeX `picture` environment.[13]

10.7 Unicode characters

Unicode is a "universal character set"—a standard for encoding (i.e., assigning unique numbers to) the symbols appearing in many of the world's languages. While ASCII can represent 128 symbols and Latin 1 can represent 256 symbols, Unicode can represent an astonishing 1,114,112 symbols.

Because TeX and LaTeX predate the Unicode standard and Unicode fonts by almost a decade, support for Unicode has had to be added to the base TeX and LaTeX systems. Note first that LaTeX distinguishes between *input* encoding—the characters used in the `.tex` file—and *output* encoding—the characters that appear in the generated `.dvi`, `.pdf`, etc. file.

[13] isoent is not featured in this document, because it is not available from CTAN and because the faked symbols are not "true" characters; they exist in only one size, regardless of the body text's font size.

Inputting Unicode characters

To include Unicode characters in a `.tex` file, load the ucs package and load the inputenc package with the utf8x ("UTF-8 extended") option.[14] These packages enable LaTeX to translate UTF-8 sequences to LaTeX commands, which are subsequently processed as normal. For example, the UTF-8 text "`Copyright ©
2015`"—"©" is not an ASCII character and therefore cannot be input directly without packages such as ucs/inputenc—is converted internally by inputenc to "`Copyright \textcopyright{} 2015`" and therefore typeset as "Copyright © 2015".

The ucs/inputenc combination supports only a tiny subset of Unicode's million-plus symbols. Additional symbols can be added manually using the `\DeclareUnicodeCharacter` command. `\DeclareUnicodeCharacter` takes two arguments: a Unicode number and a LaTeX command to execute when the corresponding Unicode character is encountered in the input. For example, the Unicode character "degree celsius" ("℃") appears at character position U+2103.[15] However, "℃" is not one of the characters that ucs and inputenc recognize. The following document shows how to use `\DeclareUnicodeCharacter` to tell LaTeX that the "℃" character should be treated as a synonym for `\textcelsius`:

```
\documentclass{article}
\usepackage{ucs}
\usepackage[utf8x]{inputenc}
\usepackage{textcomp}

\DeclareUnicodeCharacter{"2103}{\textcelsius}   % Enable direct input of U+2103.

\begin{document}
It was a balmy 21℃.
\end{document}
```

which produces

> It was a balmy 21℃.

See the ucs documentation for more information and for descriptions of the various options that control ucs's behavior.

Outputting Unicode characters

Orthogonal to the ability to include Unicode characters in a LaTeX input file is the ability to include a given Unicode character in the corresponding output file. By far the easiest approach is to use XeLaTeX instead of pdfLaTeX or ordinary LaTeX. XeLaTeX handles Unicode input and output natively and can utilize system fonts directly without having to expose them via `.tfm`, `.fd`, and other such files. To output a Unicode character, a XeLaTeX document can either include that character directly as UTF-8 text or use TeX's `\char` primitive, which XeLaTeX extends to accept numbers larger than 255.

Suppose we want to output the symbols for versicle ("℣") and response ("℟") in a document. The Unicode charts list "versicle" at position U+2123 and "response" at position U+211F. We therefore need to install a font that contains those characters at their proper positions. One such font that is freely available from CTAN is Junicode (`Junicode.ttf`) from the junicode package. The fontspec package makes it easy for a XeLaTeX document to utilize a system font. The following example defines a `\textjuni` command that uses fontspec to typeset its argument in Junicode:

```
\documentclass{article}
\usepackage{fontspec}

\newcommand{\textjuni}[1]{{\fontspec{Junicode}#1}}

\begin{document}
We use ``\textjuni{\char"2123}'' for a versicle
and ``\textjuni{\char"211F}'' for a response.
\end{document}
```

[14] UTF-8 is the 8-bit Unicode Transformation Format, a popular mechanism for representing Unicode symbol numbers as sequences of one to four bytes.

[15] The Unicode convention is to express character positions as "U+⟨*hexadecimal number*⟩".

which produces

> We use "℣" for a versicle and "℟" for a response.

(Typesetting the entire document in Junicode would be even easier. See the fontspec documentation for more information regarding font selection.) Note how the preceding example uses `\char` to specify a Unicode character by number. The double quotes before the number indicate that the number is represented in hexadecimal instead of decimal.

10.8 About this document

History David Carlisle wrote the first version of this document in October, 1994. It originally contained all of the native LaTeX symbols (Table 50, Table 71, Table 87, Table 137, Table 177, Table 180, Table 214, Table 215, Table 228, Table 236, Table 286, and a few tables that have since been reorganized) and was designed to be nearly identical to the tables in Chapter 3 of Leslie Lamport's book [Lam86]. Even the table captions and the order of the symbols within each table matched! The $\mathcal{AMS}$ symbols (Table 51, Table 88, Table 89, Table 140, Table 141, Table 181, Table 190, Table 208, and Table 287) and an initial Math Alphabets table (Table 299) were added thereafter. Later, Alexander Holt provided the stmaryrd tables (Table 52, Table 73, Table 90, Table 143, Table 173, and Table 209).

In January, 2001, Scott Pakin took responsibility for maintaining the symbol list and has since implemented a complete overhaul of the document. The result, now called, "The Comprehensive LaTeX Symbol List", includes the following new features:

- the addition of a handful of new math alphabets, dozens of new font tables, and thousands of new symbols
- the categorization of the symbol tables into body-text symbols, mathematical symbols, science and technology symbols, dingbats, ancient languages, and other symbols, to provide a more user-friendly document structure
- an index, table of contents, hyperlinks, and a frequently-requested symbol list, to help users quickly locate symbols
- symbol tables rewritten to list the symbols in alphabetical order
- appendices providing additional information relevant to using symbols in LaTeX
- tables showing how to typeset all of the characters in the ASCII and Latin 1 font encodings

Furthermore, the internal structure of the document has been completely altered from David Carlisle's original version. Most of the changes are geared towards making the document easier to extend, modify, and reformat.

Build characteristics Table 521 on the next page lists some of this document's build characteristics. Most important is the list of packages that LaTeX couldn't find, but that `symbols.tex` otherwise would have been able to take advantage of. Complete, prebuilt versions of this document are available from CTAN (`http://www.ctan.org/` or one of its many mirror sites) in the directory `tex-archive/info/symbols/comprehensive`. Table 522 shows the package date (specified in the `.sty` file with `\ProvidesPackage`) for each package that was used to build this document and that specifies a package date. Packages are not listed in any particular order in either Table 521 or Table 522.

TABLE 521: Document Characteristics

Characteristic	Value
Source file:	`symbols.tex`
Build date:	November 30, 2015
Symbols documented:	14032
Packages included:	textcomp latexsym amssymb stmaryrd euscript wasysym pifont manfnt bbding undertilde ifsym tipa tipx extraipa wsuipa phonetic ulsy ar metre txfonts mathabx fclfont skak ascii dingbat skull eurosym esvect yfonts yhmath esint mathdots trsym universa upgreek overrightarrow chemarr chemarrow nath trfsigns mathtools phaistos arcs vietnam t4phonet holtpolt semtrans dictsym extarrows protosem harmony hieroglf cclicenses mathdesign arev MnSymbol fdsymbol boisik cmll extpfeil keystroke fge turnstile simpsons epsdice feyn staves igo colonequals shuffle fourier dozenal pmboxdraw pigpen clock teubner linearA linearb cypriot sarabian china2e harpoon steinmetz milstd recycle DotArrow ushort hhcount ogonek combelow musixtex ccicons adfsymbols adforn bigints soyombo tfrupee knitting textgreek begriff frege abraces CountriesOfEurope cookingsymbols prodint epiolmec mdwmath rsfso fontawesome stix hands greenpoint nkarta astrosym webomints moonphase dancers semaphor umranda umrandb cryst starfont tikzsymbols dice apl go magic bartel-chess-fonts actuarialangle lilyglyphs knot bclogo bullcntr rubikcube svrsymbols accents nicefrac bm junicode mathrsfs chancery urwchancal calligra bbold mbboard dsfont bbm
Packages omitted:	*none*

TABLE 522: Package versions used in the preparation of this document

Name	Date	Name	Date	Name	Date
textcomp	2005/09/27	latexsym	1998/08/17	amssymb	2013/01/14
stmaryrd	1994/03/03	euscript	2009/06/22	wasysym	2003/10/30
pifont	2005/04/12	manfnt	1999/07/01	bbding	1999/04/15
undertilde	2000/08/08	ifsym	2000/04/18	tipa	2002/08/08
tipx	2003/01/01	wsuipa	1994/07/16	ar	2012/01/23
metre	2001/12/05	txfonts	2008/01/22	mathabx	2003/07/29
skak	2013/07/18	ascii	2006/05/30	dingbat	2001/04/27
skull	2002/01/23	eurosym	1998/08/06	yfonts	2003/01/08
mathdots	2014/06/11	trsym	2000/06/25	universa	98/08/01
upgreek	2003/02/12	chemarr	2006/02/20	mathtools	2015/11/12
phaistos	2004/04/23	arcs	2004/05/09	t4phonet	2004/06/01
semtrans	1998/02/10	dictsym	2004/07/26	extarrows	2008/05/15
protosem	2005/03/18	harmony	2007/05/04	hieroglf	2015/06/02
cclicenses	2005/05/20	MnSymbol	2007/01/21	fdsymbol	2011/11/01
boisik	2009/08/21	extpfeil	2009/10/31	keystroke	2010/04/23
fge	2015/05/19	turnstile	2007/06/23	epsdice	2007/02/15
feyn	2009/10/08	colonequals	2006/08/01	shuffle	2008/10/27
dozenal	2015/01/29	pmboxdraw	2011/03/24	pigpen	2008/12/07
clock	2001/04/10	teubner	2015/10/25	linearA	2006/03/13

(continued on next page)

(continued from previous page)

Name	Date	Name	Date	Name	Date
linearb	2005/06/22	cypriot	2009/05/22	sarabian	2005/11/12
china2e	1997/06/01	harpoon	1994/11/02	steinmetz	2009/06/14
milstd	2009/06/25	DotArrow	2007/02/12	ushort	2001/06/13
hhcount	1995/03/31	ogonek	95/07/17	combelow	2010/05/02
musixtex	2001/07/08	ccicons	2013/04/16	adforn	2010/07/25
bigints	2010/02/15	soyombo	1996/09/01	tfrupee	2010/12/15
knitting	2010/08/29	textgreek	2011/10/09	frege	2012/08/04
abraces	2012/08/24	CountriesOfEurope	2012/04/18	cookingsymbols	2014/12/28
epiolmec	2003/11/05	mdwmath	1996/04/11	fontawesome	2015/07/30
stix	2015/04/17	starfont	2010/09/29	tikzsymbols	2015/10/13
bclogo	2011/07/06	bullcntr	2007/04/02	rubikcube	2015/09/25
svrsymbols	2015/09/01	accents	2006/05/12	nicefrac	1998/08/04
bm	2014/10/28	calligra	2012/04/10		

10.9 Copyright and license

References

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[Ber01] Karl Berry. Fontname: Filenames for TEX fonts, June 2001. Available from `http://www.ctan.org/tex-archive/info/fontname`.

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If you're having trouble locating a symbol, try looking under "T" for "`\text`...". Many text-mode commands begin with that prefix. Also, accents are shown over/under a gray box (e.g., "◌́" for "`\'`").

Some symbol entries appear to be listed repeatedly. This happens when multiple packages define identical (or nearly identical) glyphs with the same symbol name.[16]

[16] This occurs frequently between `amssymb` and `mathabx`, for example.

B

C

D

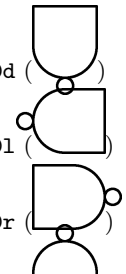
E

F

H

M

N



P

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