

# The Comprehensive L<sup>A</sup>T<sub>E</sub>X Symbol List

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## Abstract

This document lists 14283 symbols and the corresponding L<sup>A</sup>T<sub>E</sub>X commands that produce them. Some of these symbols are guaranteed to be available in every L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> 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 T<sub>E</sub>X Archive Network (<http://www.ctan.org/>).

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# 1 Introduction

Welcome to the Comprehensive L<sup>A</sup>T<sub>E</sub>X Symbol List! This document strives to be your primary source of L<sup>A</sup>T<sub>E</sub>X symbol information: font samples, L<sup>A</sup>T<sub>E</sub>X 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 T<sub>E</sub>X Archive Network (<http://www.ctan.org/>).
2. All of their symbols have L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> bindings. That is, a user should be able to access a symbol by name (e.g., `\bigtriangleup`).

As of version 12 of the Comprehensive L<sup>A</sup>T<sub>E</sub>X Symbol List, that second restriction has been relaxed with the inclusion of Section 9, which showcases fonts that provide, at a minimum, either T<sub>E</sub>X font-metric files (`.tfm`) or the METAFONT sources (`.mf`) that produce those font-metric files. Some of the Section 9 fonts do include L<sup>A</sup>T<sub>E</sub>X 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 L<sup>A</sup>T<sub>E</sub>X style file (`.sty`) that individually names each of the glyphs.

The restrictions listed above are not particularly limiting criteria; the Comprehensive L<sup>A</sup>T<sub>E</sub>X Symbol List contains samples of 14283 symbols—quite a large number. Some of these symbols are guaranteed to be available in every L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> 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 L<sup>A</sup>T<sub>E</sub>X 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 L<sup>A</sup>T<sub>E</sub>X) 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 L<sup>A</sup>T<sub>E</sub>X ASCII and Latin 1 tables, shows how to input and output Unicode characters, and provides some information about this document itself. The Comprehensive L<sup>A</sup>T<sub>E</sub>X 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.” . . . . .	14	ℒ . . . . .	41
ī, î, ĩ, ï, ı̇, etc. (versus ı̄, ı̄̇, ı̄̈, ı̄̈́, and ı̄̈́) . . . . .	20	∴ . . . . .	48
¢ . . . . .	25	≐ and ≑ . . . . .	49
€ . . . . .	25	≲ and ≳ . . . . .	62
©, ®, and ™ . . . . .	26	∴ . . . . .	112
% <sub>00</sub> . . . . .	27	°, as in “180°” or “15°C” . . . . .	117



$\mathcal{L}, \mathcal{F}$ , etc. ....	119	$\grave{a}, \grave{e}$ , etc. (i.e., several accents per character)	
$\mathbb{N}, \mathbb{Z}, \mathbb{R}$ , etc. ....	119		219
$\varepsilon$ .....	119	<, >, and   (instead of $\lrcorner$ , $\llcorner$ , and $\dashv$ ) ...	226
$f$ .....	217	$\hat{\ } and \tilde{\ } (or \sim)$ .....	226

## 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: L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> 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 L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> Text-mode Commands

^	\textasciicircum*	<	\textless
~	\textasciitilde*	à	\textordfeminine
*	\textasteriskcentered	ó	\textordmasculine
\	\textbackslash	¶	\textparagraph <sup>†</sup>
	\textbar	·	\textperiodcentered
	\textbardbl	‰	\textpertenthousand
○	\textbigcircle	‰	\textperthousand
{	\textbraceleft <sup>†</sup>	¿	\textquestiondown
}	\textbraceright <sup>†</sup>	“	\textquotedblleft
•	\textbullet	”	\textquotedblright
©	\textcopyright <sup>†</sup>	‘	\textquoteleft
†	\textdagger <sup>†</sup>	,	\textquoteright
‡	\textdaggerdbl <sup>†</sup>	®	\textregistered
\$	\textdollar <sup>†</sup>	§	\textsection <sup>†</sup>
...	\textellipsis <sup>†</sup>	£	\textsterling <sup>†</sup>
—	\textemdash	™	\texttrademark
-	\textendash	-	\textunderscore <sup>†</sup>
¡	\textexclamdown	˘	\textvisiblespace
>	\textgreater		

The first symbol column represents the—sometimes “faked”—symbol that L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> 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 226.

<sup>†</sup> 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: L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> 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 L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> 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: A<sup>M</sup>S 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	þ	\th*
Å	\AA	Đ	\DJ*	ł	\l	œ	\oe	Þ	\TH*
Æ	\AE	đ	\dj*	Ń	\NG*	Œ	\OE		
æ	\ae	IJ	\IJ	ŋ	\ng*	ß	\ss		
ð	\dh*	ij	\ij	Ø	\O	SS	\SS		

\* 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	\extrho	ψ	\textpsi
ζ	\textzeta	μ	\textmu*	σ	\textsigma	ω	\textomega
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

\* 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 187 on page 91), `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	<code>\B{D}</code>	đ	<code>\m{c}</code>	f	<code>\m{f}</code>	k	<code>\m{k}</code>	t	<code>\M{t}</code>	z	<code>\m{Z}</code>
đ	<code>\B{d}</code>	Đ	<code>\m{D}</code>	F	<code>\m{F}</code>	Đ	<code>\m{N}</code>	T	<code>\M{T}</code>	Ě	<code>\T{E}</code>
H	<code>\B{H}</code>	h	<code>\M{d}</code>	Y	<code>\m{G}</code>	η	<code>\m{n}</code>	t	<code>\m{t}</code>	ē	<code>\T{e}</code>
h	<code>\B{h}</code>	Đ	<code>\M{D}</code>	γ	<code>\m{g}</code>	o	<code>\m{o}</code>	T	<code>\m{T}</code>	Ō	<code>\T{O}</code>
t	<code>\B{t}</code>	d	<code>\m{d}</code>	l	<code>\m{l}</code>	o	<code>\m{o}</code>	v	<code>\m{u}*</code>	ō	<code>\T{o}</code>
T	<code>\B{T}</code>	É	<code>\m{E}</code>	ι	<code>\m{i}</code>	P	<code>\m{P}</code>	U	<code>\m{U}*</code>		
b	<code>\m{b}</code>	ε	<code>\m{e}</code>	N	<code>\m{J}</code>	þ	<code>\m{p}</code>	Y	<code>\m{Y}</code>		
B	<code>\m{B}</code>	Æ	<code>\M{E}</code>	ñ	<code>\m{j}</code>	ſ	<code>\m{s}</code>	y	<code>\m{y}</code>		
Ĉ	<code>\m{C}</code>	ə	<code>\M{e}</code>	K	<code>\m{K}</code>	ſ	<code>\m{S}</code>	z	<code>\m{z}</code>		

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

Ō	<code>\OHORN</code>	ơ	<code>\ohorn</code>	Ū	<code>\UHORN</code>	ư	<code>\uhorn</code>
---	---------------------	---	---------------------	---	---------------------	---	---------------------

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

TABLE 9: Punctuation Marks Not Found in OT1

«	<code>\guillemotleft</code>	<	<code>\guilsinglleft</code>	„	<code>\quotedblbase</code>	"	<code>\textquotedbl</code>
»	<code>\guillemotright</code>	>	<code>\guilsinglright</code>	,	<code>\quotesinglbase</code>		

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

TABLE 10: pifont Decorative Punctuation Marks

•	<code>\ding{123}</code>	“	<code>\ding{125}</code>	‡	<code>\ding{161}</code>	‡	<code>\ding{163}</code>
•	<code>\ding{124}</code>	”	<code>\ding{126}</code>	‡	<code>\ding{162}</code>		

TABLE 11: tipa Phonetic Symbols

x	\textbabygamma	ʔ	\textglotstop	ɳ	\textrightaln
ḅ	\textbarb	˙	\texthalflength	ɽ	\textrightair
Ḅ	\textbarc	ᶇ	\texthardsign	ɿ	\textrightails
Ḍ	\textbard	˘	\texthooktop	ɿ̥	\textrightailt
Ḑ	\textbardotlessj	Ḇ	\texthtb	ɿ̥̥	\textrightailz
Ḡ	\textbarg	f	\texthtbardotlessj	˘	\textrighthook
ʔ	\textbarglotstop	Ḅ	\texthtc	A	\texttsca
i	\textbari	d	\texthtd	B	\texttscb
ḥ	\textbarl	g	\texthtg	E	\texttsce
ḡ	\textbaro	h	\texthth	G	\texttscg
Ḟ	\textbarrevglotstop	ḥ	\texththeng	H	\texttsch
ḡ	\textbaru	k	\texthtk	ə	\texttschwa
ḫ	\textbeltl	ḅ	\texthtp	I	\texttschi
β	\textbeta	q	\texthtq	J	\texttscj
⊙	\textbullseye	ḑ	\texthttrtaild	L	\texttscl
˘	\textceltpal	Ḅ	\texthtscg	N	\texttscn
χ	\textchi	f	\texthtt	œ	\texttscoelig
ɛ	\textcloseepsilon	ḅ	\texthvlig	Ω	\texttscomega
ω	\textcloseomega	ḅ	\textinvglotstop	R	\texttscr
ɜ	\textcloserevepsilon	ḅ	\textinvscr	ɑ	\texttscripta
z	\textcommatailz	ι	\textiota	g	\texttscriptg
˘	\textcorner	λ	\textlambd	υ	\texttscriptv
ḅ	\textcrb	:	\textlengthmark	U	\texttscu
ḏ	\textcrd	ḑ	\textlhookt	Y	\texttscy
g	\textcrg	l	\textlhtlongi	˘	\textsecstress
ḥ	\textcrh	ɥ	\textlhtlongy	ᶇ	\textsoftsign
ḅ	\textcrinvglotstop	l	\textlinglegr	⌈	\textstretchc
λ	\textcrlambda	˘	\textlptr	ᶇ̥	\texttctclig
z	\textcrtwo	ɳ	\textltailm	ʃ	\texttेशlig
c	\textctc	ɳ	\textltailn	θ	\textttheta
d	\textctd	ḥ	\textltilde	þ	\texttthorn
ɟz	\textctdctzlig	ḅ	\textlyoghlig	˘	\texttoneletterstem
ḑ	\textctesh	J	\textḐbardotlessj	ts	\textttslig
j	\textctj	ḅ	\textḐlyoghlig	ɞ	\texttturna
ɳ	\textctn	ω	\textomega	æ	\texttturncelig
t	\textctt	˘	\textopencorner	ɥ	\texttturnh
ᶇ̥	\textcttctclig	ɔ	\textopeno	ɣ	\texttturnk
z̃	\textctyogh	˘	\textpalhook	l	\texttturnlonglegr
z	\textctz	φ	\textphi	u	\texttturnm
ɟz	\textdctzlig		\textpipe	uɥ	\texttturnmrlig
ḑ	\textdoublebaresh	˘	\textprimstress	ɿ	\texttturnr
ḑ	\textdoublebarpipe	ʔ	\textraiseglotstop	ɿ̥	\texttturnrrtail
≠	\textdoublebarslash	l	\textraiseviby	ɳ	\texttturnscripta
	\textdoublepipe	ɣ	\texttramshorns	ɿ̥	\texttturnt
	\textdoublevertline	˘	\textrevapostrophe	Λ	\texttturnv
↓	\textdownstep	ə	\textreve	ɳ	\texttturnw
ḅ	\textdyoghlig	z	\textrevepsilon	ʃ	\texttturny
ɟz	\textdzlig	ḑ	\textrevglotstop	υ	\texttupsilon
ε	\textepsilon	z̃	\textrevyogh	˘	\texttupstep
ʃ	\textesh	z̃	\textrhookrevepsilon		\texttvertline
r	\textfishhookr	ə	\textrhookschwa	l	\texttviby

(continued on next page)

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g	<code>\textg</code>	˘	<code>\textrhoticity</code>	ı	<code>\textviby</code>
γ	<code>\textgamma</code>	>	<code>\textrptr</code>	p	<code>\textwynn</code>
↘	<code>\textglobfall</code>	ɔ	<code>\textrtaild</code>	ʒ	<code>\textyogh</code>
↗	<code>\textglobrise</code>	l	<code>\textrtaill</code>		

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

TABLE 12: `tix` Phonetic Symbols

æ	<code>\textaoilig</code>	f	<code>\texthtbardotlessjvar</code>	ı	<code>\textrthooklong</code>
ɜ	<code>\textbenttailyogh</code>	ω	<code>\textinvomega</code>	ɔ	<code>\textscaolig</code>
γ	<code>\textbktaillgamma</code>	v	<code>\textinvsvca</code>	Δ	<code>\textsdelta</code>
ɔ	<code>\textctinvglotstop</code>	σ	<code>\textinvscripta</code>	F	<code>\textscf</code>
j	<code>\textctjvar</code>	ʃ	<code>\textlfishhookrlig</code>	K	<code>\textscK</code>
ɓ	<code>\textctstretchc</code>	ʒ	<code>\textlhookfour</code>	M	<code>\textscM</code>
ç	<code>\textctstretchcvar</code>	p	<code>\textlhookp</code>	P	<code>\textscP</code>
ɹ	<code>\textctturnt</code>	ı	<code>\textlhiti</code>	Q	<code>\textscQ</code>
ɔ	<code>\textdblig</code>	ı	<code>\textlooptoprevesh</code>	←	<code>\textspleftarrow</code>
≠	<code>\textdoublebarpipevar</code>	η	<code>\textnrleg</code>	⏟	<code>\textstretchcvar</code>
	<code>\textdoublepipevar</code>	⊙	<code>\textObullseye</code>	↔	<code>\textsubdoublearrow</code>
↓	<code>\textdownfullarrow</code>	ı	<code>\textpalhooklong</code>	→	<code>\textsubbrightarrow</code>
♀	<code>\textfemale</code>	ı	<code>\textpalhookvar</code>	ɓ	<code>\textthornvari</code>
n	<code>\textfrbarn</code>		<code>\textpipevar</code>	ɓ	<code>\textthornvarii</code>
ɔ	<code>\textfrhookd</code>	ϕ	<code>\textqplig</code>	ɓ	<code>\textthornvariii</code>
ɔ	<code>\textfrhookdvar</code>	◻	<code>\textrectangle</code>	ɓ	<code>\textthornvariv</code>
ɔ	<code>\textfrhookt</code>	↵	<code>\textretractingvar</code>	ɔ	<code>\textturnglotstop</code>
γ	<code>\textfrtailgamma</code>	ı	<code>\textrevscl</code>	κ	<code>\textturnsck</code>
?	<code>\textglotstopvari</code>	ı	<code>\textrevscr</code>	η	<code>\textturnscu</code>
?	<code>\textglotstopvarii</code>	ɑ	<code>\textrhooka</code>	ε	<code>\textturnthree</code>
?	<code>\textglotstopvariii</code>	ε	<code>\textrhookε</code>	ɔ	<code>\textturntwo</code>
γ	<code>\textgrgamma</code>	ε	<code>\textrhookεpsilon</code>	♀	<code>\textunrcfemale</code>
h	<code>\textheng</code>	ɔ	<code>\textrhookopeno</code>	↑	<code>\textupfullarrow</code>
h	<code>\texthmlig</code>	ı	<code>\textrtaillhth</code>		

TABLE 13: wsuipa Phonetic Symbols

ɣ	\babygamma	ŋ	\eng	ŋ	\labdentalnas	ə	\schwa
ḃ	\barb	ʒ	\er	ɬ	\latfric	ɪ	\sci
ḋ	\bard	ʃ	\esh	ɥ	\legm	ɲ	\scn
ḅ	\bari	ð	\eth	ɹ	\legr	ʀ	\scr
ḅ	\barl	ɾ	\flapr	ʒ	\lz	ɑ	\scripta
ḅ	\baro	ʔ	\glotstop	α	\nialpha	ɑ	\scriptg
ḅ	\barp	ḃ	\hookb	β	\nibeta	ʊ	\scriptv
ḅ	\barsci	ḋ	\hookd	χ	\nich	ʊ	\scu
ḅ	\barscu	ḅ	\hookg	ε	\niepsilon	ʏ	\scy
ḅ	\baru	ḅ	\hookh	γ	\nigamma	ʃ	\slashb
ḅ	\clickb	ḅ	\hookheng	ι	\niiota	ʃ	\slashc
ḅ	\clickc	ʒ	\hookrepsilon	λ	\nilambda	ʃ	\slashd
ḅ	\clickt	ḅ	\hv	ω	\niomega	ʃ	\slashu
ḅ	\closedniomega	ɛ	\inva	φ	\niph	ḅ	\taild
ḅ	\closedrepsilon	ɹ	\invf	σ	\nisigma	ḅ	\tailinr
ḅ	\crossb	ʒ	\invglotstop	θ	\nitheta	ḅ	\taill
ḅ	\crossd	ɥ	\invh	ʊ	\niupsilon	ḅ	\tailn
ḅ	\crossh	ɹ	\invlegr	ɲ	\nj	ḅ	\tailr
ḅ	\crossnilambda	ʊ	\invm	∞	\oo	ḅ	\tails
ḅ	\curlyc	ɹ	\invr	ɔ	\openo	ḅ	\tailt
ḅ	\curlyesh	ʒ	\invscr	ə	\reve	ḅ	\tailz
ḅ	\curlyyogh	ʊ	\invscripta	ɣ	\reveject	ḅ	\tesh
ḅ	\curlyz	Λ	\invv	ʒ	\repsilon	ḅ	\thorn
ḅ	\dlbari	Λ	\invw	ʃ	\revglotstop	ḅ	\tildel
ḅ	\dz	ʃ	\invy	D	\scd	ʒ	\yogh
ʔ	\ejective	ɣ	\ipagamma	G	\scg		

TABLE 14: wasysym Phonetic Symbols

ḅ	\DH	ð	\dh	ɔ	\openo
ḅ	\Thorn	ə	\inve	ḅ	\thorn

TABLE 15: phonetic Phonetic Symbols

ɹ	\barj	ɾ	\flap	ɪ	\libar	ɔ	\rotvara	ɪ	\vari
λ	\barlambda	ʔ	\glottal	ɔ	\openo	Λ	\rotw	ω	\varomega
ŋ	\emgma	ʒ	\hausab	ħ	\planck	ʃ	\roty	ɔ	\varopeno
ŋ	\engma	ḃ	\hausab	Λ	\pwedge	ə	\schwa	ʏ	\vod
ɲ	\enya	ḋ	\hausad	ḅ	\revD	ḅ	\thorn	fi	\voicedh
ε	\epsi	ḅ	\hausad	ɹ	\riota	ʃ	\ubar	ʒ	\yogh
ʃ	\esh	ḅ	\hausak	ʊ	\rotm	ɥ	\udesc		
ð	\eth	K	\hausak	ʊ	\rotOmega	ɑ	\vara		
ḅ	\fj	ḋ	\hookd	ɹ	\rotr	g	\varg		

TABLE 16: t4phonet Phonetic Symbols

đ	<code>\textcrd</code>	d'	<code>\texthtd</code>		<code>\textpipe</code>
ħ	<code>\textcrh</code>	k	<code>\texthtk</code>	ɔ	<code>\textrtaild</code>
ε	<code>\textepsilon</code>	ɸ	<code>\texthtp</code>	ʈ	<code>\textrtailt</code>
ʃ	<code>\textesh</code>	t	<code>\texthtt</code>	d'	<code>\textschwa</code>
fj	<code>\textfjlig</code>	ι	<code>\textiota</code>	ʃ	<code>\textscriptv</code>
β	<code>\texthtb</code>	ɲ	<code>\textltailn</code>	ʧ	<code>\texttेशlig</code>
℄	<code>\texthtc</code>	ɔ	<code>\textopeno</code>	ʒ	<code>\textyogh</code>

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 16) but using the same names as the `tipa` characters presented in Table 11 on page 17.

TABLE 17: semtrans Transliteration Symbols

›	<code>\Alif</code>	◁	<code>\Ayn</code>
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TABLE 18: Text-mode Accents

Ää	<code>\"{A}\{a}</code>	Áá	<code>\ {A}\ {a}‡</code>	Ââ	<code>\f{A}\f{a}¶</code>	Ââ	<code>\t{A}\t{a}</code>
Áá	<code>\' {A}\' {a}</code>	Ãã	<code>\~{A}\~{a}</code>	Ăă	<code>\G{A}\G{a}‡</code>	Ăă	<code>\u{A}\u{a}</code>
Ăă	<code>\. {A}\. {a}</code>	Ȃȃ	<code>\b{A}\b{a}</code>	Ȧȧ	<code>\h{A}\h{a}§</code>	Ȧȧ	<code>\U{A}\U{a}‡</code>
Ȧȧ	<code>\={A}\={a}</code>	Ȫȫ	<code>\c{A}\c{a}</code>	Ȩȩ	<code>\H{A}\H{a}</code>	Ȩȩ	<code>\U{A}\U{a}¶</code>
Ȩȩ	<code>\^{A}\^{a}</code>	Ȭȭ	<code>\C{A}\C{a}¶</code>	Ȫȫ	<code>\k{A}\k{a}†</code>	Ȫȫ	<code>\v{A}\v{a}</code>
Ȫȫ	<code>\‘{A}\‘{a}</code>	Ȭȭ	<code>\d{A}\d{a}</code>	Ȭȭ	<code>\r{A}\r{a}</code>		

Ââ `\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., “i” and “j”). 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 L<sup>A</sup>T<sub>E</sub>X. Font encodings other than OT1 and newer versions of L<sup>A</sup>T<sub>E</sub>X properly typeset “`na\{i}ve`” as “naïve”.



TABLE 19: tipa Text-mode Accents

Áá	<code>\textacutemacron{A}\textacutemacron{a}</code>
Ăă	<code>\textacutewedge{A}\textacutewedge{a}</code>
Ȧȧ	<code>\textadvancing{A}\textadvancing{a}</code>
Ȫȫ	<code>\textbottomtiebar{A}\textbottomtiebar{a}</code>
Ăă	<code>\textbreveaccent{A}\textbreveaccent{a}</code>
Ââ	<code>\textcircumacute{A}\textcircumacute{a}</code>
Ââ	<code>\textcircumdot{A}\textcircumdot{a}</code>
Ȧȧ	<code>\textdotacute{A}\textdotacute{a}</code>
Ȫȫ	<code>\textdotbreve{A}\textdotbreve{a}</code>
Ää	<code>\textdoublegrave{A}\textdoublegrave{a}</code>
Ăă	<code>\textdoublevbaraccent{A}\textdoublevbaraccent{a}</code>
Ȧȧ	<code>\textfallrise{A}\textfallrise{a}</code>
Ăă	<code>\textgravecircum{A}\textgravecircum{a}</code>
Ää	<code>\textgravedot{A}\textgravedot{a}</code>
Ăă	<code>\textgravemacron{A}\textgravemacron{a}</code>
Ăă	<code>\textgravemid{A}\textgravemid{a}</code>
Ȧȧ	<code>\texthighrise{A}\texthighrise{a}</code>
Ȫȫ	<code>\textinvsubbridge{A}\textinvsubbridge{a}</code>
Ȫȫ	<code>\textlowering{A}\textlowering{a}</code>
Ăă	<code>\textlowrise{A}\textlowrise{a}</code>
Ȧȧ	<code>\textmidacute{A}\textmidacute{a}</code>
Ăă	<code>\textovercross{A}\textovercross{a}</code>
Ăă	<code>\textoverw{A}\textoverw{a}</code>
Ȫȫ	<code>\textpolhook{A}\textpolhook{a}</code>
Ȫȫ	<code>\textraising{A}\textraising{a}</code>
Ȫȫ	<code>\textretracting{A}\textretracting{a}</code>
Ăă	<code>\textringmacron{A}\textringmacron{a}</code>
Ȧȧ	<code>\textrisefall{A}\textrisefall{a}</code>
Ââ	<code>\textroundcap{A}\textroundcap{a}</code>
Ȫȫ	<code>\textseagull{A}\textseagull{a}</code>
Ȫȫ	<code>\textsubacute{A}\textsubacute{a}</code>
Ȫȫ	<code>\textsubarch{A}\textsubarch{a}</code>
Ȫȫ	<code>\textsubbar{A}\textsubbar{a}</code>
Ȫȫ	<code>\textsubbridge{A}\textsubbridge{a}</code>
Ȫȫ	<code>\textsubcircum{A}\textsubcircum{a}</code>
Ȫȫ	<code>\textsubdot{A}\textsubdot{a}</code>
Ȫȫ	<code>\textsubgrave{A}\textsubgrave{a}</code>
Ȫȫ	<code>\textsublhalfring{A}\textsublhalfring{a}</code>
Ȫȫ	<code>\textsubplus{A}\textsubplus{a}</code>
Ȫȫ	<code>\textsubrhalfring{A}\textsubrhalfring{a}</code>
Ȫȫ	<code>\textsubring{A}\textsubring{a}</code>

*(continued on next page)*

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$\text{\AA}$	<code>\textsubsquare{A}\textsubsquare{a}</code>
$\text{\Aa}$	<code>\textsubtilde{A}\textsubtilde{a}</code>
$\text{\AA}$	<code>\textsubumlaut{A}\textsubumlaut{a}</code>
$\text{\AA}$	<code>\textsubw{A}\textsubw{a}</code>
$\text{\AA}$	<code>\textsubwedge{A}\textsubwedge{a}</code>
$\text{\AA}$	<code>\textsuperimposetilde{A}\textsuperimposetilde{a}</code>
$\text{\AA}$	<code>\textsyllabic{A}\textsyllabic{a}</code>
$\text{\AA}$	<code>\texttildedot{A}\texttildedot{a}</code>
$\text{\AA}$	<code>\texttoptiebar{A}\texttoptiebar{a}</code>
$\text{\AA}$	<code>\textvbaraccent{A}\textvbaraccent{a}</code>

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

TABLE 20: `extraipa` Text-mode Accents

$\text{\AA}$	<code>\bibridge{A}\bibridge{a}</code>	$\text{\AA}$	<code>\partvoiceless{A}\partvoiceless{a}</code>
$\text{\AA}$	<code>\crtilde{A}\crtilde{a}</code>	$\text{\AA}$	<code>\sliding{A}\sliding{a}</code>
$\text{\AA}$	<code>\dottedtilde{A}\dottedtilde{a}</code>	$\text{\AA}$	<code>\spreadlips{A}\spreadlips{a}</code>
$\text{\AA}$	<code>\doubletilde{A}\doubletilde{a}</code>	$\text{\AA}$	<code>\subcorner{A}\subcorner{a}</code>
$\text{\AA}$	<code>\finpartvoice{A}\finpartvoice{a}</code>	$\text{\AA}$	<code>\subdoublebar{A}\subdoublebar{a}</code>
$\text{\AA}$	<code>\finpartvoiceless{A}\finpartvoiceless{a}</code>	$\text{\AA}$	<code>\subdoublevert{A}\subdoublevert{a}</code>
$\text{\AA}$	<code>\inipartvoice{A}\inipartvoice{a}</code>	$\text{\AA}$	<code>\sublptr{A}\sublptr{a}</code>
$\text{\AA}$	<code>\inipartvoiceless{A}\inipartvoiceless{a}</code>	$\text{\AA}$	<code>\subrptr{A}\subrptr{a}</code>
$\text{\AA}$	<code>\overbridge{A}\overbridge{a}</code>	$\text{\AA}$	<code>\whistle{A}\whistle{a}</code>
$\text{\AA}$	<code>\partvoice{A}\partvoice{a}</code>		

TABLE 21: `wsuipa` Text-mode Accents

$\text{\AA}$	<code>\dental{A}\dental{a}</code>
$\text{\AA}$	<code>\underarch{A}\underarch{a}</code>

TABLE 22: phonetic Text-mode Accents

$\underset{\cdot}{A}\underset{\cdot}{a}$	<code>\hill{A}\hill{a}</code>	$\underset{\cdot}{A}\underset{\cdot}{a}$	<code>\rc{A}\rc{a}</code>	$\underset{\cdot}{A}\underset{\cdot}{a}$	<code>\ut{A}\ut{a}</code>
$\underset{\circ}{A}\underset{\circ}{a}$	<code>\od{A}\od{a}</code>	$\underset{\cdot}{A}\underset{\cdot}{a}$	<code>\syl{A}\syl{a}</code>		
$\overset{\cdot}{A}\overset{\cdot}{a}$	<code>\ohill{A}\ohill{a}</code>	$\underset{\cdot}{A}\underset{\cdot}{a}$	<code>\td{A}\td{a}</code>		

The phonetic package provides a few additional macros for linguistic accents. `\acbar` and `\acarc` compose characters with multiple accents; for example, `\acbar{'}{a}` produces “á” and `\acarc{"}{e}` produces “ë”. `\labvel` joins two characters with an arc: `\labvel{mn}` → “m̂n̂”. `\upbar` is intended to go between characters as in “x̂ŷ” → “x̂ŷ”. Lastly, `\uplett` behaves like `\textsuperscript` but uses a smaller font. Contrast “p̂`\uplett{h}`” → “p̂<sup>h</sup>” with “p̂`\textsuperscript{h}`” → “p̂<sup>h</sup>”.

TABLE 23: metre Text-mode Accents

$\acute{A}\acute{a}$	<code>\acutus{A}\acutus{a}</code>
$\breve{A}\breve{a}$	<code>\breve{A}\breve{a}</code>
$\tilde{A}\tilde{a}$	<code>\circumflexus{A}\circumflexus{a}</code>
$\ddot{A}\ddot{a}$	<code>\diaeresis{A}\diaeresis{a}</code>
$\grave{A}\grave{a}$	<code>\gravis{A}\gravis{a}</code>
$\bar{A}\bar{a}$	<code>\macron{A}\macron{a}</code>

TABLE 24: t4phonet Text-mode Accents

$\text{\AA}\text{\aa}$	<code>\textdoublegrave{A}\textdoublegrave{a}</code>
$\text{\A}\text{\a}$	<code>\textvbaraccent{A}\textvbaraccent{a}</code>
$\text{\AA}\text{\aa}$	<code>\textdoublevbaraccent{A}\textdoublevbaraccent{a}</code>

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 20) but using the same names as the `tipa` accents presented in Table 19 on page 21.

TABLE 25: arcs Text-mode Accents

$\widehat{A}\widehat{a}$	<code>\overarc{A}\overarc{a}</code>	$\underline{A}\underline{a}$	<code>\underarc{A}\underarc{a}</code>
--------------------------	-------------------------------------	------------------------------	---------------------------------------

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 `resize` package, upon which `arcs` depends. As a workaround, one should apply the patch proposed by Michael Sharpe on the X<sub>Y</sub>TeX mailing list (Subject: “The arcs package”, dated 2013/08/25) to prevent spurious text from being added to the document (as in, “5.0pt $\widehat{A}$ ” when “ $\widehat{A}$ ” is expected).

TABLE 26: semtrans Accents

$\grave{A}$	<code>\D{A}\D{a}</code>	$\grave{U}$	<code>\U{A}\U{a}</code>
$\text{\T}$	<code>\T{A}\T{a}</code> *		

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

TABLE 27: ogonek Accents

$\kern$	<code>\k{A}\k{a}</code>
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TABLE 28: combelow Accents

$\grave{A}$	<code>\cb{A}\cb{a}</code>
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`\cb` places a comma *above* letters with descenders. Hence, while “`\cb{s}`” produces “š”, “`\cb{g}`” produces “ġ”.

TABLE 29: wsuipa Diacritics

$\grave{A}$	<code>\ain</code>	$\text{\leftarrow}$	<code>\leftp</code>	$\overset{\circ}{A}$	<code>\overring</code>	$\text{\textasciicircum}$	<code>\stress</code>	$\underset{\sim}{A}$	<code>\underwedge</code>
$\text{\ulcorner}$	<code>\corner</code>	$\text{\leftarrow}$	<code>\leftt</code>	$\text{\textasciicaron}$	<code>\polishhook</code>	$\text{\textasciicircum}$	<code>\syllabic</code>	$\text{\textasciicircum}$	<code>\upp</code>
$\text{\textdownarrow}$	<code>\downp</code>	$\text{\textasciicircum}$	<code>\length</code>	$\text{\textasciicircum}$	<code>\rightp</code>	$\text{\textasciicircum}$	<code>\underdotes</code>	$\text{\textasciicircum}$	<code>\upt</code>
$\text{\textdownarrow}$	<code>\downt</code>	$\text{\textasciicircum}$	<code>\midtilde</code>	$\text{\textasciicircum}$	<code>\rightt</code>	$\text{\textasciicircum}$	<code>\underring</code>		
$\text{\textasciicircum}$	<code>\halflength</code>	$\text{\textasciicircum}$	<code>\open</code>	$\text{\textasciicircum}$	<code>\secstress</code>	$\text{\textasciicircum}$	<code>\undertilde</code>		

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 “ $\overset{\circ}{a}$ ”, and `\diaunder[\underdotes|a]` produces “ $\underset{\sim}{a}$ ”. See the `wsuipa` documentation for more information.

TABLE 30: textcomp Diacritics

$\text{\textasciicircum}$	<code>\textacutedbl</code>	$\text{\textasciicircum}$	<code>\textasciicaron</code>	$\text{\textasciicircum}$	<code>\textasciimacron</code>
$\text{\textasciicircum}$	<code>\textasciiacute</code>	$\text{\textasciicircum}$	<code>\textasciidieresis</code>	$\text{\textasciicircum}$	<code>\textgravedbl</code>
$\text{\textasciicircum}$	<code>\textasciibreve</code>	$\text{\textasciicircum}$	<code>\textasciigrave</code>		

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 218 for more information.

TABLE 31: marvosym Diacritics

$\overrightarrow{\phantom{a}}$	<code>\arrowOver</code>	$\overline{\phantom{a}}$	<code>\barOver</code>	$\overline{\phantom{a}}/\phantom{a}$	<code>\StrikingThrough</code>
$\overleftarrow{\phantom{a}}$	<code>\ArrowOver</code>	$\overline{\phantom{a}}$	<code>\BarOver</code>		

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 218 for more information.

TABLE 32: textcomp Currency Symbols

฿	<code>\textbaht</code>	\$	<code>\textdollar*</code>	₵	<code>\textguarani</code>	₩	<code>\textwon</code>
¢	<code>\textcent</code>	\$	<code>\textdollaroldstyle</code>	₹	<code>\textlira</code>	¥	<code>\textyen</code>
¢	<code>\textcentoldstyle</code>	₫	<code>\textdong</code>	₦	<code>\textnaira</code>		
₯	<code>\textcolonmonetary</code>	€	<code>\texteuro</code>	₱	<code>\textpeso</code>		
₧	<code>\textcurrency</code>	f	<code>\textflorin</code>	£	<code>\textsterling*</code>		

\* It's generally preferable to use the corresponding symbol from Table 3 on page 15 because the symbols in that table work properly in both text mode and math mode.

TABLE 33: marvosym Currency Symbols

₴	<code>\Denarius</code>	€	<code>\EURcr</code>	€	<code>\EURtm</code>	₣	<code>\Pfund</code>
€	<code>\Ecommerce</code>	€	<code>\EURdig</code>	\$	<code>\EyesDollar</code>	£	<code>\Shilling</code>
€	<code>\EUR</code>	€	<code>\EURhv</code>	₯	<code>\Florin</code>		

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 282 (`\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

₿	<code>\faBtc</code>	₹	<code>\faIls</code>	₩	<code>\faKrw</code>	\$	<code>\faUsd</code>
€	<code>\faEur</code>	₹	<code>\faInr</code>	₱	<code>\faRub</code>	₿	<code>\faViacoin</code>
£	<code>\faGbp</code>	¥	<code>\faJpy</code>	₯	<code>\faTry</code>		

`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

¢	<code>\cent</code>	₧	<code>\currency</code>
---	--------------------	---	------------------------

TABLE 36: GpA2e Currency Symbols

€	<code>\Euro</code>	£	<code>\Pound</code>
---	--------------------	---	---------------------

TABLE 37: teubner Currency Symbols

✕	<code>\denarius</code>	c	<code>\hemiobelion</code>	▷	<code>\tetartemorion</code>
⊢	<code>\dracma</code>	⋄	<code>\stater</code>		

TABLE 38: tfrupee Currency Symbols

₹	<code>\rupee</code>
---	---------------------

TABLE 39: eurosym Euro Signs

€	<code>\geneuro</code>	€	<code>\geneuronarrow</code>	€	<code>\geneurowide</code>	€	<code>\officiaeuro</code>
---	-----------------------	---	-----------------------------	---	---------------------------	---	---------------------------

`\euro` is automatically mapped to one of the above—by default, `\officiaeuro`—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

€	<code>\eurologo</code>	€	<code>\texteuro</code>
---	------------------------	---	------------------------

TABLE 41: textcomp Legal Symbols

⒫	<code>\textcircledP</code>	©	©	<code>\textcopyright</code>	SM	<code>\textservicemark</code>
Ⓒ	<code>\textcircleft</code>	®	®	<code>\textregistered</code>	TM	<code>\texttrademark</code>






The first symbol column represents the—sometimes “faked”—symbol that  $\text{\LaTeX}2_{\epsilon}$  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














©	<code>\faCopyright</code>	®	<code>\faRegistered</code>
©	<code>\faCreativeCommons</code>	TM	<code>\faTrademark</code>

TABLE 43: ccllicenses Creative Commons License Icons

	<code>\cc</code>		<code>\ccnc*</code>		<code>\ccsa*</code>
	<code>\ccbby</code>		<code>\ccnd</code>		

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

TABLE 44: ccicons Creative Commons License Icons

	<code>\ccAttribution</code>		<code>\ccNonCommercialEU</code>		<code>\ccShare</code>
	<code>\ccCopy</code>		<code>\ccNonCommercialJP</code>		<code>\ccShareAlike</code>
	<code>\ccLogo</code>		<code>\ccPublicDomain</code>		<code>\ccZero</code>
	<code>\ccNoDerivatives</code>		<code>\ccRemix</code>		
	<code>\ccNonCommercial</code>		<code>\ccSampling</code>		

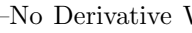
`ccicons` additionally defines a set of commands for typesetting many complete Creative Commons licenses (i.e., juxtapositions of two or more of the preceding icons). For example, the `\ccbbyncnd` command typesets the “Attribution–Noncommercial–No Derivative Works” license (“”). See the `ccicons` documentation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

TABLE 45: textcomp Old-style Numerals

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

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

<code>\b</code>	<code>\textblank</code>	<code>\P</code>	<code>\textpilcrow</code>
<code> </code>	<code>\textbrokenbar</code>	<code>'</code>	<code>\textquotesingle</code>
<code>=</code>	<code>\textdblhyphen</code>	<code>,</code>	<code>\textquotestraightbase</code>
<code>=</code>	<code>\textdblhyphenchar</code>	<code>„</code>	<code>\textquotestraightdblbase</code>
<code>%</code>	<code>\textdiscount</code>	<code>R</code>	<code>\textrecipe</code>
<code>E</code>	<code>\textestimated</code>	<code>*</code>	<code>\textreferencemark</code>
<code>‡</code>	<code>\textinterrobang</code>	<code>—</code>	<code>\textthreequartersemdash</code>
<code>‡</code>	<code>\textinterrobangdown</code>	<code>~</code>	<code>\texttildelow</code>
<code>N<sup>o</sup></code>	<code>\textnumero</code>	<code>—</code>	<code>\texttwelveudash</code>
<code>o</code>	<code>\textopenbullet</code>		

TABLE 47: Miscellaneous wasysym Text-mode Symbols

<code>%o</code>	<code>\permil</code>
-----------------	----------------------

### 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  $...$ ,  $\left[ \dots \right]$ , 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., “ $\mathcal{L}$ ” and “ $\mathcal{Z}$ ”) are usually produced using one of the math alphabets in Table 307 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 “ $\blitz$ ” (`\blitza`), “ $\Rightarrow\Leftarrow$ ” (`\Rightarrow\Leftarrow`), “ $\perp$ ” (`\bot`), “ $\Leftrightarrow$ ” (`\nlefttrightarrow`), and “ $\textcircled{*}$ ” (`\textcircled{*}`). 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`), “ $\equiv$ ” (`\equiv`), “ $\stackrel{\text{def}}{=}$ ” (`\stackrel{\text{def}}{=}`), and “ $\stackrel{\text{def}}{=}$ ” (`\stackrel{\text{def}}{=}`). See also the example of `\equalsfill` on page 219. Depending upon the context, disjoint union may be represented as “ $\coprod$ ” (`\coprod`), “ $\sqcup$ ” (`\sqcup`), “ $\dot{\cup}$ ” (`\dotcup`), “ $\oplus$ ” (`\oplus`), or any of a number of other symbols.<sup>2</sup> 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 “ $\emptyset x$ ” 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

\$	<code>\mathdollar</code>	¶	<code>\mathparagraph</code>	£	<code>\mathsterling</code>
...	<code>\mathellipsis</code>	§	<code>\mathsection</code>	-	<code>\mathunderscore</code>

It’s generally preferable to use the corresponding symbol from Table 3 on page 15 because the symbols in that table work properly in both text mode and math mode.

TABLE 49: `cmll` Unary Operators

!	<code>\oc*</code>	↑	<code>\shneg</code>	?	<code>\wn*</code>
⇕	<code>\shift</code>	↓	<code>\shpos</code>		

\* `\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 “ $A = !B$ ”.

<sup>1</sup>In `txfonts`, `pxfonts`, and `mathtools` the symbol is called `\coloneqq`. In `mathabx` and `MnSymbol` it’s called `\coloneq`. In `colonequals` it’s called `\colonequals`.

<sup>2</sup>Bob Tennent listed these and other disjoint-union symbol possibilities in a November 2007 post to `comp.text.tex`.



TABLE 50: Binary Operators

$\amalg$	<code>\amalg</code>	$\cup$	<code>\cup</code>	$\oplus$	<code>\oplus</code>	$\times$	<code>\times</code>
$*$	<code>\ast</code>	$\dagger$	<code>\dagger</code>	$\oslash$	<code>\oslash</code>	$\triangleleft$	<code>\triangleleft</code>
$\bigcirc$	<code>\bigcirc</code>	$\ddagger$	<code>\ddagger</code>	$\otimes$	<code>\otimes</code>	$\triangleright$	<code>\triangleright</code>
$\bigtriangledown$	<code>\bigtriangledown</code>	$\diamond$	<code>\diamond</code>	$\pm$	<code>\pm</code>	$\triangleleft$	<code>\unlhd*</code>
$\bigtriangleup$	<code>\bigtriangleup</code>	$\div$	<code>\div</code>	$\triangleright$	<code>\rhd*</code>	$\triangleright$	<code>\unrhd*</code>
$\bullet$	<code>\bullet</code>	$\triangleleft$	<code>\lhd*</code>	$\setminus$	<code>\setminus</code>	$\oplus$	<code>\uplus</code>
$\cap$	<code>\cap</code>	$\mp$	<code>\mp</code>	$\sqcap$	<code>\sqcap</code>	$\vee$	<code>\vee</code>
$\cdot$	<code>\cdot</code>	$\odot$	<code>\odot</code>	$\sqcup$	<code>\sqcup</code>	$\wedge$	<code>\wedge</code>
$\circ$	<code>\circ</code>	$\ominus$	<code>\ominus</code>	$\star$	<code>\star</code>	$\wr$	<code>\wr</code>

\* Not predefined by the L<sup>A</sup>T<sub>E</sub>X<sub>2 $\epsilon$</sub>  core. Use the `latexsym` package to expose this symbol.

TABLE 51:  $\mathcal{A}\mathcal{M}\mathcal{S}$  Binary Operators

$\bar{\wedge}$	<code>\barwedge</code>	$\odot$	<code>\circledcirc</code>	$\top$	<code>\intercal*</code>
$\boxdot$	<code>\boxdot</code>	$\ominus$	<code>\circleddash</code>	$\times$	<code>\leftthreetimes</code>
$\boxminus$	<code>\boxminus</code>	$\cup$	<code>\Cup</code>	$\times$	<code>\ltimes</code>
$\boxplus$	<code>\boxplus</code>	$\curlyvee$	<code>\curlyvee</code>	$\times$	<code>\rightthreetimes</code>
$\boxtimes$	<code>\boxtimes</code>	$\curlywedge$	<code>\curlywedge</code>	$\times$	<code>\rtimes</code>
$\Cap$	<code>\Cap</code>	$\div$	<code>\divideontimes</code>	$\setminus$	<code>\smallsetminus</code>
$\cdot$	<code>\centerdot</code>	$\dagger$	<code>\dotplus</code>	$\underline{\vee}$	<code>\veebar</code>
$\circledast$	<code>\circledast</code>	$\bar{\wedge}$	<code>\doublebarwedge</code>		

\* Some people use a superscripted `\intercal` for matrix transpose: “ $A^{\intercal}$ ”  $\mapsto$  “ $A^T$ ”. (See the May 2009 `comp.text.tex` thread, “raising math symbols”, for suggestions about altering the height of the superscript.) `\top` (Table 199 on page 93), `T`, and `\mathsf{T}` are other popular choices: “ $A^{\top}$ ”, “ $A^T$ ”, “ $A^T$ ”.

TABLE 52: `stmaryrd` Binary Operators

$\bar{\phi}$	<code>\baro</code>	$\parallel$	<code>\interleave</code>	$\otimes$	<code>\varoast</code>
$\parallel$	<code>\bbslash</code>	$\triangleleft$	<code>\leftslice</code>	$\oplus$	<code>\varobar</code>
$\&$	<code>\binampersand</code>	$\mathcal{M}$	<code>\merge</code>	$\oslash$	<code>\varobslash</code>
$\wp$	<code>\bindnasrepma</code>	$\ominus$	<code>\minuso</code>	$\odot$	<code>\varocircle</code>
$\boxast$	<code>\boxast</code>	$\pm$	<code>\moo</code>	$\odot$	<code>\varodot</code>
$\boxbar$	<code>\boxbar</code>	$\oplus$	<code>\nplus</code>	$\otimes$	<code>\varogreaterthan</code>
$\boxbox$	<code>\boxbox</code>	$\oplus$	<code>\obar</code>	$\otimes$	<code>\varolessthan</code>
$\boxbslash$	<code>\boxbslash</code>	$\square$	<code>\oblong</code>	$\ominus$	<code>\varominus</code>
$\boxcircle$	<code>\boxcircle</code>	$\oslash$	<code>\obslash</code>	$\oplus$	<code>\varoplus</code>
$\boxdot$	<code>\boxdot</code>	$\otimes$	<code>\ogreaterthan</code>	$\oslash$	<code>\varoslash</code>
$\boxempty$	<code>\boxempty</code>	$\otimes$	<code>\olessthan</code>	$\otimes$	<code>\varotimes</code>
$\boxslash$	<code>\boxslash</code>	$\vee$	<code>\ovee</code>	$\vee$	<code>\varovee</code>
$\curlyveedownarrow$	<code>\curlyveedownarrow</code>	$\vee$	<code>\owedge</code>	$\vee$	<code>\varowedge</code>
$\curlyveeuparrow$	<code>\curlyveeuparrow</code>	$\triangleright$	<code>\rightslice</code>	$\times$	<code>\vartimes</code>
$\curlywedgedownarrow$	<code>\curlywedgedownarrow</code>	$\parallel$	<code>\sslash</code>	$\Upsilon$	<code>\Ydown</code>
$\curlywedgeuparrow$	<code>\curlywedgeuparrow</code>	$\parallel$	<code>\talloblong</code>	$\prec$	<code>\Yleft</code>
$\fatbslash$	<code>\fatbslash</code>	$\bigcirc$	<code>\varbigcirc</code>	$\succ$	<code>\Yright</code>
$\fatsemi$	<code>\fatsemi</code>	$\curlyvee$	<code>\varcurlyvee</code>	$\curlyvee$	<code>\Yup</code>
$\fatslash$	<code>\fatslash</code>	$\curlywedge$	<code>\varcurlywedge</code>		

TABLE 53: wasysym Binary Operators

$\triangleleft$	<code>\lhd</code>	$\circ$	<code>\ocircle</code>	$\blacktriangleright$	<code>\RHD</code>	$\triangleright$	<code>\unrhd</code>
$\blacktriangleleft$	<code>\LHD</code>	$\triangleright$	<code>\rhd</code>	$\trianglelefteq$	<code>\unlhd</code>		

TABLE 54: txfonts/pxfonts Binary Operators

$\textcircled{\rule{0.4pt}{0.4pt}}$	<code>\circledbar</code>	$\textcircled{\rule{0.4pt}{0.4pt} \rule{0.4pt}{0.4pt}}$	<code>\circledwedge</code>	$\textcirc$	<code>\medcirc</code>
$\textcircled{\rule{0.4pt}{0.4pt} /}$	<code>\circledbslash</code>	$\textcircled{\rule{0.4pt}{0.4pt} \rule{0.4pt}{0.4pt} \rule{0.4pt}{0.4pt}}$	<code>\invamp</code>	$\textcircled{\rule{0.4pt}{0.4pt} \rule{0.4pt}{0.4pt} \rule{0.4pt}{0.4pt} \rule{0.4pt}{0.4pt}}$	<code>\sqcappplus</code>
$\textcircled{\rule{0.4pt}{0.4pt} \rule{0.4pt}{0.4pt}}$	<code>\circledvee</code>	$\bullet$	<code>\medbullet</code>	$\textcircled{\rule{0.4pt}{0.4pt} \rule{0.4pt}{0.4pt} \rule{0.4pt}{0.4pt} \rule{0.4pt}{0.4pt} \rule{0.4pt}{0.4pt}}$	<code>\sqcupplus</code>

TABLE 55: mathabx Binary Operators

$*$	<code>\ast</code>	$\wedge$	<code>\curlywedge</code>	$\sqcap$	<code>\sqcap</code>
$*$	<code>\Asterisk</code>	$\div$	<code>\divdot</code>	$\sqcup$	<code>\sqcup</code>
$\bar{\wedge}$	<code>\barwedge</code>	$*$	<code>\divideontimes</code>	$\sqcap\sqcap$	<code>\sqdoublecap</code>
$\star$	<code>\bigstar</code>	$\dot{\div}$	<code>\dotdiv</code>	$\sqcup\sqcup$	<code>\sqdoublecup</code>
$\star$	<code>\bigvarstar</code>	$\dot{+}$	<code>\dotplus</code>	$\square$	<code>\square</code>
$\blacklozenge$	<code>\blackdiamond</code>	$\dot{\times}$	<code>\dottimes</code>	$\boxplus$	<code>\squplus</code>
$\cap$	<code>\cap</code>	$\bar{\wedge}$	<code>\doublebarwedge</code>	$\cdot$	<code>\udot</code>
$\dagger$	<code>\circplus</code>	$\cap$	<code>\doublecap</code>	$\oplus$	<code>\uplus</code>
$*$	<code>\coasterisk</code>	$\cup$	<code>\doublecup</code>	$*$	<code>\varstar</code>
$*$	<code>\coAsterisk</code>	$\times$	<code>\ltimes</code>	$\vee$	<code>\vee</code>
$*$	<code>\convolution</code>	$\oplus$	<code>\pluscirc</code>	$\bar{\vee}$	<code>\veebar</code>
$\cup$	<code>\cup</code>	$\times$	<code>\rtimes</code>	$\bar{\bar{\vee}}$	<code>\veedoublebar</code>
$\curlyvee$	<code>\curlyvee</code>	$\blacksquare$	<code>\sqbullet</code>	$\wedge$	<code>\wedge</code>

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

$\amalg$	<code>\amalg</code>	$\sqcup\sqcup$	<code>\doublecup</code>	$\therefore$	<code>\righttherefore</code>
$*$	<code>\ast</code>	$\wp$	<code>\doublevee</code>	$\times$	<code>\rightthreetimes</code>
$\backslash$	<code>\backslashslashdiv</code>	$\wedge$	<code>\doublewedge</code>	$\succ$	<code>\rightY</code>
$\bowtie$	<code>\bowtie</code>	$\therefore$	<code>\downtherefore</code>	$\times$	<code>\rtimes</code>
$\bullet$	<code>\bullet</code>	$\curlyvee$	<code>\downY</code>	$\div$	<code>\slashdiv</code>
$\cap$	<code>\cap</code>	$\times$	<code>\dtimes</code>	$\prod$	<code>\smallprod</code>
$\cap\dot{\cap}$	<code>\capdot</code>	$\therefore$	<code>\fivedots</code>	$\sqcap$	<code>\sqcap</code>
$\textcircled{\rule{0.4pt}{0.4pt}}$	<code>\capplus</code>	$\infty$	<code>\hbipropto</code>	$\cap\dot{\cap}$	<code>\sqcapdot</code>
$\cdot$	<code>\cdot</code>	$\therefore$	<code>\hdotdot</code>	$\textcircled{\rule{0.4pt}{0.4pt} \rule{0.4pt}{0.4pt}}$	<code>\sqcupplus</code>
$\circ$	<code>\circ</code>	$\lrcorner$	<code>\lefthalfcap</code>	$\sqcup$	<code>\sqcup</code>

(continued on next page)

(continued from previous page)

$\curlyvee$	<code>\closedcurlyvee</code>	$\leftthalfcup$	<code>\lefthalfcup</code>	$\sqcupdot$	<code>\sqcupdot</code>
$\curlywedge$	<code>\closedcurlywedge</code>	$\lefttherefore$	<code>\lefttherefore</code>	$\sqcupplus$	<code>\sqcupplus</code>
$\cup$	<code>\cup</code>	$\leftthreetimes$	<code>\leftthreetimes</code>	$\squaredots$	<code>\squaredots</code>
$\cupdot$	<code>\cupdot</code>	$\leftY$	<code>\leftY</code>	$\times$	<code>\times</code>
$\cupplus$	<code>\cupplus</code>	$\ltimes$	<code>\ltimes</code>	$\udotdot$	<code>\udotdot</code>
$\curlyvee$	<code>\curlyvee</code>	$\medbackslash$	<code>\medbackslash</code>	$\uptherefore$	<code>\uptherefore</code>
$\curlyveedot$	<code>\curlyveedot</code>	$\medcircle$	<code>\medcircle</code>	$\upY$	<code>\upY</code>
$\curlywedge$	<code>\curlywedge</code>	$\medslash$	<code>\medslash</code>	$\utimes$	<code>\utimes</code>
$\curlywedgedot$	<code>\curlywedgedot</code>	$\medvert$	<code>\medvert</code>	$\vbipropto$	<code>\vbipropto</code>
$\ddot{\cdot}$	<code>\ddotdotdot</code>	$\medvertdot$	<code>\medvertdot</code>	$\vdots$	<code>\vdots</code>
$\diamonddot$	<code>\diamonddots</code>	$\minus$	<code>\minus</code>	$\vee$	<code>\vee</code>
$\div$	<code>\div</code>	$\minusdot$	<code>\minusdot</code>	$\veedot$	<code>\veedot</code>
$\dot{\mid}$	<code>\dotmedvert</code>	$\mp$	<code>\mp</code>	$\vertbowtie$	<code>\vertbowtie</code>
$\dot{-}$	<code>\dotminus</code>	$\neswbipropto$	<code>\neswbipropto</code>	$\vertdiv$	<code>\vertdiv</code>
$\doublecap$	<code>\doublecap</code>	$\nwsebipropto$	<code>\nwsebipropto</code>	$\wedge$	<code>\wedge</code>
$\doublecup$	<code>\doublecup</code>	$\plus$	<code>\plus</code>	$\wedgedot$	<code>\wedgedot</code>
$\doublecurlyvee$	<code>\doublecurlyvee</code>	$\pm$	<code>\pm</code>	$\wreath$	<code>\wreath</code>
$\doublecurlywedge$	<code>\doublecurlywedge</code>	$\righthalfcap$	<code>\righthalfcap</code>		
$\doubleqcap$	<code>\doubleqcap</code>	$\righthalfcup$	<code>\righthalfcup</code>		

MnSymbol defines `\setminusminus` and `\smallsetminusminus` 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

$\amalg$	<code>\amalg</code>	$\doublevee$	<code>\doublevee</code>	$\rtimes$	<code>\rtimes</code>
$\ast$	<code>\ast</code>	$\doublewedge$	<code>\doublewedge</code>	$\setminus$	<code>\setminus</code>
$\bar{\wedge}$	<code>\barwedge</code>	$\downY$	<code>\downY</code>	$\sqcap$	<code>\sqcap</code>
$\cap$	<code>\cap</code>	$\dimes$	<code>\dimes</code>	$\sqcapdot$	<code>\sqcapdot</code>
$\capdot$	<code>\capdot</code>	$\hdotdot$	<code>\hdotdot</code>	$\sqcapplus$	<code>\sqcapplus</code>
$\capplus$	<code>\capplus</code>	$\intercal$	<code>\intercal</code>	$\sqcup$	<code>\sqcup</code>
$\cdot$	<code>\cdot</code>	$\intprod$	<code>\intprod</code>	$\sqcupdot$	<code>\sqcupdot</code>
$\centerdot$	<code>\centerdot</code>	$\intprodr$	<code>\intprodr</code>	$\sqcupplus$	<code>\sqcupplus</code>
$\cup$	<code>\cup</code>	$\leftthreetimes$	<code>\leftthreetimes</code>	$\times$	<code>\times</code>
$\cupdot$	<code>\cupdot</code>	$\leftY$	<code>\leftY</code>	$\timesbar$	<code>\timesbar</code>
$\cupplus$	<code>\cupplus</code>	$\ltimes$	<code>\ltimes</code>	$\udotdot$	<code>\udotdot</code>
$\curlyvee$	<code>\curlyvee</code>	$\medbackslash$	<code>\medbackslash</code>	$\upbowtie$	<code>\upbowtie</code>
$\curlywedge$	<code>\curlywedge</code>	$\medslash$	<code>\medslash</code>	$\upY$	<code>\upY</code>
$\ddot{\cdot}$	<code>\ddotdotdot</code>	$\minus$	<code>\minus</code>	$\utimes$	<code>\utimes</code>
$\div$	<code>\div</code>	$\minusdot$	<code>\minusdot</code>	$\varamalg$	<code>\varamalg</code>
$\divideontimes$	<code>\divideontimes</code>	$\minusfdots$	<code>\minusfdots</code>	$\vdots$	<code>\vdots</code>
$\divslash$	<code>\divslash</code>	$\minusrdots$	<code>\minusrdots</code>	$\vdots$	<code>\vdots</code>
$\dot{-}$	<code>\dotminus</code>	$\mp$	<code>\mp</code>	$\vee$	<code>\vee</code>
$\dot{+}$	<code>\dotplus</code>	$\plus$	<code>\plus</code>	$\veebar$	<code>\veebar</code>

(continued on next page)

(continued from previous page)

$\times$	<code>\dottimes</code>	$\dagger$	<code>\plusdot</code>	$\vee$	<code>\veedot</code>
$\overline{\wedge}$	<code>\doublebarwedge</code>	$\pm$	<code>\pm</code>	$\underline{\vee}$	<code>\veedoublebar</code>
$\cap$	<code>\doublecap</code>	$\lrcorner$	<code>\pullback</code>	$\wedge$	<code>\wedge</code>
$\cup$	<code>\doublecup</code>	$\lrcorner$	<code>\pushout</code>	$\wedge$	<code>\wedgedot</code>
$\sqcap$	<code>\doublesqcap</code>	$\llcorner$	<code>\rightthreetimes</code>	$\wr$	<code>\wreath</code>
$\sqcup$	<code>\doublesqcup</code>	$\rceil$	<code>\rightY</code>		

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: boisk Binary Operators

$*$	<code>\ast</code>	$\times$	<code>\dottimes</code>	$\rtimes$	<code>\rtimesblack</code>
$\bar{\phi}$	<code>\baro</code>	$\overline{\wedge}$	<code>\doublebarwedge</code>	$\setminus$	<code>\smallsetminus</code>
$\overline{\wedge}$	<code>\barwedge</code>	$;$	<code>\fatsemi</code>	$\otimes$	<code>\smashtimes</code>
$\parallel$	<code>\bbslash</code>	$>$	<code>\gtrdot</code>	$\sqcup$	<code>\sqcupplus</code>
$\&$	<code>\binampersand</code>	$\top$	<code>\intercal</code>	$\parallel$	<code>\sslash</code>
$\wp$	<code>\bindnasrepma</code>	$\wr$	<code>\lbag</code>	$\times$	<code>\times</code>
$\blackbowtie$	<code>\blackbowtie</code>	$\blackbowtie$	<code>\lblackbowtie</code>	$\uplus$	<code>\uplus</code>
$\bowtie$	<code>\bowtie</code>	$\triangleleft$	<code>\leftslice</code>	$\cap$	<code>\varcap</code>
$\cap$	<code>\cap</code>	$\lambda$	<code>\leftthreetimes</code>	$\cup$	<code>\varcup</code>
$\Cap$	<code>\Cap</code>	$\lessdot$	<code>\lessdot</code>	$\top$	<code>\varintercal</code>
$\cdot$	<code>\cdot</code>	$\ltimes$	<code>\ltimes</code>	$\sqcap$	<code>\varsqcap</code>
$\cdot$	<code>\centerdot</code>	$\ltimes$	<code>\ltimesblack</code>	$\sqcup$	<code>\varsqcup</code>
$\dagger$	<code>\circplus</code>	$\M$	<code>\merge</code>	$\times$	<code>\vartimes</code>
$*$	<code>\coAsterisk</code>	$\ominus$	<code>\minuso</code>	$\vee$	<code>\vee</code>
$*$	<code>\convolution</code>	$\ddagger$	<code>\moo</code>	$\vee$	<code>\Vee</code>
$\cup$	<code>\cup</code>	$\mp$	<code>\mp</code>	$\underline{\vee}$	<code>\veebar</code>
$\cup$	<code>\Cup</code>	$\oplus$	<code>\nplus</code>	$\vee$	<code>\veeonvee</code>
$\cup$	<code>\cupleftarrow</code>	$\oplus$	<code>\pluscirc</code>	$\wedge$	<code>\wedge</code>
$\curlyvee$	<code>\curlyvee</code>	$\dagger$	<code>\plustrif</code>	$\wedge$	<code>\Wedge</code>
$\curlywedge$	<code>\curlywedge</code>	$\pm$	<code>\pm</code>	$\curlyvee$	<code>\Ydown</code>
$\dagger$	<code>\dagger</code>	$\int$	<code>\rbag</code>	$\leftarrow$	<code>\Yleft</code>
$\ddagger$	<code>\ddagger</code>	$\blackbowtie$	<code>\rblackbowtie</code>	$\rightarrow$	<code>\Yright</code>
$\div$	<code>\div</code>	$\triangleright$	<code>\rightslice</code>	$\curlyvee$	<code>\Yup</code>
$\otimes$	<code>\divideontimes</code>	$\llcorner$	<code>\rightthreetimes</code>		
$\dagger$	<code>\dotplus</code>	$\times$	<code>\rtimes</code>		

TABLE 59: stix Binary Operators

$\amalg$	<code>\amalg</code>	$\;$	<code>\fcmp</code>	$\sqcup$	<code>\sqcup</code>
$\ast$	<code>\ast</code>	$\;/$	<code>\fracslash</code>	$\sqcup$	<code>\Sqcup</code>
$\bar{\cap}$	<code>\barcap</code>	$\intercal$	<code>\intercal</code>	$\//$	<code>\sslash</code>
$\bar{\cup}$	<code>\barcup</code>	$\parallel$	<code>\interleave</code>	$\:$	<code>\threedotcolon</code>
$\bar{\vee}$	<code>\barvee</code>	$\int$	<code>\intprod</code>	$\times$	<code>\times</code>
$\bar{\wedge}$	<code>\barwedge</code>	$\int$	<code>\intprodr</code>	$\times$	<code>\timesbar</code>
$\bigvee$	<code>\bigvee</code>	$\sim$	<code>\invlazys</code>	$-$	<code>\tminus</code>
$\bigwedge$	<code>\bigwedge</code>	$\lambda$	<code>\leftthreetimes</code>	$+$	<code>\tplus</code>
$\times$	<code>\times</code>	$\triangleleft$	<code>\lhd</code>	$\#$	<code>\tripleplus</code>
$\cap$	<code>\cap</code>	$\times$	<code>\ltimes</code>	$\//$	<code>\trslash</code>
$\Cap$	<code>\Cap</code>	$\forall$	<code>\midbarvee</code>	$\cap$	<code>\twocaps</code>
$\bar{\cap}$	<code>\capbarcup</code>	$\wedge$	<code>\midbarwedge</code>	$\cup$	<code>\twocups</code>
$\bar{\cup}$	<code>\capdot</code>	$\cdot$	<code>\minusdot</code>	$\:$	<code>\typecolon</code>
$\bar{\vee}$	<code>\capovercup</code>	$\cdot$	<code>\minusfdots</code>	$\cup$	<code>\uminus</code>
$\bar{\wedge}$	<code>\capwedge</code>	$\cdot$	<code>\minusrdots</code>	$\triangleleft$	<code>\unlhd</code>
$\bar{\cup}$	<code>\closedvarcap</code>	$\mp$	<code>\mp</code>	$\triangleleft$	<code>\unrhd</code>
$\bar{\vee}$	<code>\closedvarcup</code>	$\#$	<code>\nhVvert</code>	$\wp$	<code>\upand</code>
$\bar{\wedge}$	<code>\closedvarcupsmashprod</code>	$\oplus$	<code>\opluslhrim</code>	$\oplus$	<code>\uplus</code>
$\dot{-}$	<code>\commaminus</code>	$\oplus$	<code>\oplusrhrim</code>	$\bar{\wedge}$	<code>\varbarwedge</code>
$\cup$	<code>\cup</code>	$\otimes$	<code>\otimeslhrim</code>	$\bar{\bar{\wedge}}$	<code>\vardoublebarwedge</code>
$\bar{\cup}$	<code>\Cup</code>	$\otimes$	<code>\otimesrhrim</code>	$\bar{\vee}$	<code>\varveebar</code>
$\bar{\cap}$	<code>\cupbarcap</code>	$\dot{+}$	<code>\plusdot</code>	$\times$	<code>\vectimes</code>
$\bar{\vee}$	<code>\cupdot</code>	$\pm$	<code>\pluseqq</code>	$\vee$	<code>\Vee</code>
$\bar{\wedge}$	<code>\cupleftarrow</code>	$\hat{+}$	<code>\plushat</code>	$\vee$	<code>\vee</code>
$\bar{\cup}$	<code>\cupovercap</code>	$\ddagger$	<code>\plussim</code>	$\bar{\vee}$	<code>\veebar</code>
$\bar{\vee}$	<code>\cupvee</code>	$\ddagger$	<code>\plussubtwo</code>	$\vee$	<code>\veedot</code>
$\bar{\wedge}$	<code>\curlyvee</code>	$\ddagger$	<code>\plustrif</code>	$\bar{\vee}$	<code>\veedoublebar</code>
$\bar{\cup}$	<code>\curlywedge</code>	$\pm$	<code>\pm</code>	$\vee$	<code>\veemidvert</code>
$\dagger$	<code>\dagger</code>	$\triangleright$	<code>\rhd</code>	$\dot{\vee}$	<code>\veedot</code>
$\ddagger$	<code>\ddagger</code>	$\times$	<code>\rightthreetimes</code>	$\wp$	<code>\veeonvee</code>
$\div$	<code>\div</code>	$\dagger$	<code>\ringplus</code>	$\wedge$	<code>\Wedge</code>
$\ast$	<code>\divideontimes</code>	$\bar{\dagger}$	<code>\rsolbar</code>	$\wedge$	<code>\wedge</code>
$\dot{-}$	<code>\dotminus</code>	$\times$	<code>\rtimes</code>	$\triangle$	<code>\wedgebar</code>
$\dot{+}$	<code>\dotplus</code>	$\setminus$	<code>\setminusminus</code>	$\wedge$	<code>\wedgedot</code>
$\dot{\times}$	<code>\dottimes</code>	$\sqcup$	<code>\shuffle</code>	$\underline{\wedge}$	<code>\wedgedoublebar</code>
$\bar{\vee}$	<code>\doublebarvee</code>	$\ddagger$	<code>\simplus</code>	$\wedge$	<code>\wedgemidvert</code>
$\bar{\bar{\wedge}}$	<code>\doublebarwedge</code>	$\smallsetminus$	<code>\smallsetminusminus</code>	$\wedge$	<code>\wedgeodot</code>
$\#$	<code>\doubleplus</code>	$\ast$	<code>\smashtimes</code>	$\wedge$	<code>\wedgeonwedge</code>
$\int$	<code>\dsol</code>	$\sqcap$	<code>\sqcap</code>	$\wr$	<code>\wr</code>
$\bar{\int}$	<code>\eqqplus</code>	$\boxplus$	<code>\Sqcap</code>		

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

$\times$  `\dtimes`  $\times$  `\udtimes`  $\times$  `\utimes`

The `mathdesign` package additionally provides versions of each of the binary operators shown in Table 51 on page 29.

TABLE 61: cml Binary Operators

$\wp$  `\parr*`     $\&$  `\with†`

\* `cml` 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 “ $A \& B$ ”.

TABLE 62: shuffle Binary Operators

$\sqcup$  `\cshuffle`     $\sqcup$  `\shuffle`

TABLE 63: ulsy Geometric Binary Operators

$\oplus$  `\odplus`

TABLE 64: mathabx Geometric Binary Operators

$\blacktriangledown$	<code>\blacktriangledown</code>	$\boxright$	<code>\boxright</code>	$\ominus$	<code>\ominus</code>
$\blacktriangleleft$	<code>\blacktriangleleft</code>	$\boxslash$	<code>\boxslash</code>	$\oplus$	<code>\oplus</code>
$\blacktriangleright$	<code>\blacktriangleright</code>	$\boxtimes$	<code>\boxtimes</code>	$\oplus$	<code>\oright</code>
$\blacktriangleup$	<code>\blacktriangleup</code>	$\boxtop$	<code>\boxtop</code>	$\oslash$	<code>\oslash</code>
$\boxasterisk$	<code>\boxasterisk</code>	$\boxtriangleup$	<code>\boxtriangleup</code>	$\otimes$	<code>\otimes</code>
$\boxbackslash$	<code>\boxbackslash</code>	$\boxvoid$	<code>\boxvoid</code>	$\oplus$	<code>\otop</code>
$\boxbot$	<code>\boxbot</code>	$\oasterisk$	<code>\oasterisk</code>	$\triangleup$	<code>\otriangleup</code>
$\boxcirc$	<code>\boxcirc</code>	$\obackslash$	<code>\obackslash</code>	$\circ$	<code>\ovoid</code>
$\boxcoasterisk$	<code>\boxcoasterisk</code>	$\obot$	<code>\obot</code>	$\blacktriangledown$	<code>\smalltriangledown</code>
$\boxdiv$	<code>\boxdiv</code>	$\ocirc$	<code>\ocirc</code>	$\blacktriangleleft$	<code>\smalltriangleleft</code>
$\boxdot$	<code>\boxdot</code>	$\ocoasterisk$	<code>\ocoasterisk</code>	$\blacktriangleright$	<code>\smalltriangleright</code>
$\boxleft$	<code>\boxleft</code>	$\odiv$	<code>\odiv</code>	$\blacktriangleup$	<code>\smalltriangleup</code>
$\boxminus$	<code>\boxminus</code>	$\odot$	<code>\odot</code>		
$\boxplus$	<code>\boxplus</code>	$\oleft$	<code>\oleft</code>		

TABLE 65: MnSymbol Geometric Binary Operators

$\boxbackslash$	$\blacktriangledown$	$\circ$
$\boxbox$	$\blacktriangleleft$	$\odot$
$\boxdot$	$\blacktriangleright$	$\ominus$
$\boxminus$	$\blacktriangleup$	$\oplus$
$\boxplus$	$\blacksquare$	$\oslash$
$\boxslash$	$\star$	$\otimes$
$\boxtimes$	$\blacktriangledown$	$\otimes$
$\boxvert$	$\blacktriangleleft$	$\otriangleright$
$\diamondbackslash$	$\blacktriangleright$	$\overt$
$\diamondddiamond$	$\blacktriangleup$	$\star$
$\diamondddot$	$\diamond$	$\smalldiamond$
$\diamonddminus$	$\square$	$\smallsquare$
$\diamonddplus$	$\star$	$\smallstar$
$\diamonddslash$	$\blacktriangledown$	$\smalltriangledown$
$\diamonddtimes$	$\blacktriangleleft$	$\smalltriangleleft$
$\diamonddvert$	$\blacktriangleright$	$\smalltriangleright$
$\downslice$	$\blacktriangleup$	$\smalltriangleup$
$\filleddiamond$	$\otimes$	$\star$
$\filledmedsquare$	$\oslash$	$\Delta$

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

$\boxbackslash$	$\blacktriangledown$	$\oplus$
$\boxbox$	$\blacktriangleleft$	$\oslash$
$\boxdot$	$\blacktriangleright$	$\otimes$
$\boxminus$	$\blacktriangleup$	$\overt$
$\boxplus$	$\circ$	$\bullet$
$\boxslash$	$\diamond$	$\blacklozenge$
$\boxtimes$	$/$	$\blacksquare$
$\boxvert$	$\square$	$\star$
$\diamondbackslash$	$\blacktriangledown$	$\blacktriangledown$
$\diamondddiamond$	$\blacktriangleleft$	$\blacktriangleleft$
$\diamondddot$	$\blacktriangleright$	$\blacktriangleright$
$\diamonddminus$	$\blacktriangleup$	$\blacktriangleup$
$\diamonddplus$	$\star$	$\circ$
$\diamonddslash$	$\otimes$	$\smalldiamond$
$\diamonddtimes$	$\oslash$	$\smallsquare$
$\diamonddvert$	$\circ$	$\smalltriangledown$
$\medblackcircle$	$\ominus$	$\smalltriangleleft$
$\medblackdiamond$	$\odot$	$\smalltriangleright$
$\medblacksquare$	$\ominus$	$\smalltriangleup$
$\medblackstar$	$\ominus$	$\star$

fdsymbol defines synonyms for most of the preceding symbols:

























































◆	<code>\blackdiamond</code>	◇	<code>\diamond</code>	●	<code>\smbkcircle</code>
▲	<code>\blacktriangle</code>	◇	<code>\Diamond</code>	◆	<code>\smbkdiamond</code>
▼	<code>\blacktriangledown</code>	◇	<code>\diamondbslash</code>	■	<code>\smbklsquare</code>
◀	<code>\blacktriangleleft</code>	◇	<code>\diamondcdot</code>	☆	<code>\smwhitestar</code>
▶	<code>\blacktriangleright</code>	◆	<code>\mdblkdiamond</code>	○	<code>\smwhtcircle</code>
□	<code>\Box</code>	■	<code>\mdblksquare</code>	◇	<code>\smwhtdiamond</code>
▣	<code>\boxbar</code>	●	<code>\mdlgbkcircle</code>	◻	<code>\smwhtsquare</code>
▤	<code>\boxbslash</code>	◆	<code>\mdlgbkdiamond</code>	□	<code>\square</code>
▥	<code>\boxdiag</code>	■	<code>\mdlgbklsquare</code>	★	<code>\star</code>
•	<code>\bullet</code>	○	<code>\mdlgwhtcircle</code>	△	<code>\triangle</code>
◦	<code>\circ</code>	◇	<code>\mdlgwhtdiamond</code>	▽	<code>\triangledown</code>
⊗	<code>\circledast</code>	◻	<code>\mdlgwhtsquare</code>	◁	<code>\triangleleft</code>
⊙	<code>\circledcirc</code>	◇	<code>\mdwhtdiamond</code>	▷	<code>\triangleright</code>
⊖	<code>\circleddash</code>	◻	<code>\mdwhtsquare</code>	△	<code>\vartriangle</code>
⊕	<code>\circledequal</code>	★	<code>\medstar</code>		
⊖	<code>\circledvert</code>	⊗	<code>\obslash</code>		

TABLE 67: boisiK Geometric Binary Operators

◆	<code>\blacklozenge</code>	▣	<code>\boxright</code>	◻	<code>\oblong</code>
■	<code>\blacksquare</code>	▤	<code>\boxslash</code>	⊕	<code>\obot</code>
▲	<code>\blacktriangle</code>	▥	<code>\boxtimes</code>	⊗	<code>\obslash</code>
▼	<code>\blacktriangledown</code>	▣	<code>\boxtop</code>	⊖	<code>\ogreaterthan</code>
◀	<code>\blacktriangleleft</code>	▤	<code>\boxtriangle</code>	⊕	<code>\oleft</code>
▶	<code>\blacktriangleright</code>	⊗	<code>\circledast</code>	⊖	<code>\olessthan</code>
⊗	<code>\boxast</code>	⊙	<code>\circledcirc</code>	⊖	<code>\ominus</code>
▣	<code>\boxbar</code>	⊖	<code>\circleddash</code>	⊕	<code>\oplus</code>
▣	<code>\boxbot</code>	◇	<code>\diamond</code>	⊕	<code>\oright</code>
▣	<code>\boxbox</code>	◊	<code>\diamondbar</code>	⊗	<code>\oslash</code>
▤	<code>\boxbslash</code>	◊	<code>\diamondcircle</code>	⊗	<code>\otimes</code>
▣	<code>\boxcircle</code>	◊	<code>\diamondminus</code>	⊕	<code>\otop</code>
▣	<code>\boxdivision</code>	◇	<code>\diamondop</code>	⊖	<code>\otriangle</code>
▣	<code>\boxdot</code>	⊕	<code>\diamondplus</code>	⊖	<code>\ovee</code>
▣	<code>\boxleft</code>	⊗	<code>\diamondtimes</code>	⊖	<code>\owedge</code>
▣	<code>\boxminus</code>	◊	<code>\diamondtriangle</code>	★	<code>\star</code>
▣	<code>\boxplus</code>	⊖	<code>\obar</code>	⏏	<code>\talloblong</code>














TABLE 68: stix Geometric Binary Operators


	<code>\blackhourglass</code>		<code>\concavediamondtickleft</code>		<code>\oplus</code>
	<code>\boxast</code>		<code>\concavediamondtickright</code>		<code>\oslash</code>
	<code>\boxbar</code>		<code>\diamond</code>		<code>\otimes</code>
	<code>\boxbox</code>		<code>\dsub</code>		<code>\otimes</code>
	<code>\boxbslash</code>		<code>\hourglass</code>		<code>\otimeshat</code>
	<code>\boxcircle</code>		<code>\lozengeminus</code>		<code>\rsub</code>
	<code>\boxdiag</code>		<code>\mdlgblklozenge</code>		<code>\smbkcircle</code>
	<code>\boxdot</code>		<code>\mdlgwhtcircle</code>		<code>\star</code>
	<code>\boxminus</code>		<code>\obar</code>		<code>\talloblong</code>
	<code>\boxplus</code>		<code>\obot*</code>		<code>\triangle</code>
	<code>\boxtimes</code>		<code>\obslash</code>		<code>\triangleminus</code>
	<code>\circledast</code>		<code>\odiv</code>		<code>\triangleplus</code>
	<code>\circledcirc</code>		<code>\odot</code>		<code>\triangleleserifs</code>
	<code>\circleddash</code>		<code>\odotslashdot*</code>		<code>\trianglerimes</code>
	<code>\circledequal</code>		<code>\ogreaterthan</code>		<code>\vysmbkcircle<sup>†</sup></code>
	<code>\circledparallel</code>		<code>\olcross*</code>		<code>\vysmwhtcircle</code>
	<code>\circledvert</code>		<code>\olessthan</code>		<code>\whitesquaretickleft</code>
	<code>\circlehbar</code>		<code>\ominus</code>		<code>\whitesquaretickright</code>
	<code>\concavediamond</code>		<code>\operp</code>		

\* 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 381, which is why they are included here.

† stix defines `\bullet` as a synonym for `\vysmbkcircle`.

TABLE 69: halloweenmath Halloween-Themed Math Operators

	<code>\bigpumpkin<sup>‡</sup></code>		<code>\mathrightghost</code>		<code>\reversemathcloud</code>
	<code>\mathcloud</code>		<code>\mathwitch<sup>†</sup></code>		<code>\reversemathwitch<sup>†</sup></code>
	<code>\mathghost</code>		<code>\mathwitch*<sup>†</sup></code>		<code>\reversemathwitch*<sup>†</sup></code>
	<code>\mathleftghost</code>		<code>\pumpkin</code>		

† These symbols accept limits. For example, `\mathwitch*_{i=0}^{\infty} f(x)` produces “  $f(x)$ ” in text mode and

$$\mathwitch*_{i=0}^{\infty} f(x)$$

in display mode.

‡ `\greatpumpkin` is a synonym for `\bigpumpkin`.

TABLE 70: stix Small Integrals

$\int$	<code>\smallawint</code>	$\int$	<code>\smallintcap</code>	$\oint$	<code>\smalloint</code>
$\int$	<code>\smallcirfnint</code>	$\int$	<code>\smallintclockwise</code>	$\oint$	<code>\smallointctrcklockwise</code>
$\int$	<code>\smallfint</code>	$\int$	<code>\smallintcup</code>	$\int$	<code>\smallpointint</code>
$\int$	<code>\smalliiiint</code>	$\int$	<code>\smallintlarhk</code>	$\int$	<code>\smallrppolint</code>
$\int$	<code>\smalliiint</code>	$\int$	<code>\smallintx</code>	$\int$	<code>\smallscpolint</code>
$\int$	<code>\smalliint</code>	$\int$	<code>\smalllowint</code>	$\int$	<code>\smallsqint</code>
$\int$	<code>\smallint</code>	$\int$	<code>\smallnpolint</code>	$\int$	<code>\smallsumint</code>
$\int$	<code>\smallintbar</code>	$\int$	<code>\smallloiiint</code>	$\int$	<code>\smallupint</code>
$\int$	<code>\smallintBar</code>	$\int$	<code>\smallloiiint</code>	$\int$	<code>\smallvarointclockwise</code>

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 71.

TABLE 71: stix Small Integrals with Explicit Slant

$\int$	<code>\smallawintsl</code>	$\int$	<code>\smallawintup</code>
$\int$	<code>\smallcirfnintsl</code>	$\int$	<code>\smallcirfnintup</code>
$\int$	<code>\smallfintsl</code>	$\int$	<code>\smallfintup</code>
$\int$	<code>\smalliiiintsl</code>	$\int$	<code>\smalliiiintup</code>
$\int$	<code>\smalliiintsl</code>	$\int$	<code>\smalliiintup</code>
$\int$	<code>\smalliintsl</code>	$\int$	<code>\smalliintup</code>
$\int$	<code>\smallintbarsl</code>	$\int$	<code>\smallintBarup</code>
$\int$	<code>\smallintBarsl</code>	$\int$	<code>\smallintbarup</code>
$\int$	<code>\smallintcapsl</code>	$\int$	<code>\smallintcapup</code>
$\int$	<code>\smallintclockwisel</code>	$\int$	<code>\smallintclockwiseup</code>
$\int$	<code>\smallintcupsl</code>	$\int$	<code>\smallintcupup</code>
$\int$	<code>\smallintlarhksl</code>	$\int$	<code>\smallintlarhkup</code>
$\int$	<code>\smallintsl</code>	$\int$	<code>\smallintup</code>
$\int$	<code>\smallintxsl</code>	$\int$	<code>\smallintxup</code>
$\int$	<code>\smalllowintsl</code>	$\int$	<code>\smalllowintup</code>
$\int$	<code>\smallnpolintsl</code>	$\int$	<code>\smallnpolintup</code>
$\int$	<code>\smallloiiintsl</code>	$\int$	<code>\smallloiiintup</code>
$\int$	<code>\smallloiiintsl</code>	$\int$	<code>\smallloiiintup</code>
$\int$	<code>\smallointctrckwisel</code>	$\int$	<code>\smallointctrckwiseup</code>
$\int$	<code>\smallointsl</code>	$\int$	<code>\smallointup</code>
$\int$	<code>\smallpointintsl</code>	$\int$	<code>\smallpointintup</code>
$\int$	<code>\smallrppolintsl</code>	$\int$	<code>\smallrppolintup</code>
$\int$	<code>\smallscpolintsl</code>	$\int$	<code>\smallscpolintup</code>
$\int$	<code>\smallsqintsl</code>	$\int$	<code>\smallsqintup</code>
$\int$	<code>\smallsumintsl</code>	$\int$	<code>\smallsumintup</code>
$\int$	<code>\smallupintsl</code>	$\int$	<code>\smallupintup</code>
$\int$	<code>\smallvarointclockwisel</code>	$\int$	<code>\smallvarointclockwiseup</code>

Instead of using the preceding symbols directly, it is generally preferable to use the symbols listed in Table 70 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 71 only when you need to include both upright and slanted variations of a symbol in the same document.

TABLE 72: Variable-sized Math Operators

$\bigcap$	<code>\bigcap</code>	$\bigotimes$	<code>\bigotimes</code>	$\bigwedge$	<code>\bigwedge</code>	$\prod$	<code>\prod</code>	<code>\prod</code>
$\bigcup$	<code>\bigcup</code>	$\bigsqcup$	<code>\bigsqcup</code>	$\coprod$	<code>\coprod</code>	$\sum$	<code>\sum</code>	<code>\sum</code>
$\bigodot$	<code>\bigodot</code>	$\bigoplus$	<code>\bigoplus</code>	$\int$	<code>\int</code>			
$\bigoplus$	<code>\bigoplus</code>	$\bigvee$	<code>\bigvee</code>	$\oint$	<code>\oint</code>			

TABLE 73:  $\mathcal{AMS}$  Variable-sized Math Operators

$\iint$	<code>\iint</code>	$\iiint$	<code>\iiint</code>
$\iiint$	<code>\iiint</code>	$\int \dots \int$	<code>\int \dots \int</code>

TABLE 74: `stmaryrd` Variable-sized Math Operators

$\bigboxplus$	<code>\bigboxplus</code>	$\biginterleave$	<code>\biginterleave</code>	$\bigsqcap$	<code>\bigsqcap</code>
$\bigcurlyvee$	<code>\bigcurlyvee</code>	$\bignplus$	<code>\bignplus</code>	$\bigtriangledown$	<code>\bigtriangledown</code>
$\bigcurlywedge$	<code>\bigcurlywedge</code>	$\bigparallel$	<code>\bigparallel</code>	$\bigtriangleup$	<code>\bigtriangleup</code>

TABLE 75: `wasysym` Variable-sized Math Operators

$\int$	<code>\int</code>	$\iint$	<code>\iint</code>	$\iiint$	<code>\iiint</code>
$\oint$	<code>\oint</code>	$\oiint$	<code>\oiint</code>		

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 76: `mathabx` Variable-sized Math Operators

$\curlyvee$	<code>\bigcurlyvee</code>	$\boxslash$	<code>\bigboxslash</code>	$\bigoplus$	<code>\bigoright</code>
$\sqcap$	<code>\bigsqcap</code>	$\boxtimes$	<code>\bigboxtimes</code>	$\bigoslash$	<code>\bigoslash</code>
$\curlywedge$	<code>\bigcurlywedge</code>	$\boxplus$	<code>\bigboxplus</code>	$\bigotimes$	<code>\bigotimes</code>
$\boxast$	<code>\bigboxasterisk</code>	$\boxtriangleup$	<code>\bigboxtriangleup</code>	$\bigtriangleup$	<code>\bigtriangleup</code>
$\boxbackslash$	<code>\bigboxbackslash</code>	$\boxvoid$	<code>\bigboxvoid</code>	$\bigcirc$	<code>\bigovoid</code>
$\boxbot$	<code>\bigboxbot</code>	$\complement$	<code>\bigcomplement</code>	$\bigplus$	<code>\bigplus</code>
$\boxcirc$	<code>\bigboxcirc</code>	$\bigcircast$	<code>\bigcircasterisk</code>	$\bigplus$	<code>\bigsqplus</code>
$\boxcoasterisk$	<code>\bigboxcoasterisk</code>	$\bigcircbackslash$	<code>\bigcircbackslash</code>	$\bigtimes$	<code>\bigtimes</code>
$\boxdiv$	<code>\bigboxdiv</code>	$\bigoplus$	<code>\bigoplus</code>	$\iiint$	<code>\iiint</code>
$\boxdot$	<code>\bigboxdot</code>	$\bigodot$	<code>\bigodot</code>	$\iint$	<code>\iint</code>
$\boxleft$	<code>\bigboxleft</code>	$\bigcircasterisk$	<code>\bigcircasterisk</code>	$\int$	<code>\int</code>
$\boxminus$	<code>\bigboxminus</code>	$\bigodiv$	<code>\bigodiv</code>	$\oiint$	<code>\oiint</code>
$\boxplus$	<code>\bigboxplus</code>	$\bigoleft$	<code>\bigoleft</code>	$\oint$	<code>\oint</code>
$\boxright$	<code>\bigboxright</code>	$\bigominus$	<code>\bigominus</code>		

TABLE 77: txfonts/pxfonts Variable-sized Math Operators

$\boxplus$	$\boxed{+}$	<code>\bigsqcapplus</code>	$\oint$	$\oint$	<code>\ointclockwise</code>
$\boxplus$	$\boxed{+}$	<code>\bigsqcupplus</code>	$\oint$	$\oint$	<code>\ointctrlockwise</code>
$\int$	$\int$	<code>\fint</code>	$\int$	$\int$	<code>\sqiiint</code>
$\int \cdots \int$	$\int \cdots \int$	<code>\idotsint</code>	$\int$	$\int$	<code>\sqiint</code>
$\iiint$	$\iiint$	<code>\iiiint</code>	$\int$	$\int$	<code>\sqint</code>
$\iiint$	$\iiint$	<code>\iiint</code>	$\int$	$\int$	<code>\varoiintclockwise</code>
$\iint$	$\iint$	<code>\iint</code>	$\int$	$\int$	<code>\varoiintctrlockwise</code>
$\oiint$	$\oiint$	<code>\oiintclockwise</code>	$\int$	$\int$	<code>\varoiintclockwise</code>
$\oiint$	$\oiint$	<code>\oiintctrlockwise</code>	$\int$	$\int$	<code>\varoiintctrlockwise</code>
$\oiint$	$\oiint$	<code>\oiint</code>	$\int$	$\int$	<code>\varointclockwise</code>
$\oiint$	$\oiint$	<code>\oiintclockwise</code>	$\int$	$\int$	<code>\varointctrlockwise</code>
$\oiint$	$\oiint$	<code>\oiintctrlockwise</code>	$\times$	$\times$	<code>\varprod</code>
$\oiint$	$\oiint$	<code>\oiint</code>			

TABLE 78: esint Variable-sized Math Operators

$\int\cdots\int$	$\int\cdots\int$	<code>\dotsint</code>	$\oint$	$\oint$	<code>\ointclockwise</code>
$\int$	$\int$	<code>\fint</code>	$\oint$	$\oint$	<code>\ointctrlockwise</code>
$\iiint$	$\iiint$	<code>\iiiint</code>	$\oiint$	$\oiint$	<code>\sqiint</code>
$\iint$	$\iint$	<code>\iiint</code>	$\oiint$	$\oiint$	<code>\sqiint</code>
$\iint$	$\iint$	<code>\iint</code>	$\oiint$	$\oiint$	<code>\varoiint</code>
$\int$	$\int$	<code>\landdownint</code>	$\oint$	$\oint$	<code>\varointclockwise</code>
$\int$	$\int$	<code>\landupint</code>	$\oint$	$\oint$	<code>\varointctrlockwise</code>
$\oiint$	$\oiint$	<code>\oiint</code>			

TABLE 79: bigints Variable-sized Math Operators

$\int$	$\int$	<code>\bigint</code>	$\oint$	$\oint$	<code>\bigoint</code>
$\int$	$\int$	<code>\bigints</code>	$\oint$	$\oint$	<code>\bigoints</code>
$\int$	$\int$	<code>\bigintss</code>	$\oint$	$\oint$	<code>\bigointss</code>
$\int$	$\int$	<code>\bigintsss</code>	$\oint$	$\oint$	<code>\bigintsss</code>
$\int$	$\int$	<code>\bigintssss</code>	$\oint$	$\oint$	<code>\bigintssss</code>

TABLE 80: MnSymbol Variable-sized Math Operators

$\bigcap$	$\bigcap$	<code>\bigcap</code>	$\ominus$	$\ominus$	<code>\bigominus</code>	$\complement$	$\complement$	<code>\complement</code>
$\bigcap\dot{\phantom{a}}$	$\bigcap\dot{\phantom{a}}$	<code>\bigcapdot</code>	$\oplus$	$\oplus$	<code>\bigoplus</code>	$\amalg$	$\amalg$	<code>\coprod</code>
$\bigcap+$	$\bigcap+$	<code>\bigcapplus</code>	$\oslash$	$\oslash$	<code>\bigoslash</code>	$\int\cdots\int$	$\int\cdots\int$	<code>\idotsint</code>
$\bigcirc$	$\bigcirc$	<code>\bigcircle</code>	$\bigodot$	$\bigodot$	<code>\bigostar</code>	$\iiint$	$\iiint$	<code>\iiiint</code>
$\bigcup$	$\bigcup$	<code>\bigcup</code>	$\bigotimes$	$\bigotimes$	<code>\bigotimes</code>	$\iiint$	$\iiint$	<code>\iiint</code>
$\bigcup\dot{\phantom{a}}$	$\bigcup\dot{\phantom{a}}$	<code>\bigcupdot</code>	$\bigtriangleup$	$\bigtriangleup$	<code>\bigotriangle</code>	$\iint$	$\iint$	<code>\iint</code>
$\bigcup+$	$\bigcup+$	<code>\bigcupplus*</code>	$\bigcirc$	$\bigcirc$	<code>\bigover</code>	$\int$	$\int$	<code>\int</code>
$\bigvee$	$\bigvee$	<code>\bigcurlyvee</code>	$+$	$+$	<code>\bigplus</code>	$\int$	$\int$	<code>\landdownint</code>
$\bigvee\dot{\phantom{a}}$	$\bigvee\dot{\phantom{a}}$	<code>\bigcurlyveedot</code>	$\sqcap$	$\sqcap$	<code>\bigsqcap</code>	$\int$	$\int$	<code>\landupint</code>
$\bigwedge$	$\bigwedge$	<code>\bigcurlywedge</code>	$\sqcap\dot{\phantom{a}}$	$\sqcap\dot{\phantom{a}}$	<code>\bigsqcapdot</code>	$\oint$	$\oint$	<code>\lcircleleftint</code>
$\bigwedge\dot{\phantom{a}}$	$\bigwedge\dot{\phantom{a}}$	<code>\bigcurlywedgedot</code>	$\sqcap+$	$\sqcap+$	<code>\bigsqcapplus</code>	$\oint$	$\oint$	<code>\lcircleleftint</code>
$\bigvee\vee$	$\bigvee\vee$	<code>\bigdoublecurlyvee</code>	$\sqcup$	$\sqcup$	<code>\bigsqcup</code>	$\oiint$	$\oiint$	<code>\oiint</code>
$\bigwedge\wedge$	$\bigwedge\wedge$	<code>\bigdoublecurlywedge</code>	$\sqcup\dot{\phantom{a}}$	$\sqcup\dot{\phantom{a}}$	<code>\bigsqcupdot</code>	$\oint$	$\oint$	<code>\oint</code>
$\bigvee\vee\vee$	$\bigvee\vee\vee$	<code>\bigdoublevee</code>	$\sqcup+$	$\sqcup+$	<code>\bigsqcupplus</code>	$\prod$	$\prod$	<code>\prod</code>
$\bigwedge\wedge\wedge$	$\bigwedge\wedge\wedge$	<code>\bigdoublewedge</code>	$\times$	$\times$	<code>\bigtimes</code>	$\oint$	$\oint$	<code>\rcircleleftint</code>
$\bigoplus$	$\bigoplus$	<code>\bigoplus</code>	$\vee$	$\vee$	<code>\bigvee</code>	$\oint$	$\oint$	<code>\rcircleleftint</code>
$\bigoslash$	$\bigoslash$	<code>\bigoslash</code>	$\vee\dot{\phantom{a}}$	$\vee\dot{\phantom{a}}$	<code>\bigveedot</code>	$\int$	$\int$	<code>\strokedint</code>
$\bigocirc$	$\bigocirc$	<code>\bigocirc</code>	$\bigwedge$	$\bigwedge$	<code>\bigwedge</code>	$\Sigma$	$\Sigma$	<code>\sum</code>
$\bigodot$	$\bigodot$	<code>\bigodot</code>	$\bigwedge\dot{\phantom{a}}$	$\bigwedge\dot{\phantom{a}}$	<code>\bigwedgedot</code>	$\int$	$\int$	<code>\sumint</code>

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

TABLE 81: fdsymbol Variable-sized Math Operators

$\bigcap$	$\bigcap$	<code>\bigcap</code>	$\sqcup$	$\sqcup$	<code>\bigsqcup</code>	$\int$	$\int$	<code>\landupint</code>
$\bigcap\dot{\phantom{a}}$	$\bigcap\dot{\phantom{a}}$	<code>\bigcapdot</code>	$\sqcup\dot{\phantom{a}}$	$\sqcup\dot{\phantom{a}}$	<code>\bigsqcupdot</code>	$\oint$	$\oint$	<code>\lcircleleftint</code>

(continued on next page)





TABLE 83: stix Variable-sized Math Operators

$\int$	$\int$	<code>\awint</code>	$\amalg$	$\amalg$	<code>\coprod</code>	$\iiint$	$\iiint$	<code>\oiint</code>
$\Sigma$	$\Sigma$	<code>\Bbbsum</code>	$\mathbb{W}$	$\mathbb{W}$	<code>\disjquant</code>	$\oint$	$\oint$	<code>\oint</code>
$\cap$	$\cap$	<code>\bigcap</code>	$\int$	$\int$	<code>\fint</code>	$\oint$	$\oint$	<code>\oint</code>
$\cup$	$\cup$	<code>\bigcup</code>	$\iiint$	$\iiint$	<code>\iiiint</code>	$\oint$	$\oint$	<code>\ointctrlockwise</code>
$\cup$	$\cup$	<code>\bigcupdot</code>	$\iiint$	$\iiint$	<code>\iiint</code>	$\oint$	$\oint$	<code>\pointint</code>
$\odot$	$\odot$	<code>\bigodot</code>	$\iint$	$\iint$	<code>\iint</code>	$\prod$	$\prod$	<code>\prod</code>
$\oplus$	$\oplus$	<code>\bigoplus</code>	$\int$	$\int$	<code>\int</code>	$\int$	$\int$	<code>\rppoint</code>
$\otimes$	$\otimes$	<code>\bigotimes</code>	$\int$	$\int$	<code>\intbar</code>	$\int$	$\int$	<code>\scpoint</code>
$\sqcap$	$\sqcap$	<code>\bigsqcap</code>	$\int$	$\int$	<code>\intBar</code>	$\int$	$\int$	<code>\sqint</code>
$\sqcup$	$\sqcup$	<code>\bigsqcup</code>	$\int$	$\int$	<code>\intcap</code>	$\Sigma$	$\Sigma$	<code>\sum</code>
$\amalg$	$\amalg$	<code>\bigtalloblong</code>	$\int$	$\int$	<code>\intclockwise</code>	$\int$	$\int$	<code>\sumint</code>
$\times$	$\times$	<code>\bigtimes</code>	$\int$	$\int$	<code>\intcup</code>	$\int$	$\int$	<code>\upint</code>
$\uplus$	$\uplus$	<code>\biguplus</code>	$\int$	$\int$	<code>\intlarhk</code>	$\oint$	$\oint$	<code>\varointclockwise</code>
$\vee$	$\vee$	<code>\bigvee</code>	$\int$	$\int$	<code>\intx</code>	$\backslash$	$\backslash$	<code>\xbsol</code>
$\wedge$	$\wedge$	<code>\bigwedge</code>	$\int$	$\int$	<code>\lowint</code>	$/$	$/$	<code>\xsol</code>
$\int$	$\int$	<code>\cirfnint</code>	$\Sigma$	$\Sigma$	<code>\modtwosum</code>			
$\mathbb{M}$	$\mathbb{M}$	<code>\conjquant</code>	$\int$	$\int$	<code>\npoint</code>			

By default, each of the integral-producing commands in Table 83 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 84.

TABLE 84: stix Integrals with Explicit Slant

$\int$	$\int$	<code>\intsl</code>	$\int$	$\int$	<code>\intup</code>
$\iint$	$\iint$	<code>\iintsl</code>	$\iint$	$\iint$	<code>\iintup</code>
$\iiint$	$\iiint$	<code>\iiintsl</code>	$\iiint$	$\iiint$	<code>\iiintup</code>
$\oint$	$\oint$	<code>\ointsl</code>	$\oint$	$\oint$	<code>\ointup</code>
$\oiint$	$\oiint$	<code>\oiintsl</code>	$\oiint$	$\oiint$	<code>\oiintup</code>
$\oiiint$	$\oiiint$	<code>\oiiintsl</code>	$\oiiint$	$\oiiint$	<code>\oiiintup</code>
$\int\limits_{\curvearrowright}$	$\int\limits_{\curvearrowright}$	<code>\intclockwisesl</code>	$\int\limits_{\curvearrowleft}$	$\int\limits_{\curvearrowleft}$	<code>\intcounterclockwiseup</code>
$\varoint\limits_{\curvearrowright}$	$\varoint\limits_{\curvearrowright}$	<code>\varointclockwisesl</code>	$\varoint\limits_{\curvearrowleft}$	$\varoint\limits_{\curvearrowleft}$	<code>\varointcounterclockwiseup</code>
$\oint\limits_{\curvearrowleft}$	$\oint\limits_{\curvearrowleft}$	<code>\ointctrclockwisesl</code>	$\oint\limits_{\curvearrowright}$	$\oint\limits_{\curvearrowright}$	<code>\ointctrclockwiseup</code>
$\sum\limits_{\int}$	$\sum\limits_{\int}$	<code>\sumintsl</code>	$\sum\limits_{\int}$	$\sum\limits_{\int}$	<code>\sumintup</code>
$\iiiiiint$	$\iiiiiint$	<code>\iiiiiintsl</code>	$\iiiiiint$	$\iiiiiint$	<code>\iiiiiintup</code>
$\int\limits{\bar{f}}$	$\int\limits{\bar{f}}$	<code>\intbarsl</code>	$\int\limits{\bar{f}}$	$\int\limits{\bar{f}}$	<code>\intbarup</code>
$\int\limits{\bar{f}}$	$\int\limits{\bar{f}}$	<code>\intBarsl</code>	$\int\limits{\bar{f}}$	$\int\limits{\bar{f}}$	<code>\intBarup</code>
$\int\limits{f}$	$\int\limits{f}$	<code>\fintsl</code>	$\int\limits{f}$	$\int\limits{f}$	<code>\fintup</code>
$\oint\limits{f}$	$\oint\limits{f}$	<code>\cirfnintsl</code>	$\oint\limits{f}$	$\oint\limits{f}$	<code>\cirfnintup</code>
$\int\limits{f}$	$\int\limits{f}$	<code>\awintsl</code>	$\int\limits{f}$	$\int\limits{f}$	<code>\awintup</code>
$\int\limits{f}$	$\int\limits{f}$	<code>\rppolintsl</code>	$\int\limits{f}$	$\int\limits{f}$	<code>\rppolintup</code>
$\int\limits{f}$	$\int\limits{f}$	<code>\scpolintsl</code>	$\int\limits{f}$	$\int\limits{f}$	<code>\scpolintup</code>
$\int\limits{f}$	$\int\limits{f}$	<code>\npolintsl</code>	$\int\limits{f}$	$\int\limits{f}$	<code>\npolintup</code>

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$\oint$	$\int$	<code>\pointintsl</code>	$\oint$	$\int$	<code>\pointintup</code>
$\oint$	$\int$	<code>\sqintsl</code>	$\oint$	$\int$	<code>\sqintup</code>
$\int$	$\int$	<code>\intlarhksl</code>	$\int$	$\int$	<code>\intlarhkup</code>
$\int$	$\int$	<code>\intxsl</code>	$\int$	$\int$	<code>\intxup</code>
$\int$	$\int$	<code>\intcapsl</code>	$\int$	$\int$	<code>\intcapup</code>
$\int$	$\int$	<code>\intcupsl</code>	$\int$	$\int$	<code>\intcupup</code>
$\int$	$\int$	<code>\upintsl</code>	$\int$	$\int$	<code>\upintup</code>
$\int$	$\int$	<code>\lowintsl</code>	$\int$	$\int$	<code>\lowintup</code>

Instead of using the preceding symbols directly, it is generally preferable to use the symbols listed in Table 83 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 84 only when you need to include both upright and slanted variations of a symbol in the same document.

TABLE 85: `mathdesign` Variable-sized Math Operators

$\int$	$\int$	<code>\intclockwise</code>	$\oint$	$\oint$	<code>\ointclockwise</code>
$\int$	$\int$	<code>\oiint</code>	$\oint$	$\oint$	<code>\ointctrlockwise</code>
$\int$	$\int$	<code>\oiint</code>			

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 86: `prodint` Variable-sized Math Operators

$\prod$	<code>\prodi</code>	$\prod$	<code>\Prodi</code>	$\prod$	<code>\PRODI</code>
---------	---------------------	---------	---------------------	---------	---------------------

`prodint` currently requires the author to manually specify `\prodi` for inlined expressions ( $\$. \dots \$$ ), `\Prodi` for displayed math ( $\[ \dots \]$ ), 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 72.

TABLE 87: `cmll` Large Math Operators

$\bigparrr$	<code>\bigparr*</code>	$\bigwith$	<code>\bigwith</code>
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\* `cmll` defines `\beginvamp` as a synonym for `\bigparr`.

TABLE 88: Binary Relations

$\approx$	<code>\approx</code>	$\equiv$	<code>\equiv</code>	$\perp$	<code>\perp</code>	$\smile$	<code>\smile</code>
$\asymp$	<code>\asymp</code>	$\frown$	<code>\frown</code>	$\prec$	<code>\prec</code>	$\succ$	<code>\succ</code>
$\bowtie$	<code>\bowtie</code>	$\Join^*$	<code>\Join*</code>	$\preceq$	<code>\preceq</code>	$\succeq$	<code>\succeq</code>
$\cong$	<code>\cong</code>	$\mid^\dagger$	<code>\mid^\dagger</code>	$\propto$	<code>\propto</code>	$\vdash$	<code>\vdash</code>
$\dashv$	<code>\dashv</code>	$\models$	<code>\models</code>	$\sim$	<code>\sim</code>		
$\doteq$	<code>\doteq</code>	$\parallel$	<code>\parallel</code>	$\simeq$	<code>\simeq</code>		

\* Not predefined by the  $\text{\LaTeX} 2_\epsilon$  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,  $\text{\LaTeX}$  typesets the two with different surrounding spacing. Contrast “ $P(A \mid B)$ ”  $\mapsto$  “ $P(A|B)$ ” with “ $P(A \mid B)$ ”  $\mapsto$  “ $P(A \mid B)$ ”.

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

$\approx$	<code>\approxeq</code>	$\#$	<code>\eqcirc</code>	$\succapprox$	<code>\succapprox</code>
$\backsimeq$	<code>\backepsilon</code>	$\fallingdotseq$	<code>\fallingdotseq</code>	$\succcurlyeq$	<code>\succcurlyeq</code>
$\backsimeq$	<code>\backsim</code>	$\multimap$	<code>\multimap</code>	$\succsim$	<code>\succsim</code>
$\backsimeq$	<code>\backsimeq</code>	$\pitchfork$	<code>\pitchfork</code>	$\therefore$	<code>\therefore</code>
$\because$	<code>\because</code>	$\precapprox$	<code>\precapprox</code>	$\thickapprox$	<code>\thickapprox</code>
$\between$	<code>\between</code>	$\preccurlyeq$	<code>\preccurlyeq</code>	$\thicksim$	<code>\thicksim</code>
$\bumpeq$	<code>\bumpeq</code>	$\precsim$	<code>\precsim</code>	$\varpropto$	<code>\varpropto</code>
$\bumpeq$	<code>\bumpeq</code>	$\risingdotseq$	<code>\risingdotseq</code>	$\Vdash$	<code>\Vdash</code>
$\circeq$	<code>\circeq</code>	$\shortmid$	<code>\shortmid</code>	$\VDash$	<code>\VDash</code>
$\curlyeqprec$	<code>\curlyeqprec</code>	$\shortparallel$	<code>\shortparallel</code>	$\Vvdash$	<code>\Vvdash</code>
$\curlyeqsucc$	<code>\curlyeqsucc</code>	$\smallfrown$	<code>\smallfrown</code>		
$\doteqdot$	<code>\doteqdot</code>	$\smallsmile$	<code>\smallsmile</code>		

TABLE 90:  $\mathcal{AMS}$  Negated Binary Relations

$\ncong$	<code>\ncong</code>	$\nshortparallel$	<code>\nshortparallel</code>	$\nVDash$	<code>\nVDash</code>
$\nmid$	<code>\nmid</code>	$\nsim$	<code>\nsim</code>	$\preccurlyeq$	<code>\preccurlyeq</code>
$\nparallel$	<code>\nparallel</code>	$\nsucc$	<code>\nsucc</code>	$\precnsim$	<code>\precnsim</code>
$\nprec$	<code>\nprec</code>	$\nsucceq$	<code>\nsucceq</code>	$\succcurlyeq$	<code>\succcurlyeq</code>
$\npreceq$	<code>\npreceq</code>	$\nVDash$	<code>\nVDash</code>	$\succnsim$	<code>\succnsim</code>
$\nshortmid$	<code>\nshortmid</code>	$\nvdash$	<code>\nvdash</code>		

TABLE 91: `stmaryrd` Binary Relations

$\in$	<code>\inplus</code>	$\ni$	<code>\niplus</code>
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TABLE 92: `wasysym` Binary Relations

$\neg$	<code>\invneg</code>	$\leadsto$	<code>\leadsto</code>	$\propto$	<code>\wasypropto</code>
$\Join$	<code>\Join</code>	$\otimes$	<code>\logof</code>		

TABLE 93: `txfonts/pxfonts` Binary Relations

$\circ$	<code>\circledgtr</code>	$\Join$	<code>\lJoin</code>	$\times$	<code>\opentimes</code>
$\circ$	<code>\circledless</code>	$\Join$	<code>\rJoin</code>	$\perp$	<code>\Perp</code>
$\approx$	<code>\colonapprox</code>	$\multimap$	<code>\multimap</code>	$\preceq$	<code>\preceq</code>
$\approx$	<code>\Colonapprox</code>	$\multimap$	<code>\multimapboth</code>	$\precneq$	<code>\precneq</code>
$\dashv$	<code>\coloneq</code>	$\multimap$	<code>\multimapbothvert</code>	$\Join$	<code>\rJoin</code>
$\dashv$	<code>\Colononeq</code>	$\multimap$	<code>\multimapdot</code>	$\strictfi$	<code>\strictfi</code>
$\doteq$	<code>\Coloneqq</code>	$\multimap$	<code>\multimapdotboth</code>	$\strictif$	<code>\strictif</code>
$\doteq$	<code>\coloneqq*</code>	$\multimap$	<code>\multimapdotbothA</code>	$\strictiff$	<code>\strictiff</code>
$\sim$	<code>\Colonsim</code>	$\multimap$	<code>\multimapdotbothAvert</code>	$\succeq$	<code>\succeq</code>
$\sim$	<code>\colonsim</code>	$\multimap$	<code>\multimapdotbothB</code>	$\succneq$	<code>\succneq</code>
$\equiv$	<code>\Eqcolon</code>	$\multimap$	<code>\multimapdotbothBvert</code>	$\varparallel$	<code>\varparallel</code>
$\equiv$	<code>\eqcolon</code>	$\multimap$	<code>\multimapdotbothvert</code>	$\varparallel$	<code>\varparallelinv</code>
$\equiv$	<code>\eqqcolon</code>	$\multimap$	<code>\multimapdotinv</code>	$\Vdash$	<code>\Vdash</code>
$\equiv$	<code>\Eqqqcolon</code>	$\multimap$	<code>\multimapinv</code>		
$\simeq$	<code>\eqsim</code>	$\Join$	<code>\openJoin</code>		

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

TABLE 94: `txfonts/pxfonts` Negated Binary Relations

$\napprox$	<code>\napproxeq</code>	$\nprec$	<code>\npreccurlyeq</code>	$\n\thickapprox$	<code>\n\thickapprox</code>
$\nasymp$	<code>\nasymp</code>	$\npreceq$	<code>\npreceq</code>	$\n\twoheadleftarrow$	<code>\n\twoheadleftarrow</code>
$\nbacksim$	<code>\nbacksim</code>	$\nprec$	<code>\nprec</code>	$\n\twoheadrightarrow$	<code>\n\twoheadrightarrow</code>
$\nbacksimeq$	<code>\nbacksimeq</code>	$\nsimeq$	<code>\nsimeq</code>	$\n\varparallel$	<code>\n\varparallel</code>
$\nbumpeq$	<code>\nbumpeq</code>	$\nsucc$	<code>\nsuccapprox</code>	$\n\varparallel$	<code>\n\varparallelinv</code>
$\nbumpeq$	<code>\nbumpeq</code>	$\nsucceq$	<code>\nsucccurlyeq</code>	$\nVDash$	<code>\nVDash</code>
$\nequiv$	<code>\nequiv</code>	$\nsucceq$	<code>\nsucceq</code>		
$\nprec$	<code>\nprecapprox</code>	$\nsucc$	<code>\nsuccsim</code>		

TABLE 95: mathabx Binary Relations

$\bowtie$	<code>\between</code>		<code>\divides</code>	$\dot{=}$	<code>\risingdotseq</code>
$\dot{=}$	<code>\botdoteq</code>	$\dot{=}$	<code>\dotseq</code>	$\approx$	<code>\succapprox</code>
$\curvearrowright$	<code>\Bumpedeq</code>	$\curvearrowright$	<code>\eqbumped</code>	$\succcurlyeq$	<code>\succcurlyeq</code>
$\bumpeq$	<code>\bumpedeq</code>	$\equiv$	<code>\eqcirc</code>	$\succdot$	<code>\succdot</code>
$\circ$	<code>\circeq</code>	$\equiv$	<code>\eqcolon</code>	$\succsim$	<code>\succsim</code>
$\coloneqq$	<code>\coloneq</code>	$\dot{=}$	<code>\fallingdotseq</code>	$\therefore$	<code>\therefore</code>
$\corresponds$	<code>\corresponds</code>	$\succcurlyeq$	<code>\ggcurly</code>	$\dot{=}$	<code>\topdoteq</code>
$\curlyeqprec$	<code>\curlyeqprec</code>	$\llcurly$	<code>\llcurly</code>	$\vDash$	<code>\vDash</code>
$\curlyeqsucc$	<code>\curlyeqsucc</code>	$\approx$	<code>\precapprox</code>	$\Vdash$	<code>\Vdash</code>
$\DashV$	<code>\DashV</code>	$\succcurlyeq$	<code>\preccurlyeq</code>	$\VDash$	<code>\VDash</code>
$\Dashv$	<code>\Dashv</code>	$\triangleleft$	<code>\precdot</code>	$\Vdash$	<code>\Vdash</code>
$\dashVv$	<code>\dashVv</code>	$\succsim$	<code>\precsim</code>		

TABLE 96: mathabx Negated Binary Relations

$\napprox$	<code>\napprox</code>	$\nperp$	<code>\notperp</code>	$\nDash$	<code>\nvDash</code>
$\ncong$	<code>\ncong</code>	$\nprec$	<code>\nprec</code>	$\nVDash$	<code>\nVDash</code>
$\ncurlyeqprec$	<code>\ncurlyeqprec</code>	$\nprecapprox$	<code>\nprecapprox</code>	$\nVdash$	<code>\nVdash</code>
$\ncurlyeqsucc$	<code>\ncurlyeqsucc</code>	$\npreccurlyeq$	<code>\npreccurlyeq</code>	$\nvDash$	<code>\nvDash</code>
$\nDashv$	<code>\nDashv</code>	$\npreceq$	<code>\npreceq</code>	$\nVdash$	<code>\nVdash</code>
$\ndashV$	<code>\ndashV</code>	$\nprecsim$	<code>\nprecsim</code>	$\precnapprox$	<code>\precnapprox</code>
$\ndashv$	<code>\ndashv</code>	$\nsim$	<code>\nsim</code>	$\precneq$	<code>\precneq</code>
$\nDashV$	<code>\nDashV</code>	$\nsimeq$	<code>\nsimeq</code>	$\precsim$	<code>\precsim</code>
$\ndashVv$	<code>\ndashVv</code>	$\nsucc$	<code>\nsucc</code>	$\succnapprox$	<code>\succnapprox</code>
$\neq$	<code>\neq</code>	$\nsuccapprox$	<code>\nsuccapprox</code>	$\succneq$	<code>\succneq</code>
$\notasymp$	<code>\notasymp</code>	$\nsucccurlyeq$	<code>\nsucccurlyeq</code>	$\succnsim$	<code>\succnsim</code>
$\notdivides$	<code>\notdivides</code>	$\nsucceq$	<code>\nsucceq</code>		
$\notequiv$	<code>\notequiv</code>	$\nsucsim$	<code>\nsucsim</code>		

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

TABLE 97: MnSymbol Binary Relations

$\approx$	<code>\approx</code>	$\hateq$	<code>\hateq</code>	$\rightpropto$	<code>\rightpropto</code>
$\approx$	<code>\approx</code>	$\hcrossing$	<code>\hcrossing</code>	$\rightslice$	<code>\rightslice</code>
$\backapprox$	<code>\backapprox</code>	$\leftfootline$	<code>\leftfootline</code>	$\rightVdash$	<code>\rightVdash</code>
$\backapprox$	<code>\backapprox</code>	$\leftfree$	<code>\leftfree</code>	$\rightvdash$	<code>\rightvdash</code>
$\backcong$	<code>\backcong</code>	$\leftmodels$	<code>\leftmodels</code>	$\risingdotseq$	<code>\risingdotseq</code>
$\backeqsim$	<code>\backeqsim</code>	$\leftModels$	<code>\leftModels</code>	$\sefootline$	<code>\sefootline</code>
$\backsim$	<code>\backsim</code>	$\leftpropto$	<code>\leftpropto</code>	$\sefree$	<code>\sefree</code>
$\backsimeq$	<code>\backsimeq</code>	$\leftrightline$	<code>\leftrightline</code>	$\seModels$	<code>\seModels</code>
$\backtriplesim$	<code>\backtriplesim</code>	$\Leftrightarrow$	<code>\Leftrightarrow</code>	$\semodels$	<code>\semodels</code>
$\between$	<code>\between</code>	$\leftslice$	<code>\leftslice</code>	$\separated$	<code>\separated</code>
$\bumpeq$	<code>\bumpeq</code>	$\leftVdash$	<code>\leftVdash</code>	$\seVdash$	<code>\seVdash</code>

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$\Leftrightarrow$	<code>\Bumpeq</code>	$\dashv$	<code>\leftvdash</code>	$\lessdot$	<code>\sevdash</code>
$\circlearrowleft$	<code>\circeq</code>	$\nearrow$	<code>\nefootline</code>	$\parallel$	<code>\shortparallel</code>
$\equiv$	<code>\closedequal</code>	$\nearrow$	<code>\nefree</code>	$\sim$	<code>\sim</code>
$\prec$	<code>\closedprec</code>	$\nrightarrow$	<code>\neModels</code>	$\simeq$	<code>\simeq</code>
$\succ$	<code>\closedsucc</code>	$\nrightarrow$	<code>\nemodels</code>	$\succ$	<code>\succ</code>
$\doteq$	<code>\coloneq</code>	$\swarrow$	<code>\neswline</code>	$\approx$	<code>\succapprox</code>
$\cong$	<code>\cong</code>	$\parallel$	<code>\Neswline</code>	$\succcurlyeq$	<code>\succcurlyeq</code>
$\curlyeqprec$	<code>\curlyeqprec</code>	$\nrightarrow$	<code>\neVdash</code>	$\succeq$	<code>\succeq</code>
$\curlyeqsucc$	<code>\curlyeqsucc</code>	$\swarrow$	<code>\nevDash</code>	$\succsim$	<code>\succsim</code>
$\doteqdot$	<code>\Doteq</code>	$\nwarrow$	<code>\nwfootline</code>	$\swarrow$	<code>\swfootline</code>
$\doteq$	<code>\doteq</code>	$\nearrow$	<code>\nwfree</code>	$\swarrow$	<code>\swfree</code>
$\downarrow$	<code>\downfootline</code>	$\swarrow$	<code>\nwmodels</code>	$\swarrow$	<code>\swModels</code>
$\downarrow$	<code>\downfree</code>	$\swarrow$	<code>\nwModels</code>	$\swarrow$	<code>\swmodels</code>
$\Downarrow$	<code>\downmodels</code>	$\times$	<code>\nwsecrossing</code>	$\swarrow$	<code>\swVdash</code>
$\Downarrow$	<code>\downModels</code>	$\parallel$	<code>\Nwseline</code>	$\swarrow$	<code>\swvdash</code>
$\propto$	<code>\downpropto</code>	$\swarrow$	<code>\nwseline</code>	$\approx$	<code>\triplesim</code>
$\dashv$	<code>\downvdash</code>	$\swarrow$	<code>\nwvdash</code>	$\updownarrow$	<code>\updownline</code>
$\dashv$	<code>\downVdash</code>	$\swarrow$	<code>\nwVdash</code>	$\parallel$	<code>\Updownline</code>
$\bumpeq$	<code>\eqbump</code>	$\prec$	<code>\prec</code>	$\uparrow$	<code>\upfootline</code>
$\circ$	<code>\eqcirc</code>	$\approx$	<code>\precapprox</code>	$\uparrow$	<code>\upfree</code>
$\dot{=}$	<code>\eqdot</code>	$\approx$	<code>\preccurlyeq</code>	$\parallel$	<code>\upModels</code>
$\sim$	<code>\eqsim</code>	$\succeq$	<code>\preceq</code>	$\parallel$	<code>\upmodels</code>
$=$	<code>\equal</code>	$\succsim$	<code>\precsim</code>	$\propto$	<code>\uppropto</code>
$\equiv$	<code>\equalclosed</code>	$\dashv$	<code>\rightfootline</code>	$\perp$	<code>\upvdash</code>
$\equiv$	<code>\equiv</code>	$\rightarrow$	<code>\rightfree</code>	$\perp$	<code>\upVdash</code>
$\equiv$	<code>\equivclosed</code>	$\models$	<code>\rightmodels</code>	$\times$	<code>\vcrossing</code>
$\fallingdotseq$	<code>\fallingdotseq</code>	$\models$	<code>\rightModels</code>	$\Vdash$	<code>\Vdash</code>

MnSymbol additionally defines synonyms for some of the preceding symbols:

$\dashv$	<code>\dashv</code>	(same as <code>\leftvdash</code> )
$\searrow$	<code>\diagdown</code>	(same as <code>\nwseline</code> )
$\swarrow$	<code>\diagup</code>	(same as <code>\neswline</code> )
$\swarrow$	<code>\divides</code>	(same as <code>\updownline</code> )
$\doteqdot$	<code>\doteqdot</code>	(same as <code>\Doteq</code> )
$\models$	<code>\models</code>	(same as <code>\rightmodels</code> )
$\parallel$	<code>\parallel</code>	(same as <code>\Updownline</code> )
$\perp$	<code>\perp</code>	(same as <code>\upvdash</code> )
$\propto$	<code>\propto</code>	(same as <code>\leftpropto</code> )
$\bar{=}$	<code>\relbar</code>	(same as <code>\leftrighthline</code> )
$\bar{=}$	<code>\Relbar</code>	(same as <code>\Leftrightarrow</code> )
$\propto$	<code>\varpropto</code>	(same as <code>\leftpropto</code> )
$\models$	<code>\vDash</code>	(same as <code>\rightmodels</code> )
$\models$	<code>\VDash</code>	(same as <code>\rightModels</code> )
$\vdash$	<code>\vdash</code>	(same as <code>\rightvdash</code> )
$\Vdash$	<code>\Vdash</code>	(same as <code>\rightVdash</code> )

TABLE 98: MnSymbol Negated Binary Relations

$\napprox$	$\nleftfootline$	$\nrisingdotseq$
$\napproxeq$	$\nleftfree$	$\nsefootline$
$\nbackapprox$	$\nleftmodels$	$\nsefree$
$\nbackapproxeq$	$\nleftModels$	$\nseModels$
$\nbackcong$	$\nleftrightline$	$\nsemodels$
$\nbackeqsim$	$\nLeftrightarrow$	$\nsevdash$
$\nbacksim$	$\nleftvdash$	$\nseVdash$
$\nbacksimeq$	$\nleftVdash$	$\nshortmid$
$\nbacktriple sim$	$\nnefootline$	$\nshortparallel$
$\nbumpeq$	$\nnefree$	$\nsim$
$\nBumpeq$	$\nnemodels$	$\nsimeq$
$\ncirceq$	$\nneModels$	$\nsucc$
$\nclosedequal$	$\nneswline$	$\nsuccapprox$
$\ncong$	$\nNeswline$	$\nsucccurlyeq$
$\ncurlyeqprec$	$\nneVdash$	$\nsucceq$
$\ncurlyeqsucc$	$\nnevDash$	$\nsuccsim$
$\ndoteq$	$\nnwfootline$	$\nswfootline$
$\nDoteq$	$\nnwfree$	$\nswfree$
$\ndownfootline$	$\nnwmodels$	$\nswModels$
$\ndownfree$	$\nnwModels$	$\nswmodels$
$\ndownModels$	$\nNwseline$	$\nswvdash$
$\ndownmodels$	$\nnwseline$	$\nswVdash$
$\ndownVdash$	$\nnwvdash$	$\ntriple sim$
$\ndownvdash$	$\nnwVdash$	$\nUpdownline$
$\neqbump$	$\nprec$	$\nupdownline$
$\neqcirc$	$\nprecapprox$	$\nupfootline$
$\neqdot$	$\nprec curlyeq$	$\nupfree$
$\neqsim$	$\npreceq$	$\nupModels$
$\nequal$	$\nprecsim$	$\nupmodels$
$\nequalclosed$	$\nrightfootline$	$\nupVdash$
$\nequiv$	$\nrightrightfree$	$\nupvdash$
$\nequivclosed$	$\nrightrightModels$	$\nprecnapprox$
$\neswcrossing$	$\nrightrightmodels$	$\nprecnsim$
$\nfallingdotseq$	$\nrightrightvdash$	$\succnapprox$
$\nhateq$	$\nrightrightVdash$	$\succnsim$

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 $\nrightrightmodels$ )
$\nparallel$	(same as $\nUpdownline$ )
$\nperp$	(same as $\nupvdash$ )
$\nrelbar$	(same as $\nleftrightline$ )
$\nRelbar$	(same as $\nLeftrightarrow$ )
$\nvDash$	(same as $\nrightrightmodels$ )
$\nvdash$	(same as $\nrightrightvdash$ )
$\nVdash$	(same as $\nrightrightVdash$ )
$\nVDash$	(same as $\nrightrightModels$ )



TABLE 99: fdsymbol Binary Relations

$\approx$	<code>\approx</code>	$\equiv$	<code>\equiv</code>	$\vDash$	<code>\rightmodels</code>
$\approx\approx$	<code>\approxpeq</code>	$\doteq$	<code>\fallingdotseq</code>	$\Vdash$	<code>\rightVdash</code>
$\cong$	<code>\backcong</code>	$\frown$	<code>\frown</code>	$\Vdash$	<code>\rightVDash</code>
$\propto$	<code>\backpropto</code>	$\frown\approx$	<code>\frowneq</code>	$\vdash$	<code>\rightvdash</code>
$\smile$	<code>\backsim</code>	$\circ$	<code>\frownsmile</code>	$\vDash$	<code>\rightvDash</code>
$\simeq$	<code>\backsimeq</code>	$\in$	<code>\in</code>	$\doteq$	<code>\risingdotseq</code>
$\wp$	<code>\between</code>	$\dashv$	<code>\leftassert</code>	$\mid$	<code>\shortmid</code>
$\bowtie$	<code>\bowtie</code>	$\dashv$	<code>\leftAssert</code>	$\parallel$	<code>\shortparallel</code>
$\bumpeq$	<code>\bumpeq</code>	$\vdash$	<code>\leftfootline</code>	$\sim$	<code>\sim</code>
$\Bumpeq$	<code>\Bumpeq</code>	$\dashv$	<code>\leftmodels</code>	$\approx$	<code>\simeq</code>
$\bumpeq\approx$	<code>\bumpeqq</code>	$\dashv$	<code>\leftvdash</code>	$\smile$	<code>\smile</code>
$\circ\approx$	<code>\circeq</code>	$\dashv$	<code>\leftvDash</code>	$\equiv$	<code>\smileeq</code>
$\coloneqq$	<code>\coloneq</code>	$\dashv$	<code>\leftVDash</code>	$\times$	<code>\smilefrown</code>
$\cong$	<code>\cong</code>	$\dashv$	<code>\leftVDash</code>	$\equiv$	<code>\stareq</code>
$\times$	<code>\crossing</code>	$\vdash$	<code>\longleftfootline</code>	$\succ$	<code>\succ</code>
$\prec$	<code>\curlyeqprec</code>	$\dashv$	<code>\Longmapsfrom</code>	$\approx$	<code>\succapprox</code>
$\succ$	<code>\curlyeqsucc</code>	$\dashv$	<code>\longmapsfrom</code>	$\succ$	<code>\succcurlyeq</code>
$\dashv$	<code>\dashvV</code>	$\vdash$	<code>\longrightfootline</code>	$\succ$	<code>\succeq</code>
$\dashv$	<code>\Ddashv</code>	$\mid$	<code>\mid</code>	$\approx$	<code>\succeqq</code>
$\dot{\cong}$	<code>\dotcong</code>	$\ni$	<code>\owns</code>	$\succ$	<code>\succsim</code>
$\doteq$	<code>\doteq</code>	$\parallel$	<code>\parallel</code>	$\approx$	<code>\thickapprox</code>
$\doteq$	<code>\Doteq</code>	$\prec$	<code>\prec</code>	$\sim$	<code>\thicksim</code>
$\dots$	<code>\dotsminusdots</code>	$\approx$	<code>\precapprox</code>	$\approx$	<code>\triplesim</code>
$\dashv$	<code>\downAssert</code>	$\prec$	<code>\preccurlyeq</code>	$\perp$	<code>\upassert</code>
$\dashv$	<code>\downassert</code>	$\prec$	<code>\preceq</code>	$\dashv$	<code>\upAssert</code>
$\dashv$	<code>\downmodels</code>	$\approx$	<code>\preceqq</code>	$\dashv$	<code>\upmodels</code>
$\dashv$	<code>\downvDash</code>	$\approx$	<code>\precnapprox</code>	$\perp$	<code>\upvdash</code>
$\dashv$	<code>\downVdash</code>	$\approx$	<code>\precneq</code>	$\dashv$	<code>\upvDash</code>
$\dashv$	<code>\downvdash</code>	$\approx$	<code>\precneqq</code>	$\dashv$	<code>\upVdash</code>
$\dashv$	<code>\downVDash</code>	$\approx$	<code>\precnsim</code>	$\dashv$	<code>\upVDash</code>
$\#$	<code>\eqcirc</code>	$\prec$	<code>\precsim</code>	$\equiv$	<code>\vDash</code>
$\equiv$	<code>\eqcolon</code>	$\propto$	<code>\propto</code>	$\equiv$	<code>\veeeq</code>
$\equiv$	<code>\eqdot</code>	$\vdash$	<code>\rightassert</code>	$\dashv$	<code>\Vdash</code>
$\approx$	<code>\eqsim</code>	$\Vdash$	<code>\rightAssert</code>	$\equiv$	<code>\wedgeq</code>
$=$	<code>\equal</code>	$\dashv$	<code>\rightfootline</code>		

fdsymbol defines synonyms for many of the preceding symbols:

$\approx$	<code>\approxdident</code>	$\dashv$	<code>\dashv</code>	$\vdash$	<code>\shortrighttack</code>
$\approx$	<code>\arceq</code>	$\doteq$	<code>\doteqdot</code>	$\perp$	<code>\shortuptack</code>
$\Vdash$	<code>\Assert</code>	$\equiv$	<code>\eqqcolon</code>	$\frown$	<code>\smallfrown</code>
$\vdash$	<code>\assert</code>	$\equiv$	<code>\hateq</code>	$\smile$	<code>\smallsmile</code>
$\times$	<code>\asymp</code>	$\bowtie$	<code>\Join</code>	$\propto$	<code>\varpropto</code>
$\dashv$	<code>\Barv</code>	$\dashv$	<code>\longdashv</code>	$\dashv$	<code>\vBar</code>
$\dashv$	<code>\barV</code>	$\vDash$	<code>\models</code>	$\dashv$	<code>\Vbar</code>
$\circ$	<code>\closure</code>	$\ni$	<code>\ni</code>	$\vDash$	<code>\vDash</code>
$\equiv$	<code>\coloneqq</code>	$\perp$	<code>\perp</code>	$\Vdash$	<code>\VDash</code>
$\dashv$	<code>\dashv</code>	$\propto$	<code>\propfrom</code>	$\dashv$	<code>\Vdash</code>
$\dashv$	<code>\DashV</code>	$\dashv$	<code>\shortdowntack</code>	$\vdash$	<code>\vdash</code>
$\dashv$	<code>\Dashv</code>	$\dashv$	<code>\shortlefttack</code>	$\dashv$	<code>\vlongdash</code>

TABLE 100: fdsymbol Negated Binary Relations

$\neq$	<code>\backsimneqq</code>	$\notin$	<code>\nin</code>	$\nexists$	<code>\nsim</code>
$\approx$	<code>\napprox</code>	$\nVdash$	<code>\nleftAssert</code>	$\neq$	<code>\nsimeq</code>
$\approx$	<code>\napproxeq</code>	$\nVdash$	<code>\nleftassert</code>	$\nexists$	<code>\nsmile</code>
$\approx$	<code>\nbackcong</code>	$\nVdash$	<code>\nleftfootline</code>	$\neq$	<code>\nsmileeq</code>
$\nexists$	<code>\nbacksim</code>	$\nexists$	<code>\nleftmodels</code>	$\nexists$	<code>\nsmilefrown</code>
$\neq$	<code>\nbacksimeq</code>	$\nexists$	<code>\nleftvDash</code>	$\neq$	<code>\nstareq</code>
$\neq$	<code>\nbumpeq</code>	$\nexists$	<code>\nleftvdash</code>	$\nexists$	<code>\nsucc</code>
$\neq$	<code>\nBumpeq</code>	$\nexists$	<code>\nleftVDash</code>	$\neq$	<code>\nsuccapprox</code>
$\neq$	<code>\nbumpeqq</code>	$\nexists$	<code>\nleftVdash</code>	$\neq$	<code>\nsucccurlyeq</code>
$\neq$	<code>\ncirceq</code>	$\nexists$	<code>\nlongleftfootline</code>	$\neq$	<code>\nsucceq</code>
$\neq$	<code>\ncong</code>	$\nexists$	<code>\nlongmapsfrom</code>	$\neq$	<code>\nsucceqq</code>
$\neq$	<code>\ncurlyeqprec</code>	$\nexists$	<code>\nlongmapsfrom</code>	$\neq$	<code>\nsuccsim</code>
$\neq$	<code>\ncurlyeqsucc</code>	$\nexists$	<code>\nlongrightfootline</code>	$\neq$	<code>\ntriplesim</code>
$\nexists$	<code>\ndashVv</code>	$\nexists$	<code>\nmid</code>	$\nexists$	<code>\nupassert</code>
$\nexists$	<code>\nDdashv</code>	$\nexists$	<code>\nowns</code>	$\nexists$	<code>\nupAssert</code>
$\neq$	<code>\ndoteq</code>	$\nexists$	<code>\nparallel</code>	$\nexists$	<code>\nupmodels</code>
$\neq$	<code>\nDoteq</code>	$\nexists$	<code>\nprec</code>	$\nexists$	<code>\nupVDash</code>
$\nexists$	<code>\ndownassert</code>	$\nexists$	<code>\nprecapprox</code>	$\nexists$	<code>\nupvDash</code>
$\nexists$	<code>\ndownAssert</code>	$\nexists$	<code>\npreccurlyeq</code>	$\nexists$	<code>\nupVdash</code>
$\nexists$	<code>\ndownmodels</code>	$\nexists$	<code>\npreceq</code>	$\nexists$	<code>\nupvdash</code>
$\nexists$	<code>\ndownvdash</code>	$\nexists$	<code>\npreceqq</code>	$\nexists$	<code>\nvDdash</code>
$\nexists$	<code>\ndownVdash</code>	$\nexists$	<code>\nprecsim</code>	$\nexists$	<code>\nveeeq</code>
$\nexists$	<code>\ndownVDash</code>	$\nexists$	<code>\nrightassert</code>	$\nexists$	<code>\nVvdash</code>
$\nexists$	<code>\ndownvDash</code>	$\nexists$	<code>\nrightAssert</code>	$\nexists$	<code>\nwedgeq</code>
$\neq$	<code>\neqcirc</code>	$\nexists$	<code>\nrightfootline</code>	$\nexists$	<code>\precneq</code>
$\neq$	<code>\neqdot</code>	$\nexists$	<code>\nrightmodels</code>	$\nexists$	<code>\precneqq</code>
$\neq$	<code>\neqsim</code>	$\nexists$	<code>\nrightvdash</code>	$\nexists$	<code>\simneqq</code>
$\neq$	<code>\nequal</code>	$\nexists$	<code>\nrightVdash</code>	$\nexists$	<code>\succnapprox</code>
$\neq$	<code>\nequiv</code>	$\nexists$	<code>\nrightvDash</code>	$\nexists$	<code>\succneq</code>
$\neq$	<code>\nfallingdotseq</code>	$\nexists$	<code>\nrightVdash</code>	$\nexists$	<code>\succneqq</code>
$\nexists$	<code>\nfrown</code>	$\nexists$	<code>\nrisingdotseq</code>	$\nexists$	<code>\succnsim</code>
$\neq$	<code>\nfrowneq</code>	$\nexists$	<code>\nshortmid</code>		
$\neq$	<code>\nfrownsmile</code>	$\nexists$	<code>\nshortparallel</code>		

fdsymbol defines synonyms for many of the preceding symbols:

$\neq$	<code>\napproxident</code>	$\nexists$	<code>\ndashV</code>	$\nexists$	<code>\nshortrighttack</code>
$\neq$	<code>\narceq</code>	$\neq$	<code>\ne</code>	$\nexists$	<code>\nshortuptack</code>
$\nexists$	<code>\nAssert</code>	$\neq$	<code>\neq</code>	$\neq$	<code>\nsime</code>
$\nexists$	<code>\nassert</code>	$\neq$	<code>\nhateq</code>	$\nexists$	<code>\nvBar</code>
$\nexists$	<code>\nasymp</code>	$\nexists$	<code>\nlongdashv</code>	$\nexists$	<code>\nVbar</code>
$\nexists$	<code>\nBarv</code>	$\nexists$	<code>\nmodels</code>	$\nexists$	<code>\nVdash</code>
$\nexists$	<code>\nbarV</code>	$\nexists$	<code>\nni</code>	$\nexists$	<code>\nvDash</code>
$\neq$	<code>\nclosure</code>	$\notin$	<code>\notin</code>	$\nexists$	<code>\nVDash</code>
$\nexists$	<code>\nDashV</code>	$\nexists$	<code>\nperp</code>	$\nexists$	<code>\nvdash</code>
$\nexists$	<code>\nDashv</code>	$\nexists$	<code>\nshortdowntack</code>	$\nexists$	<code>\nVlongdash</code>
$\nexists$	<code>\ndashv</code>	$\nexists$	<code>\nshortlefttack</code>		

TABLE 101: boisik Binary Relations

$\simeq$	<code>\ac</code>	$\//$	<code>\fatslash</code>	$\gamma$	<code>\scurel</code>
$\approx$	<code>\approxeq</code>	$\ni$	<code>\forkv</code>	$\mid$	<code>\shortmid</code>
$\bar{=}$	<code>\arceq</code>	$\frown$	<code>\frown</code>	$\parallel$	<code>\shortparallel</code>
$\backsimeq$	<code>\backsim</code>	$\ggcurly$	<code>\ggcurly</code>	$\sim$	<code>\simrdots</code>
$\backsimeq$	<code>\backsimeq</code>	$\#$	<code>\hash</code>	$\frown$	<code>\smallfrown</code>
$\in$	<code>\bagmember</code>	$\inplus$	<code>\inplus</code>	$\smile$	<code>\smallsmile</code>
$\because$	<code>\because</code>	$\kernelcontraction$	<code>\kernelcontraction</code>	$\smile$	<code>\smile</code>
$\between$	<code>\between</code>	$\llcurly$	<code>\llcurly</code>	$\strictfi$	<code>\strictfi</code>
$\bumpeq$	<code>\bumpeq</code>	$\multimap$	<code>\multimap</code>	$\strictif$	<code>\strictif</code>
$\Bumpeq$	<code>\Bumpeq</code>	$\multimapboth$	<code>\multimapboth</code>	$\succapprox$	<code>\succapprox</code>
$\circeq$	<code>\circeq</code>	$\multimapbothvert$	<code>\multimapbothvert</code>	$\succcurlyeq$	<code>\succcurlyeq</code>
$\CircledEq$	<code>\CircledEq</code>	$\multimapdot$	<code>\multimapdot</code>	$\succnapprox$	<code>\succnapprox</code>
$\cong$	<code>\cong</code>	$\multimapdotboth$	<code>\multimapdotboth</code>	$\succneqq$	<code>\succneqq</code>
$\corresponds$	<code>\corresponds</code>	$\multimapdotbothA$	<code>\multimapdotbothA</code>	$\succnsim$	<code>\succnsim</code>
$\curlyeqprec$	<code>\curlyeqprec</code>	$\multimapdotbothAvert$	<code>\multimapdotbothAvert</code>	$\succsim$	<code>\succsim</code>
$\curlyeqsucc$	<code>\curlyeqsucc</code>	$\multimapdotbothB$	<code>\multimapdotbothB</code>	$\therefore$	<code>\therefore</code>
$\dashV$	<code>\dashV</code>	$\multimapdotbothBvert$	<code>\multimapdotbothBvert</code>	$\thickapprox$	<code>\thickapprox</code>
$\DashV$	<code>\DashV</code>	$\multimapdotbothvert$	<code>\multimapdotbothvert</code>	$\thicksim$	<code>\thicksim</code>
$\dashVv$	<code>\dashVv</code>	$\multimapdotinv$	<code>\multimapdotinv</code>	$\topfork$	<code>\topfork</code>
$\dfourier$	<code>\dfourier</code>	$\multimapinv$	<code>\multimapinv</code>	$\triangleq$	<code>\triangleq</code>
$\Dfourier$	<code>\Dfourier</code>	$\niplus$	<code>\niplus</code>	$\varhash$	<code>\varhash</code>
$\disin$	<code>\disin</code>	$\nisd$	<code>\nisd</code>	$\varisins$	<code>\varisins</code>
$\doteq$	<code>\doteq</code>	$\Perp$	<code>\Perp</code>	$\varnis$	<code>\varnis</code>
$\doteqdot$	<code>\doteqdot</code>	$\pitchfork$	<code>\pitchfork</code>	$\varpropto$	<code>\varpropto</code>
$\dotminus$	<code>\dotminus</code>	$\precapprox$	<code>\precapprox</code>	$\Vdash$	<code>\Vdash</code>
$\dotsim$	<code>\dotsim</code>	$\preccurlyeq$	<code>\preccurlyeq</code>	$\vDash$	<code>\vDash</code>
$\eqbumped$	<code>\eqbumped</code>	$\precnapprox$	<code>\precnapprox</code>	$\VDash$	<code>\VDash</code>
$\eqcirc$	<code>\eqcirc</code>	$\precneqq$	<code>\precneqq</code>	$\veeeq$	<code>\veeeq</code>
$\eqsim$	<code>\eqsim</code>	$\precnsim$	<code>\precnsim</code>	$\Vvdash$	<code>\Vvdash</code>
$\equalparallel$	<code>\equalparallel</code>	$\precsim$	<code>\precsim</code>	$\ztransf$	<code>\ztransf</code>
$\fallingdotseq$	<code>\fallingdotseq</code>	$\prurel$	<code>\prurel</code>	$\Ztransf$	<code>\Ztransf</code>
$\fatbslash$	<code>\fatbslash</code>	$\risingdotseq$	<code>\risingdotseq</code>		

TABLE 102: boisik Negated Binary Relations

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

TABLE 103: stix Binary Relations

$\approx$	<code>\approx</code>	$\#$	<code>\eqvparsl</code>	$\rightarrow$	<code>\rightfishtail</code>
$\approx\approx$	<code>\approxeq</code>	$\equiv$	<code>\fallingdotseq</code>	$\Rightarrow$	<code>\rightimply</code>
$\approx\approx\approx$	<code>\approxeqq</code>	$\bowtie$	<code>\fbowtie</code>	$\Uparrow$	<code>\righttail</code>
$\approx\approx\approx\approx$	<code>\approxident</code>	$\pitchfork$	<code>\forksnot</code>	$\equiv$	<code>\risingdotseq</code>
$\supset$	<code>\arceq</code>	$\ni$	<code>\forkv</code>	$\sqsubset$	<code>\rsqhook</code>
$\top$	<code>\assert</code>	$\frown$	<code>\frown</code>	$\rightarrowtail$	<code>\ruledelayed</code>
$\approx^*$	<code>\asteq</code>	$\equiv$	<code>\gleichstark</code>	$\surd$	<code>\scurel</code>
$\asymp$	<code>\asymp</code>	$\hat{\approx}$	<code>\hatapprox</code>	$\dashv$	<code>\shortdowntack</code>
$\backcong$	<code>\backcong</code>	$\circlearrowleft$	<code>\imageof</code>	$\dashv$	<code>\shortlefttack</code>
$\backsimeq$	<code>\backsimeq</code>	$\in$	<code>\in</code>	$\mid$	<code>\shortmid</code>
$\backsimeqq$	<code>\backsimeqq</code>	$\in\dot{}$	<code>\isindot</code>	$\equiv$	<code>\shortparallel</code>
$\baggmember$	<code>\baggmember</code>	$\in E$	<code>\isinE</code>	$\dashv$	<code>\shortuptack</code>
$\Barv$	<code>\Barv</code>	$\in\bar{}$	<code>\isinobar</code>	$\sim$	<code>\sim</code>
$\bar{V}$	<code>\bar{V}</code>	$\in$	<code>\isins</code>	$\simeq$	<code>\simeq</code>
$\between$	<code>\between</code>	$\in$	<code>\isinvb</code>	$\simeq\approx$	<code>\simminussim</code>
$\bNot$	<code>\bNot</code>	$\sim$	<code>\kernelcontraction</code>	$\approx$	<code>\simneqq</code>
$\bowtie$	<code>\bowtie</code>	$\leftarrowtail$	<code>\leftdbltail</code>	$\sim$	<code>\simrdots</code>
$\bumpeq$	<code>\bumpeq</code>	$\rightarrowtail$	<code>\leftfishtail</code>	$\smile$	<code>\smallfrown</code>
$\bumpeq$	<code>\bumpeq</code>	$\leftarrowtail$	<code>\lefttail</code>	$\epsilon$	<code>\smallin</code>
$\bumpeq\approx$	<code>\bumpeq\approx</code>	$\bowtie$	<code>\lfbowtie</code>	$\ni$	<code>\smallni</code>
$\circlearrowleft$	<code>\cirbot</code>	$\times$	<code>\lftimes</code>	$\smile$	<code>\smallsmile</code>
$\circlearrowleft$	<code>\circeq</code>	$\longdashv$	<code>\longdashv</code>	$\#$	<code>\smeparsl</code>
$\circlearrowleft$	<code>\cirmid</code>	$\sqsubset$	<code>\lsqhook</code>	$\smile$	<code>\smile</code>
$\circlearrowleft$	<code>\closure</code>	$\equiv$	<code>\measeq</code>	$\equiv$	<code>\stareq</code>
$\coloneq$	<code>\coloneq</code>	$\mid$	<code>\mid</code>	$\succ$	<code>\succ</code>
$\coloneq$	<code>\coloneq</code>	$\circlearrowleft$	<code>\midcir</code>	$\succ$	<code>\Succ</code>
$\cong$	<code>\cong</code>	$\ni$	<code>\mlcp</code>	$\succ\approx$	<code>\succapprox</code>
$\cong\dot{}$	<code>\cong\dot{}</code>	$\models$	<code>\models</code>	$\succ\approx$	<code>\succcurlyeq</code>
$\curlyeqprec$	<code>\curlyeqprec</code>	$\circ$	<code>\multimap</code>	$\succ$	<code>\succeq</code>
$\curlyeqsucc$	<code>\curlyeqsucc</code>	$\circ$	<code>\multimapinv</code>	$\succ$	<code>\succeqq</code>
$\dashv$	<code>\dashv</code>	$\ni$	<code>\ni</code>	$\succ\approx$	<code>\succnapprox</code>
$\dashv$	<code>\dashv</code>	$\ni\bar{}$	<code>\niobar</code>	$\succ\approx$	<code>\succneq</code>
$\dashv$	<code>\dashv</code>	$\ni$	<code>\nis</code>	$\succ\approx$	<code>\succneqq</code>
$\Dashv$	<code>\Dashv</code>	$\ni$	<code>\nisd</code>	$\succ\approx$	<code>\succnsim</code>
$\Dashv$	<code>\Dashv</code>	$\neg$	<code>\Not</code>	$\succ\approx$	<code>\succsim</code>
$\Dashv\Dash$	<code>\Dashv\Dash</code>	$/$	<code>\notchar</code>	$\approx$	<code>\thickapprox</code>
$\dashv\dashv$	<code>\dashv\dashv</code>	$\circ$	<code>\origof</code>	$\sim$	<code>\thicksim</code>
$\dot{\equiv}$	<code>\ddotseq</code>	$\parallel$	<code>\parallel</code>	$\ni$	<code>\topfork</code>
$\in$	<code>\disin</code>	$\#$	<code>\parsim</code>	$\rightarrowtail$	<code>\upfishtail</code>
$\doteq$	<code>\Doteq</code>	$\perp$	<code>\perp</code>	$\in$	<code>\upin</code>
$\doteq$	<code>\doteq</code>	$\ni$	<code>\pitchfork</code>	$\in$	<code>\varisinobar</code>
$\dotequiv$	<code>\dotequiv</code>	$\prec$	<code>\prec</code>	$\in$	<code>\varisins</code>
$\dot{\sim}$	<code>\dot{sim}</code>	$\prec$	<code>\Prec</code>	$\ni$	<code>\varniobar</code>
$\dot{\sim}$	<code>\dot{sim}</code>	$\prec\approx$	<code>\precapprox</code>	$\ni$	<code>\varnis</code>
$\dot{\sim}$	<code>\dot{sim}</code>	$\prec\approx$	<code>\preccurlyeq</code>	$\ni$	<code>\varpropto</code>
$\downarrow$	<code>\downfishtail</code>	$\ni$	<code>\preceq</code>	$\#$	<code>\varVdash</code>
$\circlearrowleft$	<code>\dualmap</code>	$\ni$	<code>\preceqq</code>	$\#$	<code>\vBar</code>
$\#$	<code>\eparsl</code>	$\ni$	<code>\preceqq</code>	$\#$	<code>\Vbar</code>
$\#$	<code>\eqcirc</code>	$\ni$	<code>\precnapprox</code>	$\#$	<code>\Vbarv</code>
$\equiv$	<code>\eqcolon</code>	$\ni$	<code>\precneq</code>	$\#$	<code>\Vdash</code>
$\equiv$	<code>\eqdef</code>	$\ni$	<code>\precneqq</code>	$\#$	<code>\Vdash</code>
$\equiv$	<code>\eqdot</code>	$\ni$	<code>\precnsim</code>	$\top$	<code>\vdash</code>

(continued on next page)

(continued from previous page)

$\approx$	<code>\eqeq</code>	$\lesssim$	<code>\precsim</code>	$\vDash$	<code>\vDash</code>
$\approx\approx$	<code>\eqeqeq</code>	$\propto$	<code>\propto</code>	$\Vdash$	<code>\VDash</code>
$\approx\approx\approx$	<code>\eqqsim</code>	$\rightsquigarrow$	<code>\prurel</code>	$\vDash\!\!\!\!\!\vDash$	<code>\vDdash</code>
$\approx\approx\approx\approx$	<code>\eqsim</code>	$\lrcorner$	<code>\pullback</code>	$\vdots$	<code>\vdots</code>
$\#$	<code>\equalparallel</code>	$\lrcorner$	<code>\pushout</code>	$\vDash\!\!\!\!\!\vDash$	<code>\veeeq</code>
$\equiv$	<code>\equiv</code>	$\stackrel{?}{=}$	<code>\questeq</code>	$\wedge$	<code>\veeonwedge</code>
$\equiv\equiv$	<code>\Equiv</code>	$\dagger$	<code>\revnmid</code>	$\mid$	<code>\vertoverlay</code>
$\equiv\equiv\equiv$	<code>\equivDD</code>	$\bowtie$	<code>\rftimes</code>	$\text{---}$	<code>\vlongdash</code>
$\#$	<code>\equivVert</code>	$\bowtie$	<code>\rftimes</code>	$\text{---}$	<code>\Vvdash</code>
$\#$	<code>\equivVvert</code>	$\succ$	<code>\rightdbltail</code>	$\triangleq$	<code>\wedgex</code>

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

TABLE 104: stix Negated Binary Relations

$\nexists$	<code>\forks</code>	$\nparallel$	<code>\nhpar</code>	$\nsime$	<code>\nsime</code>
$\approx$	<code>\napprox</code>	$\nmid$	<code>\nmid</code>	$\nsucc$	<code>\nsucc</code>
$\approx\approx$	<code>\napproxeqq</code>	$\ncong$	<code>\nni</code>	$\nsucceq$	<code>\nsucceq</code>
$\asymp$	<code>\nasymp</code>	$\notin$	<code>\notin</code>	$\nsucceq$	<code>\nsucceq</code>
$\nbumpeq$	<code>\nbumpeq</code>	$\nparallel$	<code>\nparallel</code>	$\nvarisinobar$	<code>\nvarisinobar</code>
$\nbumpex$	<code>\nbumpex</code>	$\nprec$	<code>\nprec</code>	$\nvarniobar$	<code>\nvarniobar</code>
$\ncong$	<code>\ncong</code>	$\npreccurlyeq$	<code>\npreccurlyeq</code>	$\nvDash$	<code>\nvDash</code>
$\ncong\dot{}$	<code>\ncongdot</code>	$\npreceq$	<code>\npreceq</code>	$\nvdash$	<code>\nvdash</code>
$\neq$	<code>\neq</code>	$\nshortmid$	<code>\nshortmid</code>	$\nVDash$	<code>\nVDash</code>
$\neqsim$	<code>\neqsim</code>	$\nshortparallel$	<code>\nshortparallel</code>	$\nVdash$	<code>\nVdash</code>
$\nequiv$	<code>\nequiv</code>	$\nsim$	<code>\nsim</code>		

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

TABLE 105: mathtools Binary Relations

$\approx\approx$	<code>\Colonapprox</code>	$\coloneq$	<code>\coloneq</code>	$\Eqcolon$	<code>\Eqcolon</code>
$\approx$	<code>\colonapprox</code>	$\colonsim$	<code>\colonsim</code>	$\eqqcolon$	<code>\eqqcolon</code>
$\equiv$	<code>\coloneqq</code>	$\Colonsim$	<code>\Colonsim</code>	$\Eqqcolon$	<code>\Eqqcolon</code>
$\equiv\equiv$	<code>\Coloneqq</code>	$\dblcolon$	<code>\dblcolon</code>		
$\equiv\equiv\equiv$	<code>\Coloneq</code>	$\eqcolon$	<code>\eqcolon</code>		

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

$$\begin{array}{ccc} \equiv\dot{=} & \text{vs.} & \equiv\dot{=} \\ \text{"=:="} & & \text{"=\vcentcolon="} \end{array}$$

TABLE 106: turnstile Binary Relations

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

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 107: trsym Binary Relations

$\bullet \circ$	<code>\InversTransformHoriz</code>	$\circ \bullet$	<code>\TransformHoriz</code>
$\bullet \downarrow$	<code>\InversTransformVert</code>	$\downarrow \bullet$	<code>\TransformVert</code>

TABLE 108: trfsigns Binary Relations

$\swarrow$	<code>\dfourier</code>	$\searrow$	<code>\Dfourier</code>
$\text{---}$	<code>\fourier</code>	$\text{---}$	<code>\Fourier</code>
$\circ \bullet$	<code>\laplace</code>	$\bullet \circ$	<code>\Laplace</code>
$\swarrow \bullet$	<code>\ztransf</code>	$\bullet \searrow$	<code>\Ztransf</code>

TABLE 109: cml Binary Relations

$\circ$	<code>\coh</code>	$\frown$	<code>\scoh</code>
$\succ$	<code>\incoh</code>	$\smile$	<code>\sincoh</code>
$\perp$	<code>\Perp</code>	$\downarrow$	<code>\simperp</code>
$\circ \circ$	<code>\multimapboth</code>		

TABLE 110: colonequals Binary Relations

$\approx$	<code>\approxcolon</code>	$::-$	<code>\coloncolonminus</code>	$=::$	<code>\equalscoloncolon</code>
$\approx::$	<code>\approxcoloncolon</code>	$::\sim$	<code>\coloncolonsim</code>	$-:$	<code>\minuscolon</code>
$:\approx$	<code>\colonapprox</code>	$:=$	<code>\colonequals</code>	$-::$	<code>\minuscoloncolon</code>
$::$	<code>\coloncolon</code>	$:-$	<code>\colonminus</code>	$:$	<code>\ratio</code>
$:\approx$	<code>\coloncolonapprox</code>	$:\sim$	<code>\colonsim</code>	$\sim:$	<code>\simcolon</code>
$:=$	<code>\coloncolonequals</code>	$=:$	<code>\equalscolon</code>	$\sim::$	<code>\simcoloncolon</code>

TABLE 111: fourier Binary Relations

$\#$	<code>\nparallelslant</code>	$\#$	<code>\parallelslant</code>
------	------------------------------	------	-----------------------------

TABLE 112: Subset and Superset Relations

$\sqsubset$	<code>\sqsubset*</code>	$\sqsupseteq$	<code>\sqsupseteq</code>	$\supset$	<code>\supset</code>
$\sqsubseteq$	<code>\sqsubseteq</code>	$\subset$	<code>\subset</code>	$\supseteq$	<code>\supseteq</code>
$\sqsupset$	<code>\sqsupset*</code>	$\subseteq$	<code>\subseteq</code>		

\* Not predefined by the  $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}_{2\epsilon}$  core. Use the `latexsym` package to expose this symbol.

TABLE 113:  $\mathcal{AMS}$  Subset and Superset Relations

$\not\subset$	<code>\nsubseteqq</code>	$\subsetneq$	<code>\subseteqq</code>	$\supsetneq$	<code>\supsetneqq</code>
$\not\supset$	<code>\nsupseteq</code>	$\subsetneqq$	<code>\subsetneqq</code>	$\varsubsetneq$	<code>\varsubsetneqq</code>
$\not\supseteq$	<code>\nsupseteqq</code>	$\subsetneqq$	<code>\subsetneqq</code>	$\varsubsetneqq$	<code>\varsubsetneqq</code>
$\sqsubset$	<code>\sqsubset</code>	$\supset$	<code>\Supset</code>	$\varsupsetneq$	<code>\varsupsetneqq</code>
$\sqsupset$	<code>\sqsupset</code>	$\supseteq$	<code>\supseteqq</code>	$\varsupsetneqq$	<code>\varsupsetneqq</code>
$\Subset$	<code>\Subset</code>	$\supsetneq$	<code>\supsetneq</code>		

TABLE 114: `stmaryrd` Subset and Superset Relations

$\Subsetplus$	<code>\subsetplus</code>	$\supsetplus$	<code>\supsetplus</code>
$\Subsetpluseq$	<code>\subsetpluseq</code>	$\supsetpluseq$	<code>\supsetpluseq</code>

TABLE 115: `wasysym` Subset and Superset Relations

$\sqsubset$	<code>\sqsubset</code>	$\sqsupset$	<code>\sqsupset</code>
-------------	------------------------	-------------	------------------------

TABLE 116: `txfonts/pxfonts` Subset and Superset Relations

$\not\sqsubset$	<code>\nsqsubset</code>	$\not\supseteq$	<code>\nsqsupseteq</code>	$\not\supset$	<code>\nSupset</code>
$\not\sqsubseteq$	<code>\nsqsubseteqq</code>	$\notin$	<code>\nSubset</code>		
$\not\supset$	<code>\nsqsupset</code>	$\not\subseteq$	<code>\nsubseteqq</code>		

TABLE 117: `mathabx` Subset and Superset Relations

$\not\sqsubset$	<code>\nsqsubset</code>	$\not\supset$	<code>\nsupset</code>	$\supseteq$	<code>\sqsupseteq</code>	$\supseteq$	<code>\supseteq</code>
$\not\sqsubseteq$	<code>\nsqSubset</code>	$\not\supseteq$	<code>\nSupset</code>	$\supseteqq$	<code>\sqsupseteqq</code>	$\supseteqq$	<code>\supseteqq</code>
$\not\sqsupset$	<code>\nsqsubseteqq</code>	$\not\supseteqq$	<code>\nsupseteq</code>	$\supsetneq$	<code>\sqsupsetneq</code>	$\supsetneq$	<code>\supsetneq</code>
$\not\sqsupseteq$	<code>\nsqsubseteqqq</code>	$\not\supseteqqq$	<code>\nsupseteqq</code>	$\supsetneqq$	<code>\sqsupsetneqq</code>	$\supsetneqq$	<code>\supsetneqq</code>
$\not\sqsupseteqq$	<code>\nsqsubset</code>	$\subset$	<code>\sqsubset</code>	$\subset$	<code>\subset</code>	$\varsubsetneq$	<code>\varsubsetneq</code>
$\not\supset$	<code>\nsqSupset</code>	$\subseteq$	<code>\sqSubset</code>	$\subseteq$	<code>\Subset</code>	$\varsubsetneqq$	<code>\varsubsetneqq</code>
$\not\supseteq$	<code>\nsqsupseteq</code>	$\subseteqq$	<code>\sqsubseteqq</code>	$\subseteqq$	<code>\subseteqq</code>	$\varsubsetneqq$	<code>\varsubsetneqq</code>
$\not\supseteqq$	<code>\nsqsubseteqqq</code>	$\subseteqqq$	<code>\sqsubseteqqq</code>	$\subseteqqq$	<code>\subseteqqq</code>	$\varsubsetneqq$	<code>\varsubsetneqq</code>
$\not\supsetneq$	<code>\nsubset</code>	$\subsetneq$	<code>\sqsubsetneq</code>	$\subsetneq$	<code>\subsetneq</code>	$\varsubsetneq$	<code>\varsubsetneq</code>
$\not\supsetneqq$	<code>\nSubset</code>	$\subsetneqq$	<code>\sqsubsetneqq</code>	$\subsetneqq$	<code>\subsetneqq</code>	$\varsubsetneqq$	<code>\varsubsetneqq</code>
$\not\supsetneqq$	<code>\nsubseteq</code>	$\supset$	<code>\sqSupset</code>	$\supset$	<code>\supset</code>	$\varsubsetneqq$	<code>\varsubsetneqq</code>
$\not\supsetneqq$	<code>\nsubseteqq</code>	$\supseteq$	<code>\sqsupset</code>	$\supseteq$	<code>\supseteq</code>	$\varsubsetneqq$	<code>\varsubsetneqq</code>
$\not\supsetneqq$	<code>\nsubseteqqq</code>	$\supseteqq$	<code>\sqsupseteq</code>	$\supseteqq$	<code>\supseteqq</code>	$\varsubsetneqq$	<code>\varsubsetneqq</code>



TABLE 118: MnSymbol Subset and Superset Relations

$\not\subseteq$	<code>\nSqssubset</code>	$\not\subsetneq$	<code>\nsubseteq</code>	$\not\supsetneq$	<code>\sqsubsetneq</code>	$\subseteq$	<code>\subseteq</code>
$\not\subset$	<code>\nqssubset</code>	$\not\subseteq$	<code>\nsubseteqqq</code>	$\not\supseteq$	<code>\sqsubsetneqq</code>	$\subseteq$	<code>\subseteqqq</code>
$\not\supseteq$	<code>\nqssubseteq</code>	$\not\supset$	<code>\nSupset</code>	$\not\supseteq$	<code>\Sqsupset</code>	$\supseteq$	<code>\supseteq</code>
$\not\supseteq$	<code>\nqssubseteqqq</code>	$\not\supset$	<code>\nSupset</code>	$\not\supseteq$	<code>\sqsupset</code>	$\supseteq$	<code>\supseteqqq</code>
$\not\supset$	<code>\nSqsupset</code>	$\not\supseteq$	<code>\nsubseteq</code>	$\not\supseteq$	<code>\sqsupseteq</code>	$\supset$	<code>\Supset</code>
$\not\supset$	<code>\nqsupset</code>	$\not\supseteq$	<code>\nsubseteqqq</code>	$\not\supseteq$	<code>\sqsupseteqqq</code>	$\supset$	<code>\supset</code>
$\not\supseteq$	<code>\nqssubseteq</code>	$\subseteq$	<code>\Sqssubset</code>	$\not\supseteq$	<code>\sqsupsetneq</code>	$\supseteq$	<code>\supseteq</code>
$\not\supseteq$	<code>\nqssubseteqqq</code>	$\subseteq$	<code>\sqsubset</code>	$\not\supseteq$	<code>\sqsupsetneqq</code>	$\supseteq$	<code>\supseteqqq</code>
$\subseteq$	<code>\nSubset</code>	$\subseteq$	<code>\sqsubseteq</code>	$\subseteq$	<code>\Subset</code>	$\supseteq$	<code>\supseteqneq</code>
$\subset$	<code>\nsubset</code>	$\subseteq$	<code>\sqsubseteqqq</code>	$\subset$	<code>\subset</code>	$\supseteq$	<code>\supseteqqq</code>

MnSymbol additionally defines `\varsubsetneq` as a synonym for `\subseteq`, `\varsubsetneqq` as a synonym for `\subseteqqq`, `\varsupsetneq` as a synonym for `\supseteq`, and `\varsupsetneqq` as a synonym for `\supseteqqq`.

TABLE 119: fdsymbol Subset and Superset Relations

$\not\subset$	<code>\nqssubset</code>	$\not\subsetneq$	<code>\nsubseteq</code>	$\not\supsetneq$	<code>\sqsubsetneq</code>	$\subseteq$	<code>\subseteq</code>
$\not\subseteq$	<code>\nSqssubset</code>	$\not\subseteq$	<code>\nsubseteqqq</code>	$\not\supseteq$	<code>\sqsubsetneqq</code>	$\subseteq$	<code>\subseteqqq</code>
$\not\supseteq$	<code>\nqssubseteq</code>	$\not\supset$	<code>\nSupset</code>	$\not\supseteq$	<code>\Sqsupset</code>	$\supseteq$	<code>\supseteq</code>
$\not\supseteq$	<code>\nqssubseteqqq</code>	$\not\supset$	<code>\nSupset</code>	$\not\supseteq$	<code>\sqsupset</code>	$\supseteq$	<code>\supseteqqq</code>
$\not\supset$	<code>\nSqsupset</code>	$\not\supseteq$	<code>\nsubseteq</code>	$\not\supseteq$	<code>\sqsupseteq</code>	$\supset$	<code>\Supset</code>
$\not\supset$	<code>\nqsupset</code>	$\not\supseteq$	<code>\nsubseteqqq</code>	$\not\supseteq$	<code>\sqsupseteqqq</code>	$\supset$	<code>\supset</code>
$\not\supseteq$	<code>\nqssubseteq</code>	$\subseteq$	<code>\Sqssubset</code>	$\not\supseteq$	<code>\sqsupsetneq</code>	$\supseteq$	<code>\supseteq</code>
$\not\supseteq$	<code>\nqssubseteqqq</code>	$\subseteq$	<code>\sqsubset</code>	$\not\supseteq$	<code>\sqsupsetneqq</code>	$\supseteq$	<code>\supseteqqq</code>
$\subset$	<code>\nsubset</code>	$\subseteq$	<code>\sqsubseteq</code>	$\subset$	<code>\subset</code>	$\supseteq$	<code>\supseteqneq</code>
$\subseteq$	<code>\nSubset</code>	$\subseteq$	<code>\sqsubseteqqq</code>	$\subseteq$	<code>\Subset</code>	$\supseteq$	<code>\supseteqqq</code>

fdsymbol additionally defines `\varsubsetneqq` as a synonym for `\subseteqqq`, `\varsubsetneq` as a synonym for `\subseteq`, `\varsupsetneqq` as a synonym for `\supseteqqq`, and `\varsupsetneq` as a synonym for `\supseteq`.

TABLE 120: boisk Subset and Superset Relations

$\subset$	<code>\nsubset</code>	$\subseteq$	<code>\sqSubset</code>	$\subseteq$	<code>\subsetplus</code>	$\supseteq$	<code>\supsetplus</code>
$\subsetneq$	<code>\nsubseteq</code>	$\supseteq$	<code>\sqSupset</code>	$\subseteq$	<code>\subsetpluseq</code>	$\not\subseteq$	<code>\varsubsetneq</code>
$\subseteq$	<code>\nsubseteqqq</code>	$\supseteq$	<code>\sqsupset</code>	$\supseteq$	<code>\Supset</code>	$\not\subseteq$	<code>\varsubsetneqq</code>
$\supseteq$	<code>\nqssubseteq</code>	$\subseteq$	<code>\Subset</code>	$\supseteq$	<code>\supseteqqq</code>	$\not\supseteq$	<code>\varsupsetneq</code>
$\supseteq$	<code>\nqssubseteqqq</code>	$\subseteq$	<code>\subseteqqq</code>	$\not\supseteq$	<code>\supsetneq</code>	$\not\supseteq$	<code>\varsupsetneqq</code>
$\supseteq$	<code>\nqssubseteqqq</code>	$\not\subseteq$	<code>\subseteqneq</code>	$\not\supseteq$	<code>\supsetneqq</code>		
$\subseteq$	<code>\sqsubset</code>	$\not\subseteq$	<code>\subseteqneqq</code>	$\supseteq$	<code>\supsetplus</code>		

TABLE 121: stix Subset and Superset Relations

$\subset$	<code>\bsolhsb</code>	$\sqsupseteq$	<code>\sqsupseteq</code>	$\supsetsubset$	<code>\supsetsubset</code>
$\subsetneq$	<code>\csub</code>	$\sqsupsetneq$	<code>\sqsupsetneq</code>	$\supsetlarr$	<code>\suplarr</code>
$\subseteq$	<code>\csube</code>	$\subedot$	<code>\subedot</code>	$\supmult$	<code>\supmult</code>
$\supset$	<code>\csup</code>	$\submult$	<code>\submult</code>	$\Supset$	<code>\Supset</code>
$\supseteq$	<code>\csupe</code>	$\subrarr$	<code>\subrarr</code>	$\supset$	<code>\supset</code>
$\leftarrow\subset$	<code>\leftarrowsubset</code>	$\Subset$	<code>\Subset</code>	$\supsetapprox$	<code>\supsetapprox</code>
$\not\subset$	<code>\nqssubset</code>	$\subset$	<code>\subset</code>	$\supsetcirc^*$	<code>\supsetcirc^*</code>
$\not\subseteq$	<code>\nqssubseteq</code>	$\subsetapprox$	<code>\subsetapprox</code>	$\supsetdot$	<code>\supsetdot</code>
$\not\supset$	<code>\nqsusupset</code>	$\subsetcirc^*$	<code>\subsetcirc^*</code>	$\supseteq$	<code>\supseteq</code>
$\not\supseteq$	<code>\nqsussubseteq</code>	$\subsetdot$	<code>\subsetdot</code>	$\supseteqeq$	<code>\supseteqeq</code>
$\not\subsetneq$	<code>\nsubsetneq</code>	$\subseteq$	<code>\subseteq</code>	$\supsetneq$	<code>\supsetneq</code>
$\not\subseteq$	<code>\nsubseteq</code>	$\subseteqeq$	<code>\subseteqeq</code>	$\supsetneqq$	<code>\supsetneqq</code>
$\not\subseteqeq$	<code>\nsubseteqeq</code>	$\subseteqeqq$	<code>\subseteqeqq</code>	$\supsetplus$	<code>\supsetplus</code>
$\not\supset$	<code>\nsupset</code>	$\subsetneq$	<code>\subsetneq</code>	$\supsim$	<code>\supsim</code>
$\not\supseteq$	<code>\nsupseteq</code>	$\subsetneqq$	<code>\subsetneqq</code>	$\supsub$	<code>\supsub</code>
$\not\supseteqeq$	<code>\nsupseteqq</code>	$\subsetplus$	<code>\subsetplus</code>	$\supsup$	<code>\supsup</code>
$\rightarrow\supset$	<code>\rightarrowsupset</code>	$\subset$	<code>\subset</code>	$\varsubsetneq$	<code>\varsubsetneq</code>
$\sqsubset$	<code>\sqsubset</code>	$\subset$	<code>\subset</code>	$\varsubsetneqq$	<code>\varsubsetneqq</code>
$\sqsubseteq$	<code>\sqsubseteq</code>	$\supdsub$	<code>\supdsub</code>	$\varsupsetneq$	<code>\varsupsetneq</code>
$\sqsubsetneq$	<code>\sqsubsetneq</code>	$\supedot$	<code>\supedot</code>	$\varsupsetneqq$	<code>\varsupsetneqq</code>
$\sqsupset$	<code>\sqsupset</code>	$\supsol$	<code>\supsol</code>		

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

TABLE 122: Inequalities

$\geq$	<code>\geq</code>	$\gg$	<code>\gg</code>	$\leq$	<code>\leq</code>	$\ll$	<code>\ll</code>	$\neq$	<code>\neq</code>
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TABLE 123:  $\mathcal{AMS}$  Inequalities

$\gtrsim$	<code>\eqslantgtr</code>	$\gtrdot$	<code>\gtrdot</code>	$\lesseqgtr$	<code>\lesseqgtr</code>	$\ngeq$	<code>\ngeq</code>
$\lessgtr$	<code>\eqslantless</code>	$\gtreqless$	<code>\gtreqless</code>	$\lesseqqgtr$	<code>\lesseqqgtr</code>	$\ngeqq$	<code>\ngeqq</code>
$\gtrsim$	<code>\geqq</code>	$\gtreqqlless$	<code>\gtreqqlless</code>	$\lessgtr$	<code>\lessgtr</code>	$\ngeqslant$	<code>\ngeqslant</code>
$\gtrsim$	<code>\geqslant</code>	$\gtrless$	<code>\gtrless</code>	$\lesssim$	<code>\lesssim</code>	$\ngtr$	<code>\ngtr</code>
$\ggg$	<code>\ggg</code>	$\gtrsim$	<code>\gtrsim</code>	$\lll$	<code>\lll</code>	$\nleq$	<code>\nleq</code>
$\gtrapprox$	<code>\gnapprox</code>	$\gvertneqq$	<code>\gvertneqq</code>	$\lnapprox$	<code>\lnapprox</code>	$\nleqq$	<code>\nleqq</code>
$\gneq$	<code>\gneq</code>	$\leqq$	<code>\leqq</code>	$\lneq$	<code>\lneq</code>	$\nleqslant$	<code>\nleqslant</code>
$\gneqq$	<code>\gneqq</code>	$\leqslant$	<code>\leqslant</code>	$\lneqq$	<code>\lneqq</code>	$\nless$	<code>\nless</code>
$\gnsim$	<code>\gnsim</code>	$\lessapprox$	<code>\lessapprox</code>	$\lnsim$	<code>\lnsim</code>		
$\gtrapprox$	<code>\gtrapprox</code>	$\lessdot$	<code>\lessdot</code>	$\lvertneqq$	<code>\lvertneqq</code>		

TABLE 124: wasysym Inequalities

$\gtrsim$  `\apprge`  $\lesssim$  `\apprle`

TABLE 125: txfonts/pxfonts Inequalities

$\nlessgtr$  `\ngg`  $\nlessgtr$  `\ngtrsim`  $\nlessgtr$  `\nlesssim`  
 $\nlessgtr$  `\ngtrapprox`  $\nlessgtr$  `\nlessapprox`  $\nlessgtr$  `\nll`  
 $\nlessgtr$  `\ngtrless`  $\nlessgtr$  `\nlessgtr`

TABLE 126: mathabx Inequalities

$\gtrsim$	<code>\eqslantgtr</code>	$\gtrsim$	<code>\gtreqless</code>	$\lesssim$	<code>\lesssim</code>	$\nlessgtr$	<code>\ngtr</code>
$\lessgtr$	<code>\eqslantless</code>	$\lessgtr$	<code>\gtreqqless</code>	$\ll$	<code>\ll</code>	$\ngtrapprox$	<code>\ngtrapprox</code>
$\geq$	<code>\geq</code>	$\geq$	<code>\gtrless</code>	$\lll$	<code>\lll</code>	$\ngtrsim$	<code>\ngtrsim</code>
$\geqq$	<code>\geqq</code>	$\gtrsim$	<code>\gtrsim</code>	$\lnapprox$	<code>\lnapprox</code>	$\nleq$	<code>\nleq</code>
$\gg$	<code>\gg</code>	$\nlessgtr$	<code>\gvertneqq</code>	$\lneq$	<code>\lneq</code>	$\nleqq$	<code>\nleqq</code>
$\ggg$	<code>\ggg</code>	$\leq$	<code>\leq</code>	$\lneqq$	<code>\lneqq</code>	$\nless$	<code>\nless</code>
$\ngtrapprox$	<code>\ngtrapprox</code>	$\leqq$	<code>\leqq</code>	$\lnsim$	<code>\lnsim</code>	$\nlessapprox$	<code>\nlessapprox</code>
$\gneq$	<code>\gneq</code>	$\lessapprox$	<code>\lessapprox</code>	$\lvertneqq$	<code>\lvertneqq</code>	$\nlesssim$	<code>\nlesssim</code>
$\gneqq$	<code>\gneqq</code>	$\lessdot$	<code>\lessdot</code>	$\neqslantgtr$	<code>\neqslantgtr</code>	$\nvareq$	<code>\nvareq</code>
$\gnsim$	<code>\gnsim</code>	$\lesseqgtr$	<code>\lesseqgtr</code>	$\neqslantless$	<code>\neqslantless</code>	$\nvarleq$	<code>\nvarleq</code>
$\gtrapprox$	<code>\gtrapprox</code>	$\lesseqqgtr$	<code>\lesseqqgtr</code>	$\ngeq$	<code>\ngeq</code>	$\vareq$	<code>\vareq</code>
$\gtrdot$	<code>\gtrdot</code>	$\lessgtr$	<code>\lessgtr</code>	$\ngeqq$	<code>\ngeqq</code>	$\varleq$	<code>\varleq</code>

`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 127: MnSymbol Inequalities

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

MnSymbol additionally defines synonyms for some of the preceding symbols:

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

TABLE 128: fdsymbol Inequalities

$\succ$	<code>\eqslantgtr</code>	$\cong$	<code>\leqslantdot</code>	$\ncong$	<code>\ngtrapprox</code>
$\preccurlyeq$	<code>\eqslantless</code>	$\trianglelefteq$	<code>\leqslcc</code>	$\ntrianglelefteq$	<code>\ngtrcc</code>
$\succcurlyeq$	<code>\geq</code>	$<$	<code>\less</code>	$\nless$	<code>\ngtrclosed</code>
$\triangleright$	<code>\geqclosed</code>	$\approx$	<code>\lessapprox</code>	$\napprox$	<code>\ngtrdot</code>
$\triangleright$	<code>\geqdot</code>	$\triangleleft$	<code>\lesscc</code>	$\ntriangleleft$	<code>\ngtreqlless</code>
$\triangleright$	<code>\geqq</code>	$\triangleleft$	<code>\lessclosed</code>	$\ntriangleleft$	<code>\ngtreqqless</code>
$\triangleright$	<code>\geqslant</code>	$\triangleleft$	<code>\lessdot</code>	$\ntriangleleft$	<code>\ngtreqslantless</code>
$\triangleright$	<code>\geqslantdot</code>	$\lesseqgtr$	<code>\lesseqgtr</code>	$\nlesseqgtr$	<code>\ngtrless</code>
$\triangleright$	<code>\geqslcc</code>	$\lesseqqgtr$	<code>\lesseqqgtr</code>	$\nlesseqqgtr$	<code>\ngtrsim</code>
$\triangleright$	<code>\gg</code>	$\lesseqslantgtr$	<code>\lesseqslantgtr</code>	$\nlesseqslantgtr$	<code>\nleq</code>
$\triangleright$	<code>\ggg</code>	$\lessgtr$	<code>\lessgtr</code>	$\nlessgtr$	<code>\nleqclosed</code>
$\napprox$	<code>\gnapprox</code>	$\lessssim$	<code>\lessssim</code>	$\nlessssim$	<code>\nleqdot</code>
$\ncong$	<code>\gneq</code>	$\ll$	<code>\ll</code>	$\nll$	<code>\nleqq</code>
$\ncong$	<code>\gneqq</code>	$\lll$	<code>\lll</code>	$\nlll$	<code>\nleqslant</code>
$\ncong$	<code>\gnsim</code>	$\lnapprox$	<code>\lnapprox</code>	$\nlnapprox$	<code>\nleqslantdot</code>
$>$	<code>\gtr</code>	$\lneq$	<code>\lneq</code>	$\nlneq$	<code>\nleqslcc</code>
$\approx$	<code>\gtrapprox</code>	$\lneqq$	<code>\lneqq</code>	$\nlneqq$	<code>\nless</code>
$\triangleright$	<code>\gtrcc</code>	$\lnsim$	<code>\lnsim</code>	$\nlnsim$	<code>\nlessapprox</code>
$\triangleright$	<code>\gtrclosed</code>	$\neqslantgtr$	<code>\neqslantgtr</code>	$\nneqslantgtr$	<code>\nlesscc</code>
$>$	<code>\gtrdot</code>	$\neqslantless$	<code>\neqslantless</code>	$\nneqslantless$	<code>\nlessclosed</code>
$\approx$	<code>\gtreqlless</code>	$\ngeq$	<code>\ngeq</code>	$\nng$	<code>\nlessdot</code>
$\approx$	<code>\gtreqqless</code>	$\ngeqclosed$	<code>\ngeqclosed</code>	$\nngclosed$	<code>\nlesseqgtr</code>
$\approx$	<code>\gtreqslantless</code>	$\ngeqdot$	<code>\ngeqdot</code>	$\nngdot$	<code>\nlesseqqgtr</code>
$\approx$	<code>\gtrless</code>	$\ngeqq$	<code>\ngeqq</code>	$\nngqq$	<code>\nlesseqslantgtr</code>
$\approx$	<code>\gtrsim</code>	$\ngeqslant$	<code>\ngeqslant</code>	$\nngslant$	<code>\nlessgtr</code>
$\trianglelefteq$	<code>\leq</code>	$\ngeqslantdot$	<code>\ngeqslantdot</code>	$\nngslantdot$	<code>\nlesssim</code>
$\trianglelefteq$	<code>\leqclosed</code>	$\ngeqslcc$	<code>\ngeqslcc</code>	$\nngslcc$	<code>\nll</code>
$\trianglelefteq$	<code>\leqdot</code>	$\ngg$	<code>\ngg</code>	$\nngg$	<code>\nlll</code>
$\trianglelefteq$	<code>\leqq</code>	$\nggg$	<code>\nggg</code>	$\nnggg$	
$\trianglelefteq$	<code>\leqslant</code>	$\ngtr$	<code>\ngtr</code>	$\nngtr$	

fdsymbol defines synonyms for some of the preceding symbols:

$\geq$	<code>\ge</code>	$\lesdot$	<code>\lesdot</code>	$\ngtcc$	<code>\ngtcc</code>
$\triangleright$	<code>\gescc</code>	$\lesg$	<code>\lesg</code>	$\ngtreqllesslant$	<code>\ngtreqllesslant</code>
$\triangleright$	<code>\gesdot</code>	$\lesseqgtrslant$	<code>\lesseqgtrslant</code>	$\nlescc$	<code>\nlescc</code>
$\approx$	<code>\gesl</code>	$\lhd$	<code>\lhd</code>	$\nlesdot$	<code>\nlesdot</code>
$\triangleright$	<code>\gggtr</code>	$\llless$	<code>\llless</code>	$\nlesg$	<code>\nlesg</code>
$\triangleright$	<code>\gtcc</code>	$\ltcc$	<code>\ltcc</code>	$\nlesseqgtrslant$	<code>\nlesseqgtrslant</code>
$\approx$	<code>\gtreqllesslant</code>	$\lvertneqq$	<code>\lvertneqq</code>	$\nltcc$	<code>\nltcc</code>
$\ncong$	<code>\gvertneqq</code>	$\ngescc$	<code>\ngescc</code>	$\rhd$	<code>\rhd</code>

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$\leq$	<code>\le</code>	$\not\geq$	<code>\ngesdot</code>	$\trianglelefteq$	<code>\unlhd</code>
$\trianglelefteq$	<code>\lescc</code>	$\not\geq$	<code>\ngesl</code>	$\trianglerighteq$	<code>\unrhd</code>

TABLE 129: boisk Inequalities

$\gg$	<code>\eqslantgtr</code>	$\triangleright$	<code>\gtcir</code>	$\ggg$	<code>\lesseqgtr</code>	$\not\geq$	<code>\ngeq</code>
$\triangleleft$	<code>\eqslantless</code>	$\ggg$	<code>\gtrapprox</code>	$\gg$	<code>\lessgtr</code>	$\not\geq$	<code>\ngeqq</code>
$\equiv$	<code>\geqq</code>	$\ggg$	<code>\gtreqless</code>	$\gtrsim$	<code>\lesssim</code>	$\not\geq$	<code>\ngeqslant</code>
$\triangleright$	<code>\geqslant</code>	$\ggg$	<code>\gtreqqless</code>	$\lll$	<code>\lll</code>	$\not\geq$	<code>\ngtr</code>
$\ggg$	<code>\ggg</code>	$\ggg$	<code>\gtrless</code>	$\approx$	<code>\lnapprox</code>	$\not\geq$	<code>\nleq</code>
$\times$	<code>\glj</code>	$\ggg$	<code>\gtrsim</code>	$\approx$	<code>\lneq</code>	$\not\geq$	<code>\nleqq</code>
$\approx$	<code>\gnapprox</code>	$\ggg$	<code>\gvertneqq</code>	$\approx$	<code>\lneqq</code>	$\not\geq$	<code>\nleqslant</code>
$\approx$	<code>\gneq</code>	$\ggg$	<code>\leqq</code>	$\approx$	<code>\lnsim</code>	$\not\geq$	<code>\nless</code>
$\approx$	<code>\gneqq</code>	$\ggg$	<code>\leqslant</code>	$\ll$	<code>\Lt</code>		
$\approx$	<code>\gnsim</code>	$\ggg$	<code>\lessapprox</code>	$\triangleleft$	<code>\ltcir</code>		
$\triangleright$	<code>\Gt</code>	$\ggg$	<code>\lesseqgtr</code>	$\approx$	<code>\lvertneqq</code>		

TABLE 130: stix Inequalities

$\triangleright$	<code>\egsdot</code>	$\triangleright$	<code>\gtquest</code>	$\approx$	<code>\lnsim</code>
$\triangleleft$	<code>\elsdot</code>	$\ggg$	<code>\gtrapprox</code>	$\approx$	<code>\lsime</code>
$\triangleright$	<code>\eqgtr</code>	$\triangleright$	<code>\gtrarr</code>	$\approx$	<code>\lsimg</code>
$\triangleleft$	<code>\eqless</code>	$\triangleright$	<code>\gtrdot</code>	$\triangleleft$	<code>\Lt</code>
$\equiv$	<code>\eqqgtr</code>	$\ggg$	<code>\gtreqless</code>	$\triangleleft$	<code>\ltcc</code>
$\triangleleft$	<code>\eqqless</code>	$\ggg$	<code>\gtreqqless</code>	$\triangleleft$	<code>\ltcir</code>
$\ggg$	<code>\eqqslantgtr</code>	$\ggg$	<code>\gtrless</code>	$\triangleright$	<code>\ltlarr</code>
$\ggg$	<code>\eqqslantless</code>	$\ggg$	<code>\gtrsim</code>	$\triangleright$	<code>\ltquest</code>
$\triangleright$	<code>\eqslantgtr</code>	$\ggg$	<code>\gvertneqq</code>	$\approx$	<code>\lvertneqq</code>
$\triangleleft$	<code>\eqslantless</code>	$\triangleright$	<code>\lat</code>	$\not\geq$	<code>\neqslantgtr</code>
$\triangleleft$	<code>\geq</code>	$\triangleright$	<code>\late</code>	$\not\geq$	<code>\neqslantless</code>
$\equiv$	<code>\geqq</code>	$\triangleleft$	<code>\leftarrowless</code>	$\not\geq$	<code>\ngeq</code>
$\equiv$	<code>\geqqslant</code>	$\triangleleft$	<code>\leq</code>	$\not\geq$	<code>\ngeqq</code>
$\triangleright$	<code>\geqslant</code>	$\triangleleft$	<code>\leqq</code>	$\not\geq$	<code>\ngeqslant</code>
$\triangleright$	<code>\gescc</code>	$\equiv$	<code>\leqqslant</code>	$\not\geq$	<code>\ngg</code>
$\triangleright$	<code>\gesdot</code>	$\triangleleft$	<code>\leqslant</code>	$\not\geq$	<code>\ngtr</code>
$\triangleright$	<code>\gesdoto</code>	$\triangleleft$	<code>\lescc</code>	$\not\geq$	<code>\ngtrless</code>
$\triangleright$	<code>\gesdotol</code>	$\triangleleft$	<code>\lesdot</code>	$\not\geq$	<code>\ngtrsim</code>

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$\lesssim$	<code>\gesles</code>	$\lesdoto$	$\nleq$
$\gtrsim$	<code>\gg</code>	$\lesdotor$	$\nleqq$
$\ggg$	<code>\ggg</code>	$\lesges$	$\nleqslant$
$\ggg\text{nest}$	<code>\ggg\text{nest}</code>	$\lessapprox$	$\nless$
$\gla$	<code>\gla</code>	$\lessdot$	$\nlessgtr$
$\glE$	<code>\glE</code>	$\lesseqgtr$	$\nlesssim$
$\glj$	<code>\glj</code>	$\lesseqqgtr$	$\nll$
$\gnapprox$	<code>\gnapprox</code>	$\lessgtr$	$\partialmeetcontraction$
$\gneq$	<code>\gneq</code>	$\lesssim$	$\rightarrowtr$
$\gneqq$	<code>\gneqq</code>	$\lgE$	$\simE$
$\gnsim$	<code>\gnsim</code>	$\ll$	$\simgtr$
$\gsime$	<code>\gsime</code>	$\lll$	$\simLE$
$\gsiml$	<code>\gsiml</code>	$\lllnest$	$\simless$
$\Gt$	<code>\Gt</code>	$\lnapprox$	$\smt$
$\gtcc$	<code>\gtcc</code>	$\lneq$	$\smt_e$
$\gtcir$	<code>\gtcir</code>	$\lneqq$	

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 131:  $\mathcal{AMS}$  Triangle Relations

$\blacktriangleleft$	<code>\blacktriangleleft</code>	$\ntriangleright$	<code>\ntriangleright</code>	$\trianglerighteq$	<code>\trianglerighteq</code>
$\blacktriangleright$	<code>\blacktriangleright</code>	$\ntrianglerighteq$	<code>\ntrianglerighteq</code>	$\vartriangleleft$	<code>\vartriangleleft</code>
$\triangleleft$	<code>\triangleleft</code>	$\trianglelefteq$	<code>\trianglelefteq</code>	$\vartriangleright$	<code>\vartriangleright</code>
$\ntrianglelefteq$	<code>\ntrianglelefteq</code>	$\triangleq$	<code>\triangleq</code>		

TABLE 132: stmaryrd Triangle Relations

$\trianglelefteqslant$	<code>\trianglelefteqslant</code>	$\trianglerighteqslant$	<code>\trianglerighteqslant</code>
$\ntrianglelefteqslant$	<code>\ntrianglelefteqslant</code>	$\ntrianglerighteqslant$	<code>\ntrianglerighteqslant</code>

TABLE 133: mathabx Triangle Relations

$\triangleleft$	<code>\triangleleft</code>	$\vartriangleleft$	<code>\vartriangleleft</code>
$\trianglelefteq$	<code>\trianglelefteq</code>	$\vartriangleright$	<code>\vartriangleright</code>
$\triangleright$	<code>\triangleright</code>		
$\trianglerighteq$	<code>\trianglerighteq</code>		

TABLE 134: MnSymbol Triangle Relations

▼	<code>\filledmedtriangledown</code>	△	<code>\largetriangleup</code>	▽	<code>\smalltriangledown</code>
◀	<code>\filledmedtriangleleft</code>	▽	<code>\medtriangledown</code>	◄	<code>\smalltriangleleft</code>
▶	<code>\filledmedtriangleright</code>	◄	<code>\medtriangleleft</code>	►	<code>\smalltriangleright</code>
▲	<code>\filledmedtriangleup</code>	▷	<code>\medtriangleright</code>	△	<code>\smalltriangleup</code>
▼	<code>\filledtriangledown</code>	△	<code>\medtriangleup</code>	≐	<code>\triangleeq</code>
◀	<code>\filledtriangleleft</code>	≠	<code>\ntriangleeq</code>	◄	<code>\triangleleftteq</code>
▶	<code>\filledtriangleright</code>	≠	<code>\ntriangleleft</code>	►	<code>\trianglerighteq</code>
▲	<code>\filledtriangleup</code>	≠	<code>\ntriangleleftteq</code>	◄	<code>\vartriangleleft</code>
▽	<code>\largetriangledown</code>	≠	<code>\ntriangleright</code>	►	<code>\vartriangleright</code>
◄	<code>\largetriangleleft</code>	≠	<code>\ntrianglerighteq</code>		
►	<code>\largetriangleright</code>	⊗	<code>\otriangle</code>		

MnSymbol additionally defines synonyms for many of the preceding symbols: `\triangleeq` 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 `\triangleleftteq`; `\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 `\ntriangleleftteq`; 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 T<sub>E</sub>X relations (class 3 symbols). The `\largetriangle...` symbols are defined as T<sub>E</sub>X “ordinary” characters (class 0) and all of the remaining characters are defined as T<sub>E</sub>X binary operators (class 2).



TABLE 135: fdsymbol Triangle Relations

$\rhd$	<code>\geqclosed</code>	$\nabla$	<code>\medtriangledown</code>	$\blacktriangleleft$	<code>\smallblacktriangleleft</code>
$\triangleright$	<code>\gtrclosed</code>	$\triangleleft$	<code>\medtriangleleft</code>	$\blacktriangleright$	<code>\smallblacktriangleright</code>
$\bigtriangledown$	<code>\largetriangledown</code>	$\triangleright$	<code>\medtriangleright</code>	$\blacktriangleup$	<code>\smallblacktriangleup</code>
$\bigtriangleup$	<code>\largetriangleup</code>	$\triangleup$	<code>\medtriangleup</code>	$\nabla$	<code>\smalltriangledown</code>
$\leqclosed$	<code>\leqclosed</code>	$\nexists$	<code>\ngeqclosed</code>	$\triangleleft$	<code>\smalltriangleleft</code>
$\lessclosed$	<code>\lessclosed</code>	$\ntriangleright$	<code>\ngtrclosed</code>	$\triangleright$	<code>\smalltriangleright</code>
$\blacktriangledown$	<code>\medblacktriangledown</code>	$\nleqclosed$	<code>\nleqclosed</code>	$\triangleup$	<code>\smalltriangleup</code>
$\blacktriangleleft$	<code>\medblacktriangleleft</code>	$\nlessclosed$	<code>\nlessclosed</code>	$\triangleq$	<code>\triangleeq</code>
$\blacktriangleright$	<code>\medblacktriangleright</code>	$\ntriangleeq$	<code>\ntriangleeq</code>		
$\blacktriangleup$	<code>\medblacktriangleup</code>	$\blacktriangledown$	<code>\smallblacktriangledown</code>		

fdsymbol defines synonyms for almost all of the preceding symbols:

$\bigtriangledown$	<code>\bigtriangledown</code>	$\ntrianglelefteq$	<code>\ntrianglelefteq</code>	$\triangleq$	<code>\triangleq</code>
$\bigtriangleup$	<code>\bigtriangleup</code>	$\ntriangleright$	<code>\ntriangleright</code>	$\triangleright$	<code>\triangleright</code>
$\blacktriangle$	<code>\blacktriangle</code>	$\ntrianglerighteq$	<code>\ntrianglerighteq</code>	$\trianglerighteq$	<code>\trianglerighteq</code>
$\blacktriangledown$	<code>\blacktriangledown</code>	$\triangle$	<code>\triangle</code>	$\triangle$	<code>\vartriangle</code>
$\blacktriangleleft$	<code>\blacktriangleleft</code>	$\triangledown$	<code>\triangledown</code>	$\triangleleft$	<code>\vartriangleleft</code>
$\blacktriangleright$	<code>\blacktriangleright</code>	$\triangleleft$	<code>\triangleleft</code>	$\triangleright$	<code>\vartriangleright</code>
$\blacktriangleleft$	<code>\ntriangleleft</code>	$\trianglelefteq$	<code>\trianglelefteq</code>		

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 136: boisik Triangle Relations

$\ntriangleleft$	<code>\ntriangleleft</code>	$\trianglelefteq$	<code>\trianglelefteq</code>	$\vartriangleleft$	<code>\vartriangleleft</code>
$\ntrianglelefteq$	<code>\ntrianglelefteq</code>	$\trianglelefteqslant$	<code>\trianglelefteqslant</code>	$\vartriangleleft$	<code>\vartriangleleft</code>
$\ntriangleright$	<code>\ntriangleright</code>	$\triangleright$	<code>\triangleright</code>	$\vartriangleleft$	<code>\vartriangleleft</code>
$\ntrianglerighteq$	<code>\ntrianglerighteq</code>	$\trianglerighteq$	<code>\trianglerighteq</code>	$\vartriangleright$	<code>\vartriangleright</code>
$\triangleleft$	<code>\triangleleft</code>	$\trianglerighteqslant$	<code>\trianglerighteqslant</code>		

TABLE 137: stix Triangle Relations

$\ltriangleright$	<code>\ltriangleright</code>	$\nvartriangleright$	<code>\nvartriangleright</code>	$\triangle$	<code>\vartriangle</code>
$\ltrivb$	<code>\ltrivb</code>	$\rtriltri$	<code>\rtriltri</code>	$\triangleleft$	<code>\vartriangleleft</code>
$\ntrianglelefteq$	<code>\ntrianglelefteq</code>	$\trianglelefteq$	<code>\trianglelefteq</code>	$\triangleright$	<code>\vartriangleright</code>
$\ntrianglerighteq$	<code>\ntrianglerighteq</code>	$\triangleq$	<code>\triangleq</code>	$\triangleright$	<code>\vbrtri</code>
$\nvartriangleleft$	<code>\nvartriangleleft</code>	$\trianglerighteq$	<code>\trianglerighteq</code>		

TABLE 138: Arrows

$\Downarrow$	<code>\Downarrow</code>	$\longleftarrow$	<code>\longleftarrow</code>	$\nwarrow$	<code>\nwarrow</code>
$\downarrow$	<code>\downarrow</code>	$\Longleftarrow$	<code>\Longleftarrow</code>	$\Rightarrow$	<code>\Rightarrow</code>
$\hookleftarrow$	<code>\hookleftarrow</code>	$\longleftrightarrow$	<code>\longleftrightarrow</code>	$\rightarrow$	<code>\rightarrow</code>
$\hookrightarrow$	<code>\hookrightarrow</code>	$\Longleftrightarrow$	<code>\Longleftrightarrow</code>	$\searrow$	<code>\searrow</code>
$\leadsto$	<code>\leadsto*</code>	$\mapsto$	<code>\longmapsto</code>	$\swarrow$	<code>\swarrow</code>
$\leftarrow$	<code>\leftarrow</code>	$\Longrightarrow$	<code>\Longrightarrow</code>	$\Uparrow$	<code>\Uparrow</code>
$\Leftarrow$	<code>\Leftarrow</code>	$\longrightarrow$	<code>\longrightarrow</code>	$\Uparrow$	<code>\Uparrow</code>
$\Leftrightarrow$	<code>\Leftrightarrow</code>	$\mapsto$	<code>\mapsto</code>	$\Updownarrow$	<code>\Updownarrow</code>
$\leftrightharpoonup$	<code>\leftrightharpoonup</code>	$\nearrow$	<code>\nearrow<sup>†</sup></code>	$\Updownarrow$	<code>\Updownarrow</code>

\* Not predefined by the L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> core. Use the latexsym package to expose this symbol.

† See the note beneath Table 240 for information about how to put a diagonal arrow across a mathematical expression (as in “ $\nabla \cdot \vec{B}$ ”).

TABLE 139: Harpoons

$\leftharpoonup$	<code>\leftharpoonup</code>	$\rightharpoonup$	<code>\rightharpoonup</code>	$\rightleftharpoons$	<code>\rightleftharpoons</code>
$\leftleftarrows$	<code>\leftleftarrows</code>	$\rightrightarrows$	<code>\rightrightarrows</code>		

TABLE 140: textcomp Text-mode Arrows

$\Downarrow$	<code>\textdownarrow</code>	$\rightarrow$	<code>\textrightarrow</code>
$\leftarrow$	<code>\textleftarrow</code>	$\Uparrow$	<code>\textuparrow</code>

TABLE 141:  $\mathcal{A}\mathcal{M}\mathcal{S}$  Arrows

$\circlearrowleft$	<code>\circlearrowleft</code>	$\Lleftarrow$	<code>\Lleftarrow</code>	$\rightleftarrows$	<code>\rightleftarrows</code>
$\circlearrowright$	<code>\circlearrowright</code>	$\Lrightarrow$	<code>\Lrightarrow</code>	$\rightrightarrows$	<code>\rightrightarrows</code>
$\curvearrowleft$	<code>\curvearrowleft</code>	$\looparrowleft$	<code>\looparrowleft</code>	$\rightsquigarrow$	<code>\rightsquigarrow</code>
$\curvearrowright$	<code>\curvearrowright</code>	$\looparrowright$	<code>\looparrowright</code>	$\Rsh$	<code>\Rsh</code>
$\dashleftarrow$	<code>\dashleftarrow</code>	$\Lsh$	<code>\Lsh</code>	$\twoheadleftarrow$	<code>\twoheadleftarrow</code>
$\dashrightarrow$	<code>\dashrightarrow</code>	$\Lsh$	<code>\Lsh</code>	$\twoheadrightarrow$	<code>\twoheadrightarrow</code>
$\downdownarrows$	<code>\downdownarrows</code>	$\rightarrowtail$	<code>\rightarrowtail</code>	$\upuparrows$	<code>\upuparrows</code>
$\leftarrowtail$	<code>\leftarrowtail</code>				

TABLE 142:  $\mathcal{A}\mathcal{M}\mathcal{S}$  Negated Arrows

$\nleftarrow$	<code>\nleftarrow</code>	$\nrightarrow$	<code>\nrightarrow</code>	$\nleftrightarrow$	<code>\nleftrightarrow</code>
$\leftleftarrows$	<code>\leftleftarrows</code>	$\rightrightarrows$	<code>\rightrightarrows</code>		

TABLE 143:  $\mathcal{A}\mathcal{M}\mathcal{S}$  Harpoons

$\downharpoonleft$	<code>\downharpoonleft</code>	$\leftrightharpoons$	<code>\leftrightharpoons</code>	$\upharpoonleft$	<code>\upharpoonleft</code>
$\downharpoonright$	<code>\downharpoonright</code>	$\rightleftharpoons$	<code>\rightleftharpoons</code>	$\upharpoonright$	<code>\upharpoonright</code>

TABLE 144: stmaryrd Arrows

$\leftarrow$	<code>\leftarrowtriangle</code>	$\Leftarrow$	<code>\Mapsfrom</code>	$\leftarrow$	<code>\shortleftarrow</code>
$\Leftrightarrow$	<code>\leftrightharveq</code>	$\mapsto$	<code>\mapsfrom</code>	$\rightarrow$	<code>\shortrightarrow</code>
$\Leftrightarrow$	<code>\leftrightharveqtriangle</code>	$\mapsto$	<code>\Mapsto</code>	$\uparrow$	<code>\shortuparrow</code>
$\lightning$	<code>\lightning</code>	$\nearrow$	<code>\nnearrow</code>	$\searrow$	<code>\ssearrow</code>
$\Longmapsfrom$	<code>\Longmapsfrom</code>	$\nwarrow$	<code>\nnwarrow</code>	$\swarrow$	<code>\sswarrow</code>
$\longmapsfrom$	<code>\longmapsfrom</code>	$\rightarrowtriangle$	<code>\rightarrowtriangle</code>		
$\Longmapsto$	<code>\Longmapsto</code>	$\downarrow$	<code>\shortdownarrow</code>		

TABLE 145: txfonts/pxfonts Arrows

$\boxdotleft$	<code>\boxdotLeft</code>	$\circrightarrow$	<code>\circleddotright</code>	$\diamondleft$	<code>\Diamondleft</code>
$\boxdotleft$	<code>\boxdotleft</code>	$\circleftarrow$	<code>\circleleft</code>	$\diamondrightarrow$	<code>\Diamondright</code>
$\boxdotright$	<code>\boxdotright</code>	$\circrightarrow$	<code>\circcleright</code>	$\diamondrightarrow$	<code>\DiamondRight</code>
$\boxdotright$	<code>\boxdotRight</code>	$\dashrightarrow$	<code>\dashleftrightharveq</code>	$\leftleftarrows$	<code>\leftsquigarrow</code>
$\boxleftarrow$	<code>\boxLeft</code>	$\diamondleftarrow$	<code>\DiamonddotLeft</code>	$\nearrow$	<code>\Nearrow</code>
$\boxleftarrow$	<code>\boxleft</code>	$\diamondleftarrow$	<code>\Diamonddotleft</code>	$\nwarrow$	<code>\Nwarrow</code>
$\boxrightarrow$	<code>\boxright</code>	$\diamondrightarrow$	<code>\Diamonddotright</code>	$\rightarrow$	<code>\Rrightarrow</code>
$\boxrightarrow$	<code>\boxRight</code>	$\diamondrightarrow$	<code>\DiamonddotRight</code>	$\searrow$	<code>\Searrow</code>
$\circleftarrow$	<code>\circleddotleft</code>	$\diamondleftarrow$	<code>\DiamondLeft</code>	$\swarrow$	<code>\Swarrow</code>

TABLE 146: mathabx Arrows

$\circleftarrow$	<code>\circleftarrow</code>	$\leftarrow$	<code>\leftarrow</code>	$\nearrow$	<code>\nearrow</code>
$\circrightarrow$	<code>\circrightarrow</code>	$\leftleftarrows$	<code>\leftleftarrows</code>	$\restriction$	<code>\restriction</code>
$\curvearrowleft$	<code>\curvearrowleft</code>	$\leftrightarrows$	<code>\leftrightarrows</code>	$\rightarrow$	<code>\rightarrow</code>
$\curvearrowleft$	<code>\curvearrowleft</code>	$\leftrightsquigarrow$	<code>\leftrightsquigarrow</code>	$\rightleftarrows$	<code>\rightleftarrows</code>
$\curvearrowleft$	<code>\curvearrowleft</code>	$\rightsquigarrow$	<code>\rightsquigarrow</code>	$\rightrightarrows$	<code>\rightrightarrows</code>
$\curvearrowleft$	<code>\curvearrowleft</code>	$\leftsquigarrow$	<code>\leftsquigarrow</code>	$\rightsquigarrow$	<code>\rightsquigarrow</code>
$\curvearrowleft$	<code>\curvearrowleft</code>	$\lefttorightarrow$	<code>\lefttorightarrow</code>	$\righttoleftarrow$	<code>\righttoleftarrow</code>
$\curvearrowleft$	<code>\curvearrowleft</code>	$\looparrowleft$	<code>\looparrowleft</code>	$\Rsh$	<code>\Rsh</code>
$\curvearrowleft$	<code>\curvearrowleft</code>	$\looparrowright$	<code>\looparrowright</code>	$\searrow$	<code>\searrow</code>
$\curvearrowleft$	<code>\curvearrowleft</code>	$\looparrowleft$	<code>\looparrowleft</code>	$\swarrow$	<code>\swarrow</code>
$\curvearrowleft$	<code>\curvearrowleft</code>	$\looparrowright$	<code>\looparrowright</code>	$\updownarrows$	<code>\updownarrows</code>
$\curvearrowleft$	<code>\curvearrowleft</code>	$\Lsh$	<code>\Lsh</code>	$\uptodownarrow$	<code>\uptodownarrow</code>
$\curvearrowleft$	<code>\curvearrowleft</code>	$\nearrow$	<code>\nearrow</code>	$\upuparrows$	<code>\upuparrows</code>

TABLE 147: mathabx Negated Arrows

$\nleftarrow$	<code>\nleftarrow</code>	$\nrightarrow$	<code>\nrightarrow</code>	$\rightarrow$	<code>\rightarrow</code>
$\leftarrow$	<code>\leftarrow</code>	$\Leftarrow$	<code>\Leftarrow</code>	$\rightarrow$	<code>\rightarrow</code>

TABLE 148: mathabx Harpoons

$\bar{\leftarrow}$	<code>\barleftharpoon</code>	$\leftarrow$	<code>\leftarrow</code>	$\rightleftarrows$	<code>\rightleftharpoons</code>
$\bar{\rightarrow}$	<code>\barrightharpoon</code>	$\leftleftarrows$	<code>\leftleftarpoons</code>	$\rightleftarrows$	<code>\rightrightharpoons</code>
$\Downarrow$	<code>\downdownharpoons</code>	$\leftarrow$	<code>\leftarrow</code>	$\Downarrow$	<code>\updownharpoons</code>
$\downarrow$	<code>\downharpoonleft</code>	$\rightleftarrows$	<code>\leftrightharpoons</code>	$\uparrow$	<code>\upharpoonleft</code>
$\downarrow$	<code>\downharpoonright</code>	$\rightleftarrows$	<code>\leftrightharpoons</code>	$\uparrow$	<code>\upharpoonright</code>
$\Uparrow$	<code>\downupharpoons</code>	$\rightarrow$	<code>\rightarrow</code>	$\Uparrow$	<code>\upupharpoons</code>
$\Leftarrow$	<code>\leftbarharpoon</code>	$\rightarrow$	<code>\rightarrow</code>		
$\leftarrow$	<code>\leftarrow</code>	$\rightarrow$	<code>\rightarrow</code>		

TABLE 149: MnSymbol Arrows

$\curvearrowright$	<code>\curvearrowdownup</code>	$\longleftarrow$	<code>\longleftarrow</code>	$\curvearrowleft$	<code>\rhookswarrow</code>
$\curvearrowright$	<code>\curvearrowleftright</code>	$\Longleftarrow$	<code>\Longleftarrow</code>	$\uparrow$	<code>\rhookuparrow</code>
$\curvearrowright$	<code>\curvearrownesw</code>	$\longleftrightarrow$	<code>\longleftrightarrow</code>	$\rightarrow$	<code>\rightarrow</code>
$\curvearrowright$	<code>\curvearrownwse</code>	$\longleftrightarrow$	<code>\longleftrightarrow</code>	$\Rightarrow$	<code>\Rightarrow</code>
$\curvearrowright$	<code>\curvearrowrightleft</code>	$\mapsto$	<code>\longmapsto</code>	$\Rightarrow$	<code>\rightarrowtail</code>
$\curvearrowright$	<code>\curvearrowswne</code>	$\rightarrow$	<code>\longrightarrow</code>	$\Leftrightarrow$	<code>\rightleftarrows</code>
$\curvearrowright$	<code>\curvearrowswne</code>	$\Rightarrow$	<code>\longrightarrow</code>	$\rightsquigarrow$	<code>\rightlsquigarrow</code>
$\curvearrowright$	<code>\curvearrowupdown</code>	$\looparrowleft$	<code>\looparrowleft</code>	$\mapsto$	<code>\rightmapsto</code>
$\dashrightarrow$	<code>\dasheddownarrow</code>	$\looparrowright$	<code>\looparrowright</code>	$\Rightarrow$	<code>\rightrightarrow</code>
$\dashrightarrow$	<code>\dashedleftarrow</code>	$\Lsh$	<code>\Lsh</code>	$\rightsquigarrow$	<code>\rightsquigarrow</code>
$\dashrightarrow$	<code>\dashednearrow</code>	$\nearrow$	<code>\nearrow</code>	$\Rightarrow$	<code>\Rightarrow</code>
$\dashrightarrow$	<code>\dashednarrow</code>	$\nearrow$	<code>\nearrow</code>	$\Rrightarrow$	<code>\Rsh</code>
$\dashrightarrow$	<code>\dashedrightarrow</code>	$\nearrowtail$	<code>\nearrowtail</code>	$\searrow$	<code>\searrow</code>
$\dashrightarrow$	<code>\dashedsearrow</code>	$\nearrow$	<code>\nearrow</code>	$\searrow$	<code>\searrow</code>
$\dashrightarrow$	<code>\dashedswarrow</code>	$\nearrow$	<code>\nearrow</code>	$\searrowtail$	<code>\searrowtail</code>
$\dashrightarrow$	<code>\dasheduparrow</code>	$\nearrow$	<code>\nearrow</code>	$\searrow$	<code>\seltsquigarrow</code>
$\Downarrow$	<code>\Downarrow</code>	$\nearrow$	<code>\nearrow</code>	$\searrow$	<code>\semapsto</code>
$\downarrow$	<code>\downarrow</code>	$\nearrow$	<code>\nearrow</code>	$\searrow$	<code>\senwarrows</code>
$\Downarrow$	<code>\downarrowtail</code>	$\nearrow$	<code>\nearrow</code>	$\searrow$	<code>\sersquigarrow</code>
$\Downarrow$	<code>\downdownarrows</code>	$\nearrow$	<code>\nearrow</code>	$\searrow$	<code>\sesearrows</code>
$\Downarrow$	<code>\downlsquigarrow</code>	$\nearrow$	<code>\nearrow</code>	$\searrow$	<code>\squigarrowdownup</code>
$\Downarrow$	<code>\downmapsto</code>	$\nearrow$	<code>\nearrow</code>	$\searrow$	<code>\squigarrowleftright</code>
$\Downarrow$	<code>\downrsquigarrow</code>	$\nearrow$	<code>\nearrow</code>	$\searrow$	<code>\squigarrownesw</code>
$\Downarrow$	<code>\downuparrows</code>	$\nearrow$	<code>\nearrow</code>	$\searrow$	<code>\squigarrownwse</code>
$\bigcirc$	<code>\lrcirclearrowdown</code>	$\nearrow$	<code>\nearrow</code>	$\searrow$	<code>\squigarrowrightleft</code>
$\bigcirc$	<code>\lrcirclearrowleft</code>	$\nearrow$	<code>\nearrow</code>	$\searrow$	<code>\squigarrowswne</code>
$\bigcirc$	<code>\lrcirclearrowright</code>	$\nearrow$	<code>\nearrow</code>	$\searrow$	<code>\squigarrowswne</code>
$\bigcirc$	<code>\lrcirclearrowup</code>	$\nearrow$	<code>\nearrow</code>	$\searrow$	<code>\squigarrowupdown</code>
$\curvearrowright$	<code>\lrcurvearrowdown</code>	$\nearrow$	<code>\nearrow</code>	$\swarrow$	<code>\swarrow</code>
$\curvearrowright$	<code>\lrcurvearrowleft</code>	$\nearrow$	<code>\nearrow</code>	$\swarrow$	<code>\swarrow</code>
$\curvearrowright$	<code>\lrcurvearrowne</code>	$\nearrow$	<code>\nearrow</code>	$\swarrow$	<code>\swarrowtail</code>
$\curvearrowright$	<code>\lrcurvearrownw</code>	$\nearrow$	<code>\nearrow</code>	$\swarrow$	<code>\swlsquigarrow</code>
$\curvearrowright$	<code>\lrcurvearrowright</code>	$\nearrow$	<code>\nearrow</code>	$\swarrow$	<code>\swmapsto</code>
$\curvearrowright$	<code>\lrcurvearrowse</code>	$\nearrow$	<code>\nearrow</code>	$\swarrow$	<code>\swnearrows</code>
$\curvearrowright$	<code>\lrcurvearrowsw</code>	$\nearrow$	<code>\nearrow</code>	$\swarrow$	<code>\swrsquigarrow</code>
$\curvearrowright$	<code>\lrcurvearrowup</code>	$\nearrow$	<code>\nearrow</code>	$\swarrow$	<code>\swswarrows</code>
$\Leftarrow$	<code>\Leftarrow</code>	$\nearrow$	<code>\nearrow</code>	$\downarrow$	<code>\twoheaddownarrow</code>

(continued on next page)

(continued from previous page)

$\leftarrow$	<code>\leftarrow</code>	$\circlearrowleft$	<code>\partial\text{vartrcirclearightint}</code> *	$\twoheadleftarrow$	<code>\twoheadleftarrow</code>
$\leftarrowtail$	<code>\leftarrowtail</code>	$\circlearrowdown$	<code>\rcirclearrowdown</code>	$\twoheadnearrow$	<code>\twoheadnearrow</code>
$\leftleftarrows$	<code>\leftleftarrows</code>	$\circlearrowleft$	<code>\rcirclearrowleft</code>	$\twoheadnwarrow$	<code>\twoheadnwarrow</code>
$\leftleftsquigarrow$	<code>\leftleftsquigarrow</code>	$\circlearrowright$	<code>\rcirclearrowright</code>	$\twoheadrightarrow$	<code>\twoheadrightarrow</code>
$\leftmapsto$	<code>\leftmapsto</code>	$\circlearrowup$	<code>\rcirclearrowup</code>	$\twoheadsearrow$	<code>\twoheadsearrow</code>
$\leftrightarrow$	<code>\leftrightarrow</code>	$\curvearrowdown$	<code>\rcurvearrowdown</code>	$\twoheadswarrow$	<code>\twoheadswarrow</code>
$\Leftrightarrow$	<code>\Leftrightarrow</code>	$\curvearrowleft$	<code>\rcurvearrowleft</code>	$\twoheaduparrow$	<code>\twoheaduparrow</code>
$\leftrightsquigarrow$	<code>\leftrightsquigarrow</code>	$\curvearrowright$	<code>\rcurvearrowne</code>	$\uparrow$	<code>\uparrow</code>
$\leftrsrqigarrow$	<code>\leftrsrqigarrow</code>	$\curvearrownw$	<code>\rcurvearrownw</code>	$\Uparrow$	<code>\Uparrow</code>
$\hookrightarrow$	<code>\hookrightarrow</code>	$\curvearrowright$	<code>\rcurvearrowright</code>	$\uparrowtail$	<code>\uparrowtail</code>
$\hookleftarrow$	<code>\hookleftarrow</code>	$\curvearrowse$	<code>\rcurvearrowse</code>	$\updownarrow$	<code>\updownarrow</code>
$\hooknearrow$	<code>\hooknearrow</code>	$\curvearrowsw$	<code>\rcurvearrowsw</code>	$\Updownarrow$	<code>\Updownarrow</code>
$\hooknwarrow$	<code>\hooknwarrow</code>	$\curvearrowup$	<code>\rcurvearrowup</code>	$\updownarrows$	<code>\updownarrows</code>
$\hookrightarrow$	<code>\hookrightarrow</code>	$\hookrightarrow$	<code>\rhookdownarrow</code>	$\uplsquigarrow$	<code>\uplsquigarrow</code>
$\hooksearrow$	<code>\hooksearrow</code>	$\hookleftarrow$	<code>\rhookleftarrow</code>	$\upmapsto$	<code>\upmapsto</code>
$\hookswarrow$	<code>\hookswarrow</code>	$\hooknearrow$	<code>\rhooknearrow</code>	$\uprsquigarrow$	<code>\uprsquigarrow</code>
$\hookuparrow$	<code>\hookuparrow</code>	$\hooknwarrow$	<code>\rhooknwarrow</code>	$\upuparrows$	<code>\upuparrows</code>
$\lightning$	<code>\lightning</code>	$\hookrightarrow$	<code>\rhookrightarrow</code>		
$\Lleftarrow$	<code>\Lleftarrow</code>	$\hooksearrow$	<code>\rhooksearrow</code>		

MnSymbol additionally defines synonyms for some of the preceding symbols:

$\circlearrowleft$	<code>\circlearrowleft</code>	(same as <code>\rcirclearrowup</code> )
$\circlearrowright$	<code>\circlearrowright</code>	(same as <code>\lcirclearrowup</code> )
$\curvearrowleft$	<code>\curvearrowleft</code>	(same as <code>\rcurvearrowleft</code> )
$\curvearrowright$	<code>\curvearrowright</code>	(same as <code>\lcurvearrowright</code> )
$\dashleftarrow$	<code>\dashleftarrow</code>	(same as <code>\dashedleftarrow</code> )
$\dashrightarrow$	<code>\dashrightarrow</code>	(same as <code>\dashedrightarrow</code> )
$\hookleftarrow$	<code>\hookleftarrow</code>	(same as <code>\rhookleftarrow</code> )
$\hookrightarrow$	<code>\hookrightarrow</code>	(same as <code>\lhookrightarrow</code> )
$\leadsto$	<code>\leadsto</code>	(same as <code>\rightlsquigarrow</code> )
$\leftrightsquigarrow$	<code>\leftrightsquigarrow</code>	(same as <code>\squigarrowleftright</code> )
$\mapsto$	<code>\mapsto</code>	(same as <code>\rightmapsto</code> )
$\rightsquigarrow$	<code>\rightsquigarrow</code>	(same as <code>\rightlsquigarrow</code> )

\* The `\partial\text{var}...int` macros are intended to be used internally by MnSymbol to produce various types of integrals.

TABLE 150: MnSymbol Negated Arrows

$\ncurvearrowdownup$	<code>\ncurvearrowdownup</code>	$\nlhooknwarrow$	<code>\nlhooknwarrow</code>	$\nrightharpoonleft$	<code>\nrightharpoonleft</code>
$\ncurvearrowleftrightarrow$	<code>\ncurvearrowleftrightarrow</code>	$\nlhookrightarrow$	<code>\nlhookrightarrow</code>	$\nrightharpoonright$	<code>\nrightharpoonright</code>
$\ncurvearrownesw$	<code>\ncurvearrownesw</code>	$\nlhooksearrow$	<code>\nlhooksearrow</code>	$\nrightharpoonmapsto$	<code>\nrightharpoonmapsto</code>
$\ncurvearrownwse$	<code>\ncurvearrownwse</code>	$\nlhookswarrow$	<code>\nlhookswarrow</code>	$\nrightharpoonrightarrow$	<code>\nrightharpoonrightarrow</code>
$\ncurvearrowrightleft$	<code>\ncurvearrowrightleft</code>	$\nlhookuparrow$	<code>\nlhookuparrow</code>	$\nrightharpoonrightrightarrow$	<code>\nrightharpoonrightrightarrow</code>
$\ncurvearrowswne$	<code>\ncurvearrowswne</code>	$\nLleftarrow$	<code>\nLleftarrow</code>	$\nRrightarrow$	<code>\nRrightarrow</code>
$\ncurvearrowswne$	<code>\ncurvearrowswne</code>	$\nnearrow$	<code>\nnearrow</code>	$\nSearrow$	<code>\nSearrow</code>
$\ncurvearrowupdown$	<code>\ncurvearrowupdown</code>	$\nNearrow$	<code>\nNearrow</code>	$\nsearrow$	<code>\nsearrow</code>

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	<code>\ndasheddownarrow</code>		<code>\nnearrowtail</code>		<code>\nsearrowtail</code>
	<code>\ndashedleftarrow</code>		<code>\nnelsquigarrow</code>		<code>\nselsquigarrow</code>
	<code>\ndashednearrow</code>		<code>\nnemapsto</code>		<code>\nsemapsto</code>
	<code>\ndashednrightarrow</code>		<code>\nnenearrows</code>		<code>\nsenarrows</code>
	<code>\ndashedrightarrow</code>		<code>\nnersquigarrow</code>		<code>\nsersquigarrow</code>
	<code>\ndashedsearrow</code>		<code>\nNeswarrow</code>		<code>\nsesearrows</code>
	<code>\ndashedswarrow</code>		<code>\nneswarrow</code>		<code>\nsquigarrowdownup</code>
	<code>\ndasheduparrow</code>		<code>\nneswarrows</code>		<code>\nsquigarrowleftright</code>
	<code>\ndownarrow</code>		<code>\nNwarrow</code>		<code>\nsquigarrownesw</code>
	<code>\nDownarrow</code>		<code>\nnwarrow</code>		<code>\nsquigarrownwse</code>
	<code>\ndownarrowtail</code>		<code>\nnwarrowtail</code>		<code>\nsquigarrowrightleft</code>
	<code>\ndowndownarrows</code>		<code>\nnwlsquigarrow</code>		<code>\nsquigarrowsenw</code>
	<code>\ndownlsquigarrow</code>		<code>\nnwmapsto</code>		<code>\nsquigarrowswne</code>
	<code>\ndownmapsto</code>		<code>\nnwnwarrows</code>		<code>\nsquigarrowupdown</code>
	<code>\ndownrsquigarrow</code>		<code>\nnwrsquigarrow</code>		<code>\nswarrow</code>
	<code>\ndownuparrows</code>		<code>\nnwsearrow</code>		<code>\nSswarrow</code>
	<code>\nldcirclearrowdown</code>		<code>\nNwsearrow</code>		<code>\nswarrowtail</code>
	<code>\nldcirclearrowleft</code>		<code>\nnwsearrows</code>		<code>\nswlsquigarrow</code>
	<code>\nldcirclearrowright</code>		<code>\nrcirclearrowdown</code>		<code>\nswmapsto</code>
	<code>\nldcirclearrowup</code>		<code>\nrcirclearrowleft</code>		<code>\nswnearrows</code>
	<code>\nlcurvearrowdown</code>		<code>\nrcirclearrowright</code>		<code>\nswrsquigarrow</code>
	<code>\nlcurvearrowleft</code>		<code>\nrcirclearrowup</code>		<code>\nswswarrows</code>
	<code>\nlcurvearrowne</code>		<code>\nrcurvearrowdown</code>		<code>\ntwoheaddownarrow</code>
	<code>\nlcurvearrownw</code>		<code>\nrcurvearrowleft</code>		<code>\ntwoheadleftarrow</code>
	<code>\nlcurvearrowright</code>		<code>\nrcurvearrowne</code>		<code>\ntwoheadnearrow</code>
	<code>\nlcurvearrowse</code>		<code>\nrcurvearrownw</code>		<code>\ntwoheadnrightarrow</code>
	<code>\nlcurvearrowsw</code>		<code>\nrcurvearrowright</code>		<code>\ntwoheadrightarrow</code>
	<code>\nlcurvearrowup</code>		<code>\nrcurvearrowse</code>		<code>\ntwoheadsearrow</code>
	<code>\nLeftarrow</code>		<code>\nrcurvearrowsw</code>		<code>\ntwoheadswarrow</code>
	<code>\nleftarrow</code>		<code>\nrcurvearrowup</code>		<code>\ntwoheaduparrow</code>
	<code>\nleftarrowtail</code>		<code>\nrhookdownarrow</code>		<code>\nuparrow</code>
	<code>\nleftleftarrows</code>		<code>\nrhookleftarrow</code>		<code>\nUpward</code>
	<code>\nleftlsquigarrow</code>		<code>\nrhooknearrow</code>		<code>\nuparrowtail</code>
	<code>\nleftmapsto</code>		<code>\nrhooknrightarrow</code>		<code>\nupdownarrow</code>
	<code>\nleftrightarrow</code>		<code>\nrhookrightarrow</code>		<code>\nUpdownarrow</code>
	<code>\nLeftrightarrow</code>		<code>\nrhooksearrow</code>		<code>\nupdownarrows</code>
	<code>\nleftrightarrows</code>		<code>\nrhookswarrow</code>		<code>\nuplsquigarrow</code>
	<code>\nleftrsquigarrow</code>		<code>\nrhookuparrow</code>		<code>\nupmapsto</code>
	<code>\nlhookdownarrow</code>		<code>\nrhookrightarrow</code>		<code>\nuprsquigarrow</code>
	<code>\nlhookleftarrow</code>		<code>\nRightarrow</code>		<code>\nupuparrows</code>
	<code>\nlhooknearrow</code>		<code>\nrrightarrowtail</code>		

MnSymbol additionally defines synonyms for some of the preceding symbols:

$\circlearrowleft$	<code>\ncirclearrowleft</code>	(same as <code>\nrcirclearrowup</code> )
$\circlearrowright$	<code>\ncirclearrowright</code>	(same as <code>\nlcirclearrowup</code> )
$\curvearrowleft$	<code>\ncurvearrowleft</code>	(same as <code>\nrcurvearrowleft</code> )
$\curvearrowright$	<code>\ncurvearrowright</code>	(same as <code>\nlcurvearrowright</code> )
$\dashrightarrow$	<code>\ndasharrow</code>	(same as <code>\ndashedrightarrow</code> )
$\dashleftarrow$	<code>\ndashleftarrow</code>	(same as <code>\ndashedleftarrow</code> )
$\dashrightarrow$	<code>\ndashrightarrow</code>	(same as <code>\ndashedrightarrow</code> )
$\leftarrow$	<code>\ngets</code>	(same as <code>\leftarrow</code> )
$\hookleftarrow$	<code>\nhookleftarrow</code>	(same as <code>\rhookleftarrow</code> )
$\hookrightarrow$	<code>\nhookrightarrow</code>	(same as <code>\lhookrightarrow</code> )
$\leadsto$	<code>\nleadsto</code>	(same as <code>\rightsquigarrow</code> )
$\leftrightsquigarrow$	<code>\nleftrightsquigarrow</code>	(same as <code>\squigarrowleftright</code> )
$\mapsto$	<code>\nmapsto</code>	(same as <code>\rightmapsto</code> )
$\rightsquigarrow$	<code>\nrightrightarrow</code>	(same as <code>\rightsquigarrow</code> )
$\rightarrow$	<code>\nto</code>	(same as <code>\rightarrow</code> )

TABLE 151: MnSymbol Harpoons

$\downharpoonccw^*$	$\swharpoon$	<code>\neswharpoons</code>	$\seharpooncw$
$\downharpooncw^*$	$\swharpoon$	<code>\neswharpoonsenw</code>	$\senwharpoons$
$\downupharpoons$	$\swharpoonccw$	<code>\nwharpoonccw</code>	$\swharpoonccw$
$\leftharpoonccw^*$	$\swharpoon$	<code>\nwharpooncw</code>	$\swharpooncw$
$\leftharpooncw^*$	$\swharpoon$	<code>\nwseharpoonsesw</code>	$\swneharpoons$
$\leftrightharpoondownup$	$\swharpoon$	<code>\nwseharpoons</code>	$\updownharpoonleftright$
$\leftrightharpoons$	$\swharpoon$	<code>\nwseharpoonswne</code>	$\updownharpoonrightleft$
$\leftrightharpoonupdown$	$\rightarrow$	<code>\rightharpoonccw^*</code>	$\updownharpoons$
$\neharpoonccw$	$\rightarrow$	<code>\rightharpooncw^*</code>	$\upharpoonccw^*$
$\neharpooncw$	$\rightleftharpoons$	<code>\rightleftharpoons</code>	$\upharpooncw^*$
$\neswharpoonnwse$	$\seharpoonccw$		

\* 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 152: MnSymbol Negated Harpoons

$\downharpoonccw^*$	$\swharpoon$	<code>\neswharpoons</code>	$\seharpooncw$
$\downharpooncw^*$	$\swharpoon$	<code>\neswharpoonsenw</code>	$\senwharpoons$
$\downupharpoons$	$\swharpoonccw$	<code>\nwharpoonccw</code>	$\swharpoonccw$
$\leftharpoonccw^*$	$\swharpoon$	<code>\nwharpooncw</code>	$\swharpooncw$
$\leftharpooncw^*$	$\swharpoon$	<code>\nwseharpoonsesw</code>	$\swneharpoons$
$\leftrightharpoondownup$	$\swharpoon$	<code>\nwseharpoons</code>	$\nupdownharpoonleftright$
$\leftrightharpoons$	$\swharpoon$	<code>\nwseharpoonswne</code>	$\nupdownharpoonrightleft$
$\leftrightharpoonupdown$	$\rightarrow$	<code>\rightharpoonccw^*</code>	$\nupdownharpoons$
$\neharpoonccw$	$\rightarrow$	<code>\rightharpooncw^*</code>	$\nupharpoonccw^*$
$\neharpooncw$	$\rightleftharpoons$	<code>\rightleftharpoons</code>	$\nupharpooncw^*$
$\neswharpoonnwse$	$\seharpoonccw$		

\* 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 153: fdsymbol Arrows

	<code>\acwcirclearrowdown</code>		<code>\leftarrow</code>		<code>\rightrightarrows</code>
	<code>\acwcirclearrowleft</code>		<code>\leftarrowtail</code>		<code>\rightwvearrow</code>
	<code>\acwcirclearrowright</code>		<code>\leftbkarrow</code>		<code>\rightarrow</code>
	<code>\acwcirclearrowup</code>		<code>\leftleftarrows</code>		<code>\Rsh</code>
	<code>\acwleftarrow</code>		<code>\leftmapsto</code>		<code>\searrow</code>
	<code>\acwnearrow</code>		<code>\Leftmapsto</code>		<code>\searrow</code>
	<code>\acwnwarrow</code>		<code>\Leftrightarrow</code>		<code>\searrowtail</code>
	<code>\acwoverrightarrow</code>		<code>\leftrightharrow</code>		<code>\sebkarrow</code>
	<code>\acwrightarrow</code>		<code>\leftrightharrows</code>		<code>\senarrows</code>
	<code>\acwsearrow</code>		<code>\leftrighthwvearrow</code>		<code>\sesearrows</code>
	<code>\acswarrow</code>		<code>\leftwvearrow</code>		<code>\swarrow</code>
	<code>\acwunderarrow</code>		<code>\lightning</code>		<code>\swarrow</code>
	<code>\bdleftarrow</code>		<code>\Lleftarrow</code>		<code>\swarrowtail</code>
	<code>\bdnearrow</code>		<code>\Longleftarrow</code>		<code>\swbkarrow</code>
	<code>\bdnwardarrow</code>		<code>\longleftarrow</code>		<code>\swnearrows</code>
	<code>\bdoverrightarrow</code>		<code>\longleftrightarrow</code>		<code>\swswnarrows</code>
	<code>\bdrightrightarrow</code>		<code>\Longleftrightarrow</code>		<code>\twoheaddownarrow</code>
	<code>\bdsearrow</code>		<code>\longleftwvearrow</code>		<code>\twoheadleftarrow</code>
	<code>\bdswarrow</code>		<code>\Longmapsfrom</code>		<code>\twoheadnearrow</code>
	<code>\bdunderarrow</code>		<code>\longmapsfrom</code>		<code>\twoheadnearrow</code>
	<code>\cwcirclearrowdown</code>		<code>\Longmapsto</code>		<code>\twoheadrightarrow</code>
	<code>\cwcirclearrowleft</code>		<code>\longmapsto</code>		<code>\twoheadsearrow</code>
	<code>\cwcirclearrowright</code>		<code>\longrightarrow</code>		<code>\twoheadswarrow</code>
	<code>\cwcirclearrowup</code>		<code>\Longrightarrow</code>		<code>\twoheaduparrow</code>
	<code>\cwleftarrow</code>		<code>\longrightwvearrow</code>		<code>\uparrow</code>
	<code>\cwnearrow</code>		<code>\looparrowleft</code>		<code>\Uparrow</code>
	<code>\cwnwardarrow</code>		<code>\looparrowright</code>		<code>\uparrowtail</code>
	<code>\cwoverrightarrow</code>		<code>\Lsh</code>		<code>\upbkarrow</code>
	<code>\cwrightarrow</code>		<code>\nearrow</code>		<code>\Updownarrow</code>
	<code>\cwsearrow</code>		<code>\Nearrow</code>		<code>\updownarrow</code>
	<code>\cswarrow</code>		<code>\nearrowtail</code>		<code>\updownarrows</code>
	<code>\cwunderarrow</code>		<code>\nebkarrow</code>		<code>\updownwvearrow</code>
	<code>\Ddownarrow</code>		<code>\nennearrows</code>		<code>\upmapsto</code>
	<code>\Downarrow</code>		<code>\Neswarrow</code>		<code>\Upmapsto</code>
	<code>\downarrow</code>		<code>\neswarrow</code>		<code>\upuparrows</code>
	<code>\downarrowtail</code>		<code>\neswarrows</code>		<code>\upwvearrow</code>
	<code>\downnbkarrow</code>		<code>\Nwarrow</code>		<code>\Uparrow</code>
	<code>\downdownarrows</code>		<code>\narrow</code>		<code>\vardownwvearrow</code>
	<code>\Downmapsto</code>		<code>\narrowtail</code>		<code>\varhookdownarrow</code>
	<code>\downmapsto</code>		<code>\nwbkarrow</code>		<code>\varhookleftarrow</code>
	<code>\downuparrows</code>		<code>\nwnwarrows</code>		<code>\varhooknearrow</code>
	<code>\downwvearrow</code>		<code>\Nwsearrow</code>		<code>\varhooknarrow</code>
	<code>\hookdownarrow</code>		<code>\nwsearrow</code>		<code>\varhookrightarrow</code>
	<code>\hookleftarrow</code>		<code>\nwsearrows</code>		<code>\varhooksearrow</code>
	<code>\hooknearrow</code>		<code>\Rdsh</code>		<code>\varhookswarrow</code>
	<code>\hooknarrow</code>		<code>\rightarrow</code>		<code>\varhookuparrow</code>
	<code>\hookrightarrow</code>		<code>\rightarrow</code>		<code>\varleftrighthwvearrow</code>
	<code>\hooksearrow</code>		<code>\rightarrowtail</code>		<code>\varleftwvearrow</code>
	<code>\hookswarrow</code>		<code>\rightarrowbkarrow</code>		<code>\varrightwvearrow</code>
	<code>\hookuparrow</code>		<code>\rightleftarrows</code>		<code>\varupdownwvearrow</code>
	<code>\hookdownarrow</code>		<code>\Rightmapsto</code>		<code>\varupwvearrow</code>

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$\Leftarrow$  `\Leftarrow`                       $\mapsto$  `\rightmapsto`

fdsymbol defines synonyms for most of the preceding symbols:

$\circlearrowleft$	<code>\acwgapcirclearrow</code>	$\leftrightarrow$	<code>\leftrightsquigarrow</code>	$\hookrightarrow$	<code>\rhooknwarrow</code>
$\circlearrowright$	<code>\acwopencirclearrow</code>	$\leftarrow$	<code>\leftsquigarrow</code>	$\rightarrow$	<code>\rhookrightarrow</code>
$\circlearrowleft$	<code>\circlearrowleft</code>	$\leftarrow$	<code>\leftsquigarrow</code>	$\hookrightarrow$	<code>\rhooksearrow</code>
$\circlearrowright$	<code>\circlearrowright</code>	$\hookrightarrow$	<code>\leftupcurvedarrow</code>	$\curvearrowright$	<code>\rhookswarrow</code>
$\curvearrowleft$	<code>\curvearrowleft</code>	$\downarrow$	<code>\lhookdownarrow</code>	$\uparrow$	<code>\rhookuparrow</code>
$\curvearrowright$	<code>\curvearrowright</code>	$\leftarrow$	<code>\lhookleftarrow</code>	$\curvearrowright$	<code>\rightcurvedarrow</code>
$\circlearrowleft$	<code>\cwgapcirclearrow</code>	$\curvearrowright$	<code>\lhooknearrow</code>	$\hookrightarrow$	<code>\rightdowncurvedarrow</code>
$\circlearrowright$	<code>\cwopencirclearrow</code>	$\hookrightarrow$	<code>\lhooknwarrow</code>	$\curvearrowright$	<code>\rightlcurvedarrow</code>
$\dashrightarrow$	<code>\dasharrow</code>	$\rightarrow$	<code>\lhookrightarrow</code>	$\curvearrowleft$	<code>\rightleftcurvedarrow</code>
$\dashleftarrow$	<code>\dashleftarrow</code>	$\hookrightarrow$	<code>\lhooksearrow</code>	$\leftrightarrow$	<code>\rightleftsquigarrow</code>
$\dashrightarrow$	<code>\dashrightarrow</code>	$\curvearrowright$	<code>\lhookswarrow</code>	$\curvearrowright$	<code>\rightlsquigarrow</code>
$\downleftcurvedarrow$	<code>\downlcurvedarrow</code>	$\uparrow$	<code>\lhookuparrow</code>	$\curvearrowright$	<code>\rightrcurvedarrow</code>
$\downleftcurvedarrow$	<code>\downleftcurvedarrow</code>	$\rightsquigarrow$	<code>\longleadsto</code>	$\curvearrowright$	<code>\rightrsquigarrow</code>
$\downleftsquigarrow$	<code>\downlsquigarrow</code>	$\rightsquigarrow$	<code>\longleftsquigarrow</code>	$\curvearrowright$	<code>\rightsquigarrow</code>
$\downrightcurvedarrow$	<code>\downrcurvedarrow</code>	$\rightsquigarrow$	<code>\longrightsquigarrow</code>	$\curvearrowright$	<code>\rightupcurvedarrow</code>
$\downrightcurvedarrow$	<code>\downrightcurvedarrow</code>	$\Downarrow$	<code>\mapsdown</code>	$\hookrightarrow$	<code>\selcurvedarrow</code>
$\downrightsquigarrow$	<code>\downrsquigarrow</code>	$\Downarrow$	<code>\Mapsdown</code>	$\hookrightarrow$	<code>\senwcurvedarrow</code>
$\downupcurvedarrow$	<code>\downupcurvedarrow</code>	$\leftarrow$	<code>\mapsfrom</code>	$\hookrightarrow$	<code>\sercurvedarrow</code>
$\downupsquigarrow$	<code>\downupsquigarrow</code>	$\Leftarrow$	<code>\Mapsfrom</code>	$\curvearrowright$	<code>\swlcurvedarrow</code>
$\downzigzagarrow$	<code>\downzigzagarrow</code>	$\mapsto$	<code>\mapsto</code>	$\curvearrowright$	<code>\swnecurvedarrow</code>
$\gets$	<code>\gets</code>	$\Rightarrow$	<code>\Mapsto</code>	$\curvearrowright$	<code>\swrcurvedarrow</code>
$\hknearrow$	<code>\hknearrow</code>	$\uparrow$	<code>\mapsup</code>	$\rightarrow$	<code>\to</code>
$\hknwarrow$	<code>\hknwarrow</code>	$\Uparrow$	<code>\Mapsup</code>	$\updowncurvedarrow$	<code>\updowncurvedarrow</code>
$\hksearrow$	<code>\hksearrow</code>	$\curvearrowright$	<code>\nelcurvedarrow</code>	$\updownsquigarrow$	<code>\updownsquigarrow</code>
$\hkswarrow$	<code>\hkswarrow</code>	$\curvearrowright$	<code>\nercurvedarrow</code>	$\upleftcurvedarrow$	<code>\upleftcurvedarrow</code>
$\leadsto$	<code>\leadsto</code>	$\curvearrowright$	<code>\neswcurvedarrow</code>	$\upleftcurvedarrow$	<code>\upleftcurvedarrow</code>
$\leftcurvedarrow$	<code>\leftcurvedarrow</code>	$\curvearrowright$	<code>\nwlcurvedarrow</code>	$\upleftsquigarrow$	<code>\upleftsquigarrow</code>
$\leftdowncurvedarrow$	<code>\leftdowncurvedarrow</code>	$\hookrightarrow$	<code>\nwrcurvedarrow</code>	$\uprightcurvedarrow$	<code>\uprightcurvedarrow</code>
$\leftlcurvedarrow$	<code>\leftlcurvedarrow</code>	$\hookrightarrow$	<code>\nwsecurvedarrow</code>	$\uprightcurvedarrow$	<code>\uprightcurvedarrow</code>
$\leftlsquigarrow$	<code>\leftlsquigarrow</code>	$\downarrow$	<code>\rhookdownarrow</code>	$\uprightsquigarrow$	<code>\uprightsquigarrow</code>
$\leftrcurvedarrow$	<code>\leftrcurvedarrow</code>	$\leftarrow$	<code>\rhookleftarrow</code>		
$\leftrightcurvedarrow$	<code>\leftrightcurvedarrow</code>	$\curvearrowright$	<code>\rhooknearrow</code>		

TABLE 154: fdsymbol Negated Arrows

$\nrightarrow$	<code>\nacwcirclearrowdown</code>	$\nrightarrow$	<code>\nleftarrow</code>	$\nrightarrow$	<code>\nRrightarrow</code>
$\nrightarrow$	<code>\nacwcirclearrowleft</code>	$\nrightarrow$	<code>\nLeftarrow</code>	$\nrightarrow$	<code>\nsearrow</code>
$\nrightarrow$	<code>\nacwcirclearrowright</code>	$\nrightarrow$	<code>\nleftarrowtail</code>	$\nrightarrow$	<code>\nsearrowtail</code>
$\nrightarrow$	<code>\nacwcirclearrowup</code>	$\nrightarrow$	<code>\nleftbkarrow</code>	$\nrightarrow$	<code>\nsearrowtail</code>
$\nrightarrow$	<code>\nacwleftarcarrow</code>	$\nrightarrow$	<code>\nleftleftarrows</code>	$\nrightarrow$	<code>\nsebkarrow</code>
$\nrightarrow$	<code>\nacwnearcarrow</code>	$\nrightarrow$	<code>\nleftmapsto</code>	$\nrightarrow$	<code>\nsewarrows</code>
$\nrightarrow$	<code>\nacwnwarcarrow</code>	$\nrightarrow$	<code>\nLeftmapsto</code>	$\nrightarrow$	<code>\nsesearrows</code>
$\nrightarrow$	<code>\nacwoverarcarrow</code>	$\nrightarrow$	<code>\nleftrightarrow</code>	$\nrightarrow$	<code>\nswarrow</code>

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$\curvearrowright$	<code>\nacwrightarrow</code>	$\Leftrightarrow$	<code>\nLeftrightarrow</code>	$\swarrow$	<code>\nSwarrow</code>
$\curvearrowleft$	<code>\nacwsearrow</code>	$\Leftrightarrow$	<code>\nlefrightarrows</code>	$\searrow$	<code>\nswarrowtail</code>
$\swarrow$	<code>\nacwswarrow</code>	$\Leftrightarrow$	<code>\nlefrightwvearrow</code>	$\swarrow$	<code>\nswbkarrow</code>
$\searrow$	<code>\nacwunderarrow</code>	$\Leftrightarrow$	<code>\nleftwvearrow</code>	$\swarrow$	<code>\nswnearrows</code>
$\leftarrow$	<code>\nbdleftarrow</code>	$\Leftrightarrow$	<code>\nLleftarrow</code>	$\swarrow$	<code>\nswswarrows</code>
$\nearrow$	<code>\nbdnearrow</code>	$\leftarrow$	<code>\nlongleftarrow</code>	$\downarrow$	<code>\ntwoheaddownarrow</code>
$\nwarrow$	<code>\nbdnwarrow</code>	$\Leftrightarrow$	<code>\nLongleftarrow</code>	$\leftarrow$	<code>\ntwoheadleftarrow</code>
$\rightarrow$	<code>\nbdoverarrow</code>	$\rightarrow$	<code>\nlongleftrightarrow</code>	$\nearrow$	<code>\ntwoheadnearrow</code>
$\rightarrow$	<code>\nbdrightarrow</code>	$\Leftrightarrow$	<code>\nLongleftrightarrow</code>	$\nwarrow$	<code>\ntwoheadnwarrow</code>
$\curvearrowleft$	<code>\nbdsearrow</code>	$\curvearrowleft$	<code>\nlongleftwvearrow</code>	$\rightarrow$	<code>\ntwoheadrightarrow</code>
$\searrow$	<code>\nbdswarrow</code>	$\leftarrow$	<code>\nlongmapsfrom</code>	$\searrow$	<code>\ntwoheadsearrow</code>
$\searrow$	<code>\nbdunderarrow</code>	$\Leftrightarrow$	<code>\nLongmapsfrom</code>	$\swarrow$	<code>\ntwoheadswarrow</code>
$\downarrow$	<code>\ncwcirclearrowdown</code>	$\rightarrow$	<code>\nlongmapsto</code>	$\uparrow$	<code>\ntwoheaduparrow</code>
$\leftarrow$	<code>\ncwcirclearrowleft</code>	$\Leftrightarrow$	<code>\nLongmapsto</code>	$\uparrow$	<code>\nuparrow</code>
$\rightarrow$	<code>\ncwcirclearrowright</code>	$\rightarrow$	<code>\nlongrightarrow</code>	$\uparrow$	<code>\nUparrow</code>
$\uparrow$	<code>\ncwcirclearrowup</code>	$\Leftrightarrow$	<code>\nLongrightarrow</code>	$\nearrow$	<code>\nuparrowtail</code>
$\leftarrow$	<code>\ncwleftarrow</code>	$\curvearrowright$	<code>\nlongrightwvearrow</code>	$\uparrow$	<code>\nupbkarrow</code>
$\nearrow$	<code>\ncwnearrow</code>	$\nearrow$	<code>\nnearrow</code>	$\uparrow$	<code>\nupdownarrow</code>
$\nwarrow$	<code>\ncwnwarrow</code>	$\nwarrow$	<code>\nNearrow</code>	$\uparrow$	<code>\nUpdownarrow</code>
$\rightarrow$	<code>\ncwoverarrow</code>	$\nearrow$	<code>\nnearrowtail</code>	$\uparrow$	<code>\nupdownarrows</code>
$\rightarrow$	<code>\ncwrightarrow</code>	$\nearrow$	<code>\nnebkarrow</code>	$\uparrow$	<code>\nupdownwvearrow</code>
$\searrow$	<code>\ncwsearrow</code>	$\nwarrow$	<code>\nnenearrows</code>	$\uparrow$	<code>\nupmapsto</code>
$\searrow$	<code>\ncwswarrow</code>	$\nwarrow$	<code>\nneswarrow</code>	$\uparrow$	<code>\nUpmapsto</code>
$\searrow$	<code>\ncwunderarrow</code>	$\nwarrow$	<code>\nNeswarrow</code>	$\uparrow$	<code>\nupuparrows</code>
$\downarrow$	<code>\nDdownarrow</code>	$\nwarrow$	<code>\nneswarrows</code>	$\uparrow$	<code>\nupwvearrow</code>
$\downarrow$	<code>\ndownarrow</code>	$\nwarrow$	<code>\nnwarrow</code>	$\uparrow$	<code>\nUuparrow</code>
$\downarrow$	<code>\nDownarrow</code>	$\nwarrow$	<code>\nNwarrow</code>	$\downarrow$	<code>\nvardownwvearrow</code>
$\downarrow$	<code>\ndownarrowtail</code>	$\nwarrow$	<code>\nnwarrowtail</code>	$\downarrow$	<code>\nvarhookdownarrow</code>
$\downarrow$	<code>\ndownbkarrow</code>	$\nwarrow$	<code>\nnwbkarrow</code>	$\leftarrow$	<code>\nvarhookleftarrow</code>
$\downarrow$	<code>\ndowndownarrows</code>	$\nwarrow$	<code>\nnwnwarrows</code>	$\nearrow$	<code>\nvarhooknearrow</code>
$\downarrow$	<code>\ndownmapsto</code>	$\nwarrow$	<code>\nnwsearrow</code>	$\nwarrow$	<code>\nvarhooknwarrow</code>
$\downarrow$	<code>\nDownmapsto</code>	$\nwarrow$	<code>\nNwsearrow</code>	$\rightarrow$	<code>\nvarhookrightarrow</code>
$\downarrow$	<code>\ndownuparrows</code>	$\nwarrow$	<code>\nnwsearrows</code>	$\nwarrow$	<code>\nvarhooksearrow</code>
$\downarrow$	<code>\ndownwvearrow</code>	$\rightarrow$	<code>\nrightarrow</code>	$\nwarrow$	<code>\nvarhookswarrow</code>
$\downarrow$	<code>\nhookdownarrow</code>	$\rightarrow$	<code>\nRightarrow</code>	$\uparrow$	<code>\nvarhookuparrow</code>
$\leftarrow$	<code>\nhookleftarrow</code>	$\rightarrow$	<code>\nrightarrowtail</code>	$\Leftrightarrow$	<code>\nvarleftrightwvearrow</code>
$\nearrow$	<code>\nhooknearrow</code>	$\rightarrow$	<code>\nrightbkarrow</code>	$\leftarrow$	<code>\nvarleftwvearrow</code>
$\nwarrow$	<code>\nhooknwarrow</code>	$\rightarrow$	<code>\nrightleftarrows</code>	$\rightarrow$	<code>\nvarrightwvearrow</code>
$\rightarrow$	<code>\nhookrightarrow</code>	$\rightarrow$	<code>\nrightmapsto</code>	$\downarrow$	<code>\nvarupdownwvearrow</code>
$\searrow$	<code>\nhooksearrow</code>	$\Leftrightarrow$	<code>\nRightmapsto</code>	$\uparrow$	<code>\nvarupwvearrow</code>
$\swarrow$	<code>\nhookswarrow</code>	$\rightarrow$	<code>\nrightrightarrows</code>		
$\uparrow$	<code>\nhookuparrow</code>	$\rightarrow$	<code>\nrightwvearrow</code>		

fdsymbol defines synonyms for most of the preceding symbols:

$\circlearrowleft$	<code>\nacwgapcirclearrow</code>	$\nwarrow$	<code>\nleftdowncurvedarrow</code>	$\rightarrow$	<code>\nrightcurvedarrow</code>
$\circlearrowright$	<code>\nacwopencirclearrow</code>	$\nwarrow$	<code>\nleftlcurvearrow</code>	$\searrow$	<code>\nrightdowncurvedarrow</code>
$\leftarrow$	<code>\ncirclearrowleft</code>	$\leftarrow$	<code>\nleftlsquigarrow</code>	$\rightarrow$	<code>\nrightlcurvearrow</code>
$\rightarrow$	<code>\ncirclearrowright</code>	$\nwarrow$	<code>\nleftrcurvearrow</code>	$\nwarrow$	<code>\nrightleftcurvearrow</code>
$\leftarrow$	<code>\ncurvearrowleft</code>	$\rightarrow$	<code>\nleftrightsquigarrow</code>	$\Leftrightarrow$	<code>\nrightleftsquigarrow</code>
$\rightarrow$	<code>\ncurvearrowright</code>	$\Leftrightarrow$	<code>\nleftrightsquigarrow</code>	$\rightarrow$	<code>\nrightlsquigarrow</code>
$\leftarrow$	<code>\ncwgapcirclearrow</code>	$\leftarrow$	<code>\nleftrsquigarrow</code>	$\nwarrow$	<code>\nrightrcurvearrow</code>
$\rightarrow$	<code>\ncwopencirclearrow</code>	$\leftarrow$	<code>\nleftsquigarrow</code>	$\rightarrow$	<code>\nrightrsquigarrow</code>

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->	\ndasharrow	↗	\nleftupcurvedarrow	↘	\nrightrightarrow
←-	\ndashleftarrow	↖	\nlongleadsto	↗	\nrightharpoonup
->	\ndashrightarrow	↖	\nlongleftsquigarrow	↘	\nsearrow
↓	\ndownlcurvedarrow	↖	\nlongrightsquigarrow	↗	\nsenwcurvedarrow
↙	\ndownleftcurvedarrow	↓	\nmapsdown	↘	\nsercurvedarrow
↘	\ndownlsquigarrow	⤵	\nMapsdown	↙	\nswlcurvedarrow
↘	\ndownrcurvedarrow	←	\nmapsfrom	↗	\nswnecurvedarrow
↘	\ndownrightcurvedarrow	↖	\nMapsfrom	↙	\nswrcurvedarrow
↘	\ndownrsquigarrow	↗	\nmapsto	↘	\nto
↗	\ndownupcurvedarrow	↖	\nMapsto	↗	\nupdowncurvedarrow
↗	\ndownupsquigarrow	↑	\nmapsup	↘	\nupdownsquigarrow
←	\ngets	⤵	\nMapsup	↗	\nuplcurvedarrow
↗	\nhknearrow	↗	\nnelcurvedarrow	↘	\nupleftcurvedarrow
↗	\nhknwarrow	↘	\nnercurvedarrow	↗	\nuplsquigarrow
↗	\nhksearrow	↘	\nneswcurvedarrow	↗	\nuprcurvedarrow
↗	\nhkswarrow	↘	\nnwlcurvedarrow	↘	\nuprightcurvedarrow
↗	\nleadsto	↗	\nnwrcurvedarrow	↘	\nuprsquigarrow
←	\nleftcurvedarrow	↘	\nnwsecurvedarrow		

TABLE 155: 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 156: fdsymbol Negated Harpoons

‡	<code>\ndownharpoonleft</code>	⌘	<code>\nneswharpoons</code>	⌘	<code>\nseharpoonsw</code>
‡	<code>\ndownharpoonright</code>	⌘	<code>\nneswharpoonsenw</code>	⌘	<code>\nsenwharpoons</code>
‡	<code>\ndownupharpoons</code>	⌘	<code>\nnwharpoonne</code>	⌘	<code>\nswharpoonnw</code>
↵	<code>\nleftharpoondown</code>	⌘	<code>\nnwharpoonsw</code>	⌘	<code>\nswharpoonse</code>
↵	<code>\nleftharpoonup</code>	⌘	<code>\nnwseharpoonsesw</code>	⌘	<code>\nswneharpoons</code>
↵	<code>\nleftrightharpoondownup</code>	⌘	<code>\nnwseharpoons</code>	‡	<code>\nupdownharpoonleftright</code>
↵	<code>\nleftrightharpoons</code>	⌘	<code>\nnwseharpoonswne</code>	‡	<code>\nupdownharpoonrightleft</code>
↵	<code>\nleftrightharpoonupdown</code>	↵	<code>\nrightharpoondown</code>	‡	<code>\nupdownharpoons</code>
⌘	<code>\nneharpoonnw</code>	↵	<code>\nrightharpoonup</code>	‡	<code>\nupharpoonleft</code>
⌘	<code>\nneharpoonse</code>	↵	<code>\nrightharpoonup</code>	‡	<code>\nupharpoonright</code>
⌘	<code>\nneswharpoonnwse</code>	⌘	<code>\nseharpoonne</code>		

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

TABLE 157: boisik Arrows

←	<code>\barleftarrow</code>	↖	<code>\Lsh</code>
↔	<code>\barleftarrowrightarrowbar</code>	↓	<code>\mapsdown</code>
↖	<code>\barovernorthwestarrow</code>	←	<code>\Mapsfrom</code>
↵	<code>\carriagereturn</code>	←	<code>\mapsfrom</code>
↶	<code>\circlearrowleft</code>	⇒	<code>\Mapsto</code>
↷	<code>\circlearrowright</code>	⇒	<code>\mapsto</code>
↶	<code>\cupleftarrow</code>	↑	<code>\mapsup</code>
↷	<code>\curlyveedownarrow</code>	↗	<code>\Nearrow</code>
↶	<code>\curlyveeuparrow</code>	↘	<code>\nearrowcorner</code>
↷	<code>\curlywedgedownarrow</code>	↗	<code>\nnearrow</code>
↶	<code>\curlywedgeuparrow</code>	↖	<code>\nnwarrow</code>
↶	<code>\curvearrowbotleft</code>	↖	<code>\Nwarrow</code>
↷	<code>\curvearrowbotleftright</code>	↖	<code>\nwarrowcorner</code>
↷	<code>\curvearrowbotright</code>	→	<code>\rightarrowbar</code>
↶	<code>\curvearrowleft</code>	⇒	<code>\rightarrowcircle</code>
↷	<code>\curvearrowleftright</code>	⇒	<code>\rightarrowtail</code>
↷	<code>\curvearrowright</code>	→	<code>\rightarrowTriangle</code>
↵	<code>\dlsh</code>	→	<code>\rightarrowtriangle</code>
↓	<code>\downblackarrow</code>	➔	<code>\rightblackarrow</code>
↓	<code>\downdasharrow</code>	➔	<code>\rightdashedarrow</code>
⇓	<code>\downdownarrows</code>	⇌	<code>\rightleftarrows</code>
↶	<code>\downtouparrow</code>	⇌	<code>\rightrightarrows</code>
↓	<code>\downwhitearrow</code>	↗	<code>\rightsquigarrow</code>
⚡	<code>\downzigzagarrow</code>	⇌	<code>\rightthreearrows</code>
↳	<code>\drsh</code>	↶	<code>\righttoleftarrow</code>
↔	<code>\eqleftarrowrightarrow</code>	⇒	<code>\rightwhitearrow</code>
↶	<code>\hookleftarrow</code>	⇒	<code>\rightwhiteroundarrow</code>
↷	<code>\hookrightarrow</code>	⇒	<code>\Rrightarrow</code>
↶	<code>\leftarrowtail</code>	↖	<code>\Rsh</code>
↶	<code>\leftarrowTriangle</code>	↘	<code>\Searrow</code>

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$\leftarrow$	<code>\leftarrowtriangle</code>	$\searrow$	<code>\ssearrow</code>
$\blackleftarrow$	<code>\leftblackarrow</code>	$\swarrow$	<code>\sswarrow</code>
$\leftdasharrow$	<code>\leftdasharrow</code>	$\swarrow$	<code>\Sswarrow</code>
$\leftleftarrows$	<code>\leftleftarrows</code>	$\Downarrow$	<code>\twoheaddownarrow</code>
$\leftrightarrows$	<code>\leftrightarrows</code>	$\leftleftarrow$	<code>\twoheadleftarrow</code>
$\leftrightharpoons$	<code>\leftrightharpoons</code>	$\rightarrow$	<code>\twoheadrightarrow</code>
$\leftrightarrowtriangle$	<code>\leftrightarrowtriangle</code>	$\Uparrow$	<code>\twoheaduparrow</code>
$\leftrightarrowtriangle$	<code>\leftrightarrowtriangle</code>	$\Updownarrow$	<code>\twoheadwhiteuparrow</code>
$\blackrightarrow$	<code>\rightblackarrow</code>	$\Updownarrow$	<code>\twoheadwhiteuparrowpedestal</code>
$\rightsquigarrow$	<code>\leftrightsquigarrow</code>	$\Uparrow$	<code>\upblackarrow</code>
$\leftsquigarrow$	<code>\leftsquigarrow</code>	$\Uparrow$	<code>\updasharrow</code>
$\lefttorightarrow$	<code>\lefttorightarrow</code>	$\Downarrow$	<code>\updownarrowbar</code>
$\leftwhitearrow$	<code>\leftwhitearrow</code>	$\Downarrow$	<code>\updownblackarrow</code>
$\leftwhiteroundarrow$	<code>\leftwhiteroundarrow</code>	$\Updownarrow$	<code>\updownwhitearrow</code>
$\leftzigzagarrow$	<code>\leftzigzagarrow</code>	$\Downarrow$	<code>\uptodownarrow</code>
$\linefeed$	<code>\linefeed</code>	$\Uparrow$	<code>\upuparrows</code>
$\Lleftarrow$	<code>\Lleftarrow</code>	$\Updownarrow$	<code>\upwhitearrow</code>
$\looparrowdownleft$	<code>\looparrowdownleft</code>	$\Updownarrow$	<code>\whitearrowupfrombar</code>
$\looparrowdownright$	<code>\looparrowdownright</code>	$\Updownarrow$	<code>\whitearrowuppedestal</code>
$\looparrowleft$	<code>\looparrowleft</code>	$\Updownarrow$	<code>\whitearrowuppedestalhbar</code>
$\looparrowright$	<code>\looparrowright</code>	$\Updownarrow$	<code>\whitearrowuppedestalvbar</code>

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

TABLE 158: boisik Negated Arrows









































































































$\nHdownarrow$	<code>\nHdownarrow</code>	$\nLeftrightarrow$	<code>\nLeftrightarrow</code>	$\nRightarrow$	<code>\nRightarrow</code>
$\nHuparrow$	<code>\nHuparrow</code>	$\nleftrightarrow$	<code>\nleftrightarrow</code>	$\nVleftarrow$	<code>\nVleftarrow</code>
$\nLeftarrow$	<code>\nLeftarrow</code>	$\nLeftrightarrow$	<code>\nLeftrightarrow</code>	$\nVrightarrow$	<code>\nVrightarrow</code>
$\nleftarrow$	<code>\nleftarrow</code>	$\nrightarrow$	<code>\nrightarrow</code>		

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

TABLE 159: boisik Harpoons

$\downharpoonleft$	<code>\downharpoonleft</code>	$\leftrightharpoons$	<code>\leftrightharpoons</code>	$\upharpoonleft$	<code>\upharpoonleft</code>
$\downharpoonright$	<code>\downharpoonright</code>	$\rightarrow$	<code>\rightarrow</code>	$\upharpoonright$	<code>\upharpoonright</code>
$\leftharpoondown$	<code>\leftharpoondown</code>	$\rightarrow$	<code>\rightarrow</code>		
$\leftharpoonup$	<code>\leftharpoonup</code>	$\Rightarrow$	<code>\Rightarrow</code>		

TABLE 160: stix Arrows

	<code>\acwcirclearrow</code>		<code>\longmapsto</code>
	<code>\acwgapcirclearrow</code>		<code>\Longmapsto</code>
	<code>\acwleftarcarrow</code>		<code>\longrightarrow</code>
	<code>\acwoverarcarrow</code>		<code>\Longrightarrow</code>
	<code>\acwunderarcarrow</code>		<code>\longrightsquigarrow</code>
	<code>\barleftarrow</code>		<code>\looparrowleft</code>
	<code>\barleftarrowrightarrowbar*</code>		<code>\looparrowright</code>
	<code>\barrightarrowdiamond</code>		<code>\Lsh</code>
	<code>\baruparrow</code>		<code>\mapsdown</code>
	<code>\bsimilarleftarrow</code>		<code>\Mapsfrom</code>
	<code>\bsimilarrightarrow</code>		<code>\mapsfrom</code>
	<code>\carriagereturn*</code>		<code>\mapsto</code>
	<code>\ccwundercurvearrow</code>		<code>\Mapsto</code>
	<code>\circlearrowleft</code>		<code>\mapsup</code>
	<code>\circlearrowright</code>		<code>\Nearrow</code>
	<code>\circleonleftarrow</code>		<code>\nearrow</code>
	<code>\circleonrightarrow</code>		<code>\neovnwarrow*</code>
	<code>\curvearrowleft</code>		<code>\neovsearrow*</code>
	<code>\curvearrowleftplus</code>		<code>\neswarrow</code>
	<code>\curvearrowright</code>		<code>\nwarrow</code>
	<code>\curvearrowrightminus</code>		<code>\Nwarrow</code>
	<code>\cwcirclearrow</code>		<code>\nwovnearrow*</code>
	<code>\cwgapcirclearrow</code>		<code>\nwsearrow</code>
	<code>\cwrightarcarrow</code>		<code>\rdiagovsearrow*</code>
	<code>\cwundercurvearrow</code>		<code>\Rdsh</code>
	<code>\dbkarrow</code>		<code>\Rightarrow</code>
	<code>\DDownarrow</code>		<code>\rightarrow</code>
	<code>\Ddownarrow</code>		<code>\rightarrowapprox</code>
	<code>\diamondleftarrow</code>		<code>\rightarrowbackapprox</code>
	<code>\diamondleftarrowbar</code>		<code>\rightarrowbar</code>
	<code>\downarrow</code>		<code>\rightarrowsimilar</code>
	<code>\Downarrow</code>		<code>\rightarrowdiamond</code>
	<code>\downarrowbar</code>		<code>\rightarrowonplus</code>
	<code>\downarrowbarred</code>		<code>\rightarrowplus</code>
	<code>\downdasharrow*</code>		<code>\rightarrowshortleftarrow</code>
	<code>\downdownarrows</code>		<code>\rightarrowsimilar</code>
	<code>\downrightcurvedarrow*</code>		<code>\rightarrowtail</code>
	<code>\downuparrows</code>		<code>\rightarrowtriangle</code>
	<code>\downwhitearrow*</code>		<code>\rightarrowx</code>
	<code>\downzigzagarrow</code>		<code>\rightbkarrow</code>
	<code>\draftingarrow*</code>		<code>\rightcurvedarrow</code>
	<code>\drbkarrow</code>		<code>\rightdasharrow*</code>
	<code>\equateleftarrow</code>		<code>\rightdotarrow</code>
	<code>\equalrightarrow</code>		<code>\rightdowncurvedarrow</code>
	<code>\fdiagovnearrow*</code>		<code>\rightleftarrows</code>
	<code>\hknearrow</code>		<code>\rightrightarrows</code>
	<code>\hknwarrow</code>		<code>\rightsquigarrow</code>
	<code>\hksearrow</code>		<code>\rightthreearrows</code>
	<code>\hkswarrow</code>		<code>\rightwavearrow</code>
	<code>\hookleftarrow</code>		<code>\rightwhitearrow*</code>
	<code>\hookrightarrow</code>		<code>\RRightarrow</code>
	<code>\Ldsh</code>		<code>\Rrightarrow</code>

(continued on next page)

(continued from previous page)

$\leftarrow$	<code>\leftarrow</code>	$\Rrightarrow$	<code>\Rsh</code>
$\Leftarrow$	<code>\Leftarrow</code>	$\searrow$	<code>\searrow</code>
$\leftarrow\approx$	<code>\leftarrowapprox</code>	$\searrow\approx$	<code>\Searrow</code>
$\leftarrow\backsim$	<code>\leftarrowbackapprox</code>	$\searrow\approx$	<code>\seovnearrow*</code>
$\leftarrow\sim$	<code>\leftarrowbsimilar</code>	$\leftrightarrow$	<code>\shortrightarrowleftarrow</code>
$\leftarrow\oplus$	<code>\leftarrowonoplus</code>	$\leftarrow\sim$	<code>\similarleftarrow</code>
$\leftarrow+$	<code>\leftarrowplus</code>	$\rightarrow\sim$	<code>\similarrightarrow</code>
$\leftarrow\rightarrow$	<code>\leftarrowshortrightarrow</code>	$\swarrow$	<code>\swarrow</code>
$\leftarrow\sim$	<code>\leftarrowsimilar</code>	$\swarrow$	<code>\Sswarrow</code>
$\leftarrow\rightsquigarrow$	<code>\leftarrowtail</code>	$\swarrow$	<code>\toea</code>
$\leftarrow\triangle$	<code>\leftarrowtriangle</code>	$\swarrow$	<code>\tona</code>
$\leftarrow*$	<code>\leftarrowx</code>	$\swarrow$	<code>\tosa</code>
$\leftarrow\bowtie$	<code>\leftbkarrow</code>	$\swarrow$	<code>\towa</code>
$\leftarrow\curvearrowright$	<code>\leftcurvedarrow</code>	$\downarrow$	<code>\twoheaddownarrow</code>
$\leftarrow\cdots$	<code>\leftdasharrow*</code>	$\leftarrow$	<code>\twoheadleftarrow</code>
$\leftarrow\cdots\bowtie$	<code>\leftdbkarrow</code>	$\leftarrow$	<code>\twoheadleftarrowtail</code>
$\leftarrow\cdots$	<code>\leftdotarrow</code>	$\leftarrow\cdots$	<code>\twoheadleftdbkarrow</code>
$\leftarrow\curvearrowleft$	<code>\leftdowncurvedarrow</code>	$\leftarrow$	<code>\twoheadmapsfrom</code>
$\leftarrow\leftarrow$	<code>\leftleftarrows</code>	$\rightarrow$	<code>\twoheadmapsto</code>
$\leftarrow\rightarrow$	<code>\leftrightarrow</code>	$\rightarrow$	<code>\twoheadrightarrow</code>
$\leftarrow\rightarrow$	<code>\leftrightharrow</code>	$\rightarrow$	<code>\twoheadrightarrowtail</code>
$\leftarrow\rightarrow\circ$	<code>\leftrightharrowcircle</code>	$\uparrow$	<code>\twoheaduparrow</code>
$\leftarrow\rightarrow$	<code>\leftrightharrows</code>	$\uparrow$	<code>\twoheaduparrowcircle</code>
$\leftarrow\rightarrow\triangle$	<code>\leftrightharrowtriangle</code>	$\uparrow$	<code>\uparrow</code>
$\leftarrow\rightsquigarrow$	<code>\leftrightsquigarrow</code>	$\uparrow$	<code>\Uparrow</code>
$\leftarrow\rightsquigarrow$	<code>\leftsquigarrow</code>	$\uparrow$	<code>\uparrowbarred</code>
$\leftarrow\rightsquigarrow$	<code>\leftthreearrows</code>	$\uparrow$	<code>\updasharrow*</code>
$\leftarrow\rightsquigarrow$	<code>\leftwvearrow</code>	$\updownarrow$	<code>\Updownarrow</code>
$\leftarrow\rightsquigarrow$	<code>\leftwhitearrow*</code>	$\updownarrow$	<code>\updownarrow</code>
$\leftarrow\rightsquigarrow$	<code>\linefeed*</code>	$\updownarrow$	<code>\updownarrowbar*</code>
$\Leftarrow$	<code>\LLeftarrow</code>	$\updownarrow$	<code>\updownarrows</code>
$\Leftarrow$	<code>\Lleftarrow</code>	$\rightarrow$	<code>\uprightcurvearrow*</code>
$\longleftarrow$	<code>\longleftarrow</code>	$\upuparrows$	<code>\upuparrows</code>
$\Longleftarrow$	<code>\Longleftarrow</code>	$\upwhitearrow*$	<code>\upwhitearrow*</code>
$\longleftrightarrow$	<code>\Longleftarrowrightarrow</code>	$\Uparrow$	<code>\Uparrow</code>
$\longleftrightarrow$	<code>\longleftarrowrightarrow</code>	$\Uparrow$	<code>\Uparrow</code>
$\longleftrightarrow\rightsquigarrow$	<code>\longleftsquigarrow</code>	$\curvearrowright$	<code>\varcarriagereturn*</code>
$\Longmapsfrom$	<code>\Longmapsfrom</code>	$\upwhitearrow*$	<code>\whitearrowupfrombar*</code>
$\longmapsfrom$	<code>\longmapsfrom</code>		

\* 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 161: stix Negated Arrows

$\nrightarrow$	<code>\nHdownarrow*</code>	$\nleftrightarrow$	<code>\nvLeftrightarrow</code>
$\nrightarrow$	<code>\nHuparrow*</code>	$\nrightarrow$	<code>\nVrightarrow</code>
$\nleftarrow$	<code>\nleftarrow<sup>†</sup></code>	$\nrightarrow$	<code>\nvrightarrow</code>
$\nleftarrow$	<code>\nLeftarrow</code>	$\rightarrow$	<code>\nvrightarrow</code>
$\nleftrightarrow$	<code>\nleftrightarrow</code>	$\nrightarrow$	<code>\nVrightarrowtail</code>
$\nleftrightarrow$	<code>\nLeftrightarrow</code>	$\rightarrow$	<code>\nvrightarrowtail</code>
$\nrightarrow$	<code>\nrightarrow</code>	$\nleftarrow$	<code>\nVtwoheadleftarrow</code>
$\nrightarrow$	<code>\nrightarrow</code>	$\nleftarrow$	<code>\nVtwoheadleftarrow</code>
$\nleftarrow$	<code>\nvleftarrow</code>	$\nleftarrow$	<code>\nVtwoheadleftarrowtail</code>
$\nleftarrow$	<code>\nVleftarrow</code>	$\nleftarrow$	<code>\nVtwoheadleftarrowtail</code>
$\nleftarrow$	<code>\nVleftarrowtail</code>	$\nrightarrow$	<code>\nVtwoheadrightarrow</code>
$\nleftarrow$	<code>\nvleftarrowtail</code>	$\nrightarrow$	<code>\nVtwoheadrightarrowtail</code>
$\nleftrightarrow$	<code>\nvleftrightharrow</code>	$\nrightarrow$	<code>\nVtwoheadrightarrowtail</code>
$\nleftrightarrow$	<code>\nVleftrightharrow</code>		

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

<sup>†</sup> stix defines `\ngets` as a synonym for `\nleftarrow`.

TABLE 162: stix Harpoons

$\nrightarrow$	<code>\bardownharpoonleft</code>	$\nleftrightarrow$	<code>\leftrightharpoons</code>
$\nrightarrow$	<code>\bardownharpoonright</code>	$\nleftrightarrow$	<code>\leftrightharpoonsdown</code>
$\nleftarrow$	<code>\barlefttharpoondown</code>	$\nleftrightarrow$	<code>\leftrightharpoonsup</code>
$\nleftarrow$	<code>\barlefttharpoonup</code>	$\nleftrightarrow$	<code>\leftrightharpoonupdown</code>
$\nrightarrow$	<code>\barrightharpoondown</code>	$\nleftrightarrow$	<code>\leftrightharpoonupup</code>
$\nrightarrow$	<code>\barrightharpoonup</code>	$\nrightarrow$	<code>\rightharpoondown</code>
$\nrightarrow$	<code>\barupharpoonleft</code>	$\nrightarrow$	<code>\rightharpoondownbar</code>
$\nrightarrow$	<code>\barupharpoonright</code>	$\nleftrightarrow$	<code>\rightharpoonsdown</code>
$\nleftrightarrow$	<code>\dashlefttharpoondown</code>	$\nrightarrow$	<code>\rightharpoonup</code>
$\nleftrightarrow$	<code>\dashrighttharpoondown</code>	$\nrightarrow$	<code>\rightharpoonupbar</code>
$\nrightarrow$	<code>\downharpoonleft</code>	$\nleftrightarrow$	<code>\rightharpoonupdash</code>
$\nrightarrow$	<code>\downharpoonleftbar</code>	$\nleftrightarrow$	<code>\rightleftharpoons</code>
$\nrightarrow$	<code>\downharpoonright</code>	$\nleftrightarrow$	<code>\rightleftharpoonsdown</code>
$\nrightarrow$	<code>\downharpoonrightbar</code>	$\nleftrightarrow$	<code>\rightleftharpoonsup</code>
$\nrightarrow$	<code>\downharpoonsleftright</code>	$\nrightarrow$	<code>\updownharpoonleftleft</code>
$\nrightarrow$	<code>\downupharpoonsleftright</code>	$\nrightarrow$	<code>\updownharpoonleftright</code>
$\nleftarrow$	<code>\lefttharpoondown</code>	$\nrightarrow$	<code>\updownharpoonrightleft</code>
$\nleftarrow$	<code>\lefttharpoondownbar</code>	$\nrightarrow$	<code>\updownharpoonrightright</code>
$\nleftrightarrow$	<code>\lefttharpoonsdown</code>	$\nrightarrow$	<code>\updownharpoonsleftright</code>
$\nleftarrow$	<code>\lefttharpoonup</code>	$\nrightarrow$	<code>\upharpoonleft</code>
$\nleftarrow$	<code>\lefttharpoonupbar</code>	$\nrightarrow$	<code>\upharpoonleftbar</code>
$\nleftrightarrow$	<code>\lefttharpoonupdash</code>	$\nrightarrow$	<code>\upharpoonright*</code>
$\nleftarrow$	<code>\leftrightharpoondowndown</code>	$\nrightarrow$	<code>\upharpoonrightbar</code>
$\nleftarrow$	<code>\leftrightharpoondownup</code>	$\nrightarrow$	<code>\upharpoonsleftright</code>

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



TABLE 163: harpoon Extensible Harpoons

$\overleftarrow{abc}$	<code>\overleftharp{abc}</code>	$\overrightarrow{abc}$	<code>\overrightharpdown{abc}</code>	$\underline{abc}$	<code>\underrightharp{abc}</code>
$\overleftarrow{abc}$	<code>\overleftharpdown{abc}</code>	$\underline{abc}$	<code>\underleftharp{abc}</code>	$\overleftarrow{abc}$	<code>\underrightharpdown{abc}</code>
$\overrightarrow{abc}$	<code>\overrightharp{abc}</code>	$\underline{abc}$	<code>\underleftharpdown{abc}</code>		

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

TABLE 164: chemarrow Arrows

$\rightarrow$  `\chemarrow`

TABLE 165: fge Arrows

$\Rightarrow$  `\fgerightarrow`  $\Uparrow$  `\fgeuparrow`

TABLE 166: old-arrows Arrows

$\downarrow$	<code>\downarrow</code>	$\longleftrightarrow$	<code>\longlefttrightarrow</code>	$\nwarrow$	<code>\nwarhead</code>
$\hookleftarrow$	<code>\hookleftarrow</code>	$\longleftarrow$	<code>\longmapsfrom*</code>	$\rightarrow$	<code>\rightarrow</code>
$\hookrightarrow$	<code>\hookrightarrow</code>	$\mapsto$	<code>\longmapsto</code>	$\searrow$	<code>\searrow</code>
$\leftarrow$	<code>\leftarrow</code>	$\longrightarrow$	<code>\longrightarrow</code>	$\swarrow$	<code>\swarrow</code>
$\leftrightarrow$	<code>\leftrightarrow</code>	$\mapsto$	<code>\mapsfrom*</code>	$\uparrow$	<code>\uparrow</code>
$\longhookrightarrow$	<code>\longhookrightarrow</code>	$\mapsto$	<code>\mapsto</code>	$\updownarrow$	<code>\updownarrow</code>
$\longleftarrow$	<code>\longleftarrow</code>	$\nearrow$	<code>\nearrow</code>		

The arrows provided by `old-arrows` represent Donald Knuth's pre-1992 Computer Modern glyphs, which feature smaller arrowheads. Contrast the following:

$\rightarrow$  vs.  $\rightarrow$   
 default old-arrows

In addition to the arrows shown above, `old-arrows` also reduces the arrowhead size for  $\mathcal{AMS}$ 's `\overleftarrow`, `\overrightarrow`, `\overlefttrightarrow`, `\underleftarrow`, `\underrightarrow`, `\underlefttrightarrow`, `\xleftarrow`, `\xrightarrow`, `\varinjlim`, and `\varprojlim` symbols (Table 240 on page 104, Table 256 on page 107, and Table 182 on page 89) and `mathtools`'s `\xlefttrightarrow`, `\xhookleftarrow`, `\xhookrightarrow`, and `\xmapsto` symbols (Table 257 on page 108).

With the new package option, `old-arrows` prefixes all of the above with “`var`” (i.e., `\vardownarrow`, `\varhookleftarrow`, etc.) so both old and new glyphs can be used in the same document. See the `old-arrows` documentation for more information.

\* Requires `stmaryrd`.

TABLE 167: old-arrows Harpoons

	<code>\longleftarrow</code>		<code>\longrightarrow</code>
	<code>\longleftarrow</code>		<code>\longrightarrow</code>

Unlike the symbols shown in Table 166 on the previous page, the new package option does not define a `\var...` version of the symbols in this table. Also unlike the symbols shown in Table 166, the harpoon arrowheads in this table are not reduced in size (i.e., relative to the size of those shown in Table 139 on page 70).

TABLE 168: esrelation Restrictions

	<code>\restrictbar</code>		<code>\restrictmallet</code>		<code>\restrictwand</code>
	<code>\restrictbarup</code>		<code>\restrictmalletup</code>		<code>\restrictwandup</code>

TABLE 169: MnSymbol Spoons

	<code>\downfilledspoon</code>		<code>\nespoon</code>		<code>\nwfilledspoon</code>
	<code>\downspoon</code>		<code>\nnwfilledspoon</code>		<code>\nwspoon</code>
	<code>\leftfilledspoon</code>		<code>\nnwspoon</code>		<code>\rightfilledspoon</code>
	<code>\leftspoon</code>		<code>\nrighfilledspoon</code>		<code>\rightspoon*</code>
	<code>\ndownfilledspoon</code>		<code>\nrighspoon*</code>		<code>\sefilledspoon</code>
	<code>\ndownspoon</code>		<code>\sefilledspoon</code>		<code>\sespoon</code>
	<code>\nefilledspoon</code>		<code>\sespoon</code>		<code>\swfilledspoon</code>
	<code>\nespoon</code>		<code>\swfilledspoon</code>		<code>\swspoon</code>
	<code>\nleftfilledspoon</code>		<code>\swspoon</code>		<code>\upfilledspoon</code>
	<code>\nleftspoon</code>		<code>\nupfilledspoon</code>		<code>\upspoon</code>
	<code>\nefilledspoon</code>		<code>\upspoon</code>		

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

TABLE 170: MnSymbol Pitchforks

	<code>\downpitchfork</code>		<code>\nnwpitchfork</code>		<code>\rightpitchfork</code>
	<code>\leftpitchfork</code>		<code>\nrighpitchfork</code>		<code>\sepitchfork</code>
	<code>\ndownpitchfork</code>		<code>\sepitchfork</code>		<code>\swpitchfork</code>
	<code>\nepitchfork</code>		<code>\swpitchfork</code>		<code>\uppitchfork</code>
	<code>\leftpitchfork</code>		<code>\nuppitchfork</code>		
	<code>\nepitchfork</code>		<code>\nwpitchfork</code>		

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

TABLE 171: MnSymbol Smiles and Frowns

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

\* 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 172: fdsymbol Spoons

☉	<code>\blackwhitespoon</code>	☿	<code>\downblackspoon</code>	☿	<code>\nupblackspoon</code>
☿	<code>\downblackspoon</code>	☿	<code>\downspoon</code>	☿	<code>\nupspoon</code>
☿	<code>\downspoon</code>	☿	<code>\nleftblackspoon</code>	☿	<code>\nwhiteblackspoon</code>
☿	<code>\leftblackspoon</code>	☿	<code>\nleftrightblackspoon</code>	☿	<code>\rightblackspoon</code>
☿	<code>\leftrightblackspoon</code>	☿	<code>\nleftrightspoon</code>	☿	<code>\rightspoon</code>
☿	<code>\leftrightspoon</code>	☿	<code>\nleftspoon</code>	☿	<code>\upblackspoon</code>
☿	<code>\leftspoon</code>	☿	<code>\nrightblackspoon</code>	☿	<code>\upspoon</code>
☿	<code>\nblackwhitespoon</code>	☿	<code>\nrightspoon</code>	☿	<code>\whiteblackspoon</code>

fdsymbol defines synonyms for many of the preceding symbols:

☿	<code>\circmid</code>	☿	<code>\multimapinv</code>	☿	<code>\nmultimap</code>
☿	<code>\dualmap</code>	☿	<code>\ncircmid</code>	☿	<code>\nmultimapinv</code>
☿	<code>\imageof</code>	☿	<code>\ndualmap</code>	☿	<code>\norigof</code>
☿	<code>\midcir</code>	☿	<code>\nimageof</code>	☿	<code>\origof</code>
☿	<code>\multimap</code>	☿	<code>\nmidcir</code>		

TABLE 173: fdsymbol Pitchforks

$\Psi$	<code>\downpitchfork</code>	$\nleftpitchfork$	<code>\nleftpitchfork</code>	$\ni$	<code>\rightpitchfork</code>
$\leftarrow$	<code>\leftpitchfork</code>	$\ni$	<code>\rightpitchfork</code>	$\pitchfork$	<code>\uppitchfork</code>
$\Psi$	<code>\downpitchfork</code>	$\pitchfork$	<code>\nuppitchfork</code>		

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

TABLE 174: fdsymbol Smiles and Frowns

$\frown$	<code>\frown</code>	$\frown$	<code>\nfrowneq</code>	$\frown$	<code>\nsmilefrown</code>
$\frown$	<code>\frowneq</code>	$\frown$	<code>\nfrownsmile</code>	$\smile$	<code>\smile</code>
$\frown$	<code>\frownsmile</code>	$\smile$	<code>\nsmile</code>	$\smile$	<code>\smileeq</code>
$\frown$	<code>\nfrown</code>	$\smile$	<code>\nsmileeq</code>	$\smile$	<code>\smilefrown</code>

fdsymbol defines `\arceq` as a synonym for `\frowneq`, `\asym` as a synonym for `\smilefrown`, `\closure` as a synonym for `\frownsmile`, `\narceq` as a synonym for `\nfrowneq`, `\nasym` 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 175: ulsy Contradiction Symbols

$\blitz$	<code>\blitza</code>	$\blitz$	<code>\blitzb</code>	$\blitz$	<code>\blitzc</code>	$\blitz$	<code>\blitzd</code>	$\blitz$	<code>\blitze</code>
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TABLE 176: Extension Characters

$\bar{\phantom{x}}$	<code>\relbar</code>	$\bar{\phantom{x}}$	<code>\Relbar</code>
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TABLE 177: stmaryrd Extension Characters

$\not\rightarrow$	<code>\Arrownot</code>	$\rightarrow$	<code>\Mapsfromchar</code>	$\rightarrow$	<code>\Mapstochar</code>
$\not\rightarrow$	<code>\arrownot</code>	$\rightarrow$	<code>\mapsfromchar</code>		

TABLE 178: txfonts/pxfonts Extension Characters

$\rightarrow$	<code>\Mappedfromchar</code>	$\rightarrow$	<code>\Mmappedfromchar</code>	$\rightarrow$	<code>\Mmapstochar</code>
$\rightarrow$	<code>\mappedfromchar</code>	$\rightarrow$	<code>\mmappedfromchar</code>	$\rightarrow$	<code>\mmapstochar</code>

TABLE 179: mathabx Extension Characters

$\rightarrow$	<code>\mapsfromchar</code>	$\rightarrow$	<code>\mapstochar</code>
$\rightarrow$	<code>\Mapsfromchar</code>	$\rightarrow$	<code>\Mapstochar</code>

TABLE 180: stix Extension Characters

$\hookleftarrow$	<code>\lhook</code>	$\bar{\bar{=}}$	<code>\relbar</code>	$\bar{\bar{=}}$	<code>\Rrelbar</code>
$\mapsto$	<code>\mapsfromchar</code>	$\bar{=}$	<code>\Relbar</code>	$\bar{=}$	<code>\Rrelbar</code>
$\mapsto$	<code>\mapstochar</code>	$\hookrightarrow$	<code>\rhook</code>		

TABLE 181: Log-like Symbols

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

Calling the above “symbols” may be a bit misleading.<sup>3</sup> 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 L<sup>A</sup>T<sub>E</sub>X [Dow00] for samples.

TABLE 182:  $\mathcal{AMS}$  Log-like Symbols

<code>injlim</code>	<code>\injlim</code>	$\varinjlim$	<code>\varinjlim</code>	$\overline{\lim}$	<code>\varlimsup</code>
<code>projlim</code>	<code>\projlim</code>	$\varliminf$	<code>\varliminf</code>	$\varprojlim$	<code>\varprojlim</code>

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 L<sup>A</sup>T<sub>E</sub>X [Dow00] for samples.

TABLE 183: G<sub>U</sub>A<sub>2</sub>e Number Sets

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

<sup>3</sup>Michael J. Downes prefers the more general term, “atomic math objects”.

TABLE 184: Greek Letters

$\alpha$	<code>\alpha</code>	$\theta$	<code>\theta</code>	$o$	<code>o</code>	$\tau$	<code>\tau</code>
$\beta$	<code>\beta</code>	$\vartheta$	<code>\vartheta</code>	$\pi$	<code>\pi</code>	$\upsilon$	<code>\upsilon</code>
$\gamma$	<code>\gamma</code>	$\iota$	<code>\iota</code>	$\varpi$	<code>\varpi</code>	$\phi$	<code>\phi</code>
$\delta$	<code>\delta</code>	$\kappa$	<code>\kappa</code>	$\rho$	<code>\rho</code>	$\varphi$	<code>\varphi</code>
$\epsilon$	<code>\epsilon</code>	$\lambda$	<code>\lambda</code>	$\varrho$	<code>\varrho</code>	$\chi$	<code>\chi</code>
$\varepsilon$	<code>\varepsilon</code>	$\mu$	<code>\mu</code>	$\sigma$	<code>\sigma</code>	$\psi$	<code>\psi</code>
$\zeta$	<code>\zeta</code>	$\nu$	<code>\nu</code>	$\varsigma$	<code>\varsigma</code>	$\omega$	<code>\omega</code>
$\eta$	<code>\eta</code>	$\xi$	<code>\xi</code>				
$\Gamma$	<code>\Gamma</code>	$\Lambda$	<code>\Lambda</code>	$\Sigma$	<code>\Sigma</code>	$\Psi$	<code>\Psi</code>
$\Delta$	<code>\Delta</code>	$\Xi$	<code>\Xi</code>	$\Upsilon$	<code>\Upsilon</code>	$\Omega$	<code>\Omega</code>
$\Theta$	<code>\Theta</code>	$\Pi$	<code>\Pi</code>	$\Phi$	<code>\Phi</code>		

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 “ $\mu$ ”. To make available commands for *all* of the Greek majuscules, either use the `mathspec` package, which requires `XYLATEX`, 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 `polutoniko-greek`) option—and, of course, a font that provides the glyphs for the Greek alphabet.

TABLE 185:  $\mathcal{AMS}$  Greek Letters

$F$	<code>\digamma</code>	$\varkappa$	<code>\varkappa</code>
-----	-----------------------	-------------	------------------------

TABLE 186: txfonts/pxfonts Upright Greek Letters

$\alpha$	<code>\alphaup</code>	$\theta$	<code>\thetaaup</code>	$\pi$	<code>\piup</code>	$\phi$	<code>\phiup</code>
$\beta$	<code>\betaaup</code>	$\vartheta$	<code>\varthetaaup</code>	$\varpi$	<code>\varpiup</code>	$\varphi$	<code>\varphiup</code>
$\gamma$	<code>\gammaup</code>	$\iota$	<code>\iotaup</code>	$\rho$	<code>\rhoup</code>	$\chi$	<code>\chiup</code>
$\delta$	<code>\deltaaup</code>	$\kappa$	<code>\kappaup</code>	$\varrho$	<code>\varrhoup</code>	$\psi$	<code>\psiup</code>
$\epsilon$	<code>\epsilonup</code>	$\lambda$	<code>\lambdaup</code>	$\sigma$	<code>\sigmaup</code>	$\omega$	<code>\omegaup</code>
$\varepsilon$	<code>\varepsilonup</code>	$\mu$	<code>\muup</code>	$\varsigma$	<code>\varsigmaup</code>		
$\zeta$	<code>\zetaup</code>	$\nu$	<code>\nuup</code>	$\tau$	<code>\tauup</code>		
$\eta$	<code>\etaup</code>	$\xi$	<code>\xiup</code>	$\upsilon$	<code>\upsilonup</code>		

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 187: upgreek Upright Greek Letters

$\alpha$	<code>\upalpha</code>	$\theta$	<code>\uptheta</code>	$\pi$	<code>\uppi</code>	$\phi$	<code>\upphi</code>
$\beta$	<code>\upbeta</code>	$\vartheta$	<code>\upvartheta</code>	$\varpi$	<code>\upvarpi</code>	$\varphi$	<code>\upvarphi</code>
$\gamma$	<code>\upgamma</code>	$\iota$	<code>\upiota</code>	$\rho$	<code>\uprho</code>	$\chi$	<code>\upchi</code>
$\delta$	<code>\updelta</code>	$\kappa$	<code>\upkappa</code>	$\varrho$	<code>\upvarrho</code>	$\psi$	<code>\uppsi</code>
$\epsilon$	<code>\upepsilon</code>	$\lambda$	<code>\uplambda</code>	$\sigma$	<code>\upsigma</code>	$\omega$	<code>\upomega</code>
$\varepsilon$	<code>\upvarepsilon</code>	$\mu$	<code>\upmu</code>	$\varsigma$	<code>\upvarsigma</code>		
$\zeta$	<code>\upzeta</code>	$\nu$	<code>\upnu</code>	$\tau$	<code>\uptau</code>		
$\eta$	<code>\upeta</code>	$\xi$	<code>\upxi</code>	$\upsilon$	<code>\upupsilon</code>		
$\Gamma$	<code>\Upgamma</code>	$\Lambda$	<code>\Uplambda</code>	$\Sigma$	<code>\Upsigma</code>	$\Psi$	<code>\Uppsi</code>
$\Delta$	<code>\Updelta</code>	$\Xi$	<code>\Upxi</code>	$\Upsilon$	<code>\Upupsilon</code>	$\Omega$	<code>\Upomega</code>
$\Theta$	<code>\Uptheta</code>	$\Pi$	<code>\Uppi</code>	$\Phi$	<code>\Upphi</code>		

`upgreek` utilizes upright Greek characters from either Euler Roman (depicted above) or the PostScript Symbol font. As a result, the glyphs may appear slightly different from the above. Contrast, for example, “ $\Gamma\Delta\Theta\alpha\beta\gamma$ ” (Euler) with “ $\Gamma\Delta\Theta\alpha\beta\gamma$ ” (Symbol). Also note that the `\var. . .` forms do not always produce a distinct glyph.

Unlike `textgreek` (Table 6 on page 15), `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 188: fourier Variant Greek Letters

$\pi$	<code>\pi</code>	$\rho$	<code>\rho</code>
$\varpi$	<code>\varpi</code>	$\varrho$	<code>\varrho</code>
$\varpi$	<code>\varvarpi</code>	$\varrho$	<code>\varvarrho</code>

TABLE 189: 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 190: boisik Variant Greek Letters

$\beta$  `\varbeta`    $\kappa$  `\varkappa`    $\varpi$  `\varpi`    $\varsigma$  `\varsigma`  
 $\varepsilon$  `\varepsilon`    $\varphi$  `\varphi`    $\varrho$  `\varrho`    $\vartheta$  `\vartheta`

TABLE 191: boisik Variant Latin Letters

$g$  `\varg`

TABLE 192: stix Variant Greek Letters

$\varepsilon$  `\varepsilon`    $\varphi$  `\varphi`    $\varrho$  `\varrho`    $\vartheta$  `\vartheta`  
 $\kappa$  `\kappa`    $\varpi$  `\varpi`    $\varsigma$  `\varsigma`

TABLE 193: stix Transformed Greek Letters

$\varepsilon$  `\backepsilon`    $\iota$  `\turnediota`  
 $\upsilon$  `\mho`    $\varepsilon$  `\upbackepsilon`

TABLE 194:  $\mathcal{AMS}$  Hebrew Letters

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

$\aleph$  ( $\aleph$ ) appears in Table 294 on page 115.

TABLE 195: MnSymbol Hebrew Letters

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

TABLE 196: fdsymbol Hebrew Letters

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

TABLE 197: boisik Hebrew Letters

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



TABLE 198: stix Hebrew Letters

$\aleph$	<code>\aleph</code>	$\beth$	<code>\beth</code>	$\gimel$	<code>\gimel</code>	$\daleth$	<code>\daleth</code>
----------	---------------------	---------	--------------------	----------	---------------------	-----------	----------------------

TABLE 199: Letter-like Symbols

$\perp$	<code>\bot</code>	$\forall$	<code>\forall</code>	$\imath$	<code>\imath</code>	$\ni$	<code>\ni</code>	$\top$	<code>\top</code>
$\ell$	<code>\ell</code>	$\hbar$	<code>\hbar</code>	$\in$	<code>\in</code>	$\partial$	<code>\partial</code>	$\wp$	<code>\wp</code>
$\exists$	<code>\exists</code>	$\Im$	<code>\Im</code>	$\jmath$	<code>\jmath</code>	$\Re$	<code>\Re</code>		

TABLE 200:  $\mathcal{AMS}$  Letter-like Symbols

$\mathbb{k}$	<code>\Bbbk</code>	$\mathbb{C}$	<code>\complement</code>	$\hbar$	<code>\hbar</code>
$\mathbb{R}$	<code>\circledR</code>	$\Finv$	<code>\Finv</code>	$\hslash$	<code>\hslash</code>
$\mathbb{S}$	<code>\circledS</code>	$\Game$	<code>\Game</code>	$\nexists$	<code>\nexists</code>

TABLE 201: txfonts/pxfonts Letter-like Symbols

$\mathcal{C}$	<code>\mathcent</code>	$\mathsterling$	<code>\mathsterling*</code>	$\notin$	<code>\notin</code>	$\notni$	<code>\notni</code>
---------------	------------------------	-----------------	-----------------------------	----------	---------------------	----------	---------------------

\* It's generally preferable to use the corresponding symbol from Table 3 on page 15 because the symbols in that table work properly in both text mode and math mode.

TABLE 202: mathabx Letter-like Symbols

$\bar{\in}$	<code>\barin</code>	$\in$	<code>\in</code>	$\nottop$	<code>\nottop</code>	$\notin$	<code>\notin</code>
$\mathbb{C}$	<code>\complement</code>	$\nexists$	<code>\nexists</code>	$\owns$	<code>\owns</code>	$\notown$	<code>\notown</code>
$\exists$	<code>\exists</code>	$\notbot$	<code>\notbot</code>	$\ownsbar$	<code>\ownsbar</code>		
$\Finv$	<code>\Finv</code>	$\notin$	<code>\notin</code>	$\partial$	<code>\partial</code>		
$\Game$	<code>\Game</code>	$\notowner$	<code>\notowner</code>	$\partialslash$	<code>\partialslash</code>		

TABLE 203: MnSymbol Letter-like Symbols

$\perp$	<code>\bot</code>	$\in$	<code>\in</code>	$\notowns$	<code>\notowns*</code>	$\top$	<code>\top</code>
$\exists$	<code>\exists</code>	$\nexists$	<code>\nexists</code>	$\owns$	<code>\owns</code>	$\wp$	<code>\wp</code>
$\forall$	<code>\forall</code>	$\notin$	<code>\notin*</code>	$\mathcal{P}$	<code>\powerset</code>		

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

TABLE 204: fdsymbol Letter-like Symbols

$\perp$	<code>\bot</code>	$\forall$	<code>\forall</code>	$\in$	<code>\in</code>	$\ni$	<code>\owns</code>
$\complement$	<code>\complement</code>	$\Game$	<code>\Game</code>	$\nexists$	<code>\nexists</code>	$\top$	<code>\top</code>
$\exists$	<code>\exists</code>	$\hbar$	<code>\hbar</code>	$\notin$	<code>\notin</code>	$\wp$	<code>\wp</code>
$\Finv$	<code>\Finv</code>	$\hslash$	<code>\hslash</code>	$\nexists$	<code>\nexists</code>		

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

TABLE 205: boisik Letter-like Symbols

$\Bbbk$	<code>\Bbbk</code>	$\Game$	<code>\Game</code>	$\imath$	<code>\imath</code>	$\nexists$	<code>\nexists</code>
$\complement$	<code>\complement</code>	$\hbar$	<code>\hbar</code>	$\intercal$	<code>\intercal</code>	$\wp$	<code>\wp</code>
$\Finv$	<code>\Finv</code>	$\hslash$	<code>\hslash</code>	$\jmath$	<code>\jmath</code>		

TABLE 206: stix Letter-like Symbols

$\text{\AA}$	<code>\Angstrom</code>	$\mathcal{E}$	<code>\Eulerconst</code>	$\imath$	<code>\imath</code>	$\top$	<code>\top</code>
$\mathbb{k}$	<code>\Bbbk</code>	$\exists$	<code>\exists</code>	$\intercal$	<code>\intercal</code>	$\topbot$	<code>\topbot</code>
$\perp$	<code>\bot</code>	$\Finv$	<code>\Finv</code>	$\jmath$	<code>\jmath</code>	$\wp$	<code>\wp</code>
$\text{\textcircled{R}}$	<code>\circledR</code>	$\forall$	<code>\forall</code>	$\mathit{\$}$	<code>\mathdollar</code>	$\Upsilon$	<code>\Yup</code>
$\text{\textcircled{S}}$	<code>\circledS</code>	$\Game$	<code>\Game</code>	$\mathit{\P}$	<code>\mathparagraph</code>	$\mathbb{Z}$	<code>\Zbar</code>
$\complement$	<code>\complement</code>	$\hbar$	<code>\hbar</code>	$\mathit{\pounds}$	<code>\mathsterling</code>		
$\mathit{\digamma}$	<code>\digamma</code>	$\hslash$	<code>\hslash</code>	$\nexists$	<code>\nexists</code>		
$\ell$	<code>\ell</code>	$\Im$	<code>\Im</code>	$\Re$	<code>\Re</code>		

TABLE 207: trfsigns Letter-like Symbols

$e$	<code>\e</code>	$j$	<code>\im</code>
-----	-----------------	-----	------------------

TABLE 208: mathdesign Letter-like Symbols

$\in$	<code>\in</code>	$\ni$	<code>\owns</code>
$\notin$	<code>\notin</code>	$\in$	<code>\smallin</code>
$\notin$	<code>\notsmallin</code>	$\ni$	<code>\smallowns</code>
$\notin$	<code>\notsmallowns</code>		

The `mathdesign` package additionally provides versions of each of the letter-like symbols shown in Table 200 on the previous page.

TABLE 209: fge Letter-like Symbols

$\mathit{\forall}$	<code>\fgeA</code>	$\mathit{\text{g}}$	<code>\fgeeszett</code>	$\mathit{\mathbb{B}}$	<code>\fgeleftB</code>	$\mathit{\mathbb{U}}$	<code>\fgeU</code>
$\mathit{\text{c}}$	<code>\fgeC</code>	$\mathit{\mathcal{H}}$	<code>\fgeF</code>	$\mathit{\mathbb{C}}$	<code>\fgeleftC</code>		
$\mathit{\mathcal{P}}$	<code>\fgeD</code>	$\mathit{\mathcal{J}}$	<code>\fgef</code>	$\mathit{\mathbb{B}}$	<code>\fgerightB</code>		
$\mathit{\text{c}}$	<code>\fgee</code>	$\mathit{\mathcal{H}}$	<code>\fgelb*</code>	$\mathit{f}$	<code>\fges</code>		

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

TABLE 210: fourier Letter-like Symbols

$\partial$  `\partial`  $\partial$  `\varpartialdiff`

TABLE 211: cml Letter-like Symbols

$\perp$  `\Bot`  $\sphericalangle$  `\simbot`

TABLE 212:  $\mathcal{AMS}$  Delimiters

$\ulcorner$  `\ulcorner`  $\urcorner$  `\urcorner`  
 $\llcorner$  `\llcorner`  $\lrcorner$  `\lrcorner`

TABLE 213: stmaryrd Delimiters

$\Leftrightarrow$  `\Lbag`  $\Rrightarrow$  `\Rbag`  $\Leftrightarrow$  `\lbag`  $\Rrightarrow$  `\rbag`  
 $\lceil$  `\llceil`  $\rceil$  `\rrceil`  $\lfloor$  `\lllfloor`  $\rfloor$  `\rrrfloor`  
 $\lparen$  `\llparenthesis`  $\rrparenthesis$  `\rrparenthesis`

TABLE 214: mathabx Delimiters

$\lrcorner$  `\lrcorners`  $\rcorner$  `\rcorners`  
 $\ulcorner$  `\ulcorner`  $\urcorner$  `\urcorner`  
 $\llcorner$  `\llcorner`  $\lrcorner$  `\lrcorner`

TABLE 215: boisk Delimiters

$\ulcorner$  `\ulcorner`  $\urcorner$  `\urcorner`  
 $\llcorner$  `\llcorner`  $\lrcorner$  `\lrcorner`

TABLE 216: stix Delimiters

$\langle$  `\langedot`  $\rangle$  `\rangedot`  $\llcorner$  `\llangle`  $\ggcorner$  `\rrangle`  
 $\Leftrightarrow$  `\lbag`  $\Rrightarrow$  `\rbag`  $\llcorner$  `\llcorner`  $\lrcorner$  `\lrcorner`  
 $\lbrack$  `\lbrackbrak`  $\rbrack$  `\rbrackbrak`  $\lparen$  `\llparenthesis`  $\rrparenthesis$  `\rrparenthesis`  
 $\lbrack$  `\lbracklltick`  $\rbrack$  `\rbrackurtick`  $\lparen$  `\lparenltr`  $\rparen$  `\Rparenless`  
 $\lbrack$  `\lbrackubar`  $\rbrack$  `\rbrackubar`  $\llcorner$  `\lparenless`  $\ggcorner$  `\rparenltr`  
 $\lbrack$  `\lbrackultick`  $\rbrack$  `\rbracklrtick`  $\vzigzag$  `\lvzigzag`  $\vzigzag$  `\rvzigzag`  
 $\lbrack$  `\lbrbrak`  $\rbrack$  `\Rbrbrak`  $\vzigzag$  `\Lvzigzag`  $\vzigzag$  `\Rvzigzag`  
 $\langle$  `\lcurvyangle`  $\rangle$  `\rcurvyangle`  $\ulcorner$  `\ulcorner`  $\urcorner$  `\urcorner`

TABLE 217: nath Delimiters

$\llcorner$  `\niv`  $\lrcorner$  `\vin`

TABLE 218: Variable-sized Delimiters

$\downarrow$	$\Downarrow$	<code>\downarrow</code>	<code>\Downarrow</code>	[	[	[	]	]	]
$\langle$	$\rangle$	<code>\langle</code>	<code>\rangle</code>						\
$\lceil$	$\rceil$	<code>\lceil</code>	<code>\rceil</code>	$\uparrow$	$\Uparrow$	<code>\uparrow</code>	$\Uparrow$	<code>\Uparrow</code>	
$\lfloor$	$\rfloor$	<code>\lfloor</code>	<code>\rfloor</code>	$\updownarrow$	$\Updownarrow$	<code>\updownarrow</code>	$\Updownarrow$	<code>\Updownarrow</code>	
$($	$)$	<code>(</code>	<code>)</code>	{	{	\{	}	}	\}
/	/	/	\						<code>\backslash</code>

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 `\|`.

$\varepsilon$ -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 L<sup>A</sup>T<sub>E</sub>X using the `braket` package.

TABLE 219: Large, Variable-sized Delimiters

$\int$	$\int$	<code>\lmoustache</code>	$\}$	$\}$	<code>\rmoustache</code>	$($	$($	<code>\lgroup</code>	$)$	$)$	<code>\rgroup</code>
		<code>\arrowvert</code>			<code>\Arrowvert</code>			<code>\bracevert</code>			

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 220:  $\mathcal{A}\mathcal{M}\mathcal{S}$  Variable-sized Delimiters

		<code>\lvert</code>			<code>\rvert</code>
		<code>\lVert</code>			<code>\rVert</code>

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 218) are intended to be used as operators (e.g., as in “ $p|q$ ”).

TABLE 221: `stmaryrd` Variable-sized Delimiters

⌈	⌈	<code>\llbracket</code>	⌋	⌋	<code>\rrbracket</code>
---	---	-------------------------	---	---	-------------------------

TABLE 222: mathabx Variable-sized Delimiters

$\llbracket$	$\llbracket$	<code>\ldbrack</code>	$\rrbracket$	$\rrbracket$	<code>\rdbrack</code>
$\lrcorner$	$\lrcorner$	<code>\lfilet</code>	$\rlcorner$	$\rlcorner$	<code>\rfilet</code>
$ $	$ $	<code>\thickvert</code>	$\ $	$\ $	<code>\vvvert</code>

TABLE 223: MnSymbol Variable-sized Delimiters

$\ $	$\ $	<code>\Arrowvert</code>	$\{$	$\{$	<code>\lbrace</code>	$\}$	$\}$	<code>\rceil</code>
$ $	$ $	<code>\arrowvert</code>	$[$	$[$	<code>\lceil</code>	$]$	$]$	<code>\rfloor</code>
$\backslash$	$\backslash$	<code>\backslashslash</code>	$[$	$[$	<code>\lfloor</code>	$)$	$)$	<code>\rgroup</code>
$ $	$ $	<code>\bracevert</code>	$($	$($	<code>\lgroup</code>	$\)$	$\)$	<code>\rmoustache</code>
$[$	$[$	$[$	$\langle$	$\langle$	<code>\llangle</code>	$\rangle$	$\rangle$	<code>\rrangle</code>
$]$	$]$	$]$	$\llcorner$	$\llcorner$	<code>\llcorner</code>	$\lrcorner$	$\lrcorner$	<code>\rsem</code>
$($	$($	$($	$\lrcorner$	$\lrcorner$	<code>\lmoustache</code>	$\}\}$	$\}\}$	<code>\rWavy</code>
$)$	$)$	$)$	$\lrcorner$	$\lrcorner$	<code>\lrcorner</code>	$\}\}$	$\}\}$	<code>\rwoy</code>
$/$	$/$	$/$	$\llbracket$	$\llbracket$	<code>\lsem</code>	$\ulcorner$	$\ulcorner$	<code>\ulcorner</code>
$\langle$	$\langle$	$\langle$	$\}\}$	$\}\}$	<code>\lwavy</code>	$\ulcorner$	$\ulcorner$	<code>\ullcorner</code>
$\rangle$	$\rangle$	$\rangle$	$\}\}$	$\}\}$	<code>\lWavy</code>	$\ulcorner$	$\ulcorner$	<code>\ulrcorner</code>
$ $	$ $	$ $	$\rangle$	$\rangle$	<code>\rangle</code>	$\ulcorner$	$\ulcorner$	<code>\urcorner</code>

(continued on next page)

(continued from previous page)

<	{	<code>\langle</code>	}	}	<code>\ranglebar</code>			<code>\l</code>
<	{	<code>\langlebar</code>	}	}	<code>\rbrace</code>			

`\vert` is a synonym for `|`. `\Vert` is a synonym for `\lvert`. `\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 224: fdsymbol Variable-sized Delimiters

\	\	<code>\backslash</code>	,	,	<code>\lrcorner</code>	)	)	<code>\rparen</code>
↓	↓	<code>\downarrow</code>			<code>\lvert</code>			<code>\rvert</code>
⇓	⇓	<code>\Downarrow</code>			<code>\lVert</code>			<code>\rVert</code>
⟨⟨	⟨⟨	<code>\lAngle</code>			<code>\lVvert</code>			<code>\rVvert</code>
<	<	<code>\langle</code>	/	/	<code>\mathslash</code>	⌞	⌞	<code>\ulcorner</code>
<	<	<code>\langledot</code>	>	>	<code>\rangle</code>	[	[	<code>\ullcorner</code>
{	{	<code>\lbrace</code>	⟩	⟩	<code>\rAngle</code>	]	]	<code>\ulrcorner</code>
[	[	<code>\lbrack</code>	>	>	<code>\rangledot</code>	↑	↑	<code>\uparrow</code>
⌈	⌈	<code>\lBrack</code>	}	}	<code>\rbrace</code>	↑	↑	<code>\Uparrow</code>

(continued on next page)

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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 225: stix Variable-sized Delimiters

⋈	⋈	\Arrowvert	⋈	⋈	\lAngle		]	\rceil
		\arrowvert	{	{	\lbrace	}	]	\rfloor
\	\	\backslash	{	{	\lBrace	)	{	\rgroup
⇓	⇓	\Ddownarrow	]	]	\lBrack	\	}	\rmoustache
⇓	⇓	\DDownarrow	(	(	\lbrbrak	)	)	\rParen

(continued on next page)

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$\downarrow$	$\Big\downarrow$	<code>\downarrow</code>	$\lceil$	<code>\lceil</code>	$\uparrow$	$\Big\uparrow$	<code>\uparrow</code>
$\Downarrow$	$\Downarrow$	<code>\Downarrow</code>	$\lfloor$	<code>\lfloor</code>	$\Uparrow$	$\Uparrow$	<code>\Uparrow</code>
$[$	$[$	<code>[</code>	$($	<code>\lgroup</code>	$\Updownarrow$	$\Updownarrow$	<code>\Updownarrow</code>
$]$	$]$	<code>]</code>	$\}$	<code>\lmoustache</code>	$\updownarrow$	$\updownarrow$	<code>\updownarrow</code>
$($	$($	<code>(</code>	$(($	<code>\lParen</code>	$\Uparrow$	$\Uparrow$	<code>\Uparrow</code>
$)$	$)$	<code>)</code>	$\gg$	<code>\rAngle</code>	$\Uparrow$	$\Uparrow$	<code>\Uparrow</code>
$/$	$/$	<code>/</code>	$\rangle$	<code>\rangle</code>	$\Vert$	$\Vert$	<code>\Vert</code>
$\langle$	$\langle$	<code>&lt;</code>	$\}$	<code>\rbrace</code>	$ $	$ $	<code>\vert</code>
$\rangle$	$\rangle$	<code>&gt;</code>	$\} $	<code>\rbrace</code>	$\equiv$	$\equiv$	<code>\vvert</code>
$ $	$ $	<code> </code>	$\} $	<code>\rBrack</code>			
$\langle$	$\langle$	<code>\langle</code>	$\} $	<code>\rbrbrak</code>			

TABLE 226: `mathdesign` Variable-sized Delimiters

$\left\langle$	<code>\leftwave</code>	$\right\langle$	<code>\rightwave</code>
$\left\langle$	<code>\lefttevaw</code>	$\right\langle$	<code>\righttevaw</code>

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 227: `nath` Variable-sized Delimiters (Double)

$\langle$	$\langle\langle$	<code>\lAngle</code>	$\rangle\rangle$	$\rangle$	<code>\rAngle</code>
$\llbracket$	$\llbracket\llbracket$	<code>\lBrack</code>	$\rrbracket\rrbracket$	$\rrbracket$	<code>\rBrack</code>
$\lceil$	$\lceil\lceil$	<code>\lCeil</code>	$\rceil\lceil$	$\rceil$	<code>\rCeil</code>
$\lfloor$	$\lfloor\lfloor$	<code>\lFloor</code>	$\rfloor\rfloor$	$\rfloor$	<code>\rFloor</code>
$\lVert$	$\lVert\lVert$	<code>\lVert*</code>	$\rVert\lVert$	$\rVert$	<code>\rVert*</code>

\* `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 227 can also be expressed using the `\double` macro. See the `nath` documentation for examples and additional information.

TABLE 228: `nath` Variable-sized Delimiters (Triple)

$\lll$	$\lll\lll$	<code>\triple&lt;</code>	$\ggg\ggg$	<code>\triple&gt;</code>
$\lllbracket$	$\lllbracket\lllbracket$	<code>\triple[</code>	$\rrrbracket\rrrbracket$	<code>\triple]</code>
$\lllvert$	$\lllvert\lllvert$	<code>\triple *</code>	$\rrrvert\rrrvert$	<code>\triple *</code>

\* Similar to `\lVert` and `\rVert` in Table 227, `\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 229: `fourier` Variable-sized Delimiters

$\llbracket$	$\llbracket\llbracket$	<code>\llbracket</code>	$\rrbracket\rrbracket$	$\rrbracket$	<code>\rrbracket</code>
$\lllvert$	$\lllvert\lllvert$	<code>\VERT</code>			

TABLE 230: `textcomp` Text-mode Delimiters

$\langle$	<code>\textlangle</code>	$\rangle$	<code>\textrangle</code>
$\llbracket$	<code>\textlbrackdbl</code>	$\rrbracket$	<code>\textrbrackdbl</code>
$\{$	<code>\textlquill</code>	$\}$	<code>\textrquill</code>

TABLE 231: metre Text-mode Delimiters

}	<code>\alad</code>	}	<code>\Alad</code>	†	<code>\crux</code>	†	<code>\Crux</code>
{	<code>\alas</code>	{	<code>\Alas</code>	]	<code>\quadrad</code>	]	<code>\Quadrad</code>
>	<code>\angud</code>	>	<code>\Angud</code>	[	<code>\quadras</code>	[	<code>\Quadras</code>
<	<code>\angus</code>	<	<code>\Angus</code>				

TABLE 232: Math-mode Accents

á	<code>\acute{a}</code>	ǎ	<code>\check{a}</code>	à	<code>\grave{a}</code>	ã	<code>\tilde{a}</code>
ā	<code>\bar{a}</code> *	ä	<code>\ddot{a}</code>	â	<code>\hat{a}</code>	ā	<code>\vec{a}</code>
ă	<code>\breve{a}</code>	á	<code>\dot{a}</code>	â	<code>\mathring{a}</code>		

Note also the existence of `\imath` and `\jmath`, which produce dotless versions of “*i*” and “*j*”. (See Table 294 on page 115.) These are useful when the accent is supposed to replace the dot. For example, “`\hat{\imath}`” produces a correct “*î*”, while “`\hat{i}`” would yield the rather odd-looking “*î*”.

\* The `\overline` command (Table 240 on page 104) 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 233:  $\mathcal{AMS}$  Math-mode Accents

¨	<code>\dddots{a}</code>	¨¨	<code>\ddddot{a}</code>
---	-------------------------	----	-------------------------

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  $\ddot{a}$  to  $\ddot{a}$ ). The `mathabx` and `mathdots` versions also function properly within subscripts and superscripts ( $x^{\ddot{a}}$  instead of  $x^{\ddot{a}}$ ).

TABLE 234: MnSymbol Math-mode Accents

ā	<code>\vec{a}</code>
---	----------------------

TABLE 235: fdsymbol Math-mode Accents

$a$	<code>\middlebar{a}</code>	$\cancel{a}$	<code>\strokethrough{a}</code>
$a$	<code>\middleslash{a}</code>	$\vec{a}$	<code>\vec{a}</code>

`\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 236: boisik Math-mode Accents

$\vec{a}$	<code>\vec{a}</code>
-----------	----------------------

TABLE 237: stix Math-mode Accents

$\acute{a}$	<code>\acute{a}</code>	$\hat{a}$	<code>\hat{a}</code>
$\overline{a}$	<code>\annuity{a}</code>	$\overleftarrow{a}$	<code>\leftarrowaccent{a}</code>
$\overset{*}{a}$	<code>\asteraccent{a}</code>	$\overleftarrow{\smile}a$	<code>\leftharpoonaccent{a}</code>
$\bar{a}$	<code>\bar{a}</code>	$\overrightarrow{a}$	<code>\rightarrowaccent{a}</code>
$\breve{a}$	<code>\breve{a}</code>	$\mathring{a}$	<code>\mathring{a}</code>
$\candra{a}$	<code>\candra{a}</code>	$\text{\textcircled{a}}$	<code>\ocommatopright{a}</code>
$\check{a}$	<code>\check{a}</code>	$\text{\textcircled{a}}$	<code>\oturnedcomma{a}</code>
$\text{\textcircled{a}}$	<code>\dddod{a}</code>	$\overset{\hookrightarrow}{a}$	<code>\ovhook{a}</code>
$\ddot{a}$	<code>\dddot{a}</code>	$\overrightarrow{\smile}a$	<code>\rightharpoonaccent{a}</code>
$\ddot{a}$	<code>\ddot{a}</code>	$\tilde{a}$	<code>\tilde{a}</code>
$\dot{a}$	<code>\dot{a}</code>	$\vec{a}$	<code>\vec{a}</code>
$\text{\textcircled{a}}$	<code>\droang{a}</code>	$\overline{\overline{a}}$	<code>\widebridgeabove{a}</code>
$\grave{a}$	<code>\grave{a}</code>		

TABLE 238: fge Math-mode Accents

$\mathring{A}$	<code>\spirituslenis{A}</code>	$\mathring{a}$	<code>\spirituslenis{a}</code>
----------------	--------------------------------	----------------	--------------------------------

\* When `fge` is passed the `rescent` option, `\spirituslenis` instead uses a crescent accent as in “ $\mathring{a}$ ”.

TABLE 239: yhmath Math-mode Accents

$\mathring{a}$	<code>\ring{a}</code>
----------------	-----------------------

This symbol is largely obsolete, as standard  $\text{\LaTeX} 2_{\epsilon}$  has supported `\mathring` (Table 232 on the previous page) since June 1998 [L<sup>A</sup>T<sub>98</sub>].

TABLE 240: Extensible Accents

$\widetilde{abc}$	<code>\widetilde{abc}</code> *	$\widehat{abc}$	<code>\widehat{abc}</code> *
$\overleftarrow{abc}$	<code>\overleftarrow{abc}</code> †	$\overrightarrow{abc}$	<code>\overrightarrow{abc}</code> †
$\overline{abc}$	<code>\overline{abc}</code>	$\underline{abc}$	<code>\underline{abc}</code>
$\overbrace{abc}$	<code>\overbrace{abc}</code>	$\underbrace{abc}$	<code>\underbrace{abc}</code>
$\sqrt{abc}$	<code>\sqrt{abc}</code> ‡		

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 246 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 244 on the following page). and even more extensible by the `yhmath` package (Table 242).

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

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

TABLE 241: overrightarrow Extensible Accents

$\overrightarrow{abc}$	<code>\Overrightarrow{abc}</code>
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TABLE 242: yhmath Extensible Accents

$\widehat{abc}$	<code>\widehat{abc}</code>	$\widetilde{abc}$	<code>\widetilde{abc}</code>
$\wideparen{abc}$	<code>\wideparen{abc}</code>	$\widehat{abc}$	<code>\widehat{abc}</code>
$\overset{\circ}{abc}$	<code>\widering{abc}</code>		

TABLE 243:  $\mathcal{AMS}$  Extensible Accents

$\overleftarrow{abc}$	<code>\overleftarrow{abc}</code>	$\overleftarrow{abc}$	<code>\underleftarrow{abc}</code>
$\overrightarrow{abc}$	<code>\overrightarrow{abc}</code>	$\overrightarrow{abc}$	<code>\underrightarrow{abc}</code>

TABLE 244: MnSymbol Extensible Accents

$\overbrace{abc}$	<code>\overbrace{abc}</code>	$\undergroup{abc}$	<code>\undergroup{abc}</code>
$\overgroup{abc}$	<code>\overgroup{abc}</code>	$\underline{abc}$	<code>\underline{abc}</code>
$\overleftharpoonup{abc}$	<code>\overleftharpoonup{abc}</code>	$\widehat{abc}$	<code>\widehat{abc}</code>
$\overline{abc}$	<code>\overline{abc}</code>	$\wideparen{abc}$	<code>\wideparen{abc}</code>
$\overrightarrow{abc}$	<code>\overrightarrow{abc}</code>	$\widetilde{abc}$	<code>\widetilde{abc}</code>
$\underbrace{abc}$	<code>\underbrace{abc}</code>		

TABLE 245: fdsymbol Extensible Accents

$\overbrace{abc}$	<code>\overbrace{abc}</code>	$\undergroup{abc}$	<code>\undergroup{abc}</code>
$\overgroup{abc}$	<code>\overgroup{abc}</code>	$\underline{abc}$	<code>\underline{abc}</code>
$\overleftharpoonup{abc}$	<code>\overleftharpoonup{abc}</code>	$\widehat{abc}$	<code>\widehat{abc}</code>
$\overline{abc}$	<code>\overline{abc}</code>	$\wideparen{abc}$	<code>\wideparen{abc}</code>
$\overrightarrow{abc}$	<code>\overrightarrow{abc}</code>	$\widetilde{abc}$	<code>\widetilde{abc}</code>
$\underbrace{abc}$	<code>\underbrace{abc}</code>		

TABLE 246: stix Extensible Accents

$\overline{abc}$	<code>\longdivision{abc}</code>	$\underbracket{abc}$	<code>\underbracket{abc}</code>
$\overbrace{abc}$	<code>\overbrace{abc}</code>	$\underleftarrow{abc}$	<code>\underleftarrow{abc}</code>
$\overbracket{abc}$	<code>\overbracket{abc}</code>	$\underleftharpoonup{abc}$	<code>\underleftharpoonup{abc}</code>
$\overleftarrow{abc}$	<code>\overleftarrow{abc}</code>	$\underleftrightarrow{abc}$	<code>\underleftrightarrow{abc}</code>
$\overleftharpoonup{abc}$	<code>\overleftharpoonup{abc}</code>	$\underparen{abc}$	<code>\underparen{abc}</code>
$\overleftrightharpoonup{abc}$	<code>\overleftrightharpoonup{abc}</code>	$\underrightarrow{abc}$	<code>\underrightarrow{abc}</code>
$\overparen{abc}$	<code>\overparen{abc}</code>	$\underrightarrow{abc}$	<code>\underrightarrow{abc}</code>
$\overrightarrow{abc}$	<code>\overrightarrow{abc}</code>	$\widecheck{abc}$	<code>\widecheck{abc}</code>
$\overrightarrow{abc}$	<code>\overrightarrow{abc}</code>	$\widehat{abc}$	<code>\widehat{abc}</code>
$\sqrt{abc}$	<code>\sqrt{abc}</code>	$\widetilde{abc}$	<code>\widetilde{abc}</code>
$\underbrace{abc}$	<code>\underbrace{abc}</code>		

TABLE 247: mathtools Extensible Accents

$\widehat{abc}$	<code>\overbrace{abc}</code>	$\underbrace{abc}$	<code>\underbrace{abc}</code>
$\overline{abc}$	<code>\overbracket{abc}</code> *	$\underline{abc}$	<code>\underbracket{abc}</code> *

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

TABLE 248: mathabx Extensible Accents

$\overbrace{abc}$	<code>\overbrace{abc}</code>	$\overline{abc}$	<code>\widebar{abc}</code>
$\overgroup{abc}$	<code>\overgroup{abc}</code>	$\widetilde{abc}$	<code>\widecheck{abc}</code>
$\underbrace{abc}$	<code>\underbrace{abc}</code>	$\wideparen{abc}$	<code>\wideparen{abc}</code>
$\undergroup{abc}$	<code>\undergroup{abc}</code>	$\overset{\circ}{abc}$	<code>\widering{abc}</code>
$\overrightarrow{abc}$	<code>\widearrow{abc}</code>		

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

TABLE 249: fourier Extensible Accents

$\widehat{abc}$	<code>\widearc{abc}</code>	$\wideparen{abc}$	<code>\wideparen{abc}</code>
$\widehat{abc}$	<code>\wideOarc{abc}</code>	$\overset{\circ}{abc}$	<code>\widering{abc}</code>

TABLE 250: esvect Extensible Accents

$\overrightarrow{abc}$	<code>\vv{abc}</code> with package option a
$\overrightarrow{abc}$	<code>\vv{abc}</code> with package option b
$\overrightarrow{abc}$	<code>\vv{abc}</code> with package option c
$\overrightarrow{abc}$	<code>\vv{abc}</code> with package option d
$\overrightarrow{abc}$	<code>\vv{abc}</code> with package option e
$\overrightarrow{abc}$	<code>\vv{abc}</code> with package option f
$\overrightarrow{abc}$	<code>\vv{abc}</code> with package option g
$\overrightarrow{abc}$	<code>\vv{abc}</code> 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 251: `abraces` Extensible Accents
$$\overbrace{abc} \quad \backslash\text{aoverbrace}\{abc\} \quad \underbrace{abc} \quad \backslash\text{aunderbrace}\{abc\}$$

`\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 252: `undertilde` Extensible Accents
$$\underset{\sim}{abc} \quad \backslash\text{utilde}\{abc\}$$

Because `\utilde` is based on `\widetilde` it is also made more extensible by the `yhmath` package (Table 242 on page 104).

TABLE 253: `ushort` Extensible Accents
$$\underline{\underline{abc}} \quad \backslash\text{ushortdw}\{abc\} \quad \underline{\underline{abc}} \quad \backslash\text{ushortw}\{abc\}$$

`\ushortw` and `\ushortdw` are intended to be used with multi-character arguments (“words”) while `\ushortand` 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 “ $\underline{\underline{xyxy}}$ ”.

TABLE 254: `mdwmath` Extensible Accents
$$\sqrt{abc} \quad \backslash\text{sqrt*}\{abc\}$$
TABLE 255: `actuarialangle` Extensible Accents
$$\overline{abc} \quad \backslash\text{actuarialangle}\{abc\}$$

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

TABLE 256:  $\mathcal{AMS}$  Extensible Arrows
$$\overleftarrow{abc} \quad \backslash\text{xleftarrow}\{abc\} \quad \overrightarrow{abc} \quad \backslash\text{xrightarrow}\{abc\}$$

TABLE 257: mathtools Extensible Arrows

$\xleftarrow{abc}$	<code>\xhookleftarrow{abc}</code>	$\xleftrightarrow{abc}$	<code>\xleftrightharpoons{abc}</code>
$\xrightarrow{abc}$	<code>\xhookrightarrow{abc}</code>	$\xmapsto{abc}$	<code>\xmapsto{abc}</code>
$\xLeftrightarrow{abc}$	<code>\xLeftrightarrow{abc}</code>	$\xRightarrow{abc}$	<code>\xRightarrow{abc}</code>
$\xleftarrow{\downarrow abc}$	<code>\xleftarrow{\downarrow abc}</code>	$\xrightarrow{\downarrow abc}$	<code>\xrightarrow{\downarrow abc}</code>
$\xleftarrow{\uparrow abc}$	<code>\xleftarrow{\uparrow abc}</code>	$\xrightarrow{\uparrow abc}$	<code>\xrightarrow{\uparrow abc}</code>
$\xleftrightarrow{\leftarrow abc}$	<code>\xleftrightarrow{\leftarrow abc}</code>	$\xleftrightarrow{\rightarrow abc}$	<code>\xleftrightarrow{\rightarrow abc}</code>
$\xleftrightarrow{\rightleftarrows abc}$	<code>\xleftrightarrow{\rightleftarrows abc}</code>		

TABLE 258: chemarr Extensible Arrows

$\xleftrightarrow{abc}$	<code>\xleftrightarrow{abc}</code>	<code>\xleftrightarrow{abc}</code>	<code>\xrightleftharpoons{abc}</code>
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TABLE 259: chemarrow Extensible Arrows

$\xleftarrow{abc}$	<code>\autoleftarrow{abc}{def}</code>	$\xrightarrow{abc}$	<code>\autorightarrow{abc}{def}</code>
$\xleftrightarrow{abc}$	<code>\autoleftrightharpoons{abc}{def}</code>	$\xleftrightarrow{abc}$	<code>\autorightleftharpoons{abc}{def}</code>

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 260: extarrows Extensible Arrows

$\xleftrightarrow{abc}$	<code>\xLeftrightarrow{abc}</code>	$\xleftrightarrow{abc}$	<code>\xLonglefttrightarrow{abc}</code>
$\xleftrightarrow{abc}$	<code>\xleftrightarrow{abc}</code>	$\xleftrightarrow{abc}$	<code>\xlonglefttrightarrow{abc}</code>
$\xlongequal{abc}$	<code>\xlongequal{abc}</code>	$\xRightarrow{abc}$	<code>\xLongrightarrow{abc}</code>
$\xLeftrightarrow{abc}$	<code>\xLeftrightarrow{abc}</code>	$\xrightarrow{abc}$	<code>\xlongrightarrow{abc}</code>
$\xleftarrow{abc}$	<code>\xlongleftarrow{abc}</code>		



TABLE 261: extpfeil Extensible Arrows

$\overline{\overline{abc}}$	<code>\xlongequal{abc}</code>	$\overleftarrow{\overline{abc}}$	<code>\twoheadleftarrow{abc}</code>
$\overrightarrow{\overline{abc}}$	<code>\xmapsto{abc}</code>	$\overrightarrow{\overline{abc}}$	<code>\twoheadrightarrow{abc}</code>
$\overleftrightarrow{\overline{abc}}$	<code>\xtofrom{abc}</code>		

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 262: DotArrow Extensible Arrows

$\overset{a}{\dashrightarrow}$	<code>\dotarrow{a}</code>
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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 263: halloweenmath Extensible Arrows

$\overleftarrow{\overline{abc}}$	<code>\overscriptleftarrow{abc}</code>	$\overleftarrow{\underline{abc}}$	<code>\underscriptleftarrow{abc}</code>
$\overrightarrow{\overline{abc}}$	<code>\overscriptrightarrow{abc}</code>	$\overrightarrow{\underline{abc}}$	<code>\underscriptrightarrow{abc}</code>
$\overleftrightarrow{\overline{abc}}$	<code>\overscriptrightarrow{abc}</code>	$\overleftrightarrow{\underline{abc}}$	<code>\underscriptrightarrow{abc}</code>

These commands always typeset the arrow in script (small) style, hence the “script” in their names. Contrast the size of the arrowheads in the following examples:

$\overrightarrow{\overline{abc}}$	vs.	$\overrightarrow{\underline{abc}}$
<code>\overrightarrow{abc}</code>		<code>\overscriptrightarrow{abc}</code>

TABLE 264: trfsigns Extensible Transform Symbols

$\overline{\overline{abc}}$	<code>\dft{abc}</code>	$\overline{\overline{abc}}$	<code>\DFT{abc}</code>
-----------------------------	------------------------	-----------------------------	------------------------

TABLE 265: esrelation Extensible Relations

$\overleftarrow{\overline{abc}}$	<code>\relationleftproject{abc}</code>	$\overrightarrow{\overline{abc}}$	<code>\relationrightproject{abc}</code>
$\overline{\overline{abc}}$	<code>\relationlifting{abc}</code>		

TABLE 266: halloweenmath Extensible Witches

$\frac{abc}{\overleftarrow{\text{witch}}}$	<code>\overleftwitchonbroom{abc}</code>	$\frac{\ni abc}{\text{witch}}$	<code>\overrightwitchonbroom{abc}</code>
$\frac{abc}{\overleftarrow{\text{witch}}}$	<code>\overleftwitchonbroom*{abc}</code>	$\frac{\ni abc}{\text{witch}}$	<code>\overrightwitchonbroom*{abc}</code>
$\frac{abc}{\underleftarrow{\text{witch}}}$	<code>\underleftwitchonbroom{abc}</code>	$\frac{abc}{\underrightarrow{\text{witch}}}$	<code>\underrightwitchonbroom{abc}</code>
$\frac{abc}{\underleftarrow{\text{witch}}}$	<code>\underleftwitchonbroom*{abc}</code>	$\frac{abc}{\underrightarrow{\text{witch}}}$	<code>\underrightwitchonbroom*{abc}</code>
$\frac{abc}{\xrightarrow{\text{witch}}}$	<code>\xleftwitchonbroom{abc}</code>	$\frac{abc}{\xrightarrow{\text{witch}}}$	<code>\xrightwitchonbroom{abc}</code>
$\frac{abc}{\xrightarrow{\text{witch}}}$	<code>\xleftwitchonbroom*{abc}</code>	$\frac{abc}{\xrightarrow{\text{witch}}}$	<code>\xrightwitchonbroom*{abc}</code>

TABLE 267: halloweenmath Extensible Ghosts

$\frac{\overleftarrow{\text{ghost}}}{abc}$	<code>\overleftswishingghost{abc}</code>	$\frac{\overrightarrow{\text{ghost}}}{abc}$	<code>\overrightswishingghost{abc}</code>
$\frac{\overleftarrow{\text{ghost}}}{abc}$	<code>\underleftswishingghost{abc}</code>	$\frac{\overrightarrow{\text{ghost}}}{abc}$	<code>\underrightswishingghost{abc}</code>
$\frac{\overleftarrow{\text{ghost}}}{abc}$	<code>\xleftswishingghost{abc}</code>	$\frac{\overrightarrow{\text{ghost}}}{abc}$	<code>\xrightswishingghost{abc}</code>

TABLE 268: holtpolt Non-commutative Division Symbols

$\frac{abc}{def}$	<code>\holter{abc}{def}</code>	$\frac{abc}{def}$	<code>\polter{abc}{def}</code>
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TABLE 269: Dots

$\cdot$	<code>\cdotp</code>	$:$	<code>\colon*</code>	$\cdot$	<code>\ldotp</code>	$\vdots$	<code>\vdots†</code>
$\dots$	<code>\cdots</code>	$\ddots$	<code>\ddots†</code>	$\dots$	<code>\ldots</code>		

\* While “:” is valid in math mode, `\colon` uses different surrounding spacing. See Section 10.4 and the Short Math Guide for L<sup>A</sup>T<sub>E</sub>X [Dow00] for more information on math-mode spacing.

† The `mathdots` package redefines `\ddots` and `\vdots` (Table 275) 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 L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>’s `\ddots` and `\vdots` macros.

TABLE 270:  $\mathcal{A}\mathcal{M}\mathcal{S}$  Dots

$\because$	<code>\because*</code>	$\dots$	<code>\dotsi</code>	$\therefore$	<code>\therefore*</code>
$\cdots$	<code>\dotsb</code>	$\dots$	<code>\dotsm</code>		
$\dots$	<code>\dotsc</code>	$\dots$	<code>\dotso</code>		

\* `\because` and `\therefore` are defined as binary relations and therefore also appear in Table 89 on page 48.

The  $\mathcal{A}\mathcal{M}\mathcal{S}$  `\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 271: wasysym Dots

$\therefore$	<code>\wasytherefore</code>
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TABLE 272: MnSymbol Dots

$\cdot$	<code>\cdot</code>	$\cdots$	<code>\hdotdot</code>	$\because$	<code>\udots</code>
$\ddot{\cdot}$	<code>\ddotdotdot</code>	$\dots$	<code>\hdots</code>	$\uptherefore$	<code>\uptherefore</code>
$\ddots$	<code>\ddots</code>	$\leftthreetimes$	<code>\leftthreetimes</code>	$\vdots$	<code>\vdotdot</code>
$\diamond\cdots$	<code>\diamonddots</code>	$\rightthreetimes$	<code>\rightthreetimes</code>	$\vdots$	<code>\vdots</code>
$\downthreethree$	<code>\downthreethree</code>	$\squaresix$	<code>\squaresix</code>		
$\fivedots$	<code>\fivedots</code>	$\udotdot$	<code>\udotdot</code>		

MnSymbol defines `\therefore` as `\uptherefore` and `\because` as `\downthreethree`. Furthermore, `\cdot` and `\colon` produce the same glyphs as `\cdot` and `\vdotdot` respectively but serve as  $\text{\TeX}$  math punctuation (class 6 symbols) instead of  $\text{\TeX}$  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 30.

TABLE 273: fdsymbol Dots

$\cdot$	<code>\cdot</code>	$\dots$	<code>\hdots</code>	$\because$	<code>\udots</code>
$\ddot{\cdot}$	<code>\ddotdotdot</code>	$\leftthreetimes$	<code>\leftthreetimes</code>	$\uptherefore$	<code>\uptherefore</code>
$\ddots$	<code>\ddots</code>	$\rightthreetimes$	<code>\rightthreetimes</code>	$\vdots$	<code>\vdotdot</code>
$\downthreethree$	<code>\downthreethree</code>	$\squaresix$	<code>\squaresix</code>		
$\hdotdot$	<code>\hdotdot</code>	$\udotdot$	<code>\udotdot</code>		

fdsymbol defines `\adots` as a synonym for `\udots`; `\because` as a synonym for `\downthreethree`; `\cdot` as a synonym for `\cdot`; `\cdots` as a synonym for `\hdots`; `\Colon` as a synonym for `\squaresix`; `\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 274: stix Dots

$\therefore$	<code>\adots</code>	$\cdots$	<code>\cdots</code>	$\vdots$	<code>\fourvdots</code>
$\because$	<code>\because</code>	$\colon$	<code>\Colon</code>	$\cdot$	<code>\ldotp</code>
$\cdot$	<code>\cdot</code>	$\ddots$	<code>\ddots</code>	$\dots$	<code>\mathellipsis</code>
$\cdot$	<code>\cdotp</code>	$\text{..}$	<code>\enleadertwodots</code>	$\therefore$	<code>\therefore</code>

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

TABLE 275: mathdots Dots

$\ddots$	<code>\ddots</code>	$\iddots$	<code>\iddots</code>	$\vdots$	<code>\vdots</code>
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Unlike the default definitions of the above (Table 269), `mathdots`'s commands are designed to scale properly with the surrounding font size.

TABLE 276: ymath Dots

$\therefore$	<code>\adots</code>
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TABLE 277: teubner Dots

$\colon$	<code>\:</code>	$\dot{\colon}$	<code>\;</code>	$\dot{\dot{\colon}}$	<code>\?</code>	$\because$	<code>\antilabe</code>
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TABLE 278: begriff Begriffsschrift Symbols

$\vdash$	<code>\BGassert</code>	$-$	<code>\BGcontent</code>	$\mp$	<code>\BGnot</code>
$\begin{matrix} b \\ \lrcorner \\ a \end{matrix}$	<code>\BGconditional{a}{b}</code>	$\smile$	<code>\BGquant{a}</code>		

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

TABLE 279: frege Begriffsschrift Symbols

$\vdash$	<code>\Facontent</code>	$\vdash\pi$	<code>\Fanncontent</code>	$\vdash\pi\pi$	<code>\Fncontent</code>
$\vdash\pi$	<code>\Fancontent</code>	$\vdash\pi\pi$	<code>\Fcontent</code>	$\vdash\pi\pi\pi$	<code>\Fnncontent</code>
$\vdash\overset{a}{\vdash}$	<code>\Fannquant{a}</code>	$\vdash\overset{a}{\vdash\pi}$	<code>\Faquant{a}</code>	$\vdash\overset{a}{\vdash\pi\pi}$	<code>\Fnquant{a}</code>
$\vdash\overset{a}{\vdash\pi}$	<code>\Fannquantn{a}</code>	$\vdash\overset{a}{\vdash\pi\pi}$	<code>\Faquantn{a}</code>	$\vdash\overset{a}{\vdash\pi\pi\pi}$	<code>\Fnquantn{a}</code>
$\vdash\overset{a}{\vdash\pi\pi}$	<code>\Fannquantnn{a}</code>	$\vdash\overset{a}{\vdash\pi\pi\pi}$	<code>\Faquantnn{a}</code>		<code>\Fnquantnn{a}</code>
$\vdash\overset{a}{\vdash}$	<code>\Fanquant{a}</code>	$\vdash\overset{a}{\vdash\pi}$	<code>\Fnnquant{a}</code>	$\vdash\overset{a}{\vdash\pi}$	<code>\Fquantn{a}</code>
$\vdash\overset{a}{\vdash\pi}$	<code>\Fanquantn{a}</code>	$\vdash\overset{a}{\vdash\pi\pi}$	<code>\Fnnquantn{a}</code>	$\vdash\overset{a}{\vdash\pi\pi}$	<code>\Fquantnn{a}</code>
$\vdash\overset{a}{\vdash\pi\pi}$	<code>\Fanquantnn{a}</code>	$\vdash\overset{a}{\vdash\pi\pi\pi}$	<code>\Fnnquantnn{a}</code>		

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

TABLE 280: mathcomp Math Symbols

$^{\circ}\text{C}$	<code>\tccentigrade</code>	$\Omega$	<code>\tcohm</code>	$\text{‰}$	<code>\tcpertousand</code>
$\mu$	<code>\tcmu</code>	$\text{‰‰}$	<code>\tcpertenthousand</code>		

TABLE 281: marvosym Math Symbols

$\angle$	<code>\AngleSign</code>	$\geq$	<code>\LargerOrEqual</code>	$\times$	<code>\MVMultiplication</code>
$\Rightarrow$	<code>\Conclusion</code>	$\leq$	<code>\LessOrEqual</code>	$\cdot$	<code>\MVPeriod</code>
$\equiv$	<code>\Congruent</code>	$\cdot$	<code>\MultiplicationDot</code>	$+$	<code>\MVPlus</code>
$\cong$	<code>\Corresponds</code>	$,$	<code>\MVComma</code>	$\rightarrow$	<code>\MVRightArrow</code>
$/$	<code>\Divides</code>	$/$	<code>\MVDivision</code>	$)$	<code>\MVRightBracket</code>
$\nmid$	<code>\DividesNot</code>	$($	<code>\MVLeftBracket</code>	$\neq$	<code>\NotCongruent</code>
$\Leftrightarrow$	<code>\Equivalence</code>	$-$	<code>\MVMinus</code>		

TABLE 282: marvosym Digits

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

TABLE 283: fge Digits

0	<code>\fgestruckzero</code>	1	<code>\fgestruckone</code>
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TABLE 284: dozenal Base-12 Digits

$\zeta$	<code>\x</code>	$\xi$	<code>\e</code>
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TABLE 285: mathabx Mayan Digits

$\textcircled{0}$	<code>\maya{0}</code>	:	<code>\maya{2}</code>	:	<code>\maya{4}</code>
$\cdot$	<code>\maya{1}</code>	:	<code>\maya{3}</code>	:	<code>\maya{5}</code>

TABLE 286: stix Infinities

$\infty$	<code>\acidfree</code>	$\infty$	<code>\infty</code>	$\infty$	<code>\tieinfty</code>
$\infty$	<code>\iinfin</code>	$\infty$	<code>\vinfty</code>		

TABLE 287: stix Primes

'	<code>\prime</code>	'	<code>\backprime</code>
"	<code>\dprime</code>	"	<code>\backdprime</code>
'''	<code>\trprime</code>	'''	<code>\backtrprime</code>
'''	<code>\qprime</code>		

TABLE 288: stix Empty Sets

$\emptyset$	<code>\emptyset</code>	$\overline{\emptyset}$	<code>\emptysettoarr</code>	$\emptyset$	<code>\varnothing</code>
$\emptyset$	<code>\emptysettoarr</code>	$\emptyset$	<code>\emptysettocirc</code>		
$\emptyset$	<code>\emptysettoarrl</code>	$\emptyset$	<code>\reemptyset</code>		

TABLE 289:  $\mathcal{AMS}$  Angles

$\angle$	<code>\angle</code>	$\sphericalangle$	<code>\measuredangle</code>	$\sphericalangle$	<code>\sphericalangle</code>
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TABLE 290: MnSymbol Angles

$\angle$	<code>\angle</code>	$\sphericalangle$	<code>\measuredangle</code>	$\sphericalangle$	<code>\sphericalangle</code>
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TABLE 291: fdsymbol Angles

$\angle$	<code>\angle</code>	$\sphericalangle$	<code>\revangle</code>	$\sphericalangle$	<code>\sphericalangle</code>
$\sphericalangle$	<code>\measuredangle</code>	$\sphericalangle$	<code>\revmeasuredangle</code>	$\sphericalangle$	<code>\sphericalangledown</code>
$\sphericalangle$	<code>\measuredrightangle</code>	$\sphericalangle$	<code>\rightangle</code>	$\sphericalangle$	<code>\sphericalangleleft</code>
$\sphericalangle$	<code>\measuredrightangledot</code>	$\sphericalangle$	<code>\rightanglesquare</code>	$\sphericalangle$	<code>\sphericalangleup</code>

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

TABLE 292: boisik Angles

$\angle$	<code>\angle</code>	$\rightangle$	<code>\rightangle</code>	$\sphericalangle$	<code>\sphericalangle</code>
$\sphericalangle$	<code>\measuredangle</code>	$\rightangledot$	<code>\rightangledot</code>		
$\sphericalangle$	<code>\measuredrightangle</code>	$\rightanglesqr$	<code>\rightanglesqr</code>		

TABLE 293: stix Angles

$\sphericalangle$	<code>\angdnr</code>	$\sphericalangle$	<code>\measanglerutone</code>	$\sphericalangle$	<code>\rightangledot</code>
$\sphericalangle$	<code>\angle</code>	$\sphericalangle$	<code>\measangleultonw</code>	$\sphericalangle$	<code>\rightanglesqr</code>
$\sphericalangle$	<code>\angles</code>	$\sphericalangle$	<code>\measangleurtone</code>	$\sphericalangle$	<code>\sphericalangle</code>
$\sphericalangle$	<code>\angleubar</code>	$\sphericalangle$	<code>\measuredangle</code>	$\sphericalangle$	<code>\sphericalangleup</code>
$\sphericalangle$	<code>\gtlpar</code>	$\sphericalangle$	<code>\measuredangleleft</code>	$\sphericalangle$	<code>\threedangle</code>
$\sphericalangle$	<code>\measangledltosw</code>	$\sphericalangle$	<code>\measuredrightangle</code>	$\sphericalangle$	<code>\turnangle</code>
$\sphericalangle$	<code>\measangledrtose</code>	$\sphericalangle$	<code>\rangledownzigzagarrow</code>	$\sphericalangle$	<code>\wideangledown</code>
$\sphericalangle$	<code>\measangleldtosw</code>	$\sphericalangle$	<code>\revangle</code>	$\sphericalangle$	<code>\wideangleup</code>
$\sphericalangle$	<code>\measanglelutonw</code>	$\sphericalangle$	<code>\revangleubar</code>		
$\sphericalangle$	<code>\measanglerdtose</code>	$\sphericalangle$	<code>\rightangle</code>		

TABLE 294: Miscellaneous L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> Math Symbols

$\aleph$	<code>\aleph</code>	$\Box$	<code>\Box<sup>*,†</sup></code>	$\nabla$	<code>\nabla</code>	$\triangle$	<code>\triangle</code>
$\emptyset$	<code>\emptyset<sup>‡</sup></code>	$\diamond$	<code>\Diamond<sup>*</sup></code>	$\neg$	<code>\neg</code>		
$\angle$	<code>\angle</code>	$\infty$	<code>\infty</code>	$\prime$	<code>\prime</code>		
$\backslash$	<code>\backslash</code>	$\mho$	<code>\mho<sup>*</sup></code>	$\surd$	<code>\surd</code>		

\* Not predefined in L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>. Use one of the packages `latexsym`, `amssymb`, `txfonts`, `pxfonts`, or `wasysym`. Note, however, that `amssymb` and `amssymb` define `\Diamond` to produce the same glyph as `\lozenge` (“ $\diamond$ ”); 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  $\mathcal{A}\mathcal{M}\mathcal{S}$ ’s `\varnothing` (“ $\emptyset$ ”, Table 295) to that of L<sup>A</sup>T<sub>E</sub>X’s `\emptyset`.

TABLE 295: Miscellaneous  $\mathcal{A}\mathcal{M}\mathcal{S}$  Math Symbols

$\backprime$	<code>\backprime</code>	$\blacktriangledown$	<code>\blacktriangledown</code>	$\mho$	<code>\mho</code>
$\bigstar$	<code>\bigstar</code>	$\diagdown$	<code>\diagdown</code>	$\square$	<code>\square</code>
$\blacklozenge$	<code>\blacklozenge</code>	$\diagup$	<code>\diagup</code>	$\triangledown$	<code>\triangledown</code>
$\blacksquare$	<code>\blacksquare</code>	$\eth$	<code>\eth</code>	$\varnothing$	<code>\varnothing</code>
$\blacktriangle$	<code>\blacktriangle</code>	$\lozenge$	<code>\lozenge</code>	$\vartriangle$	<code>\vartriangle</code>

TABLE 296: Miscellaneous wasysym Math Symbols

$\Box$	<code>\Box</code>	$\diamond$	<code>\Diamond</code>	$\mho$	<code>\mho<sup>*</sup></code>	$\varangle$	<code>\varangle</code>
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\* `wasysym` also defines an `\agem0` symbol, which is the same glyph as `\mho` but is intended for use in text mode.

TABLE 297: Miscellaneous txfonts/pxfonts Math Symbols

$\blacklozenge$	<code>\Diamondblack</code>	$\lambda$	<code>\lambdabar</code>
$\diamond$	<code>\Diamonddot</code>	$\lambda$	<code>\lambdaaslash</code>

TABLE 298: Miscellaneous mathabx Math Symbols

◦	<code>\degree</code>	////	<code>\fourth</code>	∠	<code>\measuredangle</code>	//	<code>\second</code>
\	<code>\diagdown</code>	#	<code>\hash</code>	⌋	<code>\pitchfork</code>	∠	<code>\sphericalangle</code>
/	<code>\diagup</code>	∞	<code>\infty</code>	∞	<code>\propto</code>	///	<code>\third</code>
∅	<code>\diameter</code>	λ	<code>\leftthreetimes</code>	λ	<code>\rightthreetimes</code>	#	<code>\varhash</code>

TABLE 299: Miscellaneous MnSymbol Math Symbols

⊖	<code>\backneg</code>	∅	<code>\diameter</code>	⊖	<code>\invneg</code>	⊖	<code>\neg</code>
\	<code>\backprime</code>	∞	<code>\infty</code>	✱	<code>\maltese</code>	/	<code>\prime</code>
✓	<code>\checkmark</code>	⊖	<code>\invbackneg</code>	∇	<code>\nabla</code>	f	<code>\smallint</code>

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 300: Miscellaneous Internal MnSymbol Math Symbols

∂	<code>\partialvardint</code>	∂	<code>\partialvartint</code>
∂	<code>\partialvardlanddownint</code>	∂	<code>\partialvartlanddownint</code>
∂	<code>\partialvardlandupint</code>	∂	<code>\partialvartlandupint</code>
∂	<code>\partialvardlcircleleftint</code>	∂	<code>\partialvartlcircleleftint</code>
∂	<code>\partialvardlclirclerightint</code>	∂	<code>\partialvartlclirclerightint</code>
∂	<code>\partialvardoint</code>	∂	<code>\partialvartoint</code>
∂	<code>\partialvardoint</code>	∂	<code>\partialvartoint</code>
∂	<code>\partialvardrcircleleftint</code>	∂	<code>\partialvartrcircleleftint</code>
∂	<code>\partialvardrcirclerightint</code>	∂	<code>\partialvartrcirclerightint</code>
∂	<code>\partialvardstrokedint</code>	∂	<code>\partialvartstrokedint</code>
∂	<code>\partialvardsumint</code>	∂	<code>\partialvartsumint</code>

These symbols are intended to be used internally by MnSymbol to construct the integrals appearing in Table 80 on page 43 but can nevertheless be used in isolation.

TABLE 301: Miscellaneous fdsymbol Math Symbols

⊖	<code>\backneg</code>	∞	<code>\infty</code>	/	<code>\prime</code>
\	<code>\backprime</code>	⊖	<code>\invneg</code>	∅	<code>\reemptyset</code>
✓	<code>\checkmark</code>	✱	<code>\maltese</code>	∇	<code>\sector</code>
∅	<code>\emptyset</code>	⊖	<code>\neg</code>	f	<code>\smallint</code>

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 302: Miscellaneous boisik Math Symbols

$\wp$	<code>\backepsilon</code>	$\dagger$	<code>\hermitmatrix</code>	$\not\perp$	<code>\notbot</code>
$\backprime$	<code>\backprime</code>	$\infty$	<code>\iinfin</code>	$\not\top$	<code>\nottop</code>
$\checkmark$	<code>\checkmark</code>	$\ninvnot$	<code>\invnot</code>	$\riota$	<code>\riota</code>
$\dAlambert$	<code>\dAlambert</code>	$\lambda$	<code>\lambdabar</code>	$\sim$	<code>\sinewave</code>
$\diagdown$	<code>\diagdown</code>	$\lambda$	<code>\lambdaslash</code>	$\emptyset$	<code>\varnothing</code>
$\diagup$	<code>\diagup</code>	$\text{maltese}$	<code>\maltese</code>		

TABLE 303: Miscellaneous stix Math Symbols

$\sim$	<code>\accurrent</code>	$\dagger$	<code>\hermitmatrix</code>	$\text{PropertyLine}$	<code>\PropertyLine</code>
$\backslash$	<code>\backslash</code>	$\text{hyphenbullet}$	<code>\hyphenbullet</code>	$\blacksquare$	<code>\QED</code>
$\text{bracketbrk}$	<code>\bbrktbrk</code>	$\text{zigzag}$	<code>\hzigzag</code>	$\text{Question}$	<code>\Question</code>
$\text{bigbot}$	<code>\bigbot</code>	$\Delta$	<code>\increment</code>	$\text{rdiagovfdiag}$	<code>\rdiagovfdiag</code>
$\text{biginterleave}$	<code>\biginterleave</code>	$\text{inversebullet}$	<code>\inversebullet</code>	$\text{rightouterjoin}$	<code>\rightouterjoin</code>
$\text{bigtop}$	<code>\bigtop</code>	$\ninvnot$	<code>\invnot</code>	$\text{sansLmirrored}$	<code>\sansLmirrored</code>
$\text{blacksmiley}$	<code>\blacksmiley</code>	$\text{Join}$	<code>\Join</code>	$\text{sansLturned}$	<code>\sansLturned</code>
$\text{bracevert}$	<code>\bracevert</code>	$\text{laplac}$	<code>\laplac</code>	$\text{sinewave}$	<code>\sinewave</code>
$\text{caretinsert}$	<code>\caretinsert</code>	$\text{leftouterjoin}$	<code>\leftouterjoin</code>	$\text{strns}$	<code>\strns</code>
$\checkmark$	<code>\checkmark</code>	$\text{llarc}$	<code>\llarc</code>	$\text{thermod}$	<code>\thermod</code>
$\text{conictaper}$	<code>\conictaper</code>	$\text{lrarc}$	<code>\lrarc</code>	$\text{topcir}$	<code>\topcir</code>
$\text{danger}$	<code>\danger</code>	$\text{maltese}$	<code>\maltese</code>	$\text{turnednot}$	<code>\turnednot</code>
$\diagdown$	<code>\diagdown</code>	$\text{mathsection}$	<code>\mathsection</code>	$\text{ubrbrak}$	<code>\ubrbrak</code>
$\diagup$	<code>\diagup</code>	$\text{mathvisiblespace}$	<code>\mathvisiblespace</code>	$\text{ularc}$	<code>\ularc</code>
$\emptyset$	<code>\diameter</code>	$\nabla$	<code>\nabla</code>	$\text{urarc}$	<code>\urarc</code>
$\text{dingasterisk}$	<code>\dingasterisk</code>	$\text{neg}$	<code>\neg*</code>	$\text{viewdata}$	<code>\viewdata</code>
$\text{elinters}$	<code>\elinters</code>	$\text{obrbrak}$	<code>\obrbrak</code>	$\text{zigzag}$	<code>\zigzag</code>
$\eth$	<code>\eth</code>	$\text{perps}$	<code>\perps</code>	$\text{yen}$	<code>\yen</code>
$\text{Exclam}$	<code>\text{Exclam}</code>	$\text{postalmark}$	<code>\postalmark</code>	$\text{zcmp}$	<code>\zcmp</code>
$\text{fdiagovrdiag}$	<code>\fdiagovrdiag</code>	$\text{profline}$	<code>\profline</code>	$\text{zpipe}$	<code>\zpipe</code>
$\text{fullouterjoin}$	<code>\fullouterjoin</code>	$\text{profsurf}$	<code>\profsurf</code>	$\text{zproject}$	<code>\zproject</code>

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

TABLE 304: Miscellaneous textcomp Text-mode Math Symbols

$^\circ$	<code>\textdegree*</code>	$\frac{1}{2}$	<code>\textonehalf<sup>†</sup></code>	$\frac{3}{4}$	<code>\textthreequarters<sup>†</sup></code>
$\div$	<code>\textdiv</code>	$\frac{1}{4}$	<code>\textonequarter<sup>†</sup></code>	$^3$	<code>\textthreesuperior</code>
$/$	<code>\textfractionsolidus</code>	$^1$	<code>\textonesuperior</code>	$\times$	<code>\texttimes</code>
$\neg$	<code>\textlnot</code>	$\pm$	<code>\textpm</code>	$^2$	<code>\texttwosuperior</code>
$-$	<code>\textminus</code>	$\sqrt{\quad}$	<code>\textsurd</code>		

\* If you prefer a larger degree symbol you might consider defining one as `\ensuremath{\text{\char"00B0}}` (“°”).

<sup>†</sup> nicefrac (part of the units package) or the newer xfrac package can be used to construct vulgar fractions like “ $\frac{1}{2}$ ”, “ $\frac{1}{4}$ ”, “ $\frac{3}{4}$ ”, and even “ $\frac{c}{o}$ ”.

TABLE 305: Miscellaneous fge Math Symbols

$\backslash$	<code>\fgebackslash</code>	$\frown$	<code>\fgecap</code>	$\smile$	<code>\fgecupacute</code>	$\sphericalangle$	<code>\fgeangle</code>
$\perp$	<code>\fgebaracute</code>	$\cong$	<code>\fgecapbar</code>	$\cong$	<code>\fgecupbar</code>	$\lrcorner$	<code>\fgeupbracket</code>
$\bar{\smile}$	<code>\fgebarcap</code>	$\cup$	<code>\fgecup</code>	$\infty$	<code>\fgeinfty</code>		

TABLE 306: Miscellaneous mathdesign Math Symbols

$\llcorner$	<code>\rightangle</code>
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TABLE 307: Math Alphabets

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

\* 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 307, 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 “*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, “ $\langle [\alpha\beta\gamma] \rangle$ ” is produced by “`\mathbb{\langle \Langle \Lbrack \Lparen \bba\alpha \bbb\beta \bbg\gamma \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` (“ $\nabla$ ”)—but also *all* punctuation marks, various currency symbols such as `\bbdollar` (“\$”) and `\bbeuro` (“€”), and the Hebrew alphabet (e.g., “`\bbfinalnun\bbyod\bbqof\bbpe`” → “װײַזײַזײַז”).

‡ The `\sym...` commands provided by the `GfMA2e` package are actually text-mode commands. They are included in Table 307 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, `GfMA2e` provides three unlauded blackboard-bold letters: `\symAE` (“Å”), `\symOE` (“ö”), and `\symUE` (“ü”). Note that `GfMA2e` does provide math-mode commands for the most common number-set symbols. These are presented in Table 183 on page 89.

¶ As their `\text...` names imply, the fonts provided by the `yfonts` package are actually text fonts. They are included in Table 307 because they are frequently used in a mathematical context.

§ An older (i.e., prior to 1991) version of the `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 `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 2ε` 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 308: gensymb Symbols Defined to Work in Both Math and Text Mode

°C	<code>\celsius</code>	μ	<code>\micro</code>	‰	<code>\perthousand</code>
°	<code>\degree</code>	Ω	<code>\ohm</code>		

TABLE 309: wasysym Electrical and Physical Symbols

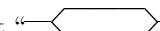
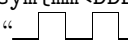
~	<code>\AC</code>	≈	<code>\VHF</code>	⋈	<code>\photon</code>	≈	<code>\HF</code>	⋈	<code>\gluon</code>
---	------------------	---	-------------------	---	----------------------	---	------------------	---	---------------------

TABLE 310: ifsym Pulse Diagram Symbols

⌋	<code>\FallingEdge</code>	⌋⌋	<code>\LongPulseLow</code>	⌋	<code>\PulseLow</code>	⌋⌋	<code>\ShortPulseHigh</code>
⌋⌋	<code>\LongPulseHigh</code>	⌋⌋	<code>\PulseHigh</code>	⌋	<code>\RaisingEdge</code>	⌋	<code>\ShortPulseLow</code>

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

<code>_ l</code>	<code>- m</code>	<code>- h</code>	<code>- d</code>	<code>&lt; &lt;</code>	<code>&gt; &gt;</code>
<code>_ L</code>	<code>- M</code>	<code>- H</code>	<code>- D</code>	<code>&lt; &lt;&lt;</code>	<code>&gt; &gt;&gt;</code>

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 311: ar Aspect Ratio Symbol

$\mathcal{R}$	<code>\AR</code>
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TABLE 312: textcomp Text-mode Science and Engineering Symbols

°C	<code>\textcelsius</code>	Ω	<code>\textmho</code>	μ	<code>\textmu</code>	Ω	<code>\textohm</code>
----	---------------------------	---	-----------------------	---	----------------------	---	-----------------------

TABLE 313: `steinmetz` Extensible Phasor Symbol

$\langle abc \rangle$  `\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 314: `emf` Electromotive Force Symbols

$\mathcal{E}$  `\emf` with package option `boondox` (default)  
 $\mathcal{E}$  `\emf` with package option `cal`\*  
 $\mathcal{E}$  `\emf` with package option `calligra`  
 $\mathcal{E}$  `\emf` with package option `chorus`  
 $\mathcal{E}$  `\emf` with package option `cmr`  
 $\mathcal{E}$  `\emf` with package option `fourier`  
 $\mathcal{E}$  `\emf` with package option `frursive`  
 $\mathcal{E}$  `\emf` with package option `miama`  
 $\mathcal{E}$  `\emf` with package option `rsfs`

\* With the `cal` package option, `\emf` uses `\mathcal{cal}`. Hence, the depiction of “E” depends on the currently loaded math font.

TABLE 315: `wasysym` Astronomical Symbols

$\♁$	<code>\mercury</code>	$\♁$	<code>\earth</code>	$\♃$	<code>\jupiter</code>	$\♅$	<code>\uranus</code>	$\♇$	<code>\pluto</code>
$\♀$	<code>\venus</code>	$\♂$	<code>\mars</code>	$\♄$	<code>\saturn</code>	$\♆$	<code>\neptune</code>		
$\odot$	<code>\astrosun</code>	$\bigcirc$	<code>\fullmoon</code>	$\☾$	<code>\leftmoon</code>	$\bullet$	<code>\newmoon</code>	$\☽$	<code>\rightmoon</code>
$\♈$	<code>\aries</code>	$\♋$	<code>\cancer</code>	$\♎$	<code>\libra</code>	$\♏$	<code>\aquarius</code>		
$\♉$	<code>\taurus</code>	$\♌$	<code>\leo</code>	$\♍$	<code>\scorpio</code>	$\♐$	<code>\capricornus</code>		
$\♊$	<code>\gemini</code>	$\♍$	<code>\virgo</code>	$\♎$	<code>\sagittarius</code>	$\♑$	<code>\pisces</code>		
$\♁$	<code>\ascnode</code>	$\♁$	<code>\descnode</code>	$\♁$	<code>\conjunction</code>	$\♁$	<code>\opposition</code>	$\♁$	<code>\vernal</code>

TABLE 316: `marvosym` Astronomical Symbols

$\♁$	<code>\Mercury</code>	$\♁$	<code>\Earth</code>	$\♃$	<code>\Jupiter</code>	$\♅$	<code>\Uranus</code>	$\♇$	<code>\Pluto</code>
$\♀$	<code>\Venus</code>	$\♂$	<code>\Mars</code>	$\♄$	<code>\Saturn</code>	$\♆$	<code>\Neptune</code>		
$\☾$	<code>\Moon</code>	$\odot$	<code>\Sun</code>						
$\♈$	<code>\Aries</code>	$\♋$	<code>\Cancer</code>	$\♎$	<code>\Libra</code>	$\♏$	<code>\Capricorn</code>		
$\♉$	<code>\Taurus</code>	$\♌$	<code>\Leo</code>	$\♍$	<code>\Scorpio</code>	$\♐$	<code>\Aquarius</code>		
$\♊$	<code>\Gemini</code>	$\♍$	<code>\Virgo</code>	$\♎$	<code>\Sagittarius</code>	$\♑$	<code>\Pisces</code>		

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

TABLE 317: fontawesome Astronomical Symbols

♂	<code>\faMars</code>	☾	<code>\faMoon0</code>	♀	<code>\faVenus</code>
☿	<code>\faMercury</code>	☼	<code>\faSun0</code>		

TABLE 318: mathabx Astronomical Symbols

☿	<code>\Mercury</code>	♁	<code>\Earth</code>	♃	<code>\Jupiter</code>	♅	<code>\Uranus</code>	♇	<code>\Pluto</code>
♀	<code>\Venus</code>	♂	<code>\Mars</code>	♄	<code>\Saturn</code>	♆	<code>\Neptune</code>	♁	<code>\varEarth</code>
◯	<code>\fullmoon</code>	☾	<code>\leftmoon</code>	●	<code>\newmoon</code>	☽	<code>\rightmoon</code>	☼	<code>\Sun</code>
♈	<code>\Aries</code>	♉	<code>\Taurus</code>	♊	<code>\Gemini</code>				

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

TABLE 319: stix Astronomical Symbols

☼	<code>\astrosun</code>	☾	<code>\leftmoon</code>	☽	<code>\rightmoon</code>	☼	<code>\sun</code>
---	------------------------	---	------------------------	---	-------------------------	---	-------------------

TABLE 320: 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 <sup>asc</sup>	\ASC	E <sup>p</sup>	\EastPoint	M <sup>c</sup>	\MC		
D <sup>asc</sup>	\DSC	I <sup>c</sup>	\IC	V <sup>x</sup>	\Vertex		
D <sup>i</sup>	\Direct	R <sub>x</sub>	\Retrograde	S <sup>i</sup>	\Station		
♁	\Air	♁	\Earth	♁	\Fire	♁	\Water
N <sup>u</sup>	\Natal	★	\Pentagram	R <sup>ad</sup>	\Radix		

TABLE 321: wasysym APL Symbols

□	\APLbox	⊞	\APLin	*	\APLstar
⊞	\APLcomment	⊞	\APLleftarrowbox	△	\APLup
▽	\APLdown	⊞	\APLlog	⊞	\APLuparrowbox
⊞	\APLdownarrowbox	-	\APLminus	↖	\notbackslash
⊞	\APLinput	⊞	\APLrightarrowbox	↗	\notslash
a	\APLcirc{a}	⊞	\APLnot{a}	⊞	\APLvert{a}

TABLE 322: stix APL Symbols

⊞	\APLboxquestion	↖	\APLnotbackslash
⊞	\APLboxupcaret	↗	\APLnotslash



TABLE 323: apl APL Symbols

	\AB	∞	\DD	∇	\GD	⊖	\LK	∅	\PD	↑	\UA	<u>G</u>	\ZG	<u>Q</u>	\ZQ
α	\AM	⊥	\DE	≥	\GE	○	\LO	∩	\QQ	_	\US	<u>H</u>	\ZH	<u>B</u>	\ZR
\	\BL	∇	\DL	→	\GO	⊃	\LU	}	\RB	U	\UU	<u>I</u>	\ZI	<u>S</u>	\ZS
□	\BX	◇	\DM	△	\GU	≠	\NE	⊖	\RK	⊕	\XQ	<u>J</u>	\ZJ	<u>T</u>	\ZT
\	\CB	⊞	\DQ	⊖	\IB	-	\NG	ρ	\RO	<u>A</u>	\ZA	<u>K</u>	\ZK	<u>U</u>	\ZU
⌈	\CE	∩	\DU	~	\IO	★	\NN	c	\RU	<u>B</u>	\ZB	<u>L</u>	\ZL	<u>V</u>	\ZV
⊇	\CO	⊖	\EN	{	\LB	∅	\NR	φ	\RV	<u>C</u>	\ZC	<u>M</u>	\ZM	<u>W</u>	\ZW
○	\CR	∈	\EP	△	\LD	~	\NT	○	\SO	<u>D</u>	\ZD	<u>N</u>	\ZN	<u>X</u>	\ZX
/	\CS	⌊	\FL	≤	\LE	ω	\OM	SS	\SS	<u>E</u>	\ZE	<u>O</u>	\ZO	<u>Y</u>	\ZY
↓	\DA	∅	\FM	⊕	\LG	v	\OR	∅	\TR	<u>F</u>	\ZF	<u>P</u>	\ZP	<u>Z</u>	\ZZ

TABLE 324: marvosym Computer Hardware Symbols

































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

TABLE 325: keystroke Computer Keys

	\Alt		\Enter*		\PrtSc*
	\AltGr		\Esc*		\RArrow
	\Break*		\Home*		\Return
	\BSpace <sup>†</sup>		\Ins*		\Scroll*
	\Ctrl*		\LArrow		\Shift*
	\DArrow		\NumLock		\Spacebar
	\Del*		\PgDown*		\Tab <sup>†</sup>
	\End*		\PgUp*		\UArrow

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

<sup>†</sup> 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 “”.

TABLE 326: 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	L	\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 327: logic Logic Gates
























	\ANDd		\BUFu		\NANDl		\ORd
	\ANDl		\BusWidth		\NANDr		\ORl
	\ANDr		\INVd		\NANDu		\ORr
	\ANDu		\INVl		\NORd		\ORu
	\BUFd		\INVr		\NORl		
	\BUF1		\INVu		\NORr		
	\BUFr		\NANDd		\NORu		

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 532 and Table 533 on page 231.

TABLE 328: marvosym Communication Symbols

	\Email		\fax		\Faxmachine		\Lightning		\Pickup
	\EmailCT		\FAX		\Letter		\Mobilephone		\Telefon

TABLE 329: marvosym Engineering Symbols

	<code>\Beam</code>		<code>\Force</code>		<code>\Octosteel</code>		<code>\RoundedTTsteel</code>
	<code>\Bearing</code>		<code>\Hexasteel</code>		<code>\Rectpipe</code>		<code>\Squarepipe</code>
	<code>\Circpipe</code>		<code>\Lefttorque</code>		<code>\Rectsteel</code>		<code>\Squaresteel</code>
	<code>\Circsteel</code>		<code>\Line load</code>		<code>\Righttorque</code>		<code>\Tsteel</code>
	<code>\Fixedbearing</code>		<code>\Loosebearing</code>		<code>\RoundedLsteel*</code>		<code>\TTsteel</code>
	<code>\Flatsteel</code>		<code>\Lsteel</code>		<code>\RoundedTsteel*</code>		

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

TABLE 330: wasysym Biological Symbols



	<code>\female</code>		<code>\male</code>
---	----------------------	---	--------------------

TABLE 331: stix Biological Symbols





	<code>\female</code>		<code>\male</code>
	<code>\Hermaphrodite</code>		<code>\neuter</code>

TABLE 332: marvosym Biological Symbols























	<code>\FEMALE</code>		<code>\FemaleMale</code>		<code>\Male</code>		<code>\Neutral</code>
	<code>\Female</code>		<code>\Hermaphrodite</code>		<code>\MALE</code>		
	<code>\FemaleFemale</code>		<code>\HERMAPHRODITE</code>		<code>\MaleMale</code>		

TABLE 333: fontawesome Biological Symbols

























	<code>\faGenderless</code>		<code>\faMarsStrokeH</code>		<code>\faTransgenderAlt</code>
	<code>\faMars</code>		<code>\faMarsStrokeV</code>		<code>\faVenus</code>
	<code>\faMarsDouble</code>		<code>\faNeuter</code>		<code>\faVenusDouble</code>
	<code>\faMarsStroke</code>		<code>\faTransgender</code>		<code>\faVenusMars</code>

fontawesome defines `\faIntersex` as a synonym for `\faTransgender`

TABLE 334: marvosym Safety-related Symbols

	<code>\Biohazard</code>		<code>\CEsign</code>		<code>\Explosionsafe</code>		<code>\Radioactivity</code>
	<code>\BSEfree</code>		<code>\Estatically</code>		<code>\Laserbeam</code>		<code>\Stopsign</code>

TABLE 335: feyn Feynman Diagram Symbols

	<code>\bigbosonloop</code>	<code>-</code>	<code>\hfermion</code>		<code>\smallbosonloopV</code>		
	<code>\bigbosonloopA</code>		<code>\shfermion</code>	<code>\</code>	<code>\wfermion</code>		
	<code>\bigbosonloopV</code>		<code>\smallbosonloop</code>	<code>=</code>	<code>\whfermion</code>		
	<code>\gvcropped</code>		<code>\smallbosonloopA</code>				
	<code>\feyn{a}</code>	<code>/</code>	<code>\feyn{fu}</code>		<code>\feyn{glS}</code>	<code>...</code>	<code>\feyn{hs}</code>
	<code>\feyn{c}</code>	<code> </code>	<code>\feyn{fv}</code>		<code>\feyn{glu}</code>	<code>/</code>	<code>\feyn{hu}</code>
<code>-</code>	<code>\feyn{f}</code>		<code>\feyn{g}</code>		<code>\feyn{gu}</code>	<code>=</code>	<code>\feyn{m}</code>
<code>\</code>	<code>\feyn{fd}</code>		<code>\feyn{g1}</code>		<code>\feyn{gv}</code>	<code>=</code>	<code>\feyn{ms}</code>
	<code>\feyn{fl}</code>		<code>\feyn{gd}</code>		<code>\feyn{gvs}</code>		<code>\feyn{p}</code>
	<code>\feyn{flS}</code>		<code>\feyn{gl}</code>	<code>----</code>	<code>\feyn{h}</code>		<code>\feyn{P}</code>
<code>-</code>	<code>\feyn{fs}</code>		<code>\feyn{glB}</code>	<code>\</code>	<code>\feyn{hd}</code>	<code>x</code>	<code>\feyn{x}</code>

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 336: svrsymbols Physics Ideograms

$\Delta$	<code>\adsorbate</code>	$\mathbb{X}$	<code>\experimentalsym</code>	$\mathcal{P}$	<code>\protein</code>
$\mathcal{C}$	<code>\adsorbent</code>	$\blacksquare$	<code>\externalsym</code>	$p^+$	<code>\proton</code>
$\mu^+$	<code>\antimuon</code>	$\mathcal{F}$	<code>\fermiDistrib</code>	$\mathcal{Q}$	<code>\quadrupole</code>
$\bar{\nu}$	<code>\antineutrino</code>	$\mathcal{F}$	<code>\fermion</code>	$q$	<code>\quark</code>
$\bar{n}$	<code>\antineutron</code>	$g$	<code>\Gluon</code>	$b$	<code>\quarkb</code>
$p^-$	<code>\antiproton</code>	$\square$	<code>\graphene</code>	$c$	<code>\quarkc</code>
$\bar{q}$	<code>\antiquark</code>	$g$	<code>\graviton</code>	$d$	<code>\quarkd</code>
$\bar{b}$	<code>\antiquarkb</code>	$\mathbb{H}$	<code>\hbond</code>	$s$	<code>\quarks</code>
$\bar{c}$	<code>\antiquarkc</code>	$\mathbb{A}$	<code>\Higgsboson</code>	$t$	<code>\quarkt</code>
$\bar{d}$	<code>\antiquarkd</code>	$h^+$	<code>\hole</code>	$u$	<code>\quarku</code>
$\bar{s}$	<code>\antiquarks</code>	$\mathcal{I}$	<code>\interaction</code>	$R$	<code>\reference</code>
$\bar{t}$	<code>\antiquarkt</code>	$\square$	<code>\internalsym</code>	$\ll$	<code>\resistivity</code>
$\bar{u}$	<code>\antiquarku</code>	$\textcircled{1}$	<code>\ion</code>	$q^-$	<code>\rhomesonminus</code>
$\mathcal{A}$	<code>\anyon</code>	$\oplus$	<code>\ionicbond</code>	$q^0$	<code>\rhomesonnull</code>
$\star$	<code>\assumption</code>	$\Psi$	<code>\Jpsimeson</code>	$q^+$	<code>\rhomesonplus</code>
$\otimes$	<code>\atom</code>	$K^-$	<code>\Kaonminus</code>	$\boxplus$	<code>\solid</code>
$\star$	<code>\bigassumption</code>	$K^0$	<code>\Kaonnull</code>	$\otimes$	<code>\spin</code>
$\bigstar$	<code>\Bigassumption</code>	$K^+$	<code>\Kaonplus</code>	$\downarrow$	<code>\spindown</code>
$\bigstar$	<code>\biggassumption</code>	$\rightarrow$	<code>\magnon</code>	$\uparrow$	<code>\spinup</code>

(continued on next page)

(continued from previous page)

$B^-$	\Bmesonminus	$\mathcal{M}$	\maxwellDistrib	$\Phi$	\surface
$B^0$	\Bmesonnull	$\mathcal{M}$	\metalbond	$\mathbb{W}$	\svrexample
$B^+$	\Bmesonplus	$\mathcal{M}$	\method	$f$	\svrphoton
$\text{—}$	\bond	$\mu^-$	\muon	$t$	\tachyon
$\mathcal{B}$	\boseDistrib	$\nu$	\neutrino	$\tau^-$	\tauleptonminus
$\mathcal{B}$	\boson	$n^0$	\neutron	$\tau^+$	\tauleptonplus
$\otimes$	\conductivity	$\text{•••}$	\nucleus	$T^-$	\Tmesonminus
$\ominus$	\covbond	$\curvearrowright$	\orbit	$T^0$	\Tmesonnull
$d$	\dipole	$\phi$	\phimeson	$T^+$	\Tmesonplus
$D^-$	\Dmesonminus	$\phi^0$	\phimesonnull	$\text{⊖}$	\triplecovbond
$D^0$	\Dmesonnull	$f$	\phonon	$Y$	\Upsilonmeson
$D^+$	\Dmesonplus	$\pi^-$	\pionminus	$\text{f}$	\varphoton
$\text{⊖}$	\doublecovbond	$\pi^0$	\pionnull	$\text{•}$	\water
$e^-$	\electron	$\pi^+$	\pionplus	$W$	\Wboson
$\mathbb{E}$	\errorsym	$\text{~e~}$	\plasmon	$W^-$	\Wbosonminus
$\eta$	\etameson	$\text{ξ}$	\polariton	$W^+$	\Wbosonplus
$\eta'$	\etamesonprime	$\text{~f~}$	\polaron	$Z$	\Zboson
$\text{~}h^+$	\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 337: `bbding` Arrows






	<code>\ArrowBoldDownRight</code>		<code>\ArrowBoldRightShort</code>		<code>\ArrowBoldUpRight</code>
	<code>\ArrowBoldRightCircled</code>		<code>\ArrowBoldRightStrobe</code>		

TABLE 338: `pifont` Arrows































































































	<code>\ding{212}</code>		<code>\ding{221}</code>		<code>\ding{230}</code>		<code>\ding{239}</code>		<code>\ding{249}</code>
	<code>\ding{213}</code>		<code>\ding{222}</code>		<code>\ding{231}</code>		<code>\ding{241}</code>		<code>\ding{250}</code>
	<code>\ding{214}</code>		<code>\ding{223}</code>		<code>\ding{232}</code>		<code>\ding{242}</code>		<code>\ding{251}</code>
	<code>\ding{215}</code>		<code>\ding{224}</code>		<code>\ding{233}</code>		<code>\ding{243}</code>		<code>\ding{252}</code>
	<code>\ding{216}</code>		<code>\ding{225}</code>		<code>\ding{234}</code>		<code>\ding{244}</code>		<code>\ding{253}</code>
	<code>\ding{217}</code>		<code>\ding{226}</code>		<code>\ding{235}</code>		<code>\ding{245}</code>		<code>\ding{254}</code>
	<code>\ding{218}</code>		<code>\ding{227}</code>		<code>\ding{236}</code>		<code>\ding{246}</code>		
	<code>\ding{219}</code>		<code>\ding{228}</code>		<code>\ding{237}</code>		<code>\ding{247}</code>		
	<code>\ding{220}</code>		<code>\ding{229}</code>		<code>\ding{238}</code>		<code>\ding{248}</code>		

TABLE 339: `adfsymbols` Arrows

	<code>\adfarrowe1</code>		<code>\adfarrowe1</code>		<code>\adfarrows1</code>		<code>\adfarrowsw1</code>
	<code>\adfarrowe2</code>		<code>\adfarrowe2</code>		<code>\adfarrows2</code>		<code>\adfarrowsw2</code>
	<code>\adfarrowe3</code>		<code>\adfarrowe3</code>		<code>\adfarrows3</code>		<code>\adfarrowsw3</code>
	<code>\adfarrowe4</code>		<code>\adfarrowe4</code>		<code>\adfarrows4</code>		<code>\adfarrowsw4</code>
	<code>\adfarrowe5</code>		<code>\adfarrowe5</code>		<code>\adfarrows5</code>		<code>\adfarrowsw5</code>
	<code>\adfarrowe6</code>		<code>\adfarrowe6</code>		<code>\adfarrows6</code>		<code>\adfarrowsw6</code>
	<code>\adfarrown1</code>		<code>\adfarrownw1</code>		<code>\adfarrowse1</code>		<code>\adfarrownw1</code>
	<code>\adfarrown2</code>		<code>\adfarrownw2</code>		<code>\adfarrowse2</code>		<code>\adfarrownw2</code>
	<code>\adfarrown3</code>		<code>\adfarrownw3</code>		<code>\adfarrowse3</code>		<code>\adfarrownw3</code>
	<code>\adfarrown4</code>		<code>\adfarrownw4</code>		<code>\adfarrowse4</code>		<code>\adfarrownw4</code>
	<code>\adfarrown5</code>		<code>\adfarrownw5</code>		<code>\adfarrowse5</code>		<code>\adfarrownw5</code>
	<code>\adfarrown6</code>		<code>\adfarrownw6</code>		<code>\adfarrowse6</code>		<code>\adfarrownw6</code>
	<code>\adhalfarrowleft</code>		<code>\adhalfarrowright</code>				
	<code>\adhalfarrowleftsolid</code>		<code>\adhalfarrowrightsolid</code>				

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 340: adorn Arrows

↖	<code>\adfhalfleftarrow</code>	↗	<code>\adfhalfrightarrowhead</code>
↖	<code>\adfhalfleftarrowhead</code>	↖	<code>\adleftarrowhead</code>
↗	<code>\adhalfrightarrow</code>	↗	<code>\adrightarrowhead</code>

TABLE 341: arev Arrows

➤	<code>\arrowbullet</code>
---	---------------------------

TABLE 342: fontawesome Arrows

⬇	<code>\faArrowCircleDown</code>	⬇	<code>\faArrowDown</code>	⬇	<code>\faLongArrowDown</code>
⬅	<code>\faArrowCircleLeft</code>	⬅	<code>\faArrowLeft</code>	⬅	<code>\faLongArrowLeft</code>
⬇	<code>\faArrowCircleODown</code>	➡	<code>\faArrowRight</code>	➡	<code>\faLongArrowRight</code>
⬅	<code>\faArrowCircleOLeft</code>	↕	<code>\faArrows</code>	⬆	<code>\faLongArrowUp</code>
➡	<code>\faArrowCircleORight</code>	⌘	<code>\faArrowsAlt</code>	↻	<code>\faRepeat</code>
⬆	<code>\faArrowCircleOUp</code>	↔	<code>\faArrowsH</code>	↺	<code>\faUndo</code>
➡	<code>\faArrowCircleRight</code>	⬆	<code>\faArrowsV</code>		
⬆	<code>\faArrowCircleUp</code>	⬆	<code>\faArrowUp</code>		

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

TABLE 343: fontawesome Chevrons

⬇	<code>\faChevronCircleDown</code>	⬆	<code>\faChevronCircleUp</code>	➤	<code>\faChevronRight</code>
⬅	<code>\faChevronCircleLeft</code>	⬇	<code>\faChevronDown</code>	⬆	<code>\faChevronUp</code>
⬆	<code>\faChevronCircleRight</code>	⬅	<code>\faChevronLeft</code>		

TABLE 344: marvosym Scissors

✂	<code>\CutLeft</code>	---	<code>\CuttingLine</code>	✂	<code>\RightScissors</code>
✂	<code>\CutRight</code>	✂	<code>\LeftScissors</code>		

TABLE 345: bbding Scissors

✂	<code>\ScissorHollowLeft</code>	✂	<code>\ScissorLeftBrokenTop</code>
✂	<code>\ScissorHollowRight</code>	✂	<code>\ScissorRight</code>
✂	<code>\ScissorLeft</code>	✂	<code>\ScissorRightBrokenBottom</code>
✂	<code>\ScissorLeftBrokenBottom</code>	✂	<code>\ScissorRightBrokenTop</code>

TABLE 346: pifont Scissors

✂	<code>\ding{33}</code>	✂	<code>\ding{34}</code>	✂	<code>\ding{35}</code>	✂	<code>\ding{36}</code>
---	------------------------	---	------------------------	---	------------------------	---	------------------------

TABLE 347: dingbat Pencils



 `\largepencil`  `\smallpencil`

TABLE 348: arev Pencils


 `\pencil`

TABLE 349: fontawesome Pencils




 `\faPencil`  `\faPencilSquare`  `\faPencilSquareO`

TABLE 350: bbding Pencils and Nibs











	<code>\NibLeft</code>		<code>\PencilLeft</code>		<code>\PencilRightDown</code>
	<code>\NibRight</code>		<code>\PencilLeftDown</code>		<code>\PencilRightUp</code>
	<code>\NibSolidLeft</code>		<code>\PencilLeftUp</code>		
	<code>\NibSolidRight</code>		<code>\PencilRight</code>		

TABLE 351: pifont Pencils and Nibs






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

TABLE 352: dingbat Fists








	<code>\leftpointright</code>		<code>\rightpointleft</code>		<code>\rightpointright</code>
	<code>\leftthumbsdown</code>		<code>\rightthumbsdown</code>		
	<code>\leftthumbsup</code>		<code>\rightthumbsup</code>		

TABLE 353: bbding Fists










	<code>\HandCuffLeft</code>		<code>\HandCuffRightUp</code>		<code>\HandPencilLeft</code>
	<code>\HandCuffLeftUp</code>		<code>\HandLeft</code>		<code>\HandRight</code>
	<code>\HandCuffRight</code>		<code>\HandLeftUp</code>		<code>\HandRightUp</code>

TABLE 354: pifont Fists





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



TABLE 355: fourier Fists

 `\lefthand`  `\righthand`

TABLE 356: arev Fists

















 `\pointright`

TABLE 357: fontawesome Fists

	<code>\faHandLizard0</code>		<code>\faHandPaper0</code>		<code>\faHandSpock0</code>
	<code>\faHand0Down</code>		<code>\faHandPeace0</code>		<code>\faThumbsDown</code>
	<code>\faHand0Left</code>		<code>\faHandPointer0</code>		<code>\faThumbs0Down</code>
	<code>\faHand0Right</code>		<code>\faHandRock0</code>		<code>\faThumbs0Up</code>
	<code>\faHand0Up</code>		<code>\faHandScissors0</code>		<code>\faThumbsUp</code>

fontawesome defines `\faHandGrab0` as a synonym for `\faHandRock0` and `\faHandStop0` as a synonym for `\faHandPaper0`.

TABLE 358: bbding Crosses and Plusses











	<code>\Cross</code>		<code>\CrossOpenShadow</code>		<code>\PlusOutline</code>
	<code>\CrossBoldOutline</code>		<code>\CrossOutline</code>		<code>\PlusThinCenterOpen</code>
	<code>\CrossClowerTips</code>		<code>\Plus</code>		
	<code>\CrossMaltese</code>		<code>\PlusCenterOpen</code>		

TABLE 359: pifont Crosses and Plusses









	<code>\ding{57}</code>		<code>\ding{59}</code>		<code>\ding{61}</code>		<code>\ding{63}</code>
	<code>\ding{58}</code>		<code>\ding{60}</code>		<code>\ding{62}</code>		<code>\ding{64}</code>

TABLE 360: adfsymbols Crosses and Plusses

	<code>\adfbullet{4}</code>		<code>\adfbullet{6}</code>		<code>\adfbullet{8}</code>		<code>\adfbullet{10}</code>
	<code>\adfbullet{5}</code>		<code>\adfbullet{7}</code>		<code>\adfbullet{9}</code>		

TABLE 361: arev Crosses

 `\eastcross`  `\westcross`

TABLE 362: bbding Xs and Check Marks






	<code>\Checkmark</code>		<code>\XSolid</code>		<code>\XSolidBrush</code>
	<code>\CheckmarkBold</code>		<code>\XSolidBold</code>		

TABLE 363: pifont Xs and Check Marks

✓	<code>\ding{51}</code>	×	<code>\ding{53}</code>	✗	<code>\ding{55}</code>
✓	<code>\ding{52}</code>	✖	<code>\ding{54}</code>	✗	<code>\ding{56}</code>

TABLE 364: wasysym Xs and Check Marks

☑	<code>\CheckedBox</code>	□	<code>\Square</code>	☒	<code>\XBox</code>
---	--------------------------	---	----------------------	---	--------------------

TABLE 365: marvosym Xs and Check Marks

☑	<code>\Checkedbox</code>	☒	<code>\CrossedBox*</code>	□	<code>\HollowBox</code>
---	--------------------------	---	---------------------------	---	-------------------------

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

TABLE 366: arev Xs and Check Marks

✓	<code>\ballotcheck</code>	✗	<code>\ballotx</code>
---	---------------------------	---	-----------------------

TABLE 367: fontawesome Xs and Check Marks

✓	<code>\faCheck</code>	☑	<code>\faCheckSquare</code>	⊗	<code>\faTimesCircle</code>
⊗	<code>\faCheckCircle</code>	☑	<code>\faCheckSquare0</code>	⊗	<code>\faTimesCircle0</code>
⊗	<code>\faCheckCircle0</code>	✗	<code>\faTimes*</code>		

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

TABLE 368: pifont Circled Numerals

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

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

<sup>4</sup>In fact, `dingautolist` can use any set of consecutive Zapf Dingbats symbols.

TABLE 369: wasysym Stars

⊠ `\davidstar` \* `\hexstar` \* `\varhexstar`

TABLE 370: bbding Stars, Flowers, and Similar Shapes

	<code>\Asterisk</code>		<code>\FiveFlowerPetal</code>		<code>\JackStar</code>
	<code>\AsteriskBold</code>		<code>\FiveStar</code>		<code>\JackStarBold</code>
	<code>\AsteriskCenterOpen</code>		<code>\FiveStarCenterOpen</code>		<code>\SixFlowerAlternate</code>
	<code>\AsteriskRoundedEnds</code>		<code>\FiveStarConvex</code>		<code>\SixFlowerAltPetal</code>
	<code>\AsteriskThin</code>		<code>\FiveStarLines</code>		<code>\SixFlowerOpenCenter</code>
	<code>\AsteriskThinCenterOpen</code>		<code>\FiveStarOpen</code>		<code>\SixFlowerPetalDotted</code>
	<code>\DavidStar</code>		<code>\FiveStarOpenCircled</code>		<code>\SixFlowerPetalRemoved</code>
	<code>\DavidStarSolid</code>		<code>\FiveStarOpenDotted</code>		<code>\SixFlowerRemovedOpenPetal</code>
	<code>\EightAsterisk</code>		<code>\FiveStarOutline</code>		<code>\SixStar</code>
	<code>\EightFlowerPetal</code>		<code>\FiveStarOutlineHeavy</code>		<code>\SixteenStarLight</code>
	<code>\EightFlowerPetalRemoved</code>		<code>\FiveStarShadow</code>		<code>\Snowflake</code>
	<code>\EightStar</code>		<code>\FourAsterisk</code>		<code>\SnowflakeChevron</code>
	<code>\EightStarBold</code>		<code>\FourCloverOpen</code>		<code>\SnowflakeChevronBold</code>
	<code>\EightStarConvex</code>		<code>\FourCloverSolid</code>		<code>\Sparkle</code>
	<code>\EightStarTaper</code>		<code>\FourStar</code>		<code>\SparkleBold</code>
	<code>\FiveFlowerOpen</code>		<code>\FourStarOpen</code>		<code>\TwelveStar</code>

TABLE 371: pifont Stars, Flowers, and Similar Shapes

	<code>\ding{65}</code>		<code>\ding{74}</code>		<code>\ding{83}</code>		<code>\ding{92}</code>		<code>\ding{101}</code>
	<code>\ding{66}</code>		<code>\ding{75}</code>		<code>\ding{84}</code>		<code>\ding{93}</code>		<code>\ding{102}</code>
	<code>\ding{67}</code>		<code>\ding{76}</code>		<code>\ding{85}</code>		<code>\ding{94}</code>		<code>\ding{103}</code>
	<code>\ding{68}</code>		<code>\ding{77}</code>		<code>\ding{86}</code>		<code>\ding{95}</code>		<code>\ding{104}</code>
	<code>\ding{69}</code>		<code>\ding{78}</code>		<code>\ding{87}</code>		<code>\ding{96}</code>		<code>\ding{105}</code>
	<code>\ding{70}</code>		<code>\ding{79}</code>		<code>\ding{88}</code>		<code>\ding{97}</code>		<code>\ding{106}</code>
	<code>\ding{71}</code>		<code>\ding{80}</code>		<code>\ding{89}</code>		<code>\ding{98}</code>		<code>\ding{107}</code>
	<code>\ding{72}</code>		<code>\ding{81}</code>		<code>\ding{90}</code>		<code>\ding{99}</code>		
	<code>\ding{73}</code>		<code>\ding{82}</code>		<code>\ding{91}</code>		<code>\ding{100}</code>		

TABLE 372: adfsymbols Stars, Flowers, and Similar Shapes

	<code>\adfbullet{1}</code>		<code>\adfbullet{13}</code>		<code>\adfbullet{18}</code>		<code>\adfbullet{23}</code>
	<code>\adfbullet{2}</code>		<code>\adfbullet{14}</code>		<code>\adfbullet{19}</code>		<code>\adfbullet{24}</code>
	<code>\adfbullet{3}</code>		<code>\adfbullet{15}</code>		<code>\adfbullet{20}</code>		<code>\adfbullet{25}</code>
	<code>\adfbullet{11}</code>		<code>\adfbullet{16}</code>		<code>\adfbullet{21}</code>		<code>\adfbullet{26}</code>
	<code>\adfbullet{12}</code>		<code>\adfbullet{17}</code>		<code>\adfbullet{22}</code>		

TABLE 373: adorn Stars

	<code>\adfast{1}</code>		<code>\adfast{3}</code>		<code>\adfast{5}</code>		<code>\adfast{7}</code>		<code>\adfast{9}</code>
	<code>\adfast{2}</code>		<code>\adfast{4}</code>		<code>\adfast{6}</code>		<code>\adfast{8}</code>		<code>\adfast{10}</code>

TABLE 374: fontawesome Stars

★ `\faStar` ☆ `\faStarHalf` ☆ `\faStarHalf0` ☆ `\faStar0`

fontawesome defines both `\faStarHalfEmpty` and `\faStarHalfFull` as synonyms for `\faStarHalf0`.

TABLE 375: fourier Fleurons and Flowers

🌀	<code>\aldine</code>	✿	<code>\decoone</code>	🌸	<code>\floweroneright</code>
🌀	<code>\aldineleft</code>	✧	<code>\decosix</code>	🍃	<code>\leafleft</code>
🌀	<code>\aldineright</code>	🌀	<code>\decothreeleft</code>	🍃	<code>\leafNE</code>
🌀	<code>\aldinesmall</code>	🌀	<code>\decothreeright</code>	🍃	<code>\leafright</code>
🌀	<code>\decofourleft</code>	🌀	<code>\decotwo</code>	✦	<code>\starredbullet</code>
🌀	<code>\decofourright</code>	🌸	<code>\floweroneleft</code>		

TABLE 376: adorn Fleurons and Flowers

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

TABLE 377: wasysym Geometric Shapes

○	<code>\Circle</code>	◐	<code>\LEFTcircle</code>	◑	<code>\octagon</code>	◓	<code>\RIGHTcircle</code>
●	<code>\CIRCLE</code>	◑	<code>\LEFTCIRCLE</code>	◓	<code>\pentagon</code>	◔	<code>\RIGHTCIRCLE</code>
◑	<code>\hexagon</code>	◐	<code>\Leftcircle</code>	◓	<code>\Rightcircle</code>	◕	<code>\varhexagon</code>

TABLE 378: MnSymbol Geometric Shapes

★	<code>\filledlargestar</code>	◇	<code>\largelozenge</code>	◇	<code>\medlozenge</code>
◆	<code>\filledlozenge</code>	☆	<code>\largepentagram</code>	☆	<code>\medstarofdavid</code>
◆	<code>\filledmedlozenge</code>	□	<code>\largesquare</code>	◇	<code>\smalllozenge</code>
○	<code>\largecircle</code>	☆	<code>\largestar</code>		
◇	<code>\largediamond</code>	☆	<code>\largestarofdavid</code>		

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 379: fdsymbol Geometric Shapes

●	<code>\largeblackcircle</code>	▽	<code>\argetriangledown</code>	◇	<code>\medlozenge</code>
■	<code>\largeblacksquare</code>	△	<code>\argetriangleup</code>	◆	<code>\smallblacklozenge</code>
★	<code>\largeblackstar</code>	☆	<code>\largewhitestar</code>	◇	<code>\smalllozenge</code>
○	<code>\largecircle</code>	◊	<code>\lozengeminus</code>	☆	<code>\starofdavid</code>
□	<code>\largsquare</code>	◆	<code>\medblacklozenge</code>		

fdsymbol defines synonyms for almost all of the preceding symbols:

○	<code>\bigcirc</code>	■	<code>\lgblksquare</code>	◇	<code>\mdlghtlozenge</code>
★	<code>\bigstar</code>	○	<code>\lgwhtcircle</code>	◇	<code>\mdwhtlozenge</code>
▽	<code>\bigtriangledown</code>	□	<code>\lgwhtsquare</code>	◆	<code>\smbklozenge</code>
△	<code>\bigtriangleup</code>	◇	<code>\lozenge</code>	◇	<code>\smwhtlozenge</code>
◆	<code>\blacklozenge</code>	◆	<code>\mdblklzenge</code>		
●	<code>\lgblkcircle</code>	◆	<code>\mdlgbklozenge</code>		

TABLE 380: boisik Geometric Shapes

★	<code>\bigstar</code>	◇	<code>\diamond</code>	▽	<code>\triangledown</code>
◆	<code>\blacklozenge</code>	◇	<code>\lozenge</code>	◁	<code>\triangleleft</code>
■	<code>\blacksquare</code>	◇	<code>\lozengedot</code>	▷	<code>\triangleright</code>
▲	<code>\blacktriangle</code>	□	<code>\square</code>	◁	<code>\varlrrtriangle</code>
▼	<code>\blacktriangledown</code>	*	<code>\star</code>		

TABLE 381: stix Geometric Shapes

↻	<code>\acwopencirclearrow</code>	▽	<code>\downtriangleleftblack</code>	◁	<code>\smalltriangleleft</code>
↶	<code>\barovernorthwestarrow</code>	▽	<code>\downtrianglerightblack</code>	▷	<code>\smalltriangleright</code>
⊕	<code>\benzenr</code>	○	<code>\enclosecircle</code>	◆	<code>\smbkldiamond</code>
▼	<code>\bigblacktriangledown</code>	◇	<code>\enclosediamond</code>	◆	<code>\smbklozenge</code>
▲	<code>\bigblacktriangleup</code>	□	<code>\enclosesquare</code>	■	<code>\smbklsquare</code>
★	<code>\bigstar</code>	△	<code>\enclosetriangle</code>	☆	<code>\smwhitestar</code>
▽	<code>\bigtriangledown</code>	●	<code>\errbarblackcircle</code>	○	<code>\smwhtcircle</code>
◁	<code>\bigtriangleleft</code>	◆	<code>\errbarblackdiamond</code>	◇	<code>\smwhtdiamond</code>
△	<code>\bigtriangleup</code>	■	<code>\errbarblacksquare</code>	◇	<code>\smwhtlozenge</code>
☆	<code>\bigwhitestar</code>	○	<code>\errbarcircle</code>	□	<code>\smwhtsquare</code>
●	<code>\blackcircledownarrow</code>	◇	<code>\errbardiamond</code>	◻	<code>\sqlozenge</code>
●	<code>\blackcircledrightdot</code>	◻	<code>\errbarsquare</code>	◼	<code>\squarebotblack</code>
⊙	<code>\blackcircledtwodots</code>	●	<code>\fisheye</code>	▒	<code>\squarecrossfill</code>
◐	<code>\blackcircleulquadwhite</code>	▱	<code>\fltns</code>	▒	<code>\squarehfill</code>
◆	<code>\blackdiamonddownarrow</code>	⬡	<code>\hexagon</code>	▒	<code>\squarehvfill</code>
◇	<code>\blackinwhitediamond</code>	⬛	<code>\hexagonblack</code>	◼	<code>\squareleftblack</code>
◼	<code>\blackinwhitesquare</code>	⬜	<code>\house</code>	◼	<code>\squarellblack</code>
◐	<code>\blacklefthalfcircle</code>	▭	<code>\hrectangle</code>	◼	<code>\squarellquad</code>
◆	<code>\blacklozenge</code>	▬	<code>\hrectangleblack</code>	◼	<code>\squarelrblack</code>
◀	<code>\blackpointerleft</code>	⊙	<code>\inversewhitecircle</code>	◼	<code>\squarelrquad</code>
▶	<code>\blackpointerright</code>	◐	<code>\invwhitelowerhalfcircle</code>	▨	<code>\squareneswfill</code>
◑	<code>\blackrighthalfcircle</code>	◑	<code>\invwhiteupperhalfcircle</code>	▩	<code>\squarenwsefill</code>






































































(continued on next page)

(continued from previous page)

▲	\blacktriangle	●	\lgblkcircle	◻	\squaresrightblack
▼	\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	●	\mdlgbkcircle	◼	\triangleleftblack
◓	\circledrightdot	◆	\mdlgbkdiamond	△	\triangleodot
☆	\circledstar	■	\mdlgbksquare	◼	\trianglerightblack
⊙	\circledtwodots	◇	\mdlgwhtdiamond	△	\triangles
◉	\circledwhitebullet	◇	\mdlgwhtlozenge	△	\triangleubar
◌	\circlelefthalfblack	◻	\mdlgwhtsquare	◼	\ulblacktriangle
⊕	\circlellquad	●	\mdsmbkcircle	◻	\ultriangle
⊖	\circlelrquad	■	\mdsmbksquare	⊕	\uparrowoncircle
◐	\cirlerrighthalfblack	◦	\mdsmwhtcircle	◼	\urblacktriangle
◑	\cirlertophalfblack	◻	\mdsmwhtsquare	▽	\urtriangle
⊕	\circleulquad	○	\mdwhtcircle	⬡	\varhexagon
⊖	\circleurquad	◇	\mdwhtdiamond	⬢	\varhexagonblack
◐	\circleurquadblack	◇	\mdwhtlozenge	⬣	\varhexagonlronds
◑	\circlevertfill	◻	\mdwhtsquare	◻	\varlrtriangle
⊖	\cirE	★	\medblackstar	★	\varstar
◌	\cirscir	☆	\medwhitestar	◻	\vrectangle
↻	\cwopencirclearrow	▭	\parallelogram	■	\vrectangleblack
◼	\diamondbotblack	▨	\parallelogramblack	·	\vysmbklsquare
◊	\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 \mdlgbksquare, \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 382: ifsym Geometric Shapes

	<code>\BigCircle</code>		<code>\FilledBigTriangleRight</code>		<code>\SmallCircle</code>
	<code>\BigCross</code>		<code>\FilledBigTriangleUp</code>		<code>\SmallCross</code>
	<code>\BigDiamondshape</code>		<code>\FilledCircle</code>		<code>\SmallDiamondshape</code>
	<code>\BigHBar</code>		<code>\FilledDiamondShadowA</code>		<code>\SmallHBar</code>
	<code>\BigLowerDiamond</code>		<code>\FilledDiamondShadowC</code>		<code>\SmallLowerDiamond</code>
	<code>\BigRightDiamond</code>		<code>\FilledDiamondshape</code>		<code>\SmallRightDiamond</code>
	<code>\BigSquare</code>		<code>\FilledSmallCircle</code>		<code>\SmallSquare</code>
	<code>\BigTriangleDown</code>		<code>\FilledSmallDiamondshape</code>		<code>\SmallTriangleDown</code>
	<code>\BigTriangleLeft</code>		<code>\FilledSmallSquare</code>		<code>\SmallTriangleLeft</code>
	<code>\BigTriangleRight</code>		<code>\FilledSmallTriangleDown</code>		<code>\SmallTriangleRight</code>
	<code>\BigTriangleUp</code>		<code>\FilledSmallTriangleLeft</code>		<code>\SmallTriangleUp</code>
	<code>\BigVBar</code>		<code>\FilledSmallTriangleRight</code>		<code>\SmallVBar</code>
	<code>\Circle</code>		<code>\FilledSmallTriangleUp</code>		<code>\SpinDown</code>
	<code>\Cross</code>		<code>\FilledSquare</code>		<code>\SpinUp</code>
	<code>\DiamondShadowA</code>		<code>\FilledSquareShadowA</code>		<code>\Square</code>
	<code>\DiamondShadowB</code>		<code>\FilledSquareShadowC</code>		<code>\SquareShadowA</code>
	<code>\DiamondShadowC</code>		<code>\FilledTriangleDown</code>		<code>\SquareShadowB</code>
	<code>\Diamondshape</code>		<code>\FilledTriangleLeft</code>		<code>\SquareShadowC</code>
	<code>\FilledBigCircle</code>		<code>\FilledTriangleRight</code>		<code>\TriangleDown</code>
	<code>\FilledBigDiamondshape</code>		<code>\FilledTriangleUp</code>		<code>\TriangleLeft</code>
	<code>\FilledBigSquare</code>		<code>\HBar</code>		<code>\TriangleRight</code>
	<code>\FilledBigTriangleDown</code>		<code>\LowerDiamond</code>		<code>\TriangleUp</code>
	<code>\FilledBigTriangleLeft</code>		<code>\RightDiamond</code>		<code>\VBar</code>



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 383: bbding Geometric Shapes






















	<code>\CircleShadow</code>		<code>\Rectangle</code>		<code>\SquareShadowTopLeft</code>
	<code>\CircleSolid</code>		<code>\RectangleBold</code>		<code>\SquareShadowTopRight</code>
	<code>\DiamondSolid</code>		<code>\RectangleThin</code>		<code>\SquareSolid</code>
	<code>\Ellipse</code>		<code>\Square</code>		<code>\TriangleDown</code>
	<code>\EllipseShadow</code>		<code>\SquareCastShadowBottomRight</code>		<code>\TriangleUp</code>
	<code>\EllipseSolid</code>		<code>\SquareCastShadowTopLeft</code>		
	<code>\HalfCircleLeft</code>		<code>\SquareCastShadowTopRight</code>		
	<code>\HalfCircleRight</code>		<code>\SquareShadowBottomRight</code>		

TABLE 384: 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 385: universa Geometric Shapes

● `\baucircle`   ■ `\bausquare`   ▲ `\bautriangle`

TABLE 386: 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 387: fontawesome Geometric Shapes

● `\faCircle`   ○ `\faCircle0Notch`   ⊙ `\faDotCircle0`   □ `\faSquare0`  
 ○ `\faCircle0`   ○ `\faCircleThin`   ■ `\faSquare`

TABLE 388: L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> Playing-Card Suits

♣ `\clubsuit`   ♦ `\diamondsuit`   ♥ `\heartsuit`   ♠ `\spadesuit`

TABLE 389: txfonts/pxfonts Playing-Card Suits

♣ `\varclubsuit`   ♦ `\vardiamondsuit`   ♥ `\varheartsuit`   ♠ `\varspadesuit`

TABLE 390: MnSymbol Playing-Card Suits

♣ `\clubsuit`   ♦ `\diamondsuit`   ♥ `\heartsuit`   ♠ `\spadesuit`

TABLE 391: fdsymbol Playing-Card Suits

♣ `\clubsuit`   ♥ `\heartsuit`   ♦ `\vardiamondsuit`  
 ♦ `\diamondsuit`   ♠ `\spadesuit`   ♥ `\varheartsuit`

TABLE 392: boisik Playing-Card Suits

♣ `\clubsuit`   ♦ `\diamondsuit`   ♥ `\heartsuit`   ♠ `\spadesuit`



TABLE 393: stix Playing-Card Suits

♣	<code>\clubsuit</code>	♥	<code>\heartsuit</code>	♠	<code>\varclubsuit</code>	♥	<code>\varheartsuit</code>
◇	<code>\diamondsuit</code>	♠	<code>\spadesuit</code>	◆	<code>\vardiamondsuit</code>	♠	<code>\varspadesuit</code>

TABLE 394: arev Playing-Card Suits

♣	<code>\varclub</code>	◆	<code>\vardiamond</code>	♥	<code>\varheart</code>	♠	<code>\varspade</code>
---	-----------------------	---	--------------------------	---	------------------------	---	------------------------

TABLE 395: adorn Flourishes

~	<code>\adfclosedflourishleft</code>	~	<code>\adfclosedflourishright</code>
~	<code>\adfdoubleflourishleft</code>	~	<code>\adfdoubleflourishright</code>
~	<code>\adfdoublesharpflourishleft</code>	~	<code>\adfdoublesharpflourishright</code>
~	<code>\adfflourishleft</code>	~	<code>\adfflourishright</code>
~	<code>\adfflourishlefthdouble</code>	~	<code>\adfflourishrightdouble</code>
~	<code>\adfopenflourishleft</code>	~	<code>\adfopenflourishright</code>
~	<code>\adfsharpflourishleft</code>	~	<code>\adfsharpflourishright</code>
~	<code>\adfsickleflourishleft</code>	~	<code>\adfsickleflourishright</code>
~	<code>\adfsingleflourishleft</code>	~	<code>\adfsingleflourishright</code>
~	<code>\adftripleflourishleft</code>	~	<code>\adftripleflourishright</code>
~	<code>\adfwavesleft</code>	~	<code>\adfwavesright</code>

TABLE 396: Miscellaneous dingbat Dingbats

⚓	<code>\anchor</code>	👁	<code>\eye</code>	⏏	<code>\Sborder</code>
↩	<code>\carriagereturn</code>	◼	<code>\filledsquarewithdots</code>	◻	<code>\squarewithdots</code>
✓	<code>\checkmark</code>	📡	<code>\satellitedish</code>	⏏	<code>\Zborder</code>

TABLE 397: Miscellaneous bbding Dingbats

✉	<code>\Envelope</code>	✌	<code>\Peace</code>	📞	<code>\PhoneHandset</code>	☀	<code>\SunshineOpenCircled</code>
◼	<code>\OrnamentDiamondSolid</code>	☎	<code>\Phone</code>	✈	<code>\Plane</code>	📼	<code>\Tape</code>

TABLE 398: Miscellaneous pifont Dingbats

☎	<code>\ding{37}</code>	✈	<code>\ding{40}</code>	♥	<code>\ding{164}</code>	♠	<code>\ding{167}</code>	♠	<code>\ding{171}</code>
🕒	<code>\ding{38}</code>	✉	<code>\ding{41}</code>	♠	<code>\ding{165}</code>	♣	<code>\ding{168}</code>	◆	<code>\ding{169}</code>
🕒	<code>\ding{39}</code>	♠	<code>\ding{118}</code>	♠	<code>\ding{166}</code>	♥	<code>\ding{170}</code>		

TABLE 399: Miscellaneous adorn Dingbats

•	<code>\adfbullet</code>	◇	<code>\adfdiamond</code>	ƒ	<code>\adfgee</code>	§	<code>\adfS</code>	◻	<code>\adfsquare</code>
---	-------------------------	---	--------------------------	---	----------------------	---	--------------------	---	-------------------------

## 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 400: phaistos Symbols from the Phaistos Disk













































































	<code>\PHarrow</code>		<code>\PHeagle</code>		<code>\PHplumedHead</code>
	<code>\PHbee</code>		<code>\PHflute</code>		<code>\PHram</code>
	<code>\PHbeehive</code>		<code>\PHgauntlet</code>		<code>\PHrosette</code>
	<code>\PHboomerang</code>		<code>\PHgrater</code>		<code>\PHsaw</code>
	<code>\PHbow</code>		<code>\PHhelmet</code>		<code>\PHshield</code>
	<code>\PHbullLeg</code>		<code>\PHhide</code>		<code>\PHship</code>
	<code>\PHcaptive</code>		<code>\PHhorn</code>		<code>\PHsling</code>
	<code>\PHcarpentryPlane</code>		<code>\PHlid</code>		<code>\PHsmallAxe</code>
	<code>\PHcat</code>		<code>\PHlily</code>		<code>\PHstrainer</code>
	<code>\PHchild</code>		<code>\PHmanacles</code>		<code>\PHTattooedHead</code>
	<code>\PHclub</code>		<code>\PHmattock</code>		<code>\PHTiara</code>
	<code>\PHcolumn</code>		<code>\PHoxBack</code>		<code>\PHTunny</code>
	<code>\PHcomb</code>		<code>\PHpapyrus</code>		<code>\PHvine</code>
	<code>\PHdolium</code>		<code>\PHpedestrian</code>		<code>\PHwavyBand</code>
	<code>\PHdove</code>		<code>\PHplaneTree</code>		<code>\PHwoman</code>

TABLE 401: protosem Proto-Semitic Characters

	<code>\Aaleph</code>		<code>\AAhe</code>		<code>\Akaph</code>		<code>\Asamekh</code>		<code>\Aresh</code>
	<code>\AAaleph</code>		<code>\Azayin</code>		<code>\AAkaph</code>		<code>\Ape</code>		<code>\Ashin</code>
	<code>\Abeth</code>		<code>\Avav</code>		<code>\Alamed</code>		<code>\AApe</code>		<code>\Ahelme</code>
	<code>\AAbeth</code>		<code>\Aheth</code>		<code>\AAlamed</code>		<code>\Asade</code>		<code>\AAhelme</code>
	<code>\Agimel</code>		<code>\AAheth</code>		<code>\Amem</code>		<code>\AAsade</code>		<code>\Atav</code>
	<code>\Adaleth</code>		<code>\Ateth</code>		<code>\Anun</code>		<code>\Aqoph</code>		
	<code>\AAdaleth</code>		<code>\Ayod</code>		<code>\Aayin</code>		<code>\AAqoph</code>		
	<code>\Ahe</code>		<code>\AAyod</code>		<code>\AAayin</code>		<code>\Aresh</code>		

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 “`𐤀𐤁𐤂𐤃𐤄𐤅𐤆𐤇𐤈`”). See the protosem documentation for more information.

TABLE 402: hieroglf Hieroglyphics

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

The hieroglf package defines alternate control sequences and single-letter short-cuts 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 403: linearA Linear A Script

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

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𠄎	\LinearAXIV	𠄎	\LinearACXII	𠄎	\LinearACCX	𠄎	\LinearACCCVIII
𠄏	\LinearAXV	𠄏	\LinearACXIII	𠄏	\LinearACCXI	𠄏	\LinearACCCIX
𠄐	\LinearAXVI	𠄐	\LinearACXIV	𠄐	\LinearACCXII	𠄐	\LinearACCCX
𠄑	\LinearAXVII	𠄑	\LinearACXV	𠄑	\LinearACCXIII	𠄑	\LinearACCCXI
𠄒	\LinearAXVIII	𠄒	\LinearACXVI	𠄒	\LinearACCXIV	𠄒	\LinearACCCXII
𠄓	\LinearAXIX	𠄓	\LinearACXVII	𠄓	\LinearACCXV	𠄓	\LinearACCCXIII
𠄔	\LinearAXX	𠄔	\LinearACXVIII	𠄔	\LinearACCXVI	𠄔	\LinearACCCXIV
𠄕	\LinearAXXI	𠄕	\LinearACXIX	𠄕	\LinearACCXVII	𠄕	\LinearACCCXV
𠄖	\LinearAXXII	𠄖	\LinearACXX	𠄖	\LinearACCXVIII	𠄖	\LinearACCCXVI
𠄗	\LinearAXXIII	𠄗	\LinearACXXI	𠄗	\LinearACCXIX	𠄗	\LinearACCCXVII
𠄘	\LinearAXXIV	𠄘	\LinearACXXII	𠄘	\LinearACCXX	𠄘	\LinearACCCXVIII
𠄙	\LinearAXXV	𠄙	\LinearACXXIII	𠄙	\LinearACCXXI	𠄙	\LinearACCCXIX
𠄚	\LinearAXXVI	𠄚	\LinearACXXIV	𠄚	\LinearACCXXII	𠄚	\LinearACCCXX
𠄛	\LinearAXXVII	𠄛	\LinearACXXV	𠄛	\LinearACCXXIII	𠄛	\LinearACCCXXI
𠄜	\LinearAXXVIII	𠄜	\LinearACXXVI	𠄜	\LinearACCXXIV	𠄜	\LinearACCCXXII
𠄝	\LinearAXXIX	𠄝	\LinearACXXVII	𠄝	\LinearACCXXV	𠄝	\LinearACCCXXIII
𠄞	\LinearAXXX	𠄞	\LinearACXXVIII	𠄞	\LinearACCXXVI	𠄞	\LinearACCCXXIV
𠄟	\LinearAXXXI	𠄟	\LinearACXXIX	𠄟	\LinearACCXXVII	𠄟	\LinearACCCXXV
𠄠	\LinearAXXXII	𠄠	\LinearACXXX	𠄠	\LinearACCXXVIII	𠄠	\LinearACCCXXVI
𠄡	\LinearAXXXIII	𠄡	\LinearACXXXI	𠄡	\LinearACCXXIX	𠄡	\LinearACCCXXVII
𠄢	\LinearAXXXIV	𠄢	\LinearACXXXII	𠄢	\LinearACCXXX	𠄢	\LinearACCCXXVIII
𠄣	\LinearAXXXV	𠄣	\LinearACXXXIII	𠄣	\LinearACCXXXI	𠄣	\LinearACCCXXIX
𠄤	\LinearAXXXVI	𠄤	\LinearACXXXIV	𠄤	\LinearACCXXXII	𠄤	\LinearACCCXXX
𠄥	\LinearAXXXVII	𠄥	\LinearACXXXV	𠄥	\LinearACCXXXIII	𠄥	\LinearACCCXXXI
𠄦	\LinearAXXXVIII	𠄦	\LinearACXXXVI	𠄦	\LinearACCXXXIV	𠄦	\LinearACCCXXXII
𠄧	\LinearAXXXIX	𠄧	\LinearACXXXVII	𠄧	\LinearACCXXXV	𠄧	\LinearACCCXXXIII
𠄨	\LinearAXL	𠄨	\LinearACXXXVIII	𠄨	\LinearACCXXXVI	𠄨	\LinearACCCXXXIV
𠄩	\LinearAXLI	𠄩	\LinearACXXXIX	𠄩	\LinearACCXXXVII	𠄩	\LinearACCCXXXV
𠄪	\LinearAXLII	𠄪	\LinearACXL	𠄪	\LinearACCXXXVIII	𠄪	\LinearACCCXXXVI
𠄫	\LinearAXLIII	𠄫	\LinearACXLI	𠄫	\LinearACCXXXIX	𠄫	\LinearACCCXXXVII
𠄬	\LinearAXLIV	𠄬	\LinearACXLII	𠄬	\LinearACCXL	𠄬	\LinearACCCXXXVIII
𠄭	\LinearAXLV	𠄭	\LinearACXLIII	𠄭	\LinearACCXLI	𠄭	\LinearACCCXXXIX
𠄮	\LinearAXLVI	𠄮	\LinearACXLIV	𠄮	\LinearACCXLII	𠄮	\LinearACCCXL
𠄯	\LinearAXLVII	𠄯	\LinearACXLV	𠄯	\LinearACCXLIII	𠄯	\LinearACCCXLI
𠄰	\LinearAXLVIII	𠄰	\LinearACXLVI	𠄰	\LinearACCXLIV	𠄰	\LinearACCCXLII
𠄱	\LinearAXLVIX	𠄱	\LinearACXLVII	𠄱	\LinearACCXLV	𠄱	\LinearACCCXLIII
𠄲	\LinearAL	𠄲	\LinearACXLVIII	𠄲	\LinearACCXLVI	𠄲	\LinearACCCXLIV
𠄳	\LinearALI	𠄳	\LinearACXLIX	𠄳	\LinearACCXLVII	𠄳	\LinearACCCXLV
𠄴	\LinearALII	𠄴	\LinearACL	𠄴	\LinearACCXLVIII	𠄴	\LinearACCCXLVI
𠄵	\LinearALIII	𠄵	\LinearACLI	𠄵	\LinearACCXLIX	𠄵	\LinearACCCXLVII
𠄶	\LinearALIV	𠄶	\LinearACLII	𠄶	\LinearACCL	𠄶	\LinearACCCXLVIII
𠄷	\LinearALV	𠄷	\LinearACLIII	𠄷	\LinearACCLI	𠄷	\LinearACCCXLIX
𠄸	\LinearALVI	𠄸	\LinearACLIV	𠄸	\LinearACCLII	𠄸	\LinearACCCCL
𠄹	\LinearALVII	𠄹	\LinearACLV	𠄹	\LinearACCLIII	𠄹	\LinearACCCCLI
𠄺	\LinearALVIII	𠄺	\LinearACLVI	𠄺	\LinearACCLIV	𠄺	\LinearACCCCLII
𠄻	\LinearALIX	𠄻	\LinearACLVII	𠄻	\LinearACCLV	𠄻	\LinearACCCCLIII
𠄼	\LinearALX	𠄼	\LinearACLVIII	𠄼	\LinearACCLVI	𠄼	\LinearACCCCLIV
𠄽	\LinearALXI	𠄽	\LinearACLIX	𠄽	\LinearACCLVII	𠄽	\LinearACCCCLV
𠄾	\LinearALXII	𠄾	\LinearACLX	𠄾	\LinearACCLVIII	𠄾	\LinearACCCCLVI
𠄿	\LinearALXIII	𠄿	\LinearACLXI	𠄿	\LinearACCLIX	𠄿	\LinearACCCCLVII
𠅀	\LinearALXIV	𠅀	\LinearACLXII	𠅀	\LinearACCLX	𠅀	\LinearACCCCLVIII
𠅁	\LinearALXV	𠅁	\LinearACLXIII	𠅁	\LinearACCLXI	𠅁	\LinearACCCCLIX
𠅂	\LinearALXVI	𠅂	\LinearACLXIV	𠅂	\LinearACCLXII	𠅂	\LinearACCCCLX

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𠂇	\LinearALXVII	𠂇	\LinearACLXV	𠂇	\LinearACCLXIII	𠂇	\LinearACCCLXI
𠂈	\LinearALXVIII	𠂈	\LinearACLXVI	𠂈	\LinearACCLXIV	𠂈	\LinearACCCLXII
𠂉	\LinearALXIX	𠂉	\LinearACLXVII	𠂉	\LinearACCLXV	𠂉	\LinearACCCLXIII
𠂊	\LinearALXX	𠂊	\LinearACLXVIII	𠂊	\LinearACCLXVI	𠂊	\LinearACCCLXIV
𠂋	\LinearALXXI	𠂋	\LinearACLXIX	𠂋	\LinearACCLXVII	𠂋	\LinearACCCLXV
𠂌	\LinearALXXII	𠂌	\LinearACLXX	𠂌	\LinearACCLXVIII	𠂌	\LinearACCCLXVI
𠂍	\LinearALXXIII	𠂍	\LinearACLXXI	𠂍	\LinearACCLXIX	𠂍	\LinearACCCLXVII
𠂎	\LinearALXXIV	𠂎	\LinearACLXXII	𠂎	\LinearACCLXX	𠂎	\LinearACCCLXVIII
𠂏	\LinearALXXV	𠂏	\LinearACLXXIII	𠂏	\LinearACCLXXI	𠂏	\LinearACCCLXIX
𠂐	\LinearALXXVI	𠂐	\LinearACLXXIV	𠂐	\LinearACCLXXII	𠂐	\LinearACCCLXX
𠂑	\LinearALXXVII	𠂑	\LinearACLXXV	𠂑	\LinearACCLXXIII	𠂑	\LinearACCCLXXI
𠂒	\LinearALXXVIII	𠂒	\LinearACLXXVI	𠂒	\LinearACCLXXIV	𠂒	\LinearACCCLXXII
𠂓	\LinearALXXIX	𠂓	\LinearACLXXVII	𠂓	\LinearACCLXXV	𠂓	\LinearACCCLXXIII
𠂔	\LinearALXXX	𠂔	\LinearACLXXVIII	𠂔	\LinearACCLXXVI	𠂔	\LinearACCCLXXIV
𠂕	\LinearALXXXI	𠂕	\LinearACLXXIX	𠂕	\LinearACCLXXVII	𠂕	\LinearACCCLXXV
𠂖	\LinearALXXXII	𠂖	\LinearACLXXX	𠂖	\LinearACCLXXVIII	𠂖	\LinearACCCLXXVI
𠂗	\LinearALXXXIII	𠂗	\LinearACLXXXI	𠂗	\LinearACCLXXIX	𠂗	\LinearACCCLXXVII
𠂘	\LinearALXXXIV	𠂘	\LinearACLXXXII	𠂘	\LinearACCLXXX	𠂘	\LinearACCCLXXVIII
𠂙	\LinearALXXXV	𠂙	\LinearACLXXXIII	𠂙	\LinearACCLXXXI	𠂙	\LinearACCCLXXIX
𠂚	\LinearALXXXVI	𠂚	\LinearACLXXXIV	𠂚	\LinearACCLXXXII	𠂚	\LinearACCCLXXX
𠂛	\LinearALXXXVII	𠂛	\LinearACLXXXV	𠂛	\LinearACCLXXXIII	𠂛	\LinearACCCLXXXI
𠂜	\LinearALXXXVIII	𠂜	\LinearACLXXXVI	𠂜	\LinearACCLXXXIV	𠂜	\LinearACCCLXXXII
𠂝	\LinearALXXXIX	𠂝	\LinearACLXXXVII	𠂝	\LinearACCLXXXV	𠂝	\LinearACCCLXXXIII
𠂞	\LinearALXXXX	𠂞	\LinearACLXXXVIII	𠂞	\LinearACCLXXXVI	𠂞	\LinearACCCLXXXIV
𠂟	\LinearAXCI	𠂟	\LinearACLXXXIX	𠂟	\LinearACCLXXXVII	𠂟	\LinearACCCLXXXV
𠂠	\LinearAXCII	𠂠	\LinearACLXXXX	𠂠	\LinearACCLXXXVIII	𠂠	\LinearACCCLXXXVI
𠂡	\LinearAXCIII	𠂡	\LinearACXCI	𠂡	\LinearACCLXXXIX	𠂡	\LinearACCCLXXXVII
𠂢	\LinearAXCIV	𠂢	\LinearACXCII	𠂢	\LinearACCLXXXX	𠂢	\LinearACCCLXXXVIII
𠂣	\LinearAXCV	𠂣	\LinearACXCIII	𠂣	\LinearACCXCI	𠂣	\LinearACCCLXXXIX
𠂤	\LinearAXCVI	𠂤	\LinearACXCIV	𠂤	\LinearACCXCII		
𠂥	\LinearAXCVII	𠂥	\LinearACXCV	𠂥	\LinearACCXCIII		
𠂦	\LinearAXCVIII	𠂦	\LinearACXCVI	𠂦	\LinearACCXCIV		

TABLE 404: linearb Linear B Basic and Optional Letters

	<code>\Ba</code>		<code>\Bja</code>		<code>\Bmu</code>		<code>\Bpte</code>		<code>\Broii</code>		<code>\Bto</code>
	<code>\Baii</code>		<code>\Bje</code>		<code>\Bna</code>		<code>\Bpu</code>		<code>\Bru</code>		<code>\Btu</code>
	<code>\Baiii</code>		<code>\Bjo</code>		<code>\Bne</code>		<code>\Bpuii</code>		<code>\Bsa</code>		<code>\Btwo</code>
	<code>\Bau</code>		<code>\Bju</code>		<code>\Bni</code>		<code>\Bqa</code>		<code>\Bse</code>		<code>\Bu</code>
	<code>\Bda</code>		<code>\Bka</code>		<code>\Bno</code>		<code>\Bqe</code>		<code>\Bsi</code>		<code>\Bwa</code>
	<code>\Bde</code>		<code>\Bke</code>		<code>\Bnu</code>		<code>\Bqi</code>		<code>\Bso</code>		<code>\Bwe</code>
	<code>\Bdi</code>		<code>\Bki</code>		<code>\Bnwa</code>		<code>\Bqo</code>		<code>\Bsu</code>		<code>\Bwi</code>
	<code>\Bdo</code>		<code>\Bko</code>		<code>\Bo</code>		<code>\Bra</code>		<code>\Bswa</code>		<code>\Bwo</code>
	<code>\Bdu</code>		<code>\Bku</code>		<code>\Bpa</code>		<code>\Braii</code>		<code>\Bswi</code>		<code>\Bza</code>
	<code>\Bdwe</code>		<code>\Bma</code>		<code>\Bpaiii</code>		<code>\Braiii</code>		<code>\Bta</code>		<code>\Bze</code>
	<code>\Bdwo</code>		<code>\Bme</code>		<code>\Bpe</code>		<code>\Bre</code>		<code>\Btaii</code>		<code>\Bzo</code>
	<code>\Be</code>		<code>\Bmi</code>		<code>\Bpi</code>		<code>\Bri</code>		<code>\Bte</code>		
	<code>\Bi</code>		<code>\Bmo</code>		<code>\Bpo</code>		<code>\Bro</code>		<code>\Bti</code>		

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 “ $\text{𐀀} \text{𐀁} \text{𐀂}$ ”, for example. See the linearb documentation for more information.

TABLE 405: linearb Linear B Numerals

<code>\BNi</code>		<code>\BNvii</code>		<code>\BNxl</code>		<code>\BNc</code>		<code>\BNdcc</code>
<code>\BNii</code>		<code>\BNviii</code>		<code>\BNl</code>		<code>\BNcc</code>		<code>\BNdcc</code>
<code>\BNiii</code>		<code>\BNix</code>		<code>\BNlx</code>		<code>\BNccc</code>		<code>\BNcm</code>
<code>\BNiv</code>		<code>\BNx</code>		<code>\BNlxx</code>		<code>\BNcd</code>		<code>\BNm</code>
<code>\BNv</code>		<code>\BNxx</code>		<code>\BNlxxx</code>		<code>\BNd</code>		
<code>\BNvi</code>		<code>\BNxxx</code>		<code>\BNxc</code>		<code>\BNdc</code>		

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

TABLE 406: linearb Linear B Weights and Measures

	<code>\BPtalent</code>		<code>\BPvolb</code>		<code>\BPvolcf</code>		<code>\BPwtb</code>		<code>\BPwtd</code>
	<code>\BPvola</code>		<code>\BPvolcd</code>		<code>\BPwta</code>		<code>\BPwtc</code>		

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

TABLE 407: linearb Linear B Ideograms

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

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

TABLE 408: linearb Unidentified Linear B Symbols

	<code>\BUi</code>		<code>\BUiv</code>		<code>\BUvii</code>		<code>\BUx</code>		<code>\Btwe</code>
	<code>\BUii</code>		<code>\BUv</code>		<code>\BUviii</code>		<code>\BUxi</code>		
	<code>\BUiii</code>		<code>\BUvi</code>		<code>\BUix</code>		<code>\BUxii</code>		

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

TABLE 409: cypriot Cypriot Letters

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

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 “ $\ddagger \Upsilon \bar{\Gamma}$ ”, for example. See the cypriot documentation for more information.

TABLE 410: sarabian South Arabian Letters

◦	<code>\SAa</code>	𐩨	<code>\SAz</code>	𐩧	<code>\SAm</code>	𐩦	<code>\SAsd</code>	𐩣	<code>\Sadb</code>
𐩡	<code>\SAb</code>	𐩠	<code>\SAhd</code>	𐩩	<code>\SAh</code>	𐩤	<code>\SAq</code>	𐩢	<code>\SAtb</code>
𐩢	<code>\SAg</code>	𐩣	<code>\SAtd</code>	𐩥	<code>\SAs</code>	𐩡	<code>\SAr</code>	𐩠	<code>\SAga</code>
𐩣	<code>\SAd</code>	𐩤	<code>\SAy</code>	𐩦	<code>\SAf</code>	𐩧	<code>\SAsv</code>	𐩨	<code>\SAzd</code>
𐩤	<code>\SAh</code>	𐩥	<code>\SAk</code>	𐩦	<code>\SAlq</code>	𐩧	<code>\SAt</code>	𐩨	<code>\SAsa</code>
◦	<code>\SAw</code>	𐩩	<code>\SAI</code>	𐩪	<code>\SAo</code>	𐩫	<code>\SAhu</code>	𐩬	<code>\SAdd</code>

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 “𐩡𐩢𐩣”, for example. See the sarabian documentation for more information.

TABLE 411: teubner Archaic Greek Letters and Greek Numerals

Ϟ	<code>\Coppa<sup>†</sup></code>	Ϛ	<code>\Digamma*</code>	ϛ	<code>\sampi*</code>	Ϝ	<code>\varstigma</code>
ϙ	<code>\coppa<sup>†</sup></code>	ϛ	<code>\koppa*</code>	Ϟ	<code>\Stigma</code>		
Ϛ	<code>\digamma*<sup>‡</sup></code>	ϛ	<code>\Sampi</code>	Ϝ	<code>\stigma*</code>		

\* 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 412: boisik Archaic Greek Letters and Greek Numerals

Ϛ	<code>\Digamma</code>	ϙ	<code>\qoppa</code>	Ϟ	<code>\stigma</code>	ϛ	<code>\varsampi</code>
Ϛ	<code>\digamma</code>	ϙ	<code>\Qoppa</code>	Ϟ	<code>\Stigma</code>		
ϛ	<code>\heta</code>	ϛ	<code>\Sampi</code>	Ϛ	<code>\vardigamma</code>		
ϛ	<code>\Heta</code>	ϛ	<code>\sampi</code>	ϛ	<code>\Varsampi</code>		





































TABLE 413: epiolmec Epi-Olmec Script

	<code>\EOafter</code>		<code>\EOMiddle</code>		<code>\EOStarWarrior</code>
	<code>\EOandThen</code>		<code>\EOMonster</code>		<code>\EOstep</code>
	<code>\EOAppear</code>		<code>\EOMountain</code>		<code>\EOSu</code>
	<code>\EOBeardMask</code>		<code>\EOMuu</code>		<code>\EOsu</code>
	<code>\EOBedeck</code>		<code>\EOna</code>		<code>\EOSun</code>

(continued on next page)



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	\EOBlood		\EOne		\EOSuu
	\EObrace		\EOni		\EOSuu
	\EObuilding		\EOnow		\EOta
	\EOBundle		\EOnu		\EOte
	\EOChop		\EOnuu		\EOthrone
	\EOChronI		\EOofficerI		\EOti
	\EOCloth		\EOofficerII		\EOtime
	\EODealWith		\EOofficerIII		\EOTime
	\EODeer		\EOofficerIV		\EOTitle
	\EOeat		\EOpa		\EOTitleII
	\EOflint		\EOpak		\EOTitleIV
	\EOflower		\EOPatron		\EOto
	\EOFold		\EOPatronII		\EOtu
	\EOGod		\EOpe		\EOtuki
	\EOGoUp		\EOpenis		\EOtukpa
	\EOgovernor		\EOpi		\EOturtle
	\EOGuise		\EOPierce		\EOtuu
	\EOHallow		\EOPlant		\EOtza
	\EOja		\EOPlay		\EOtze
	\EOjaguar		\EOpo		\EOtzetze
	\EOje		\EOpriest		\EOtzi
	\EOji		\EOPrince		\EOtzu
	\EOJI		\EOpu		\EOtzuu
	\EOjo		\EOpuu		\EOundef
	\EOju		\EOpuuk		\EOvarBeardMask
	\EOkak		\EORain		\EOvarja
	\EOke		\EOSa		\EOvarji
	\EOki		\EOSa		\EOvarki
	\EOkij		\EOSacrifice		\EOvarkuu
	\EOKing		\EOSaw		\EOvarni
	\EOknottedCloth		\EOScorpius		\EOvarpa

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	\EOknottedClothStraps		\EOset		\EOvarSi
	\EOko		\EOSi		\EOvarsi
	\EOku		\EOSi		\EOvartza
	\EOkuu		\EOSing	o o	\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 414: epiolmec Epi-Olmec Numerals

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

TABLE 415: allrunes Runes

þ	\a	Ǫ	E	ᚠ	\ING	ᚱ	m	Ÿ	R	ſ	\sthree
*	\A	ƿ	F	ᚦ	\ing	ᚢ	n	⌘	\RR	†	T
ƿ	a	ƿ	f	ᚦ	\Ing	ᚱ	\NG	ᚱ	\s	↑	t
ᚱ	A	X	g	᚞	\j	ᚩ	\ng	ſ	s	↳	\textsection
ᚢ	b	ᚱ	\h	᚞	j	ᚩ	o	ſ	S	↳	\th
ᚢ	B	N	H	ᚱ	J	ᚱ	\p	ſ	\seight	^	U
ᚱ	\d	H	h	᚞	\k	ᚱ	p	ſ	\sfive	∩	u
Ǫ	D	ſ	\i	Ÿ	\K	ᚱ	P	ſ	\sfour	Ɔ	w
ᚱ	d	l	i	<	k	ᚱ	\R	ſ	\sseven		
ᚱ	e	ᚱ	I	↑	l	ᚱ	r	ſ	\ssix		

The symbols in this table should appear within the argument to `\textarc` (for common Germanic runes), `\textara` (for Anglo-Frisian runes), `\textarn` (for normal runes), `\textart` (for short-twig runes), `\textarl` (for staveless runes), `\textarm` (for medieval runes), or within a scope that sets, respectively, `\arcfamily`, `\arafamily`, `\arnfamily`, `\artfamily`, `\arlfamily`, or `\armfamily`. Each family presents slightly different glyphs and/or slightly different subsets of the available runes. (The table presents the common Germanic runes.) See the `allrunes` documentation for more information.

TABLE 416: allrunes Rune Separators

	\bar	:	\doubleeye	+	\plus	:	\tripleddot
*	\cross	‡	\doubleplus	⋮	\quaddot	⋆	\tripleeye
.	\dot	⌘	\doublestar	⋄	\quadeye	‡	\tripleplus
!	\doublebar	.	\eye	*	\star		
⌘	\doublecross	⋮	\pentdot	!	\triplebar		
:	\doubledot	⋆	\penteeye	⌘	\triplecross		

See the usage comment under Table 415.

## 7 Musical symbols

The following symbols are used to typeset musical notation. The *lily<sup>♩</sup>ly<sup>♩</sup>ps* package provides a large subset of the symbols in this section. Note, however, that *lily<sup>♩</sup>ly<sup>♩</sup>ps* depends upon the *fontspec* package, OpenType (*.otf*) fonts, and some PDF graphics and therefore works only with Lua<sup>ℒ</sup>TEX or X<sub>ℒ</sub>TEX.

TABLE 417: L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> Musical Symbols

`b \flat` `♮ \natural` `♯ \sharp`

TABLE 418: textcomp Musical Symbols

`♪ \textmusicalnote`

TABLE 419: wasysym Musical Symbols

`♪ \eighthnote` `♩ \halfnote` `♪♪ \twonotes` `⋅ \fullnote` `♩ \quarternote`

TABLE 420: MnSymbol Musical Symbols

`b \flat` `♮ \natural` `♯ \sharp`

TABLE 421: fdsymbol Musical Symbols

`b \flat` `♮ \natural` `♯ \sharp`

TABLE 422: boisk Musical Symbols

`b \flat` `♮ \natural` `♯ \sharp`























































TABLE 423: stix Musical Symbols

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

TABLE 424: arev Musical Symbols





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

TABLE 425: MusiX<sub>TEX</sub> Musical Symbols

	<code>\allabreve</code>		<code>\lsf</code>		<code>\shake</code>
	<code>\altoclef</code>		<code>\lsfz</code>		<code>\Shake</code>
	<code>\backturn</code>		<code>\maxima</code>		<code>\Shake1</code>
	<code>\bassclef</code>		<code>\meterplus</code>		<code>\Shakene</code>
	<code>\caesura</code>		<code>\mordent</code>		<code>\Shakenw</code>
	<code>\coda</code>		<code>\Mordent</code>		<code>\Shakesw</code>
	<code>\Coda</code>		<code>\PAUSE</code>		<code>\smallaltoclef</code>
	<code>\Dep</code>		<code>\PAuse</code>		<code>\smallbassclef</code>
	<code>\doublethumb</code>		<code>\pause</code>		<code>\smalltrebleclef</code>
	<code>\downbow</code>		<code>\Ped</code>		<code>\sPed</code>
	<code>\ds</code>		<code>\qp</code>		<code>\trebleclef</code>
	<code>\duevolte</code>		<code>\qqs</code>		<code>\trill</code>
	<code>\fermatadown</code>		<code>\qs</code>		<code>\turn</code>
	<code>\fermataup</code>		<code>\reverseallabreve</code>		<code>\upbow</code>
	<code>\flageolet</code>		<code>\reverseC</code>		<code>\usf</code>
	<code>\hpause</code>		<code>\sDep</code>		<code>\usfz</code>
	<code>\hs</code>		<code>\Segno</code>		<code>\wq</code>
	<code>\longa</code>		<code>\segno</code>		<code>\wqq</code>




























All of these symbols are intended to be used in the context of typesetting musical scores. See the MusiX<sub>TEX</sub> documentation for more information.

TABLE 426: MusiX<sub>TEX</sub> Alternative Clefs

	<code>\drumclef</code>		<code>\gregorianFclef</code>
	<code>\gregorianCclef</code>		<code>\oldGclef</code>






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

TABLE 427: harmony Musical Symbols

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

The MusiX<sub>TEX</sub> package must be installed to use `harmony`.

TABLE 428: harmony Musical Accents

































	<code>\Ferli{A}\Ferli{a}</code> *		<code>\Ohne{A}\Ohne{a}</code> *
	<code>\Fermi{A}\Fermi{a}</code>		<code>\Umd{A}\Umd{a}</code> *
	<code>\Kr{A}\Kr{a}</code>		

\* 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 “**C**” and “`\Takt{c}{1}`” produces “**C**”.

The MusiX<sub>TEX</sub> package must be installed to use `harmony`.

TABLE 429: *lily&lilypbs* Single Notes

	<code>\eighthNote</code>		<code>\quarterNoteDottedDown</code>
	<code>\eighthNoteDotted</code>		<code>\quarterNoteDown</code>
	<code>\eighthNoteDottedDouble</code>		<code>\sixteenthNote</code>
	<code>\eighthNoteDottedDoubleDown</code>		<code>\sixteenthNoteDotted</code>
	<code>\eighthNoteDottedDown</code>		<code>\sixteenthNoteDottedDouble</code>
	<code>\eighthNoteDown</code>		<code>\sixteenthNoteDottedDoubleDown</code>
	<code>\halfNote</code>		<code>\sixteenthNoteDottedDown</code>
	<code>\halfNoteDotted</code>		<code>\sixteenthNoteDown</code>
	<code>\halfNoteDottedDouble</code>		<code>\thirtysecondNote</code>
	<code>\halfNoteDottedDoubleDown</code>		<code>\thirtysecondNoteDotted</code>
	<code>\halfNoteDottedDown</code>		<code>\thirtysecondNoteDottedDouble</code>
	<code>\halfNoteDown</code>		<code>\thirtysecondNoteDottedDoubleDown</code>
	<code>\quarterNote</code>		<code>\thirtysecondNoteDottedDown</code>
	<code>\quarterNoteDotted</code>		<code>\thirtysecondNoteDown</code>
	<code>\quarterNoteDottedDouble</code>		<code>\wholeNote</code>
	<code>\quarterNoteDottedDoubleDown</code>		<code>\wholeNoteDotted</code>

*lily&lilypbs* defines synonyms for all of the preceding symbols:

































	<code>\crotchet</code>		<code>\minimDottedDown</code>
	<code>\crotchetDotted</code>		<code>\minimDown</code>
	<code>\crotchetDottedDouble</code>		<code>\quaver</code>
	<code>\crotchetDottedDoubleDown</code>		<code>\quaverDotted</code>
	<code>\crotchetDottedDown</code>		<code>\quaverDottedDouble</code>
	<code>\crotchetDown</code>		<code>\quaverDottedDoubleDown</code>
	<code>\demisemiquaver</code>		<code>\quaverDottedDown</code>
	<code>\demisemiquaverDotted</code>		<code>\quaverDown</code>
	<code>\demisemiquaverDottedDouble</code>		<code>\semibreve</code>
	<code>\demisemiquaverDottedDoubleDown</code>		<code>\semibreveDotted</code>
	<code>\demisemiquaverDottedDown</code>		<code>\semiquaver</code>
	<code>\demisemiquaverDown</code>		<code>\semiquaverDotted</code>
	<code>\minim</code>		<code>\semiquaverDottedDouble</code>
	<code>\minimDotted</code>		<code>\semiquaverDottedDoubleDown</code>
	<code>\minimDottedDouble</code>		<code>\semiquaverDottedDown</code>
	<code>\minimDottedDoubleDown</code>		<code>\semiquaverDown</code>

TABLE 430: *lily&lilypbs* Beamed Notes









	<code>\twoBeamedQuavers</code>		<code>\threeBeamedQuaversII</code>
	<code>\threeBeamedQuavers</code>		<code>\threeBeamedQuaversIII</code>
	<code>\threeBeamedQuaversI</code>		

TABLE 431: *lilypond* 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 *lilypond* documentation for more information.

TABLE 432: *lilypond* Time Signatures

 `\lilyTimeC`     `\lilyTimeCHalf`

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

TABLE 433: *lilypond* Accidentals























 <code>\doublesharp</code>	 <code>\sharpArrowdown</code>
 <code>\flat</code>	 <code>\sharpArrowup</code>
 <code>\flatflat</code>	 <code>\sharpSlashslashslashStem</code>
 <code>\natural</code>	 <code>\sharpSlashslashslashStemstem</code>
 <code>\sharp</code>	 <code>\sharpSlashslashStem</code>
 <code>\sharpArrowboth</code>	 <code>\sharpSlashslashStemstemstem</code>

TABLE 434: *lilypond* Rests

 <code>\crotchetRest</code>	 <code>\quaverRestDotted</code>
 <code>\crotchetRestDotted</code>	 <code>\semiquaverRest</code>
 <code>\halfNoteRest</code>	 <code>\semiquaverRestDotted</code>
 <code>\halfNoteRestDotted</code>	 <code>\wholeNoteRest</code>
 <code>\quaverRest</code>	 <code>\wholeNoteRestDotted</code>

Multiply dotted rests can be produced with the `\lilyPrintMoreDots` command. See the *lilypond* documentation for more information.



TABLE 435: *lily<sup>♩</sup>ly<sup>♩</sup>pb<sup>s</sup>* Dynamics Letters

<b><i>f</i></b>	<code>\lilyDynamics{f}</code>	<b><i>r</i></b>	<code>\lilyDynamics{r}</code>
<b><i>p</i></b>	<code>\lilyDynamics{p}</code>	<b><i>s</i></b>	<code>\lilyDynamics{s}</code>
<b><i>m</i></b>	<code>\lilyDynamics{m}</code>	<b><i>z</i></b>	<code>\lilyDynamics{z}</code>
<b><i>rf</i></b>	<code>\lilyRF</code>	<b><i>rfz</i></b>	<code>\lilyRFZ</code>

These letters and the digits 0–9 are the only alphanumerics defined by *lily<sup>♩</sup>ly<sup>♩</sup>pb<sup>s</sup>*'s underlying Emmentaler fonts.

TABLE 436: *lily<sup>♩</sup>ly<sup>♩</sup>pb<sup>s</sup>* Dynamics Symbols

<b>&lt;</b>	<code>\crescHairpin</code>	<b>&gt;</b>	<code>\decrecHairpin</code>
-------------	----------------------------	-------------	-----------------------------

TABLE 437: *lily<sup>♩</sup>ly<sup>♩</sup>pb<sup>s</sup>* Articulations

<b>&gt;</b>	<code>\lilyAccent</code>	<b>^</b>	<code>\marcato</code>	<b>!</b>	<code>\staccatissimo</code>
<b>&lt;&gt;</b>	<code>\lilyEspressivo</code>	<b>v</b>	<code>\marcatoDown</code>	<b>-</b>	<code>\tenuto</code>
<b>.</b>	<code>\lilyStaccato</code>	<b>⋮</b>	<code>\portato</code>		
<b>◊</b>	<code>\lilyThumb</code>	<b>⋮</b>	<code>\portatoDown</code>		

TABLE 438: *lily<sup>♩</sup>ly<sup>♩</sup>pb<sup>s</sup>* Scripts

<b>⤿</b>	<code>\fermata</code>
----------	-----------------------

TABLE 439: *lily<sup>♩</sup>ly<sup>♩</sup>pb<sup>s</sup>* Accordion Notation

<b>☰</b>	<code>\accordionBayanBass</code>	<b>⊗</b>	<code>\accordionOldEE</code>	<b>⊖</b>	<code>\accordionStdBass</code>
<b>⊖</b>	<code>\accordionDiscant</code>	<b>⌈</b>	<code>\accordionPull</code>		
<b>⊖</b>	<code>\accordionFreeBass</code>	<b>&gt;</b>	<code>\accordionPush</code>		

TABLE 440: *lilyglyphs* Named Time Signatures

Ⓒ	<code>\lilyGlyph{timesig.C22}</code>	ϕ	<code>\lilyGlyph{timesig.mensural98}</code>
Ⓒ	<code>\lilyGlyph{timesig.C44}</code>	Ⓒ	<code>\lilyGlyph{timesig.neomensural22}</code>
ϕ	<code>\lilyGlyph{timesig.mensural22}</code>	Ⓓ	<code>\lilyGlyph{timesig.neomensural24}</code>
ϕ	<code>\lilyGlyph{timesig.mensural24}</code>	ⓐ	<code>\lilyGlyph{timesig.neomensural32}</code>
ⓐ	<code>\lilyGlyph{timesig.mensural32}</code>	ⓑ	<code>\lilyGlyph{timesig.neomensural34}</code>
ϕ	<code>\lilyGlyph{timesig.mensural34}</code>	Ⓒ	<code>\lilyGlyph{timesig.neomensural44}</code>
Ⓒ	<code>\lilyGlyph{timesig.mensural44}</code>	Ⓒ	<code>\lilyGlyph{timesig.neomensural48}</code>
Ⓒ	<code>\lilyGlyph{timesig.mensural48}</code>	Ⓒ	<code>\lilyGlyph{timesig.neomensural64}</code>
Ⓒ	<code>\lilyGlyph{timesig.mensural64}</code>	Ⓒ	<code>\lilyGlyph{timesig.neomensural68}</code>
ϕ	<code>\lilyGlyph{timesig.mensural68}</code>	Ⓒ	<code>\lilyGlyph{timesig.neomensural68alt}</code>
Ⓒ	<code>\lilyGlyph{timesig.mensural68alt}</code>	ⓐ	<code>\lilyGlyph{timesig.neomensural94}</code>
ⓐ	<code>\lilyGlyph{timesig.mensural94}</code>	ⓑ	<code>\lilyGlyph{timesig.neomensural98}</code>

*lilyglyphs* defines shorter names for a few of these symbols. See Table 432.

TABLE 441: *lilyglyphs* Named Scripts

⋈	<code>\lilyGlyph{scripts.arpeggio}</code>	⚡	<code>\lilyGlyph{scripts.prallmordent}</code>
↗	<code>\lilyGlyph{scripts.arpeggio.arrow.1}</code>	⚡	<code>\lilyGlyph{scripts.prallprall}</code>
↘	<code>\lilyGlyph{scripts.arpeggio.arrow.M1}</code>	⚡	<code>\lilyGlyph{scripts.prallup}</code>
.	<code>\lilyGlyph{scripts.augmentum}</code>	,	<code>\lilyGlyph{scripts.rcomma}</code>
⎵	<code>\lilyGlyph{scripts.barline.kievan}</code>	↩	<code>\lilyGlyph{scripts.reverseturn}</code>
//	<code>\lilyGlyph{scripts.caesura.curved}</code>	/	<code>\lilyGlyph{scripts.rvarcomma}</code>
//	<code>\lilyGlyph{scripts.caesura.straight}</code>	⌘	<code>\lilyGlyph{scripts.segno}</code>
.	<code>\lilyGlyph{scripts.circulus}</code>	>	<code>\lilyGlyph{scripts.sforzato}</code>
⊕	<code>\lilyGlyph{scripts.coda}</code>	ⓐ	<code>\lilyGlyph{scripts.snappizzicato}</code>
.	<code>\lilyGlyph{scripts.daccentus}</code>	.	<code>\lilyGlyph{scripts.staccato}</code>
☺	<code>\lilyGlyph{scripts.dfermata}</code>	+	<code>\lilyGlyph{scripts.stopped}</code>
⎵	<code>\lilyGlyph{scripts.dlongfermata}</code>	-	<code>\lilyGlyph{scripts.tenuto}</code>
v	<code>\lilyGlyph{scripts.dmarcato}</code>	☞	<code>\lilyGlyph{scripts.thumb}</code>
⎵	<code>\lilyGlyph{scripts.downbow}</code>	✓	<code>\lilyGlyph{scripts.tickmark}</code>
⚡	<code>\lilyGlyph{scripts.downmordent}</code>	⋈	<code>\lilyGlyph{scripts.trilelement}</code>
⚡	<code>\lilyGlyph{scripts.downprall}</code>	⚡	<code>\lilyGlyph{scripts.trill}</code>
n	<code>\lilyGlyph{scripts.dpedalheel}</code>	~	<code>\lilyGlyph{scripts.trill_element}</code>
^	<code>\lilyGlyph{scripts.dpedaltoe}</code>	∞	<code>\lilyGlyph{scripts.turn}</code>
⎵	<code>\lilyGlyph{scripts.dportato}</code>	.	<code>\lilyGlyph{scripts.uaccentus}</code>
.	<code>\lilyGlyph{scripts.dsemicirculus}</code>	☺	<code>\lilyGlyph{scripts.ufermata}</code>
V	<code>\lilyGlyph{scripts.dshortfermata}</code>	⎵	<code>\lilyGlyph{scripts.ulongfermata}</code>
§	<code>\lilyGlyph{scripts.dsignumcongruentiae}</code>	^	<code>\lilyGlyph{scripts.umarcato}</code>
⋈	<code>\lilyGlyph{scripts.dstaccatissimo}</code>	V	<code>\lilyGlyph{scripts.upbow}</code>
⎵	<code>\lilyGlyph{scripts.dverylongfermata}</code>	u	<code>\lilyGlyph{scripts.upedalheel}</code>
<>	<code>\lilyGlyph{scripts.espr}</code>	v	<code>\lilyGlyph{scripts.upedaltoe}</code>
o	<code>\lilyGlyph{scripts.flageolet}</code>	⚡	<code>\lilyGlyph{scripts.upmordent}</code>
ⓐ	<code>\lilyGlyph{scripts.halfopen}</code>	⎵	<code>\lilyGlyph{scripts.uportato}</code>
ⓐ	<code>\lilyGlyph{scripts.halfopenvertical}</code>	⚡	<code>\lilyGlyph{scripts.upprall}</code>
.	<code>\lilyGlyph{scripts.ictus}</code>	.	<code>\lilyGlyph{scripts.usemicirculus}</code>
⋈	<code>\lilyGlyph{scripts.lcomma}</code>	⊕	<code>\lilyGlyph{scripts.ushortfermata}</code>

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

*lilyglyphs* defines `\fermata` as a shorter name for “” than `\lilyGlyph{scripts.ufermata}`. See Table 438.

TABLE 442: *lilyglyphs* Named Rests

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

*lilyglyphs* defines shorter names for a few of these symbols. See Table 434.

TABLE 443: *lilyglyphs* Named Pedals

	<code>\lilyGlyph{pedal.*}</code>		<code>\lilyGlyph{pedal.M}</code>
	<code>\lilyGlyph{pedal..}</code>		<code>\lilyGlyph{pedal.P}</code>
	<code>\lilyGlyph{pedal.d}</code>		<code>\lilyGlyph{pedal.Ped}</code>
	<code>\lilyGlyph{pedal.e}</code>		



















































TABLE 444: *lilyglyphs* Named Flags

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

TABLE 445: *lilyglyphs* Named Custodes

⌋	<code>\lilyGlyph{custodes.hufnagel.d0}</code>	⌋	<code>\lilyGlyph{custodes.mensural.d0}</code>
⌋	<code>\lilyGlyph{custodes.hufnagel.d1}</code>	⌋	<code>\lilyGlyph{custodes.mensural.d1}</code>
⌋	<code>\lilyGlyph{custodes.hufnagel.d2}</code>	⌋	<code>\lilyGlyph{custodes.mensural.d2}</code>
✓	<code>\lilyGlyph{custodes.hufnagel.u0}</code>	✓	<code>\lilyGlyph{custodes.mensural.u0}</code>
✓	<code>\lilyGlyph{custodes.hufnagel.u1}</code>	✓	<code>\lilyGlyph{custodes.mensural.u1}</code>
✓	<code>\lilyGlyph{custodes.hufnagel.u2}</code>	✓	<code>\lilyGlyph{custodes.mensural.u2}</code>
⌋	<code>\lilyGlyph{custodes.medicaea.d0}</code>	⌋	<code>\lilyGlyph{custodes.vaticana.d0}</code>
⌋	<code>\lilyGlyph{custodes.medicaea.d1}</code>	⌋	<code>\lilyGlyph{custodes.vaticana.d1}</code>
⌋	<code>\lilyGlyph{custodes.medicaea.d2}</code>	⌋	<code>\lilyGlyph{custodes.vaticana.d2}</code>
⌋	<code>\lilyGlyph{custodes.medicaea.u0}</code>	⌋	<code>\lilyGlyph{custodes.vaticana.u0}</code>
⌋	<code>\lilyGlyph{custodes.medicaea.u1}</code>	⌋	<code>\lilyGlyph{custodes.vaticana.u1}</code>
⌋	<code>\lilyGlyph{custodes.medicaea.u2}</code>	⌋	<code>\lilyGlyph{custodes.vaticana.u2}</code>

TABLE 446: *lily&lypbs* Named Clefs

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



















































*lily&lypbs* defines shorter names for a few of these symbols. See Table 431.

TABLE 447: *lily&lypbs* Named Noteheads

◦	<code>\lilyGlyph{noteheads.d0doFunk}</code>
◡	<code>\lilyGlyph{noteheads.d0fa}</code>
◣	<code>\lilyGlyph{noteheads.d0faFunk}</code>
◤	<code>\lilyGlyph{noteheads.d0faThin}</code>
◊	<code>\lilyGlyph{noteheads.d0miFunk}</code>
◀	<code>\lilyGlyph{noteheads.d0reFunk}</code>
◊	<code>\lilyGlyph{noteheads.d0tiFunk}</code>
▲	<code>\lilyGlyph{noteheads.d1do}</code>
◦	<code>\lilyGlyph{noteheads.d1doFunk}</code>
◤	<code>\lilyGlyph{noteheads.d1doThin}</code>
◡	<code>\lilyGlyph{noteheads.d1doWalker}</code>
◣	<code>\lilyGlyph{noteheads.d1fa}</code>
◣	<code>\lilyGlyph{noteheads.d1faFunk}</code>
◤	<code>\lilyGlyph{noteheads.d1faThin}</code>
◣	<code>\lilyGlyph{noteheads.d1faWalker}</code>
◊	<code>\lilyGlyph{noteheads.d1miFunk}</code>
◦	<code>\lilyGlyph{noteheads.d1re}</code>
◀	<code>\lilyGlyph{noteheads.d1reFunk}</code>
◦	<code>\lilyGlyph{noteheads.d1reThin}</code>
◡	<code>\lilyGlyph{noteheads.d1reWalker}</code>
◊	<code>\lilyGlyph{noteheads.d1ti}</code>
◊	<code>\lilyGlyph{noteheads.d1tiFunk}</code>
◊	<code>\lilyGlyph{noteheads.d1tiThin}</code>
◀	<code>\lilyGlyph{noteheads.d1tiWalker}</code>
◣	<code>\lilyGlyph{noteheads.d1triangle}</code>
▲	<code>\lilyGlyph{noteheads.d2do}</code>
◦	<code>\lilyGlyph{noteheads.d2doFunk}</code>
◤	<code>\lilyGlyph{noteheads.d2doThin}</code>
◡	<code>\lilyGlyph{noteheads.d2doWalker}</code>
◣	<code>\lilyGlyph{noteheads.d2fa}</code>
◣	<code>\lilyGlyph{noteheads.d2faFunk}</code>
◤	<code>\lilyGlyph{noteheads.d2faThin}</code>
◣	<code>\lilyGlyph{noteheads.d2faWalker}</code>
◡	<code>\lilyGlyph{noteheads.d2kievan}</code>
◦	<code>\lilyGlyph{noteheads.d2re}</code>
◀	<code>\lilyGlyph{noteheads.d2reFunk}</code>
◦	<code>\lilyGlyph{noteheads.d2reThin}</code>
◡	<code>\lilyGlyph{noteheads.d2reWalker}</code>
◊	<code>\lilyGlyph{noteheads.d2ti}</code>
◊	<code>\lilyGlyph{noteheads.d2tiFunk}</code>
◊	<code>\lilyGlyph{noteheads.d2tiThin}</code>
◀	<code>\lilyGlyph{noteheads.d2tiWalker}</code>
◣	<code>\lilyGlyph{noteheads.d2triangle}</code>
◡	<code>\lilyGlyph{noteheads.d3kievan}</code>
◡	<code>\lilyGlyph{noteheads.dM2}</code>
◡	<code>\lilyGlyph{noteheads.dM2blackmensural}</code>
◡	<code>\lilyGlyph{noteheads.dM2mensural}</code>
◡	<code>\lilyGlyph{noteheads.dM2neomensural}</code>
◡	<code>\lilyGlyph{noteheads.dM2semimensural}</code>
◡	<code>\lilyGlyph{noteheads.dM3blackmensural}</code>

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 `\lilyGlyph{noteheads.dM3mensural}`  
 `\lilyGlyph{noteheads.dM3neomensural}`  
 `\lilyGlyph{noteheads.dM3semimensural}`  
 `\lilyGlyph{noteheads.drM2mensural}`  
 `\lilyGlyph{noteheads.drM2neomensural}`  
 `\lilyGlyph{noteheads.drM2semimensural}`  
 `\lilyGlyph{noteheads.drM3mensural}`  
 `\lilyGlyph{noteheads.drM3neomensural}`  
 `\lilyGlyph{noteheads.drM3semimensural}`  
 `\lilyGlyph{noteheads.s0}`  
 `\lilyGlyph{noteheads.s0blackmensural}`  
 `\lilyGlyph{noteheads.s0blackpetrucci}`  
 `\lilyGlyph{noteheads.s0cross}`  
 `\lilyGlyph{noteheads.s0diamond}`  
 `\lilyGlyph{noteheads.s0do}`  
 `\lilyGlyph{noteheads.s0doThin}`  
 `\lilyGlyph{noteheads.s0doWalker}`  
 `\lilyGlyph{noteheads.s0faWalker}`  
 `\lilyGlyph{noteheads.s0harmonic}`  
 `\lilyGlyph{noteheads.s0kievan}`  
 `\lilyGlyph{noteheads.s0la}`  
 `\lilyGlyph{noteheads.s0laFunk}`  
 `\lilyGlyph{noteheads.s0laThin}`  
 `\lilyGlyph{noteheads.s0laWalker}`  
 `\lilyGlyph{noteheads.s0mensural}`  
 `\lilyGlyph{noteheads.s0mi}`  
 `\lilyGlyph{noteheads.s0miMirror}`  
 `\lilyGlyph{noteheads.s0miThin}`  
 `\lilyGlyph{noteheads.s0miWalker}`  
 `\lilyGlyph{noteheads.s0neomensural}`  
 `\lilyGlyph{noteheads.s0petrucci}`  
 `\lilyGlyph{noteheads.s0re}`  
 `\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}`  
 `\lilyGlyph{noteheads.s1}`  
 `\lilyGlyph{noteheads.s1blackpetrucci}`  
 `\lilyGlyph{noteheads.s1cross}`  
 `\lilyGlyph{noteheads.s1diamond}`  
 `\lilyGlyph{noteheads.s1kievan}`  
 `\lilyGlyph{noteheads.s1la}`  
 `\lilyGlyph{noteheads.s1laFunk}`  
 `\lilyGlyph{noteheads.s1laThin}`  
 `\lilyGlyph{noteheads.s1laWalker}`  
 `\lilyGlyph{noteheads.s1mensural}`  
 `\lilyGlyph{noteheads.s1mi}`  
 `\lilyGlyph{noteheads.s1miMirror}`

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◊ \lilyGlyph{noteheads.s1miThin}  
◊ \lilyGlyph{noteheads.s1miWalker}  
◊ \lilyGlyph{noteheads.s1neomensural}  
◊ \lilyGlyph{noteheads.s1petrucci}  
// \lilyGlyph{noteheads.s1slash}  
◊ \lilyGlyph{noteheads.s1sol}  
◊ \lilyGlyph{noteheads.s1solFunk}  
● \lilyGlyph{noteheads.s2}  
◆ \lilyGlyph{noteheads.s2blackpetrucci}  
× \lilyGlyph{noteheads.s2cross}  
♠ \lilyGlyph{noteheads.s2diamond}  
◆ \lilyGlyph{noteheads.s2harmonic}  
■ \lilyGlyph{noteheads.s2la}  
■ \lilyGlyph{noteheads.s2laFunk}  
■ \lilyGlyph{noteheads.s2laThin}  
■ \lilyGlyph{noteheads.s2laWalker}  
⋅ \lilyGlyph{noteheads.s2mensural}  
◊ \lilyGlyph{noteheads.s2mi}  
◊ \lilyGlyph{noteheads.s2miFunk}  
◊ \lilyGlyph{noteheads.s2miMirror}  
◊ \lilyGlyph{noteheads.s2miThin}  
◊ \lilyGlyph{noteheads.s2miWalker}  
◊ \lilyGlyph{noteheads.s2neomensural}  
◆ \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}  
⊠ \lilyGlyph{noteheads.sM1}  
■ \lilyGlyph{noteheads.sM1blackmensural}  
⊠ \lilyGlyph{noteheads.sM1double}  
≡ \lilyGlyph{noteheads.sM1kievan}  
⊠ \lilyGlyph{noteheads.sM1mensural}  
⊠ \lilyGlyph{noteheads.sM1neomensural}  
⊠ \lilyGlyph{noteheads.sM1semimensural}  
⊠ \lilyGlyph{noteheads.sM2blackligmensural}  
⊠ \lilyGlyph{noteheads.sM2kievan}  
⊠ \lilyGlyph{noteheads.sM2ligmensural}  
⊠ \lilyGlyph{noteheads.sM2semiligmensural}  
⊠ \lilyGlyph{noteheads.sM3blackligmensural}  
⊠ \lilyGlyph{noteheads.sM3ligmensural}  
⊠ \lilyGlyph{noteheads.sM3semiligmensural}  
◆ \lilyGlyph{noteheads.smedicaea.inclinatum}  
■ \lilyGlyph{noteheads.smedicaea.punctum}  
┆ \lilyGlyph{noteheads.smedicaea.rvirga}  
┆ \lilyGlyph{noteheads.smedicaea.virga}  
┆ \lilyGlyph{noteheads.sr1kievan}  
⊠ \lilyGlyph{noteheads.srM1mensural}  
⊠ \lilyGlyph{noteheads.srM1neomensural}  
⊠ \lilyGlyph{noteheads.srM1semimensural}

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H \lilyGlyph{noteheads.srM2ligmensural}
H \lilyGlyph{noteheads.srM2semiligmensural}
H \lilyGlyph{noteheads.srM3ligmensural}
H \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}
r \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}
■ \lilyGlyph{noteheads.svaticana.vlpes}
. \lilyGlyph{noteheads.svaticana.vplica}
■ \lilyGlyph{noteheads.svaticana.vupes}
◊ \lilyGlyph{noteheads.u0doFunk}
4 \lilyGlyph{noteheads.u0fa}
4 \lilyGlyph{noteheads.u0faFunk}
4 \lilyGlyph{noteheads.u0faThin}
◊ \lilyGlyph{noteheads.u0miFunk}
v \lilyGlyph{noteheads.u0reFunk}
v \lilyGlyph{noteheads.u0tiFunk}
▲ \lilyGlyph{noteheads.u1do}
◊ \lilyGlyph{noteheads.u1doFunk}
▲ \lilyGlyph{noteheads.u1doThin}
◊ \lilyGlyph{noteheads.u1doWalker}
4 \lilyGlyph{noteheads.u1fa}
4 \lilyGlyph{noteheads.u1faFunk}
4 \lilyGlyph{noteheads.u1faThin}
4 \lilyGlyph{noteheads.u1faWalker}
◊ \lilyGlyph{noteheads.u1miFunk}
◊ \lilyGlyph{noteheads.u1re}
v \lilyGlyph{noteheads.u1reFunk}
◊ \lilyGlyph{noteheads.u1reThin}
◊ \lilyGlyph{noteheads.u1reWalker}
◊ \lilyGlyph{noteheads.u1ti}
v \lilyGlyph{noteheads.u1tiFunk}
◊ \lilyGlyph{noteheads.u1tiThin}
v \lilyGlyph{noteheads.u1tiWalker}

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▷	<code>\lilyGlyph{noteheads.u1triangle}</code>
▲	<code>\lilyGlyph{noteheads.u2do}</code>
•	<code>\lilyGlyph{noteheads.u2doFunk}</code>
▲	<code>\lilyGlyph{noteheads.u2doThin}</code>
▪	<code>\lilyGlyph{noteheads.u2doWalker}</code>
▼	<code>\lilyGlyph{noteheads.u2fa}</code>
▼	<code>\lilyGlyph{noteheads.u2faFunk}</code>
▼	<code>\lilyGlyph{noteheads.u2faThin}</code>
▼	<code>\lilyGlyph{noteheads.u2faWalker}</code>
┌	<code>\lilyGlyph{noteheads.u2kievan}</code>
•	<code>\lilyGlyph{noteheads.u2re}</code>
▼	<code>\lilyGlyph{noteheads.u2reFunk}</code>
•	<code>\lilyGlyph{noteheads.u2reThin}</code>
▼	<code>\lilyGlyph{noteheads.u2reWalker}</code>
◆	<code>\lilyGlyph{noteheads.u2ti}</code>
▼	<code>\lilyGlyph{noteheads.u2tiFunk}</code>
◆	<code>\lilyGlyph{noteheads.u2tiThin}</code>
▼	<code>\lilyGlyph{noteheads.u2tiWalker}</code>
▼	<code>\lilyGlyph{noteheads.u2triangle}</code>
↳	<code>\lilyGlyph{noteheads.u3kievan}</code>
⊠	<code>\lilyGlyph{noteheads.uM2}</code>
⊠	<code>\lilyGlyph{noteheads.uM2blackmensural}</code>
⊠	<code>\lilyGlyph{noteheads.uM2mensural}</code>
⊠	<code>\lilyGlyph{noteheads.uM2neomensural}</code>
⊠	<code>\lilyGlyph{noteheads.uM2semimensural}</code>
⊠	<code>\lilyGlyph{noteheads.uM3blackmensural}</code>
⊠	<code>\lilyGlyph{noteheads.uM3mensural}</code>
⊠	<code>\lilyGlyph{noteheads.uM3neomensural}</code>
⊠	<code>\lilyGlyph{noteheads.uM3semimensural}</code>
⊠	<code>\lilyGlyph{noteheads.urM2mensural}</code>
⊠	<code>\lilyGlyph{noteheads.urM2neomensural}</code>
⊠	<code>\lilyGlyph{noteheads.urM2semimensural}</code>
⊠	<code>\lilyGlyph{noteheads.urM3mensural}</code>
⊠	<code>\lilyGlyph{noteheads.urM3neomensural}</code>
⊠	<code>\lilyGlyph{noteheads.urM3semimensural}</code>

TABLE 448: `lily&lypbs` Named Accordion Symbols

⊠	<code>\lilyGlyph{accordion.bayanbass}</code>	⊗	<code>\lilyGlyph{accordion.oldEE}</code>
⊖	<code>\lilyGlyph{accordion.discant}</code>	⌋	<code>\lilyGlyph{accordion.pull}</code>
.	<code>\lilyGlyph{accordion.dot}</code>	>	<code>\lilyGlyph{accordion.push}</code>
⊖	<code>\lilyGlyph{accordion.freebass}</code>	⊖	<code>\lilyGlyph{accordion.stdbass}</code>

`lily&lypbs` defines shorter names for all of these symbols except `\lilyGlyph{accordion.dot}`. See Table 439.

TABLE 449: *lilyglyphs* Named Accidentals

⌘	<code>\lilyGlyph{accidentals.doublersharp}</code>
♭	<code>\lilyGlyph{accidentals.flat}</code>
↕	<code>\lilyGlyph{accidentals.flat.arrowboth}</code>
↓	<code>\lilyGlyph{accidentals.flat.arrowdown}</code>
↑	<code>\lilyGlyph{accidentals.flat.arrowup}</code>
/	<code>\lilyGlyph{accidentals.flat.slash}</code>
//	<code>\lilyGlyph{accidentals.flat slasheslash}</code>
♭♭	<code>\lilyGlyph{accidentals.flatflat}</code>
♭♭/	<code>\lilyGlyph{accidentals.flatflat.slash}</code>
ℳ	<code>\lilyGlyph{accidentals.hufnagelM1}</code>
⌘	<code>\lilyGlyph{accidentals.kievan1}</code>
ℳ	<code>\lilyGlyph{accidentals.kievanM1}</code>
(	<code>\lilyGlyph{accidentals.leftparen}</code>
♭	<code>\lilyGlyph{accidentals.medicaeaM1}</code>
×	<code>\lilyGlyph{accidentals.mensural1}</code>
ℳ	<code>\lilyGlyph{accidentals.mensuralM1}</code>
∩	<code>\lilyGlyph{accidentals.mirroredflat}</code>
∩	<code>\lilyGlyph{accidentals.mirroredflat.backslash}</code>
∩	<code>\lilyGlyph{accidentals.mirroredflat.flat}</code>
♮	<code>\lilyGlyph{accidentals.natural}</code>
↕	<code>\lilyGlyph{accidentals.natural.arrowboth}</code>
↓	<code>\lilyGlyph{accidentals.natural.arrowdown}</code>
↑	<code>\lilyGlyph{accidentals.natural.arrowup}</code>
)	<code>\lilyGlyph{accidentals.rightparen}</code>
#	<code>\lilyGlyph{accidentals.sharp}</code>
↕	<code>\lilyGlyph{accidentals.sharp.arrowboth}</code>
↓	<code>\lilyGlyph{accidentals.sharp.arrowdown}</code>
↑	<code>\lilyGlyph{accidentals.sharp.arrowup}</code>
/	<code>\lilyGlyph{accidentals.sharp slasheslash.stem}</code>
//	<code>\lilyGlyph{accidentals.sharp slasheslash.stemstemstem}</code>
///	<code>\lilyGlyph{accidentals.sharp slasheslashslash.stem}</code>
////	<code>\lilyGlyph{accidentals.sharp slasheslashslash.stemstem}</code>
⋈	<code>\lilyGlyph{accidentals.vaticana0}</code>
⋈	<code>\lilyGlyph{accidentals.vaticanaM1}</code>

*lilyglyphs* defines shorter names for a few of these symbols. See Table 433.

TABLE 450: *lilyglyphs* Named Arrowheads

▶	<code>\lilyGlyph{arrowheads.close.O1}</code>	>	<code>\lilyGlyph{arrowheads.open.O1}</code>
◀	<code>\lilyGlyph{arrowheads.close.O0M1}</code>	<	<code>\lilyGlyph{arrowheads.open.O0M1}</code>
▲	<code>\lilyGlyph{arrowheads.close.I1}</code>	^	<code>\lilyGlyph{arrowheads.open.I1}</code>
▼	<code>\lilyGlyph{arrowheads.close.I0M1}</code>	v	<code>\lilyGlyph{arrowheads.open.I0M1}</code>

TABLE 451: *lilyglyphs* Named Alphanumerics and Punctuation

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

See Table 435 for an alternative way to typeset dynamics letters. *lilyglyphs* additionally provides a `\lilyText` command that can be useful for typesetting groups of the preceding symbols. See the *lilyglyphs* documentation for more information.

TABLE 452: Miscellaneous *lilyglyphs* Named Musical Symbols

<b>⤵</b>	<code>\lilyGlyph{brackettips.down}</code>	<b>.</b>	<code>\lilyGlyph{dots.dotvaticana}</code>
<b>⤴</b>	<code>\lilyGlyph{brackettips.up}</code>	<b>⌋</b>	<code>\lilyGlyph{ties.lyric.default}</code>
<b>.</b>	<code>\lilyGlyph{dots.dot}</code>	<b>⌋</b>	<code>\lilyGlyph{ties.lyric.short}</code>
<b>•</b>	<code>\lilyGlyph{dots.dotkievan}</code>		

## 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 453: textcomp Genealogical Symbols

★	<code>\textborn</code>	∅	<code>\textdivorced</code>	∞	<code>\textmarried</code>
†	<code>\textdied</code>	🍃	<code>\textleaf</code>		

TABLE 454: wasysym General Symbols

🗲	<code>\ataribox</code>	🕒	<code>\clock</code>	◀	<code>\LEFTarrow</code>	▶	<code>\RIGHTarrow</code>
🔔	<code>\bell</code>	∅	<code>\diameter</code>	↶	<code>\leftturn</code>	↷	<code>\rightturn</code>
☹	<code>\blacksmiley</code>	▼	<code>\DOWNarrow</code>	⚡	<code>\lightning</code>	☺	<code>\smiley</code>
👔	<code>\Bowtie</code>	☹	<code>\frownie</code>	☎	<code>\phone</code>	☀	<code>\sun</code>
⌋	<code>\brokenvert</code>	∅	<code>\invdiameter</code>	☞	<code>\pointer</code>	▲	<code>\UParrow</code>
✓	<code>\checked</code>	✱	<code>\kreuz</code>	📻	<code>\recorder</code>	⬠	<code>\wasylouenge</code>

TABLE 455: manfnt Dangerous Bend Symbols

📉	<code>\dbend</code>	📈	<code>\lhbend</code>	📊	<code>\reversedvideobend</code>
---	---------------------	---	----------------------	---	---------------------------------

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

TABLE 456: Miscellaneous manfnt Symbols

👤	<code>\manboldkidney</code>	👤	<code>\manpenkidney</code>
◎	<code>\manconcentriccircles</code>	🌀	<code>\manquadrifolium</code>
◊	<code>\manconcentricdiamond</code>	⌒	<code>\manquartercircle</code>
◇	<code>\mancone</code>	🌀	<code>\manrotatedquadrifolium</code>
📦	<code>\mancube</code>	⌒	<code>\manrotatedquartercircle</code>
↗	<code>\manerrarrow</code>	☆	<code>\manstar</code>
▀	<code>\manfilledquartercircle</code>	🖋	<code>\mantiltspennib</code>
—	<code>\manhpennib</code>	▼	<code>\mantriangledown</code>
📦	<code>\manimpossiblecube</code>	▶	<code>\mantriangleright</code>
👤	<code>\mankidney</code>	▲	<code>\mantriangleup</code>
👤	<code>\manlhpenkidney</code>	⌋	<code>\manvpennib</code>

TABLE 457: marvosym Media Control Symbols

▶	<code>\Forward</code>	▼	<code>\MoveDown</code>	⏮	<code>\RewindToIndex</code>	⏴	<code>\ToTop</code>
▶▶	<code>\ForwardToEnd</code>	▲	<code>\MoveUp</code>	⏪	<code>\RewindToStart</code>		
▶▶▶	<code>\ForwardToIndex</code>	◀	<code>\Rewind</code>	⏴	<code>\ToBottom</code>		

TABLE 458: marvosym Laundry Symbols

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

TABLE 459: marvosym Information Symbols

	<code>\Bicycle</code>		<code>\Gentsroom</code>		<code>\PointingHand</code>
	<code>\ClockLogo</code>		<code>\Industry</code>		<code>\Wheelchair</code>
	<code>\Coffeecup</code>		<code>\Info</code>		<code>\WritingHand</code>
	<code>\Football</code>		<code>\Ladiesroom</code>		

TABLE 460: Other marvosym Symbols

	<code>\Ankh</code>		<code>\Bouquet</code>		<code>\Heart</code>		<code>\PeaceDove</code>
	<code>\Bat</code>		<code>\Celtcross</code>		<code>\ManFace</code>		<code>\Smiley</code>
	<code>\BOLogo</code>		<code>\CircledA</code>		<code>\MineSign</code>		<code>\WomanFace</code>
	<code>\BOLogoL</code>		<code>\Cross</code>		<code>\Mundus</code>		<code>\Yinyang</code>
	<code>\BOLogoP</code>		<code>\Frowny</code>		<code>\MVAt</code>		

TABLE 461: Miscellaneous universa Symbols






















	<code>\bauforms</code>		<code>\bauhead</code>
--	------------------------	--	-----------------------








TABLE 462: Miscellaneous fourier Symbols

	<code>\bomb</code>		<code>\grimace</code>		<code>\textthing*</code>		<code>\textxswup*</code>
	<code>\danger</code>		<code>\noway</code>		<code>\textxsdown*</code>		

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

TABLE 463: ifsym Weather Symbols

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

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 464: ifsym Alpine Symbols

























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

TABLE 465: ifsym Clocks

	<code>\Interval</code>		<code>\StopWatchStart</code>		<code>\VarClock</code>		<code>\Wecker</code>
	<code>\StopWatchEnd</code>		<code>\Taschenuhr</code>		<code>\VarTaschenuhr</code>		


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 466: Other ifsym Symbols
















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

TABLE 467: clock Clocks

<code>\ClockStyle</code>	<code>\ClockFramefalse</code>	<code>\ClockFrametrue</code>
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 `\ClockFramefalse` as illustrated above. See the clock documentation for more information.

TABLE 468: epsdice Dice

<code>\epsdice{1}</code>	<code>\epsdice{3}</code>	<code>\epsdice{5}</code>
<code>\epsdice{2}</code>	<code>\epsdice{4}</code>	<code>\epsdice{6}</code>

TABLE 469: hhcount Dice

<code>\fcdice{1}</code>	<code>\fcdice{3}</code>	<code>\fcdice{5}</code>
<code>\fcdice{2}</code>	<code>\fcdice{4}</code>	<code>\fcdice{6}</code>







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

TABLE 470: stix Dice

<code>\dicei</code>	<code>\diceiii</code>	<code>\dicev</code>
<code>\diceii</code>	<code>\diceiv</code>	<code>\dicevi</code>



TABLE 471: `bullctr` Tally Markers

<code>\bullctr{⟨1⟩}</code>		<code>\bullctr{⟨4⟩}</code>		<code>\bullctr{⟨7⟩}</code>
<code>\bullctr{⟨2⟩}</code>		<code>\bullctr{⟨5⟩}</code>		<code>\bullctr{⟨8⟩}</code>
<code>\bullctr{⟨3⟩}</code>		<code>\bullctr{⟨6⟩}</code>		<code>\bullctr{⟨9⟩}</code>

The notation for `\bullctr` used in the above bears explanation. `\bullctr` does not take a number as its argument but rather a L<sup>A</sup>T<sub>E</sub>X counter, whose value it uses to typeset a tally marker. “`\bullctr{⟨3⟩}`”, for example, means to invoke `\bullctr` with a counter whose value is 3. (`\bullctr` usage is therefore akin to that of L<sup>A</sup>T<sub>E</sub>X’s `\fnsymbol`.) The intention is to use `\bullctr` indirectly via the `bullemum` package’s `bullemum` environment, which is a variation on the `enumerate` environment that uses `\bullctr` to typeset the labels.




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

```

\newcounter{bull}
\newcommand{\showbullctr}[1]{%
  \setcounter{bull}{#1}%
  \bullctr{bull}%
}






```

`bullctr`’s package options `smallctrbull`, `largectrbull`, and `heartctrbull` and corresponding commands `\smallctrbull`, `\largectrbull`, and `\heartctrbull` control the formatting of each tally marker:

	small	large	heart
<code>\bullctr{⟨5⟩}</code>			

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 `\bullctr`’s pips. See the `bullctr` documentation for more information.

TABLE 472: `hhcount` Tally Markers

<code>\fcscore{1}</code>		<code>\fcscore{3}</code>		<code>\fcscore{5}</code>	
<code>\fcscore{2}</code>		<code>\fcscore{4}</code>			

The `\fcscore` command accepts values larger than 5. For example, “`\fcscore{47}`” produces “`### ### ### ### ### ### ### ### ###`”.

TABLE 473: `dozenal` Tally Markers







<code>\tally{1}</code>		<code>\tally{3}</code>		<code>\tally{5}</code>	
<code>\tally{2}</code>		<code>\tally{4}</code>		<code>\tally{6}</code>	

TABLE 474: skull Symbols


 \skull
































TABLE 475: Non-Mathematical mathabx Symbols

± \rip

TABLE 476: 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	X	\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 477: skak Chess Pieces and Chessboard Squares

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

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

TABLE 478: igo Go Symbols

	<code>\blackstone[\igocircle]</code>		<code>\whitestone[\igocircle]</code>
	<code>\blackstone[\igocross]</code>		<code>\whitestone[\igocross]</code>
	<code>\blackstone[\igonone]</code>		<code>\whitestone[\igonone]</code>
	<code>\blackstone[\igosquare]</code>		<code>\whitestone[\igosquare]</code>
	<code>\blackstone[\igotriangle]</code>		<code>\whitestone[\igotriangle]</code>

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, ..., ❹❹ and ❶, ❷, ❸, ..., ❹❹, respectively.

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

TABLE 479: go Go Symbols

	<code>\botborder</code>		<code>\lftbotcorner</code>		<code>\rttopcorner</code>
	<code>\empty</code>		<code>\lfttopcorner</code>		<code>\square</code>
	<code>\hoshi</code>		<code>\rtborder</code>		<code>\topborder</code>
	<code>\lftborder</code>		<code>\rtbotcorner</code>		<code>\triangle</code>

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 , , , ..., and , , , ..., , respectively. `\black` and `\white` additionally accept `\square` and `\triangle` as arguments, producing and for `\black` and and for `\white`.

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

TABLE 480: metre Metrical Symbols

	<code>\a</code>		<code>\bBm</code>		<code>\cc</code>		<code>\Mbb</code>		<code>\Pppp</code>		<code>\t</code>
	<code>\B</code>		<code>\bbm</code>		<code>\Ccc</code>		<code>\mbbx</code>		<code>\pppp</code>		<code>\tsbm</code>
	<code>\b</code>		<code>\Bbm</code>		<code>\m</code>		<code>\oo</code>		<code>\Ppppp</code>		<code>\tsmb</code>
	<code>\BB</code>		<code>\bbmb</code>		<code>\M</code>		<code>\p</code>		<code>\ppppp</code>		<code>\tsmm</code>
	<code>\BB</code>		<code>\bbmx</code>		<code>\ma</code>		<code>\pm</code>		<code>\ps</code>		<code>\vppm</code>
	<code>\bb</code>		<code>\bm</code>		<code>\Mb</code>		<code>\pp</code>		<code>\pxp</code>		<code>\vpppm</code>
	<code>\bB</code>		<code>\Bm</code>		<code>\mb</code>		<code>\Pp</code>		<code>\Pxp</code>		<code>\x</code>
	<code>\bba</code>		<code>\c</code>		<code>\mBb</code>		<code>\ppm</code>		<code>\R</code>		
	<code>\bbb</code>		<code>\C</code>		<code>\mbB</code>		<code>\ppp</code>		<code>\r</code>		
	<code>\BBm</code>		<code>\Cc</code>		<code>\mbb</code>		<code>\Ppp</code>		<code>\T</code>		

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

TABLE 481: metre Small and Large Metrical Symbols

	<code>\anacclasis</code>		<code>\Anacclasis</code>
	<code>\antidiple</code>		<code>\Antidiple</code>
	<code>\antidiple*</code>		<code>\Antidiple*</code>
	<code>\antisigma</code>		<code>\Antisigma</code>
	<code>\asteriscus</code>		<code>\Asteriscus</code>
	<code>\catalexis</code>		<code>\Catalexis</code>
	<code>\diple</code>		<code>\Diple</code>
	<code>\diple*</code>		<code>\Diple*</code>
	<code>\obelus</code>		<code>\Obelus</code>
	<code>\obelus*</code>		<code>\Obelus*</code>
	<code>\respondens</code>		<code>\Respondens</code>
	<code>\terminus</code>		<code>\Terminus</code>
	<code>\terminus*</code>		<code>\Terminus*</code>

TABLE 482: 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 483: dictsym Dictionary Symbols






















	\dsaeronautical		\dscommercial		\dsmedical
	\dsagricultural		\ds heraldical		\dsmilitary
	\dsarchitectural		\dsjuridical		\dsrailways
	\dsbiological		\dsliterary		\dstechnical
	\dschemical		\ds mathematical		









TABLE 484: 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:




































TABLE 485: pmboxdraw Box-Drawing Symbols

	<code>\textblock</code>	$\vrule$	<code>\textSFli</code>	$\vrule\hrule$	<code>\textSFxli</code>	$\vrule\hrule\hrule$	<code>\textSFxxiii</code>
	<code>\textdkshade</code>	$\hrule$	<code>\textSFlii</code>	$\vrule\hrule\hrule$	<code>\textSFxlii</code>	$\vrule\hrule\hrule\hrule$	<code>\textSFxxiv</code>
	<code>\textdnblock</code>	$\hrule\hrule$	<code>\textSFliii</code>	$\vrule\hrule\hrule\hrule$	<code>\textSFxliii</code>	$\vrule\hrule\hrule\hrule\hrule$	<code>\textSFxxv</code>
	<code>\textlfblock</code>	$\vrule\hrule$	<code>\textSFliv</code>	$\vrule\hrule\hrule$	<code>\textSFxliv</code>	$\vrule\hrule\hrule\hrule$	<code>\textSFxxvi</code>
	<code>\textltshade</code>	$\vrule\hrule\hrule$	<code>\textSFv</code>	$\vrule\hrule\hrule\hrule$	<code>\textSFxlix</code>	$\vrule\hrule\hrule\hrule\hrule$	<code>\textSFxxvii</code>
	<code>\textrtblock</code>	$\hrule\hrule$	<code>\textSFvi</code>	$\vrule\hrule\hrule\hrule$	<code>\textSFxlv</code>	$\vrule\hrule\hrule\hrule\hrule$	<code>\textSFxxviii</code>
$\lrcorner$	<code>\textSFi</code>	$\perp$	<code>\textSFvii</code>	$\vrule\hrule\hrule$	<code>\textSFxlvi</code>	$\vrule\hrule\hrule\hrule$	<code>\textSFxxxix</code>
$\llcorner$	<code>\textSFii</code>	$\lrcorner$	<code>\textSFviii</code>	$\vrule\hrule\hrule\hrule$	<code>\textSFxlvii</code>	$\vrule\hrule\hrule\hrule\hrule$	<code>\textSFxxxvi</code>
$\lrcorner$	<code>\textSFiii</code>	$\text{---}$	<code>\textSFx</code>	$\vrule\hrule\hrule$	<code>\textSFxlviii</code>	$\vrule\hrule\hrule\hrule\hrule$	<code>\textSFxxxvii</code>
$\lrcorner$	<code>\textSFiv</code>	$\lrcorner$	<code>\textSFxi</code>	$\vrule\hrule\hrule\hrule$	<code>\textSFxx</code>	$\vrule\hrule\hrule\hrule\hrule$	<code>\textSFxxxviii</code>
$\lrcorner$	<code>\textSFix</code>	$\lrcorner$	<code>\textSFxix</code>	$\vrule\hrule\hrule$	<code>\textSFxxi</code>		<code>\textshade</code>
$\lrcorner$	<code>\textSF1</code>	$\vrule\hrule\hrule$	<code>\textSFxl</code>	$\vrule\hrule\hrule$	<code>\textSFxxii</code>		<code>\textupblock</code>

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  $\text{T}_{\text{E}}\text{X}$  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 486: staves Magical Staves

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

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	<code>\staveXIII</code>		<code>\staveXXXVI</code>		<code>\staveLXIX</code>
	<code>\staveXIV</code>		<code>\staveXXXVII</code>		<code>\staveLXI</code>
	<code>\staveXV</code>		<code>\staveXXXVIII</code>		<code>\staveLXII</code>
	<code>\staveXVI</code>		<code>\staveXXXIX</code>		<code>\staveLXIII</code>
	<code>\staveXVII</code>		<code>\staveXL</code>		<code>\staveLXIV</code>
	<code>\staveXVIII</code>		<code>\staveXLI</code>		<code>\staveLXV</code>
	<code>\staveXIX</code>		<code>\staveXLII</code>		<code>\staveLXVI</code>
	<code>\staveXX</code>		<code>\staveXLIII</code>		<code>\staveLXVII</code>
	<code>\staveXXI</code>		<code>\staveXLIV</code>		<code>\staveLXVIII</code>
	<code>\staveXXII</code>		<code>\staveXLV</code>		
	<code>\staveXXIII</code>		<code>\staveXLVI</code>		
					


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](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 487: pigpen Cipher Symbols



























	<code>{\pigpenfont A}</code>		<code>{\pigpenfont J}</code>		<code>{\pigpenfont S}</code>
	<code>{\pigpenfont B}</code>		<code>{\pigpenfont K}</code>		<code>{\pigpenfont T}</code>
	<code>{\pigpenfont C}</code>		<code>{\pigpenfont L}</code>		<code>{\pigpenfont U}</code>
	<code>{\pigpenfont D}</code>		<code>{\pigpenfont M}</code>		<code>{\pigpenfont V}</code>
	<code>{\pigpenfont E}</code>		<code>{\pigpenfont N}</code>		<code>{\pigpenfont W}</code>
	<code>{\pigpenfont F}</code>		<code>{\pigpenfont O}</code>		<code>{\pigpenfont X}</code>
	<code>{\pigpenfont G}</code>		<code>{\pigpenfont P}</code>		<code>{\pigpenfont Y}</code>
	<code>{\pigpenfont H}</code>		<code>{\pigpenfont Q}</code>		<code>{\pigpenfont Z}</code>
	<code>{\pigpenfont I}</code>		<code>{\pigpenfont R}</code>		

TABLE 488: GnA2e Phases of the Moon

	<code>\MoonPha{1}</code>		<code>\MoonPha{2}</code>		<code>\MoonPha{3}</code>		<code>\MoonPha{4}</code>
---	--------------------------	---	--------------------------	---	--------------------------	---	--------------------------

TABLE 489: GnA2e Recycling Symbols


	<code>\Greenpoint</code>
---	--------------------------

TABLE 490: marvosym Recycling Symbols



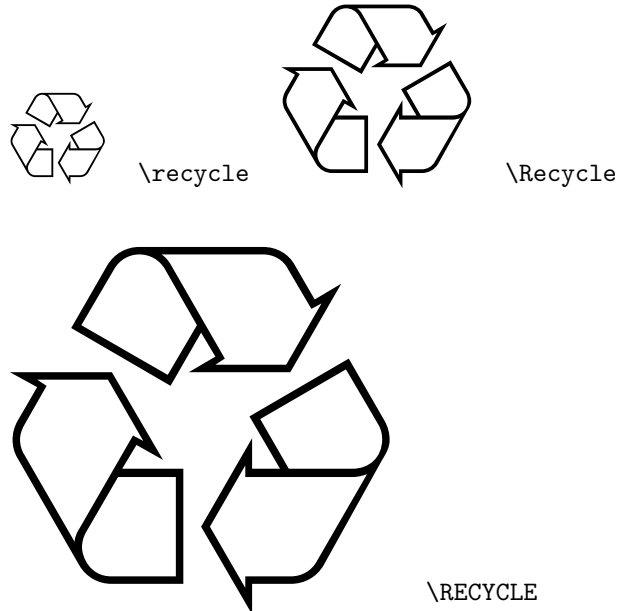
 `\PackingWaste`  `\Recycling`

TABLE 491: 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  $\langle number \rangle$ )**” 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 492: Other G<sub>U</sub>A<sub>2</sub>e Symbols





 `\Info`  `\Request`  
 `\Postbox`  `\Telephone`

TABLE 493: soyombo Soyombo Symbols



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



TABLE 494: knitting Knitting Symbols

$\wedge$	<code>\textknit{!}</code>	$\Rightarrow$	<code>\textknit{[}</code>		<code>\textknit{Q}</code>
	<code>\textknit{"}</code>	$\Leftarrow$	<code>\textknit{]}</code>		<code>\textknit{q}</code>
$\backslash$	<code>\textknit{(}</code>	$\Uparrow$	<code>\textknit{A}</code>	$\nearrow$	<code>\textknit{R}</code>
$/$	<code>\textknit{)}</code>	$\uparrow$	<code>\textknit{a}</code>	$\nwarrow$	<code>\textknit{r}</code>
$*$	<code>\textknit{*}</code>		<code>\textknit{B}</code>	$\leftarrow$	<code>\textknit{S}</code>
$ $	<code>\textknit{-}</code>		<code>\textknit{b}</code>	$\rightarrow$	<code>\textknit{s}</code>
	<code>\textknit{2}</code>	$\nabla$	<code>\textknit{E}</code>		<code>\textknit{T}</code>
	<code>\textknit{3}</code>		<code>\textknit{F}</code>		<code>\textknit{t}</code>
$\times$	<code>\textknit{4}</code>	$\frown$	<code>\textknit{f}</code>		<code>\textknit{U}</code>
$\sphericalangle$	<code>\textknit{5}</code>	$\uparrow$	<code>\textknit{H}</code>	$\sphericalangle$	<code>\textknit{u}</code>
$\sphericalangle$	<code>\textknit{6}</code>	$\downarrow$	<code>\textknit{h}</code>		<code>\textknit{V}</code>
$\sphericalangle$	<code>\textknit{7}</code>		<code>\textknit{I}</code>	$\sphericalangle$	<code>\textknit{v}</code>
$\sphericalangle$	<code>\textknit{8}</code>		<code>\textknit{i}</code>		<code>\textknit{W}</code>
$\sphericalangle$	<code>\textknit{9}</code>		<code>\textknit{J}</code>	$\sphericalangle$	<code>\textknit{w}</code>
	<code>\textknit{:}</code>		<code>\textknit{j}</code>		<code>\textknit{X}</code>
	<code>\textknit{;}</code>	$\searrow$	<code>\textknit{L}</code>		<code>\textknit{x}</code>
$\sphericalangle$	<code>\textknit{&lt;}</code>	$\swarrow$	<code>\textknit{l}</code>	$\sphericalangle$	<code>\textknit{Y}</code>
	<code>\textknit{=}</code>		<code>\textknit{M}</code>	$\sphericalangle$	<code>\textknit{y}</code>
$\sphericalangle$	<code>\textknit{&gt;}</code>	$m$	<code>\textknit{m}</code>		<code>\textknit{Z}</code>
$\bullet$	<code>\textknit{@}</code>	$\circ$	<code>\textknit{O}</code>		<code>\textknit{z}</code>

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

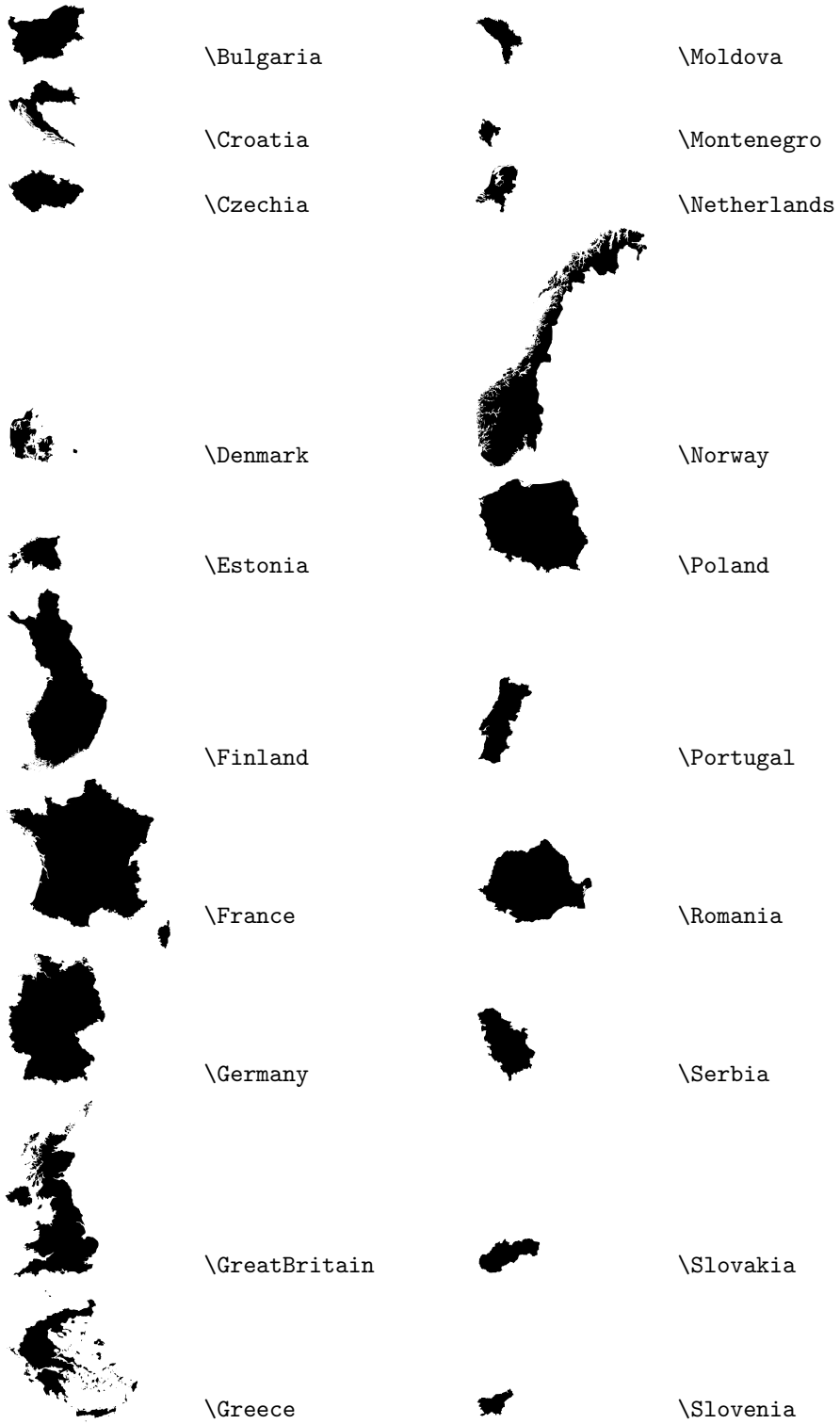
Some symbols behave differently when used as part of a sequence. For example, contrast `\textknit{1}` (“ $\uparrow$ ”), `\textknit{11}` (“ $\uparrow\uparrow$ ”), and `\textknit{111}` (“ $\uparrow\uparrow\uparrow$ ”). Similarly, contrast `\textknit{"}` (“ $\curvearrowright$ ”) and `\textknit{"}` (“ $\curvearrowleft$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

TABLE 495: CountriesOfEurope Country Maps

	<code>\Albania</code>		<code>\Latvia</code>
	<code>\Andorra</code>		<code>\Liechtenstein</code>
	<code>\Austria</code>		<code>\Lithuania</code>
	<code>\Belarus</code>		<code>\Luxembourg</code>
	<code>\Belgium</code>		<code>\Macedonia</code>
	<code>\Bosnia</code>		<code>\Malta</code>

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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 495 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 496: Miscellaneous arev Symbols















 <code>\anchor</code>	 <code>\invsmileface</code>	 <code>\skull</code>	 <code>\warning</code>
 <code>\biohazard</code>	 <code>\radiation</code>	 <code>\smileface</code>	 <code>\yinyang</code>
 <code>\heavyqleft</code>	 <code>\recycle</code>	 <code>\steaming</code>	
 <code>\heavyqright</code>	 <code>\sadface</code>	 <code>\swords</code>	

TABLE 497: cookingsymbols Cooking Symbols




























 <code>\Bottomheat</code>	 <code>\Fork</code>	 <code>\Knife</code>	 <code>\Topbottomheat</code>
 <code>\Dish</code>	 <code>\Gasstove</code>	 <code>\Oven</code>	 <code>\Topheat</code>
 <code>\Fanoven</code>	 <code>\Gloves</code>	 <code>\Spoon</code>	

TABLE 498: tikzsymbols Cooking Symbols

	<code>\bakingplate</code>		<code>\cooker</code>		<code>\oven</code>		<code>\rollingpin</code>
	<code>\blender</code>		<code>\eggbeater</code>		<code>\pan</code>		<code>\sieve</code>
	<code>\bottle</code>		<code>\fryingpan</code>		<code>\peeler</code>		<code>\squeezer</code>
	<code>\bowl</code>		<code>\grater</code>		<code>\pot</code>		<code>\trident</code>

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


















All tikzsymbols symbols are implemented with TikZ graphics, not with a font.

TABLE 499: tikzsymbols Emoticons

	<code>\Annoey</code>		<code>\Neutrey</code>		<code>\rWalley</code>		<code>\Vomey</code>
	<code>\Cat</code>		<code>\NiceReapey</code>		<code>\Sadey</code>		<code>\Walley</code>
	<code>\Cooley</code>		<code>\Ninja</code>		<code>\Sey</code>		<code>\Winkey</code>
	<code>\Innocey</code>		<code>\Nursey</code>		<code>\Smiley</code>		<code>\wInnocey</code>
	<code>\Laughy</code>		<code>\oldWinkey</code>		<code>\Tongey</code>		<code>\Xey</code>






All tikzsymbols symbols are implemented with TikZ 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 500: tikzsymbols 3D Emoticons

	<code>\dAnnoey</code>		<code>\dNinja</code>		<code>\dSmiley</code>		<code>\dXey</code>
	<code>\dCooley</code>		<code>\dNursey</code>		<code>\dTongey</code>		<code>\olddWinkey</code>
	<code>\dInnocey</code>		<code>\drWalley</code>		<code>\dVomey</code>		
	<code>\dLaughy</code>		<code>\dSadey</code>		<code>\dWalley</code>		
	<code>\dNeutrey</code>		<code>\dSey</code>		<code>\dWinkey</code>		










All tikzsymbols symbols are implemented with TikZ graphics, not with a font. Hence, all of the symbols shown above can include color. In fact, each command in Table 500 accepts one or more color arguments for further customization. See the tikzsymbols documentation for more information.

TABLE 501: tikzsymbols Trees

	<code>\Autumntree</code>		<code>\Summertree</code>		<code>\WorstTree</code>
	<code>\Springtree</code>		<code>\Wintertree</code>		


























































All tikzsymbols symbols are implemented with TikZ 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 502: Miscellaneous tikzsymbols Symbols

	<code>\Bed</code>		<code>\Chair</code>		<code>\Fire</code>		<code>\Snowman</code>		<code>\Tribar</code>
	<code>\Candle</code>		<code>\Coffeecup</code>		<code>\Moai</code>		<code>\Strichmaxerl</code>		








All `tikzsymbols` symbols are implemented with `TikZ` 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 503: Miscellaneous bclogo Symbols

	<code>\bcattention</code>		<code>\bcetoile</code>		<code>\bcpanchant</code>
	<code>\bcbombe</code>		<code>\bcfemme</code>		<code>\bcpeaceandlove</code>
	<code>\bcbook</code>		<code>\bcfeujaune</code>		<code>\bcpluie</code>
	<code>\bccalendrier</code>		<code>\bcfeurouge</code>		<code>\bcplume</code>
	<code>\bccle</code>		<code>\bcfeutricolore</code>		<code>\bcpoisson</code>
	<code>\bcclefa</code>		<code>\bcfeuvert</code>		<code>\bcquestion</code>
	<code>\bcclesol</code>		<code>\bcfleur</code>		<code>\bcrecyclage</code>
	<code>\bccoeur</code>		<code>\bchomme</code>		<code>\bcrosevents</code>
	<code>\bccrayon</code>		<code>\bchorloge</code>		<code>\bcsmbh</code>
	<code>\bccube</code>		<code>\bcicosaedre</code>		<code>\bcsmmh</code>
	<code>\bcdallemagne</code>		<code>\bcinfo</code>		<code>\bcsoleil</code>
	<code>\bcdanger</code>		<code>\bcinterdit</code>		<code>\bcspadesuit</code>
	<code>\bcdautriche</code>		<code>\bcclampe</code>		<code>\bcstop</code>
	<code>\bcdbelgique</code>		<code>\bc loupe</code>		<code>\bc takecare</code>
	<code>\bcdbulgarie</code>		<code>\bcneige</code>		<code>\bc tetraedre</code>
	<code>\bcdfrance</code>		<code>\bcnote</code>		<code>\bc trefle</code>
	<code>\bcditalie</code>		<code>\bcnucleaire</code>		<code>\bc trombone</code>
	<code>\bcdluxembourg</code>		<code>\bc octaedre</code>		<code>\bc valet coeur</code>
	<code>\bcdodecaedre</code>		<code>\bc oeil</code>		<code>\bc velo</code>

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	<code>\bcdpaysbas</code>		<code>\bcorne</code>		<code>\bcyin</code>
	<code>\bcdz</code>		<code>\bcours</code>		
	<code>\bceclaircie</code>		<code>\bcoutil</code>		

All blogo symbols are implemented with TikZ (or alternatively, PSTricks) graphics, not with a font. This is how the symbols shown above can include color.

TABLE 504: fontawesome Web-Related Icons

	<code>\fa500px</code>		<code>\faFemale</code>		<code>\faPlane</code>
	<code>\faAdjust</code>		<code>\faFighterJet</code>		<code>\faPlay</code>
	<code>\faAdn</code>		<code>\faFile</code>		<code>\faPlayCircle</code>
	<code>\faAlignCenter</code>		<code>\faFileArchive0</code>		<code>\faPlayCircle0</code>
	<code>\faAlignJustify</code>		<code>\faFileAudio0</code>		<code>\faPlug</code>
	<code>\faAlignLeft</code>		<code>\faFileCode0</code>		<code>\faPlus</code>
	<code>\faAlignRight</code>		<code>\faFileExcel0</code>		<code>\faPlusCircle</code>
	<code>\faAmazon</code>		<code>\faFileImage0</code>		<code>\faPlusSquare</code>
	<code>\faAmbulance</code>		<code>\faFile0</code>		<code>\faPlusSquare0</code>
	<code>\faAnchor</code>		<code>\faFilePdf0</code>		<code>\faPowerOff</code>
	<code>\faAndroid</code>		<code>\faFilePowerpoint0</code>		<code>\faPrint</code>
	<code>\faAngellist</code>		<code>\faFiles0</code>		<code>\faPuzzlePiece</code>
	<code>\faAngleDoubleDown</code>		<code>\faFileText</code>		<code>\faQq</code>
	<code>\faAngleDoubleLeft</code>		<code>\faFileText0</code>		<code>\faQrcode</code>
	<code>\faAngleDoubleRight</code>		<code>\faFileVideo0</code>		<code>\faQuestion</code>
	<code>\faAngleDoubleUp</code>		<code>\faFileWord0</code>		<code>\faQuestionCircle</code>
	<code>\faAngleDown</code>		<code>\faFilm</code>		<code>\faQuoteLeft</code>
	<code>\faAngleLeft</code>		<code>\faFilter</code>		<code>\faQuoteRight</code>
	<code>\faAngleRight</code>		<code>\faFire</code>		<code>\faRandom</code>
	<code>\faAngleUp</code>		<code>\faFireExtinguisher</code>		<code>\faRebel</code>
	<code>\faApple</code>		<code>\faFirefox</code>		<code>\faRecycle</code>
	<code>\faArchive</code>		<code>\faFlag</code>		<code>\faReddit</code>
	<code>\faAreaChart</code>		<code>\faFlagCheckered</code>		<code>\faRedditSquare</code>
	<code>\faAsterisk</code>		<code>\faFlag0</code>		<code>\faRefresh</code>
	<code>\faAt</code>		<code>\faFlask</code>		<code>\faRenren</code>
	<code>\faBackward</code>		<code>\faFlickr</code>		<code>\faReply</code>
	<code>\faBalanceScale</code>		<code>\faFloppy0</code>		<code>\faReplyAll</code>
	<code>\faBan</code>		<code>\faFolder</code>		<code>\faRetweet</code>
	<code>\faBarChart</code>		<code>\faFolder0</code>		<code>\faRoad</code>
	<code>\faBarcode</code>		<code>\faFolderOpen</code>		<code>\faRocket</code>
	<code>\faBars</code>		<code>\faFolderOpen0</code>		<code>\faRss</code>
	<code>\faBatteryEmpty</code>		<code>\faFont</code>		<code>\faRssSquare</code>
	<code>\faBatteryFull</code>		<code>\faFonticons</code>		<code>\faSafari</code>
	<code>\faBatteryHalf</code>		<code>\faForumbee</code>		<code>\faScissors</code>
	<code>\faBatteryQuarter</code>		<code>\faForward</code>		<code>\faSearch</code>
	<code>\faBatteryThreeQuarters</code>		<code>\faFoursquare</code>		<code>\faSearchMinus</code>

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	\faBed		\faFrownO		\faSearchPlus
	\faBeer		\faFutbolO		\faSellsy
	\faBehance		\faGamepad		\faServer
	\faBehanceSquare		\faGavel		\faShare
	\faBell		\faGetPocket		\faShareAlt
	\faBellO		\faGg		\faShareAltSquare
	\faBellSlash		\faGgCircle		\faShareSquare
	\faBellSlashO		\faGift		\faShareSquareO
	\faBicycle		\faGit		\faShield
	\faBinoculars		\faGithub		\faShip
	\faBirthdayCake		\faGithubAlt		\faShirtsinbulk
	\faBitbucket		\faGithubSquare		\faShoppingCart
	\faBitbucketSquare		\faGitSquare		\faSignal
	\faBlackTie		\faGlass		\faSignIn
	\faBold		\faGlobe		\faSignOut
	\faBolt		\faGoogle		\faSimplybuilt
	\faBomb		\faGooglePlus		\faSitemap
	\faBook		\faGooglePlusSquare		\faSkyatlas
	\faBookmark		\faGoogleWallet		\faSkype
	\faBookmarkO		\faGraduationCap		\faSlack
	\faBriefcase		\faGratipay		\faSliders
	\faBug		\faHackerNews		\faSlideshare
	\faBuilding		\faHddO		\faSmileO
	\faBuildingO		\faHeader		\faSort
	\faBullhorn		\faHeadphones		\faSortAlphaAsc
	\faBullseye		\faHeart		\faSortAlphaDesc
	\faBus		\faHeartbeat		\faSortAmountAsc
	\faBuysellads		\faHeartO		\faSortAmountDesc
	\faCalculator		\faHistory		\faSortAsc
	\faCalendar		\faHome		\faSortDesc
	\faCalendarCheckO		\faHospitalO		\faSortNumericAsc
	\faCalendarMinusO		\faHourglass		\faSortNumericDesc
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	\faCameraRetro		\faHouzz		\faSpotify
	\faCar		\faHSquare		\faStackExchange
	\faCaretDown		\faHtml5		\faStackOverflow
	\faCaretLeft		\faICursor		\faSteam
	\faCaretRight		\faInbox		\faSteamSquare
	\faCaretSquareODown		\faIndent		\faStepBackward
	\faCaretSquareOLeft		\faIndustry		\faStepForward
	\faCaretSquareORight		\faInfo		\faStethoscope
	\faCaretSquareOUp		\faInfoCircle		\faStickyNote
	\faCaretUp		\faInstagram		\faStickyNoteO
	\faCartArrowDown		\faInternetExplorer		\faStop
	\faCartPlus		\faIoxhost		\faStreetView
	\faCc		\faItalic		\faStrikethrough
	\faCcAmex		\faJoomla		\faStumbleupon
	\faCcDinersClub		\faJsfiddle		\faStumbleuponCircle
	\faCcDiscover		\faKey		\faSubscript
	\faCcJcb		\faKeyboardO		\faSubway

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

















































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	\faCcMastercard		\faLanguage		\faSuitcase
	\faCcPaypal		\faLaptop		\faSuperscript
	\faCcStripe		\faLastfm		\faTable
	\faCcVisa		\faLastfmSquare		\faTablet
	\faCertificate		\faLeaf		\faTachometer
	\faChainBroken		\faLeanpub		\faTag
	\faChild		\faLemon0		\faTags
	\faChrome		\faLevelDown		\faTasks
	\faClipboard		\faLevelUp		\faTaxi
	\faClock0		\faLifeRing		\faTelevision
	\faClone		\faLightbulb0		\faTencentWeibo
	\faCloud		\faLineChart		\faTerminal
	\faCloudDownload		\faLink		\faTextHeight
	\faCloudUpload		\faLinkedIn		\faTextWidth
	\faCode		\faLinkedInSquare		\faTh
	\faCodeFork		\faLinux		\faThLarge
	\faCodepen		\faList		\faThList
	\faCoffee		\faListAlt		\faThumbTack
	\faCog		\faList01		\faTicket
	\faCogs		\faListU1		\faTint
	\faColumns		\faLocationArrow		\faToggleOff
	\faComment		\faLock		\faToggleOn
	\faCommenting		\faMagic		\faTrain
	\faCommenting0		\faMagnet		\faTrash
	\faComment0		\faMale		\faTrash0
	\faComments		\faMap		\faTree
	\faComments0		\faMapMarker		\faTrello
	\faCompass		\faMap0		\faTripadvisor
	\faCompress		\faMapPin		\faTrophy
	\faConnectdevelop		\faMapSigns		\faTruck
	\faContao		\faMaxcdn		\faTty
	\faCreditCard		\faMeanpath		\faTumblr
	\faCrop		\faMedium		\faTumblrSquare
	\faCrosshairs		\faMedkit		\faTwitch
	\faCss3		\faMeh0		\faTwitter
	\faCube		\faMicrophone		\faTwitterSquare
	\faCubes		\faMicrophoneSlash		\faUmbrella
	\faCutlery		\faMinus		\faUnderline
	\faDashcube		\faMinusCircle		\faUniversity
	\faDatabase		\faMinusSquare		\faUnlock
	\faDelicious		\faMinusSquare0		\faUnlockAlt
	\faDesktop		\faMobile		\faUpload
	\faDeviantart		\faMoney		\faUser
	\faDiamond		\faMotorcycle		\faUserMd
	\faDigg		\faMousePointer		\faUserPlus
	\faDownload		\faMusic		\faUsers
	\faDribbble		\faNewspaper0		\faUserSecret
	\faDropbox		\faObjectGroup		\faUserTimes
	\faDrupal		\faObjectUngroup		\faVideoCamera
	\faEject		\faOdnoklassniki		\faVimeo
	\faEllipsisH		\faOdnoklassnikiSquare		\faVimeoSquare
	\faEllipsisV		\faOpenCart		\faVine
	\faEmpire		\faOpenID		\faVk

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	<code>\faEnvelope</code>		<code>\faOpera</code>		<code>\faVolumeDown</code>
	<code>\faEnvelope0</code>		<code>\faOptinMonster</code>		<code>\faVolumeOff</code>
	<code>\faEnvelopeSquare</code>		<code>\faOutdent</code>		<code>\faVolumeUp</code>
	<code>\faEraser</code>		<code>\faPagelines</code>		<code>\faWeibo</code>
	<code>\faExchange</code>		<code>\faPaintBrush</code>		<code>\faWeixin</code>
	<code>\faExclamation</code>		<code>\faPaperclip</code>		<code>\faWhatsapp</code>
	<code>\faExclamationCircle</code>		<code>\faPaperPlane</code>		<code>\faWheelchair</code>
	<code>\faExclamationTriangle</code>		<code>\faPaperPlane0</code>		<code>\faWifi</code>
	<code>\faExpand</code>		<code>\faParagraph</code>		<code>\faWikipediaW</code>
	<code>\faExpeditedssl</code>		<code>\faPause</code>		<code>\faWindows</code>
	<code>\faExternalLink</code>		<code>\faPaw</code>		<code>\faWordpress</code>
	<code>\faExternalLinkSquare</code>		<code>\faPaypal</code>		<code>\faWrench</code>
	<code>\faEye</code>		<code>\faPhone</code>		<code>\faXing</code>
	<code>\faEyedropper</code>		<code>\faPhoneSquare</code>		<code>\faXingSquare</code>
	<code>\faEyeSlash</code>		<code>\faPicture0</code>		<code>\faYahoo</code>
	<code>\faFacebook</code>		<code>\faPieChart</code>		<code>\faYCombinator</code>
	<code>\faFacebookOfficial</code>		<code>\faPiedPiper</code>		<code>\faYelp</code>
	<code>\faFacebookSquare</code>		<code>\faPiedPiperAlt</code>		<code>\faYoutube</code>
	<code>\faFastBackward</code>		<code>\faPinterest</code>		<code>\faYoutubePlay</code>
	<code>\faFastForward</code>		<code>\faPinterestP</code>		<code>\faYoutubeSquare</code>
	<code>\faFax</code>		<code>\faPinterestSquare</code>		

fontawesome defines synonyms for many of the preceding symbols:
































































	<code>\faAutomobile</code>		<code>\faFileZip0</code>		<code>\faRa</code>
	<code>\faBank</code>		<code>\faFlash</code>		<code>\faReorder</code>
	<code>\faBarChart0</code>		<code>\faGe</code>		<code>\faSave</code>
	<code>\faBattery0</code>		<code>\faGear</code>		<code>\faSend</code>
	<code>\faBattery1</code>		<code>\faGears</code>		<code>\faSend0</code>
	<code>\faBattery2</code>		<code>\faGittip</code>		<code>\faSoccerBall0</code>
	<code>\faBattery3</code>		<code>\faGroup</code>		<code>\faSortDown</code>
	<code>\faBattery4</code>		<code>\faHotel</code>		<code>\faSortUp</code>
	<code>\faCab</code>		<code>\faImage</code>		<code>\faSupport</code>
	<code>\faChain</code>		<code>\faInstitution</code>		<code>\faToggleDown</code>
	<code>\faCopy</code>		<code>\faLegal</code>		<code>\faToggleLeft</code>
	<code>\faCut</code>		<code>\faLifeBouy</code>		<code>\faToggleRight</code>
	<code>\faDashboard</code>		<code>\faLifeSaver</code>		<code>\faToggleUp</code>
	<code>\faDedent</code>		<code>\faMailForward</code>		<code>\faTv</code>
	<code>\faEdit</code>		<code>\faMailReply</code>		<code>\faUnlink</code>
	<code>\faFacebookF</code>		<code>\faMailReplyAll</code>		<code>\faUnsorted</code>
	<code>\faFeed</code>		<code>\faMobilePhone</code>		<code>\faWarning</code>
	<code>\faFileMovie0</code>		<code>\faMortarBoard</code>		<code>\faWechat</code>
	<code>\faFilePhoto0</code>		<code>\faNavicon</code>		<code>\faYc</code>
	<code>\faFilePicture0</code>		<code>\faPaste</code>		<code>\faYCombinatorSquare</code>
	<code>\faFileSound0</code>		<code>\faPhoto</code>		<code>\faYcSquare</code>

TABLE 505: rubikcube Rubik’s Cube Rotations

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

All rubikcube symbols are implemented with TikZ 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 L<sup>A</sup>T<sub>E</sub>X support

The symbol fonts shown in this section are provided without a corresponding L<sup>A</sup>T<sub>E</sub>X<sub>2</sub> $\epsilon$  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 L<sup>A</sup>T<sub>E</sub>X font family. Alas, most of the fonts in this section do not even define a L<sup>A</sup>T<sub>E</sub>X font family. Hence, except where otherwise specified, a document will need to include code like the following in its preamble:

```
\usepackage{pifont}
\DeclareFontFamily{U}{\langle name \rangle}{}
\DeclareFontShape{U}{\langle name \rangle}{m}{n}{<-> \langle font \rangle}{}

```

where  $\langle font \rangle$  is the name of the `.tfm` font file (or `.mf` font file, from which a `.tfm` font file can be generated automatically), and  $\langle name \rangle$  is a name to use to refer to that font. It's generally good practice to use the name of the font file for  $\langle name \rangle$ , as in the following:

```
\usepackage{pifont}
\DeclareFontFamily{U}{hands}{}
\DeclareFontShape{U}{hands}{m}{n}{<-> hands}{}

```

TABLE 506: hands Fists





	<code>\Pisymbol{hands}{65}</code>		<code>\Pisymbol{hands}{67}</code>
	<code>\Pisymbol{hands}{66}</code>		<code>\Pisymbol{hands}{68}</code>

TABLE 507: greenpoint Recycling Symbols





















































	<code>\Pisymbol{greenpoint}{71}</code>
---	--

TABLE 508: nkarta Map Symbols

	<code>\Pisymbol{nkarta}{33}</code>		<code>\Pisymbol{nkarta}{96}</code>		<code>\Pisymbol{nkarta}{193}</code>
	<code>\Pisymbol{nkarta}{34}</code>		<code>\Pisymbol{nkarta}{97}</code>		<code>\Pisymbol{nkarta}{194}</code>
	<code>\Pisymbol{nkarta}{35}</code>		<code>\Pisymbol{nkarta}{98}</code>		<code>\Pisymbol{nkarta}{195}</code>
	<code>\Pisymbol{nkarta}{36}</code>		<code>\Pisymbol{nkarta}{99}</code>		<code>\Pisymbol{nkarta}{196}</code>
	<code>\Pisymbol{nkarta}{37}</code>		<code>\Pisymbol{nkarta}{100}</code>		<code>\Pisymbol{nkarta}{197}</code>
	<code>\Pisymbol{nkarta}{38}</code>		<code>\Pisymbol{nkarta}{101}</code>		<code>\Pisymbol{nkarta}{198}</code>
	<code>\Pisymbol{nkarta}{39}</code>		<code>\Pisymbol{nkarta}{102}</code>		<code>\Pisymbol{nkarta}{199}</code>
	<code>\Pisymbol{nkarta}{40}</code>		<code>\Pisymbol{nkarta}{103}</code>		<code>\Pisymbol{nkarta}{200}</code>
	<code>\Pisymbol{nkarta}{41}</code>		<code>\Pisymbol{nkarta}{104}</code>		<code>\Pisymbol{nkarta}{201}</code>
	<code>\Pisymbol{nkarta}{42}</code>		<code>\Pisymbol{nkarta}{105}</code>		<code>\Pisymbol{nkarta}{202}</code>
	<code>\Pisymbol{nkarta}{43}</code>		<code>\Pisymbol{nkarta}{106}</code>		<code>\Pisymbol{nkarta}{203}</code>
	<code>\Pisymbol{nkarta}{44}</code>		<code>\Pisymbol{nkarta}{107}</code>		<code>\Pisymbol{nkarta}{204}</code>
	<code>\Pisymbol{nkarta}{45}</code>		<code>\Pisymbol{nkarta}{108}</code>		<code>\Pisymbol{nkarta}{205}</code>
	<code>\Pisymbol{nkarta}{46}</code>		<code>\Pisymbol{nkarta}{109}</code>		<code>\Pisymbol{nkarta}{206}</code>
	<code>\Pisymbol{nkarta}{47}</code>		<code>\Pisymbol{nkarta}{110}</code>		<code>\Pisymbol{nkarta}{207}</code>
	<code>\Pisymbol{nkarta}{48}</code>		<code>\Pisymbol{nkarta}{111}</code>		<code>\Pisymbol{nkarta}{208}</code>
	<code>\Pisymbol{nkarta}{49}</code>		<code>\Pisymbol{nkarta}{112}</code>		<code>\Pisymbol{nkarta}{209}</code>

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

















































































2	<code>\Pisymbol{nkarta}{50}</code>		<code>\Pisymbol{nkarta}{113}</code>		<code>\Pisymbol{nkarta}{210}</code>
3	<code>\Pisymbol{nkarta}{51}</code>		<code>\Pisymbol{nkarta}{114}</code>		<code>\Pisymbol{nkarta}{211}</code>
4	<code>\Pisymbol{nkarta}{52}</code>		<code>\Pisymbol{nkarta}{115}</code>		<code>\Pisymbol{nkarta}{212}</code>
5	<code>\Pisymbol{nkarta}{53}</code>		<code>\Pisymbol{nkarta}{116}</code>		<code>\Pisymbol{nkarta}{213}</code>
6	<code>\Pisymbol{nkarta}{54}</code>		<code>\Pisymbol{nkarta}{117}</code>		<code>\Pisymbol{nkarta}{214}</code>
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9	<code>\Pisymbol{nkarta}{57}</code>		<code>\Pisymbol{nkarta}{120}</code>		<code>\Pisymbol{nkarta}{217}</code>
▣	<code>\Pisymbol{nkarta}{58}</code>		<code>\Pisymbol{nkarta}{121}</code>		<code>\Pisymbol{nkarta}{218}</code>
⊙	<code>\Pisymbol{nkarta}{59}</code>	<i>i</i>	<code>\Pisymbol{nkarta}{122}</code>		<code>\Pisymbol{nkarta}{219}</code>
○	<code>\Pisymbol{nkarta}{60}</code>		<code>\Pisymbol{nkarta}{123}</code>		<code>\Pisymbol{nkarta}{220}</code>
▮	<code>\Pisymbol{nkarta}{61}</code>		<code>\Pisymbol{nkarta}{124}</code>		<code>\Pisymbol{nkarta}{221}</code>
✕	<code>\Pisymbol{nkarta}{62}</code>		<code>\Pisymbol{nkarta}{125}</code>		<code>\Pisymbol{nkarta}{222}</code>
▣	<code>\Pisymbol{nkarta}{63}</code>		<code>\Pisymbol{nkarta}{126}</code>		<code>\Pisymbol{nkarta}{223}</code>
□	<code>\Pisymbol{nkarta}{64}</code>		<code>\Pisymbol{nkarta}{161}</code>		<code>\Pisymbol{nkarta}{224}</code>
✳	<code>\Pisymbol{nkarta}{65}</code>		<code>\Pisymbol{nkarta}{162}</code>		<code>\Pisymbol{nkarta}{225}</code>
⋮	<code>\Pisymbol{nkarta}{66}</code>		<code>\Pisymbol{nkarta}{163}</code>		<code>\Pisymbol{nkarta}{226}</code>
▣	<code>\Pisymbol{nkarta}{67}</code>		<code>\Pisymbol{nkarta}{164}</code>		<code>\Pisymbol{nkarta}{227}</code>
▲	<code>\Pisymbol{nkarta}{68}</code>		<code>\Pisymbol{nkarta}{165}</code>		<code>\Pisymbol{nkarta}{228}</code>
☆	<code>\Pisymbol{nkarta}{69}</code>		<code>\Pisymbol{nkarta}{166}</code>		<code>\Pisymbol{nkarta}{229}</code>
✳	<code>\Pisymbol{nkarta}{70}</code>		<code>\Pisymbol{nkarta}{167}</code>		<code>\Pisymbol{nkarta}{230}</code>
▣	<code>\Pisymbol{nkarta}{71}</code>		<code>\Pisymbol{nkarta}{168}</code>		<code>\Pisymbol{nkarta}{231}</code>
▣	<code>\Pisymbol{nkarta}{72}</code>		<code>\Pisymbol{nkarta}{169}</code>		<code>\Pisymbol{nkarta}{232}</code>
▣	<code>\Pisymbol{nkarta}{73}</code>		<code>\Pisymbol{nkarta}{170}</code>		<code>\Pisymbol{nkarta}{233}</code>
+	<code>\Pisymbol{nkarta}{74}</code>		<code>\Pisymbol{nkarta}{171}</code>		<code>\Pisymbol{nkarta}{234}</code>
)	<code>\Pisymbol{nkarta}{75}</code>		<code>\Pisymbol{nkarta}{172}</code>		<code>\Pisymbol{nkarta}{235}</code>
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▣	<code>\Pisymbol{nkarta}{77}</code>		<code>\Pisymbol{nkarta}{174}</code>		<code>\Pisymbol{nkarta}{237}</code>
⋮	<code>\Pisymbol{nkarta}{78}</code>		<code>\Pisymbol{nkarta}{175}</code>		<code>\Pisymbol{nkarta}{238}</code>
○	<code>\Pisymbol{nkarta}{79}</code>		<code>\Pisymbol{nkarta}{176}</code>		<code>\Pisymbol{nkarta}{239}</code>
▽	<code>\Pisymbol{nkarta}{80}</code>		<code>\Pisymbol{nkarta}{177}</code>		<code>\Pisymbol{nkarta}{240}</code>
▣	<code>\Pisymbol{nkarta}{81}</code>		<code>\Pisymbol{nkarta}{178}</code>		<code>\Pisymbol{nkarta}{241}</code>
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▣	<code>\Pisymbol{nkarta}{83}</code>		<code>\Pisymbol{nkarta}{180}</code>		<code>\Pisymbol{nkarta}{243}</code>
⊙	<code>\Pisymbol{nkarta}{84}</code>		<code>\Pisymbol{nkarta}{181}</code>		<code>\Pisymbol{nkarta}{244}</code>
▣	<code>\Pisymbol{nkarta}{85}</code>		<code>\Pisymbol{nkarta}{182}</code>		<code>\Pisymbol{nkarta}{245}</code>
⋮	<code>\Pisymbol{nkarta}{86}</code>		<code>\Pisymbol{nkarta}{183}</code>		<code>\Pisymbol{nkarta}{246}</code>
✳	<code>\Pisymbol{nkarta}{87}</code>		<code>\Pisymbol{nkarta}{184}</code>		<code>\Pisymbol{nkarta}{247}</code>
♿	<code>\Pisymbol{nkarta}{88}</code>		<code>\Pisymbol{nkarta}{185}</code>		<code>\Pisymbol{nkarta}{248}</code>
♿	<code>\Pisymbol{nkarta}{89}</code>		<code>\Pisymbol{nkarta}{186}</code>		<code>\Pisymbol{nkarta}{249}</code>
⊙	<code>\Pisymbol{nkarta}{90}</code>		<code>\Pisymbol{nkarta}{187}</code>		<code>\Pisymbol{nkarta}{250}</code>
⋮	<code>\Pisymbol{nkarta}{91}</code>		<code>\Pisymbol{nkarta}{188}</code>		<code>\Pisymbol{nkarta}{251}</code>
⋮	<code>\Pisymbol{nkarta}{92}</code>		<code>\Pisymbol{nkarta}{189}</code>		<code>\Pisymbol{nkarta}{252}</code>
⋮	<code>\Pisymbol{nkarta}{93}</code>		<code>\Pisymbol{nkarta}{190}</code>		<code>\Pisymbol{nkarta}{253}</code>
⋮	<code>\Pisymbol{nkarta}{94}</code>		<code>\Pisymbol{nkarta}{191}</code>		<code>\Pisymbol{nkarta}{254}</code>
⋮	<code>\Pisymbol{nkarta}{95}</code>		<code>\Pisymbol{nkarta}{192}</code>		<code>\Pisymbol{nkarta}{192}</code>

TABLE 509: moonphase Astronomical Symbols



















































































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TABLE 510: astrosym Astronomical Symbols

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	<code>\Pisymbol{astrosym}{4}</code>		<code>\Pisymbol{astrosym}{136}</code>
	<code>\Pisymbol{astrosym}{5}</code>		<code>\Pisymbol{astrosym}{137}</code>
	<code>\Pisymbol{astrosym}{6}</code>		<code>\Pisymbol{astrosym}{138}</code>
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	<code>\Pisymbol{astrosym}{11}</code>		<code>\Pisymbol{astrosym}{143}</code>
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	<code>\Pisymbol{astrosym}{26}</code>		<code>\Pisymbol{astrosym}{158}</code>
	<code>\Pisymbol{astrosym}{27}</code>		<code>\Pisymbol{astrosym}{159}</code>
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


































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TABLE 511: webomints Decorative Borders







































































































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	<code>\Pisymbol{WebOMintsGD}{55}</code>		<code>\Pisymbol{WebOMintsGD}{99}</code>
	<code>\Pisymbol{WebOMintsGD}{56}</code>		<code>\Pisymbol{WebOMintsGD}{100}</code>
	<code>\Pisymbol{WebOMintsGD}{57}</code>		<code>\Pisymbol{WebOMintsGD}{101}</code>
	<code>\Pisymbol{WebOMintsGD}{65}</code>		<code>\Pisymbol{WebOMintsGD}{102}</code>
	<code>\Pisymbol{WebOMintsGD}{66}</code>		<code>\Pisymbol{WebOMintsGD}{103}</code>
	<code>\Pisymbol{WebOMintsGD}{67}</code>		<code>\Pisymbol{WebOMintsGD}{104}</code>
	<code>\Pisymbol{WebOMintsGD}{68}</code>		<code>\Pisymbol{WebOMintsGD}{105}</code>
	<code>\Pisymbol{WebOMintsGD}{69}</code>		<code>\Pisymbol{WebOMintsGD}{106}</code>
	<code>\Pisymbol{WebOMintsGD}{70}</code>		<code>\Pisymbol{WebOMintsGD}{107}</code>
	<code>\Pisymbol{WebOMintsGD}{71}</code>		<code>\Pisymbol{WebOMintsGD}{108}</code>
	<code>\Pisymbol{WebOMintsGD}{72}</code>		<code>\Pisymbol{WebOMintsGD}{109}</code>
	<code>\Pisymbol{WebOMintsGD}{73}</code>		<code>\Pisymbol{WebOMintsGD}{110}</code>
	<code>\Pisymbol{WebOMintsGD}{74}</code>		<code>\Pisymbol{WebOMintsGD}{111}</code>
	<code>\Pisymbol{WebOMintsGD}{75}</code>		<code>\Pisymbol{WebOMintsGD}{112}</code>
	<code>\Pisymbol{WebOMintsGD}{76}</code>		<code>\Pisymbol{WebOMintsGD}{113}</code>
	<code>\Pisymbol{WebOMintsGD}{77}</code>		<code>\Pisymbol{WebOMintsGD}{114}</code>
	<code>\Pisymbol{WebOMintsGD}{78}</code>		<code>\Pisymbol{WebOMintsGD}{115}</code>
	<code>\Pisymbol{WebOMintsGD}{79}</code>		<code>\Pisymbol{WebOMintsGD}{116}</code>
	<code>\Pisymbol{WebOMintsGD}{80}</code>		<code>\Pisymbol{WebOMintsGD}{117}</code>
	<code>\Pisymbol{WebOMintsGD}{81}</code>		<code>\Pisymbol{WebOMintsGD}{118}</code>
	<code>\Pisymbol{WebOMintsGD}{82}</code>		<code>\Pisymbol{WebOMintsGD}{119}</code>
	<code>\Pisymbol{WebOMintsGD}{83}</code>		<code>\Pisymbol{WebOMintsGD}{120}</code>
	<code>\Pisymbol{WebOMintsGD}{84}</code>		<code>\Pisymbol{WebOMintsGD}{121}</code>
	<code>\Pisymbol{WebOMintsGD}{85}</code>		<code>\Pisymbol{WebOMintsGD}{122}</code>
	<code>\Pisymbol{WebOMintsGD}{86}</code>		

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}{x1}{n}\char73\char74}`—alternatively, `{\usefont{U}{webo}{x1}{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 512: umranda Decorative Borders

	<code>\Pisymbol{umranda}{0}</code>		<code>\Pisymbol{umranda}{34}</code>		<code>\Pisymbol{umranda}{68}</code>
	<code>\Pisymbol{umranda}{1}</code>		<code>\Pisymbol{umranda}{35}</code>		<code>\Pisymbol{umranda}{69}</code>
	<code>\Pisymbol{umranda}{2}</code>		<code>\Pisymbol{umranda}{36}</code>		<code>\Pisymbol{umranda}{70}</code>
	<code>\Pisymbol{umranda}{3}</code>		<code>\Pisymbol{umranda}{37}</code>		<code>\Pisymbol{umranda}{71}</code>
	<code>\Pisymbol{umranda}{4}</code>		<code>\Pisymbol{umranda}{38}</code>		<code>\Pisymbol{umranda}{72}</code>
	<code>\Pisymbol{umranda}{5}</code>		<code>\Pisymbol{umranda}{39}</code>		<code>\Pisymbol{umranda}{73}</code>
	<code>\Pisymbol{umranda}{6}</code>		<code>\Pisymbol{umranda}{40}</code>		<code>\Pisymbol{umranda}{74}</code>
	<code>\Pisymbol{umranda}{7}</code>		<code>\Pisymbol{umranda}{41}</code>		<code>\Pisymbol{umranda}{75}</code>
	<code>\Pisymbol{umranda}{8}</code>		<code>\Pisymbol{umranda}{42}</code>		<code>\Pisymbol{umranda}{76}</code>
	<code>\Pisymbol{umranda}{9}</code>		<code>\Pisymbol{umranda}{43}</code>		<code>\Pisymbol{umranda}{77}</code>
	<code>\Pisymbol{umranda}{10}</code>		<code>\Pisymbol{umranda}{44}</code>		<code>\Pisymbol{umranda}{78}</code>
	<code>\Pisymbol{umranda}{11}</code>		<code>\Pisymbol{umranda}{45}</code>		<code>\Pisymbol{umranda}{79}</code>
	<code>\Pisymbol{umranda}{12}</code>		<code>\Pisymbol{umranda}{46}</code>		<code>\Pisymbol{umranda}{80}</code>
	<code>\Pisymbol{umranda}{13}</code>		<code>\Pisymbol{umranda}{47}</code>		<code>\Pisymbol{umranda}{81}</code>
	<code>\Pisymbol{umranda}{14}</code>		<code>\Pisymbol{umranda}{48}</code>		<code>\Pisymbol{umranda}{82}</code>
	<code>\Pisymbol{umranda}{15}</code>		<code>\Pisymbol{umranda}{49}</code>		<code>\Pisymbol{umranda}{83}</code>
	<code>\Pisymbol{umranda}{16}</code>		<code>\Pisymbol{umranda}{50}</code>		<code>\Pisymbol{umranda}{84}</code>
	<code>\Pisymbol{umranda}{17}</code>		<code>\Pisymbol{umranda}{51}</code>		<code>\Pisymbol{umranda}{85}</code>
	<code>\Pisymbol{umranda}{18}</code>		<code>\Pisymbol{umranda}{52}</code>		<code>\Pisymbol{umranda}{86}</code>
	<code>\Pisymbol{umranda}{19}</code>		<code>\Pisymbol{umranda}{53}</code>		<code>\Pisymbol{umranda}{87}</code>
	<code>\Pisymbol{umranda}{20}</code>		<code>\Pisymbol{umranda}{54}</code>		<code>\Pisymbol{umranda}{88}</code>
	<code>\Pisymbol{umranda}{21}</code>		<code>\Pisymbol{umranda}{55}</code>		<code>\Pisymbol{umranda}{89}</code>
	<code>\Pisymbol{umranda}{22}</code>		<code>\Pisymbol{umranda}{56}</code>		<code>\Pisymbol{umranda}{90}</code>
	<code>\Pisymbol{umranda}{23}</code>		<code>\Pisymbol{umranda}{57}</code>		<code>\Pisymbol{umranda}{91}</code>
	<code>\Pisymbol{umranda}{24}</code>		<code>\Pisymbol{umranda}{58}</code>		<code>\Pisymbol{umranda}{92}</code>
	<code>\Pisymbol{umranda}{25}</code>		<code>\Pisymbol{umranda}{59}</code>		<code>\Pisymbol{umranda}{93}</code>
	<code>\Pisymbol{umranda}{26}</code>		<code>\Pisymbol{umranda}{60}</code>		<code>\Pisymbol{umranda}{94}</code>
	<code>\Pisymbol{umranda}{27}</code>		<code>\Pisymbol{umranda}{61}</code>		<code>\Pisymbol{umranda}{95}</code>
	<code>\Pisymbol{umranda}{28}</code>		<code>\Pisymbol{umranda}{62}</code>		<code>\Pisymbol{umranda}{96}</code>
	<code>\Pisymbol{umranda}{29}</code>		<code>\Pisymbol{umranda}{63}</code>		<code>\Pisymbol{umranda}{97}</code>
	<code>\Pisymbol{umranda}{30}</code>		<code>\Pisymbol{umranda}{64}</code>		<code>\Pisymbol{umranda}{98}</code>
	<code>\Pisymbol{umranda}{31}</code>		<code>\Pisymbol{umranda}{65}</code>		<code>\Pisymbol{umranda}{99}</code>
	<code>\Pisymbol{umranda}{32}</code>		<code>\Pisymbol{umranda}{66}</code>		<code>\Pisymbol{umranda}{100}</code>
	<code>\Pisymbol{umranda}{33}</code>		<code>\Pisymbol{umranda}{67}</code>		<code>\Pisymbol{umranda}{101}</code>

















The niceframe package can be used to typeset decorative frames using fonts such as umranda.

TABLE 513: umrandb Decorative Borders

	<code>\Pisymbol{umrandb}{0}</code>		<code>\Pisymbol{umrandb}{42}</code>		<code>\Pisymbol{umrandb}{84}</code>
	<code>\Pisymbol{umrandb}{1}</code>		<code>\Pisymbol{umrandb}{43}</code>		<code>\Pisymbol{umrandb}{85}</code>
	<code>\Pisymbol{umrandb}{2}</code>		<code>\Pisymbol{umrandb}{44}</code>		<code>\Pisymbol{umrandb}{86}</code>
	<code>\Pisymbol{umrandb}{3}</code>		<code>\Pisymbol{umrandb}{45}</code>		<code>\Pisymbol{umrandb}{87}</code>
	<code>\Pisymbol{umrandb}{4}</code>		<code>\Pisymbol{umrandb}{46}</code>		<code>\Pisymbol{umrandb}{88}</code>
	<code>\Pisymbol{umrandb}{5}</code>		<code>\Pisymbol{umrandb}{47}</code>		<code>\Pisymbol{umrandb}{89}</code>
	<code>\Pisymbol{umrandb}{6}</code>		<code>\Pisymbol{umrandb}{48}</code>		<code>\Pisymbol{umrandb}{90}</code>
	<code>\Pisymbol{umrandb}{7}</code>		<code>\Pisymbol{umrandb}{49}</code>		<code>\Pisymbol{umrandb}{91}</code>
	<code>\Pisymbol{umrandb}{8}</code>		<code>\Pisymbol{umrandb}{50}</code>		<code>\Pisymbol{umrandb}{92}</code>
	<code>\Pisymbol{umrandb}{9}</code>		<code>\Pisymbol{umrandb}{51}</code>		<code>\Pisymbol{umrandb}{93}</code>
	<code>\Pisymbol{umrandb}{10}</code>		<code>\Pisymbol{umrandb}{52}</code>		<code>\Pisymbol{umrandb}{94}</code>
	<code>\Pisymbol{umrandb}{11}</code>		<code>\Pisymbol{umrandb}{53}</code>		<code>\Pisymbol{umrandb}{95}</code>
	<code>\Pisymbol{umrandb}{12}</code>		<code>\Pisymbol{umrandb}{54}</code>		<code>\Pisymbol{umrandb}{96}</code>
	<code>\Pisymbol{umrandb}{13}</code>		<code>\Pisymbol{umrandb}{55}</code>		<code>\Pisymbol{umrandb}{97}</code>
	<code>\Pisymbol{umrandb}{14}</code>		<code>\Pisymbol{umrandb}{56}</code>		<code>\Pisymbol{umrandb}{98}</code>
	<code>\Pisymbol{umrandb}{15}</code>		<code>\Pisymbol{umrandb}{57}</code>		<code>\Pisymbol{umrandb}{99}</code>
	<code>\Pisymbol{umrandb}{16}</code>		<code>\Pisymbol{umrandb}{58}</code>		<code>\Pisymbol{umrandb}{100}</code>
	<code>\Pisymbol{umrandb}{17}</code>		<code>\Pisymbol{umrandb}{59}</code>		<code>\Pisymbol{umrandb}{101}</code>
	<code>\Pisymbol{umrandb}{18}</code>		<code>\Pisymbol{umrandb}{60}</code>		<code>\Pisymbol{umrandb}{102}</code>
	<code>\Pisymbol{umrandb}{19}</code>		<code>\Pisymbol{umrandb}{61}</code>		<code>\Pisymbol{umrandb}{103}</code>
	<code>\Pisymbol{umrandb}{20}</code>		<code>\Pisymbol{umrandb}{62}</code>		<code>\Pisymbol{umrandb}{104}</code>
	<code>\Pisymbol{umrandb}{21}</code>		<code>\Pisymbol{umrandb}{63}</code>		<code>\Pisymbol{umrandb}{105}</code>
	<code>\Pisymbol{umrandb}{22}</code>		<code>\Pisymbol{umrandb}{64}</code>		<code>\Pisymbol{umrandb}{106}</code>
	<code>\Pisymbol{umrandb}{23}</code>		<code>\Pisymbol{umrandb}{65}</code>		<code>\Pisymbol{umrandb}{107}</code>
	<code>\Pisymbol{umrandb}{24}</code>		<code>\Pisymbol{umrandb}{66}</code>		<code>\Pisymbol{umrandb}{108}</code>
	<code>\Pisymbol{umrandb}{25}</code>		<code>\Pisymbol{umrandb}{67}</code>		<code>\Pisymbol{umrandb}{109}</code>
	<code>\Pisymbol{umrandb}{26}</code>		<code>\Pisymbol{umrandb}{68}</code>		<code>\Pisymbol{umrandb}{110}</code>
	<code>\Pisymbol{umrandb}{27}</code>		<code>\Pisymbol{umrandb}{69}</code>		<code>\Pisymbol{umrandb}{111}</code>
	<code>\Pisymbol{umrandb}{28}</code>		<code>\Pisymbol{umrandb}{70}</code>		<code>\Pisymbol{umrandb}{112}</code>
	<code>\Pisymbol{umrandb}{29}</code>		<code>\Pisymbol{umrandb}{71}</code>		<code>\Pisymbol{umrandb}{113}</code>
	<code>\Pisymbol{umrandb}{30}</code>		<code>\Pisymbol{umrandb}{72}</code>		<code>\Pisymbol{umrandb}{114}</code>
	<code>\Pisymbol{umrandb}{31}</code>		<code>\Pisymbol{umrandb}{73}</code>		<code>\Pisymbol{umrandb}{115}</code>
	<code>\Pisymbol{umrandb}{32}</code>		<code>\Pisymbol{umrandb}{74}</code>		<code>\Pisymbol{umrandb}{116}</code>
	<code>\Pisymbol{umrandb}{33}</code>		<code>\Pisymbol{umrandb}{75}</code>		<code>\Pisymbol{umrandb}{117}</code>
	<code>\Pisymbol{umrandb}{34}</code>		<code>\Pisymbol{umrandb}{76}</code>		<code>\Pisymbol{umrandb}{118}</code>
	<code>\Pisymbol{umrandb}{35}</code>		<code>\Pisymbol{umrandb}{77}</code>		<code>\Pisymbol{umrandb}{119}</code>
	<code>\Pisymbol{umrandb}{36}</code>		<code>\Pisymbol{umrandb}{78}</code>		<code>\Pisymbol{umrandb}{120}</code>
	<code>\Pisymbol{umrandb}{37}</code>		<code>\Pisymbol{umrandb}{79}</code>		<code>\Pisymbol{umrandb}{121}</code>
	<code>\Pisymbol{umrandb}{38}</code>		<code>\Pisymbol{umrandb}{80}</code>		<code>\Pisymbol{umrandb}{122}</code>
	<code>\Pisymbol{umrandb}{39}</code>		<code>\Pisymbol{umrandb}{81}</code>		<code>\Pisymbol{umrandb}{123}</code>
	<code>\Pisymbol{umrandb}{40}</code>		<code>\Pisymbol{umrandb}{82}</code>		
	<code>\Pisymbol{umrandb}{41}</code>		<code>\Pisymbol{umrandb}{83}</code>		

The niceframe package can be used to typeset decorative frames using fonts such as umrandb.

TABLE 514: dingbat Decorative Borders































	<code>\Pisymbol{dingbat}{69}</code>		<code>\Pisymbol{dingbat}{97}</code>
	<code>\Pisymbol{dingbat}{70}</code>		<code>\Pisymbol{dingbat}{98}</code>
	<code>\Pisymbol{dingbat}{71}</code>		<code>\Pisymbol{dingbat}{99}</code>
	<code>\Pisymbol{dingbat}{72}</code>		<code>\Pisymbol{dingbat}{100}</code>
	<code>\Pisymbol{dingbat}{74}</code>		<code>\Pisymbol{dingbat}{101}</code>
	<code>\Pisymbol{dingbat}{75}</code>		<code>\Pisymbol{dingbat}{102}</code>
	<code>\Pisymbol{dingbat}{76}</code>		<code>\Pisymbol{dingbat}{103}</code>
	<code>\Pisymbol{dingbat}{77}</code>		<code>\Pisymbol{dingbat}{104}</code>

The preceding table is incomplete in that it includes only unnamed dingbat symbols. Named symbols are included in Table 352 and Table 396 (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 515: knot Celtic Knots














































	<code>\Pisymbol{knot1}{48}</code>		<code>\Pisymbol{knot1}{68}</code>		<code>\Pisymbol{knot1}{84}</code>
	<code>\Pisymbol{knot1}{49}</code>		<code>\Pisymbol{knot1}{69}</code>		<code>\Pisymbol{knot1}{85}</code>
	<code>\Pisymbol{knot1}{50}</code>		<code>\Pisymbol{knot1}{70}</code>		<code>\Pisymbol{knot1}{86}</code>
	<code>\Pisymbol{knot1}{51}</code>		<code>\Pisymbol{knot1}{71}</code>		<code>\Pisymbol{knot1}{87}</code>
	<code>\Pisymbol{knot1}{52}</code>		<code>\Pisymbol{knot1}{72}</code>		<code>\Pisymbol{knot1}{88}</code>
	<code>\Pisymbol{knot1}{53}</code>		<code>\Pisymbol{knot1}{73}</code>		<code>\Pisymbol{knot1}{96}</code>
	<code>\Pisymbol{knot1}{58}</code>		<code>\Pisymbol{knot1}{74}</code>		<code>\Pisymbol{knot1}{97}</code>
	<code>\Pisymbol{knot1}{59}</code>		<code>\Pisymbol{knot1}{75}</code>		<code>\Pisymbol{knot1}{98}</code>
	<code>\Pisymbol{knot1}{60}</code>		<code>\Pisymbol{knot1}{76}</code>		<code>\Pisymbol{knot1}{99}</code>
	<code>\Pisymbol{knot1}{61}</code>		<code>\Pisymbol{knot1}{77}</code>		<code>\Pisymbol{knot1}{100}</code>

(continued on next page)

(continued from previous page)













































































































	<code>\Pisymbol{knot1}{62}</code>		<code>\Pisymbol{knot1}{78}</code>		<code>\Pisymbol{knot1}{101}</code>
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












































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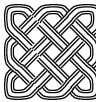

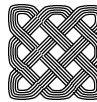
















	<code>\Pisymbol{knot3}{67}</code>		<code>\Pisymbol{knot3}{83}</code>		
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•	<code>\Pisymbol{knot6}{52}</code>		<code>\Pisymbol{knot6}{72}</code>		<code>\Pisymbol{knot6}{88}</code>
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	<code>\Pisymbol{knot6}{66}</code>		<code>\Pisymbol{knot6}{82}</code>		<code>\Pisymbol{knot6}{105}</code>
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◆	<code>\Pisymbol{knot7}{51}</code>		<code>\Pisymbol{knot7}{71}</code>		<code>\Pisymbol{knot7}{87}</code>
•	<code>\Pisymbol{knot7}{52}</code>		<code>\Pisymbol{knot7}{72}</code>		<code>\Pisymbol{knot7}{88}</code>
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	<code>\Pisymbol{knot7}{67}</code>		<code>\Pisymbol{knot7}{83}</code>		

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.

Input	knot1	knot2	knot3	knot4	knot5	knot6	knot7
CDB							
FHG							
©EA							






























































































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 516: 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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





































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 \Pisymbol{dancers}{34}	 \Pisymbol{dancers}{120}	 \Pisymbol{dancers}{206}
 \Pisymbol{dancers}{35}	 \Pisymbol{dancers}{121}	 \Pisymbol{dancers}{207}
 \Pisymbol{dancers}{36}	 \Pisymbol{dancers}{122}	 \Pisymbol{dancers}{208}
 \Pisymbol{dancers}{37}	 \Pisymbol{dancers}{123}	 \Pisymbol{dancers}{209}
 \Pisymbol{dancers}{38}	 \Pisymbol{dancers}{124}	 \Pisymbol{dancers}{210}
 \Pisymbol{dancers}{39}	 \Pisymbol{dancers}{125}	 \Pisymbol{dancers}{211}
 \Pisymbol{dancers}{40}	 \Pisymbol{dancers}{126}	 \Pisymbol{dancers}{212}
 \Pisymbol{dancers}{41}	 \Pisymbol{dancers}{127}	 \Pisymbol{dancers}{213}
 \Pisymbol{dancers}{42}	 \Pisymbol{dancers}{128}	 \Pisymbol{dancers}{214}
 \Pisymbol{dancers}{43}	 \Pisymbol{dancers}{129}	 \Pisymbol{dancers}{215}
 \Pisymbol{dancers}{44}	 \Pisymbol{dancers}{130}	 \Pisymbol{dancers}{216}
 \Pisymbol{dancers}{45}	 \Pisymbol{dancers}{131}	 \Pisymbol{dancers}{217}
 \Pisymbol{dancers}{46}	 \Pisymbol{dancers}{132}	 \Pisymbol{dancers}{218}
 \Pisymbol{dancers}{47}	 \Pisymbol{dancers}{133}	 \Pisymbol{dancers}{219}
 \Pisymbol{dancers}{48}	 \Pisymbol{dancers}{134}	 \Pisymbol{dancers}{220}
 \Pisymbol{dancers}{49}	 \Pisymbol{dancers}{135}	 \Pisymbol{dancers}{221}
 \Pisymbol{dancers}{50}	 \Pisymbol{dancers}{136}	 \Pisymbol{dancers}{222}
 \Pisymbol{dancers}{51}	 \Pisymbol{dancers}{137}	 \Pisymbol{dancers}{223}
 \Pisymbol{dancers}{52}	 \Pisymbol{dancers}{138}	 \Pisymbol{dancers}{224}
 \Pisymbol{dancers}{53}	 \Pisymbol{dancers}{139}	 \Pisymbol{dancers}{225}
 \Pisymbol{dancers}{54}	 \Pisymbol{dancers}{140}	 \Pisymbol{dancers}{226}
 \Pisymbol{dancers}{55}	 \Pisymbol{dancers}{141}	 \Pisymbol{dancers}{227}
 \Pisymbol{dancers}{56}	 \Pisymbol{dancers}{142}	 \Pisymbol{dancers}{228}
 \Pisymbol{dancers}{57}	 \Pisymbol{dancers}{143}	 \Pisymbol{dancers}{229}
 \Pisymbol{dancers}{58}	 \Pisymbol{dancers}{144}	 \Pisymbol{dancers}{230}
 \Pisymbol{dancers}{59}	 \Pisymbol{dancers}{145}	 \Pisymbol{dancers}{231}
 \Pisymbol{dancers}{60}	 \Pisymbol{dancers}{146}	 \Pisymbol{dancers}{232}
 \Pisymbol{dancers}{61}	 \Pisymbol{dancers}{147}	 \Pisymbol{dancers}{233}
 \Pisymbol{dancers}{62}	 \Pisymbol{dancers}{148}	 \Pisymbol{dancers}{234}
 \Pisymbol{dancers}{63}	 \Pisymbol{dancers}{149}	 \Pisymbol{dancers}{235}
 \Pisymbol{dancers}{64}	 \Pisymbol{dancers}{150}	 \Pisymbol{dancers}{236}
 \Pisymbol{dancers}{65}	 \Pisymbol{dancers}{151}	 \Pisymbol{dancers}{237}
 \Pisymbol{dancers}{66}	 \Pisymbol{dancers}{152}	 \Pisymbol{dancers}{238}
 \Pisymbol{dancers}{67}	 \Pisymbol{dancers}{153}	 \Pisymbol{dancers}{239}
 \Pisymbol{dancers}{68}	 \Pisymbol{dancers}{154}	 \Pisymbol{dancers}{240}

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












































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	<code>\Pisymbol{dancers}{69}</code>		<code>\Pisymbol{dancers}{155}</code>		<code>\Pisymbol{dancers}{241}</code>
	<code>\Pisymbol{dancers}{70}</code>		<code>\Pisymbol{dancers}{156}</code>		<code>\Pisymbol{dancers}{242}</code>
	<code>\Pisymbol{dancers}{71}</code>		<code>\Pisymbol{dancers}{157}</code>		<code>\Pisymbol{dancers}{243}</code>
	<code>\Pisymbol{dancers}{72}</code>		<code>\Pisymbol{dancers}{158}</code>		<code>\Pisymbol{dancers}{244}</code>
	<code>\Pisymbol{dancers}{73}</code>		<code>\Pisymbol{dancers}{159}</code>		<code>\Pisymbol{dancers}{245}</code>
	<code>\Pisymbol{dancers}{74}</code>		<code>\Pisymbol{dancers}{160}</code>		<code>\Pisymbol{dancers}{246}</code>
	<code>\Pisymbol{dancers}{75}</code>		<code>\Pisymbol{dancers}{161}</code>		<code>\Pisymbol{dancers}{247}</code>
	<code>\Pisymbol{dancers}{76}</code>		<code>\Pisymbol{dancers}{162}</code>		<code>\Pisymbol{dancers}{248}</code>
	<code>\Pisymbol{dancers}{77}</code>		<code>\Pisymbol{dancers}{163}</code>		<code>\Pisymbol{dancers}{249}</code>
	<code>\Pisymbol{dancers}{78}</code>		<code>\Pisymbol{dancers}{164}</code>		<code>\Pisymbol{dancers}{250}</code>
	<code>\Pisymbol{dancers}{79}</code>		<code>\Pisymbol{dancers}{165}</code>		<code>\Pisymbol{dancers}{251}</code>
	<code>\Pisymbol{dancers}{80}</code>		<code>\Pisymbol{dancers}{166}</code>		<code>\Pisymbol{dancers}{252}</code>
	<code>\Pisymbol{dancers}{81}</code>		<code>\Pisymbol{dancers}{167}</code>		<code>\Pisymbol{dancers}{253}</code>
	<code>\Pisymbol{dancers}{82}</code>		<code>\Pisymbol{dancers}{168}</code>		<code>\Pisymbol{dancers}{254}</code>
	<code>\Pisymbol{dancers}{83}</code>		<code>\Pisymbol{dancers}{169}</code>		<code>\Pisymbol{dancers}{255}</code>
	<code>\Pisymbol{dancers}{84}</code>		<code>\Pisymbol{dancers}{170}</code>		
	<code>\Pisymbol{dancers}{85}</code>		<code>\Pisymbol{dancers}{171}</code>		

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 517: semaphor Semaphore Alphabet

	<code>\Pisymbol{smfpr10}{34}</code>		<code>\Pisymbol{smfpr10}{116}</code>		<code>\Pisymbol{smfpr10}{184}</code>
	<code>\Pisymbol{smfpr10}{35}</code>		<code>\Pisymbol{smfpr10}{117}</code>		<code>\Pisymbol{smfpr10}{185}</code>
	<code>\Pisymbol{smfpr10}{36}</code>		<code>\Pisymbol{smfpr10}{118}</code>		<code>\Pisymbol{smfpr10}{186}</code>
	<code>\Pisymbol{smfpr10}{42}</code>		<code>\Pisymbol{smfpr10}{119}</code>		<code>\Pisymbol{smfpr10}{187}</code>
	<code>\Pisymbol{smfpr10}{46}</code>		<code>\Pisymbol{smfpr10}{120}</code>		<code>\Pisymbol{smfpr10}{192}</code>
	<code>\Pisymbol{smfpr10}{48}</code>		<code>\Pisymbol{smfpr10}{121}</code>		<code>\Pisymbol{smfpr10}{193}</code>
	<code>\Pisymbol{smfpr10}{49}</code>		<code>\Pisymbol{smfpr10}{122}</code>		<code>\Pisymbol{smfpr10}{194}</code>
	<code>\Pisymbol{smfpr10}{50}</code>		<code>\Pisymbol{smfpr10}{126}</code>		<code>\Pisymbol{smfpr10}{195}</code>
	<code>\Pisymbol{smfpr10}{51}</code>		<code>\Pisymbol{smfpr10}{128}</code>		<code>\Pisymbol{smfpr10}{196}</code>
	<code>\Pisymbol{smfpr10}{52}</code>		<code>\Pisymbol{smfpr10}{129}</code>		<code>\Pisymbol{smfpr10}{197}</code>
	<code>\Pisymbol{smfpr10}{53}</code>		<code>\Pisymbol{smfpr10}{130}</code>		<code>\Pisymbol{smfpr10}{199}</code>
	<code>\Pisymbol{smfpr10}{54}</code>		<code>\Pisymbol{smfpr10}{131}</code>		<code>\Pisymbol{smfpr10}{200}</code>
	<code>\Pisymbol{smfpr10}{55}</code>		<code>\Pisymbol{smfpr10}{132}</code>		<code>\Pisymbol{smfpr10}{201}</code>
	<code>\Pisymbol{smfpr10}{56}</code>		<code>\Pisymbol{smfpr10}{133}</code>		<code>\Pisymbol{smfpr10}{202}</code>
	<code>\Pisymbol{smfpr10}{57}</code>		<code>\Pisymbol{smfpr10}{134}</code>		<code>\Pisymbol{smfpr10}{203}</code>

(continued on next page)

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ᄀ	\Pisymbol{smfpr10}{65}	ᄁ	\Pisymbol{smfpr10}{135}	ᄂ	\Pisymbol{smfpr10}{204}
ᄃ	\Pisymbol{smfpr10}{66}	ᄄ	\Pisymbol{smfpr10}{136}	ᄅ	\Pisymbol{smfpr10}{205}
ᄆ	\Pisymbol{smfpr10}{67}	ᄇ	\Pisymbol{smfpr10}{137}	ᄈ	\Pisymbol{smfpr10}{206}
ᄉ	\Pisymbol{smfpr10}{68}	ᄊ	\Pisymbol{smfpr10}{138}	ᄋ	\Pisymbol{smfpr10}{207}
ᄌ	\Pisymbol{smfpr10}{69}	ᄍ	\Pisymbol{smfpr10}{139}	ᄎ	\Pisymbol{smfpr10}{209}
ᄏ	\Pisymbol{smfpr10}{70}	ᄐ	\Pisymbol{smfpr10}{140}	ᄑ	\Pisymbol{smfpr10}{210}
ᄒ	\Pisymbol{smfpr10}{71}	ᄓ	\Pisymbol{smfpr10}{142}	ᄔ	\Pisymbol{smfpr10}{211}
ᄕ	\Pisymbol{smfpr10}{72}	ᄖ	\Pisymbol{smfpr10}{143}	ᄗ	\Pisymbol{smfpr10}{212}
ᄘ	\Pisymbol{smfpr10}{73}	ᄙ	\Pisymbol{smfpr10}{144}	ᄚ	\Pisymbol{smfpr10}{213}
ᄛ	\Pisymbol{smfpr10}{74}	ᄜ	\Pisymbol{smfpr10}{145}	ᄝ	\Pisymbol{smfpr10}{214}
ᄞ	\Pisymbol{smfpr10}{75}	ᄟ	\Pisymbol{smfpr10}{146}	ᄠ	\Pisymbol{smfpr10}{216}
ᄡ	\Pisymbol{smfpr10}{76}	ᄢ	\Pisymbol{smfpr10}{147}	ᄣ	\Pisymbol{smfpr10}{217}
ᄤ	\Pisymbol{smfpr10}{77}	ᄥ	\Pisymbol{smfpr10}{148}	ᄦ	\Pisymbol{smfpr10}{218}
ᄧ	\Pisymbol{smfpr10}{78}	ᄨ	\Pisymbol{smfpr10}{149}	ᄩ	\Pisymbol{smfpr10}{219}
ᄪ	\Pisymbol{smfpr10}{79}	ᄫ	\Pisymbol{smfpr10}{150}	ᄬ	\Pisymbol{smfpr10}{220}
ᄭ	\Pisymbol{smfpr10}{80}	ᄮ	\Pisymbol{smfpr10}{151}	ᄯ	\Pisymbol{smfpr10}{221}
ᄮ	\Pisymbol{smfpr10}{81}	ᄰ	\Pisymbol{smfpr10}{152}	ᄱ	\Pisymbol{smfpr10}{224}
ᄯ	\Pisymbol{smfpr10}{82}	ᄲ	\Pisymbol{smfpr10}{153}	ᄳ	\Pisymbol{smfpr10}{225}
ᄱ	\Pisymbol{smfpr10}{83}	ᄴ	\Pisymbol{smfpr10}{154}	ᄵ	\Pisymbol{smfpr10}{226}
ᄲ	\Pisymbol{smfpr10}{84}	ᄵ	\Pisymbol{smfpr10}{155}	ᄶ	\Pisymbol{smfpr10}{227}
ᄳ	\Pisymbol{smfpr10}{85}	ᄷ	\Pisymbol{smfpr10}{157}	ᄸ	\Pisymbol{smfpr10}{228}
ᄴ	\Pisymbol{smfpr10}{86}	ᄸ	\Pisymbol{smfpr10}{158}	ᄹ	\Pisymbol{smfpr10}{229}
ᄵ	\Pisymbol{smfpr10}{87}	ᄹ	\Pisymbol{smfpr10}{160}	ᄺ	\Pisymbol{smfpr10}{231}
ᄶ	\Pisymbol{smfpr10}{88}	ᄺ	\Pisymbol{smfpr10}{161}	ᄻ	\Pisymbol{smfpr10}{232}
ᄷ	\Pisymbol{smfpr10}{89}	ᄻ	\Pisymbol{smfpr10}{162}	ᄼ	\Pisymbol{smfpr10}{233}
ᄸ	\Pisymbol{smfpr10}{90}	ᄼ	\Pisymbol{smfpr10}{163}	ᄽ	\Pisymbol{smfpr10}{234}
ᄹ	\Pisymbol{smfpr10}{97}	ᄿ	\Pisymbol{smfpr10}{164}	ᄾ	\Pisymbol{smfpr10}{235}
ᄺ	\Pisymbol{smfpr10}{98}	ᄿ	\Pisymbol{smfpr10}{165}	ᄿ	\Pisymbol{smfpr10}{236}
ᄻ	\Pisymbol{smfpr10}{99}	ᅀ	\Pisymbol{smfpr10}{166}	ᅀ	\Pisymbol{smfpr10}{237}
ᄼ	\Pisymbol{smfpr10}{100}	ᅁ	\Pisymbol{smfpr10}{167}	ᅁ	\Pisymbol{smfpr10}{238}
ᄽ	\Pisymbol{smfpr10}{101}	ᅂ	\Pisymbol{smfpr10}{168}	ᅂ	\Pisymbol{smfpr10}{239}
ᄾ	\Pisymbol{smfpr10}{102}	ᅃ	\Pisymbol{smfpr10}{169}	ᅃ	\Pisymbol{smfpr10}{241}
ᄿ	\Pisymbol{smfpr10}{103}	ᅄ	\Pisymbol{smfpr10}{170}	ᅄ	\Pisymbol{smfpr10}{242}
ᄿ	\Pisymbol{smfpr10}{104}	ᅅ	\Pisymbol{smfpr10}{171}	ᅅ	\Pisymbol{smfpr10}{243}
ᅀ	\Pisymbol{smfpr10}{105}	ᅆ	\Pisymbol{smfpr10}{172}	ᅆ	\Pisymbol{smfpr10}{244}
ᅁ	\Pisymbol{smfpr10}{106}	ᅇ	\Pisymbol{smfpr10}{174}	ᅇ	\Pisymbol{smfpr10}{245}
ᅂ	\Pisymbol{smfpr10}{107}	ᅈ	\Pisymbol{smfpr10}{175}	ᅈ	\Pisymbol{smfpr10}{246}
ᅃ	\Pisymbol{smfpr10}{108}	ᅉ	\Pisymbol{smfpr10}{176}	ᅉ	\Pisymbol{smfpr10}{248}
ᅄ	\Pisymbol{smfpr10}{109}	ᅊ	\Pisymbol{smfpr10}{177}	ᅊ	\Pisymbol{smfpr10}{249}
ᅅ	\Pisymbol{smfpr10}{110}	ᅋ	\Pisymbol{smfpr10}{178}	ᅋ	\Pisymbol{smfpr10}{250}
ᅆ	\Pisymbol{smfpr10}{111}	ᅌ	\Pisymbol{smfpr10}{179}	ᅌ	\Pisymbol{smfpr10}{251}
ᅇ	\Pisymbol{smfpr10}{112}	ᅍ	\Pisymbol{smfpr10}{180}	ᅍ	\Pisymbol{smfpr10}{252}
ᅈ	\Pisymbol{smfpr10}{113}	ᅎ	\Pisymbol{smfpr10}{181}	ᅎ	\Pisymbol{smfpr10}{253}
ᅉ	\Pisymbol{smfpr10}{114}	ᅏ	\Pisymbol{smfpr10}{182}		
ᅊ	\Pisymbol{smfpr10}{115}	ᅐ	\Pisymbol{smfpr10}{183}		

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 518: `cryst` Crystallography Symbols

◦	<code>\Pisymbol{cryst}{0}</code>	⬢	<code>\Pisymbol{cryst}{63}</code>	↙	<code>\Pisymbol{cryst}{138}</code>
◐	<code>\Pisymbol{cryst}{2}</code>	⬣	<code>\Pisymbol{cryst}{64}</code>	↘	<code>\Pisymbol{cryst}{139}</code>
▲	<code>\Pisymbol{cryst}{3}</code>	⬤	<code>\Pisymbol{cryst}{65}</code>	▣	<code>\Pisymbol{cryst}{140}</code>
◆	<code>\Pisymbol{cryst}{4}</code>	⬥	<code>\Pisymbol{cryst}{66}</code>	⬦	<code>\Pisymbol{cryst}{141}</code>
→	<code>\Pisymbol{cryst}{5}</code>	↖	<code>\Pisymbol{cryst}{75}</code>	▤	<code>\Pisymbol{cryst}{142}</code>
●	<code>\Pisymbol{cryst}{6}</code>	↗	<code>\Pisymbol{cryst}{77}</code>	▥	<code>\Pisymbol{cryst}{143}</code>
←	<code>\Pisymbol{cryst}{7}</code>	↘	<code>\Pisymbol{cryst}{78}</code>	↙	<code>\Pisymbol{cryst}{145}</code>
→	<code>\Pisymbol{cryst}{8}</code>	↙	<code>\Pisymbol{cryst}{79}</code>	↘	<code>\Pisymbol{cryst}{147}</code>
→	<code>\Pisymbol{cryst}{9}</code>	▣	<code>\Pisymbol{cryst}{80}</code>	↙	<code>\Pisymbol{cryst}{148}</code>
◦	<code>\Pisymbol{cryst}{10}</code>	▤	<code>\Pisymbol{cryst}{81}</code>	↘	<code>\Pisymbol{cryst}{149}</code>
◐	<code>\Pisymbol{cryst}{12}</code>	▥	<code>\Pisymbol{cryst}{82}</code>	↓	<code>\Pisymbol{cryst}{155}</code>
◑	<code>\Pisymbol{cryst}{15}</code>	▦	<code>\Pisymbol{cryst}{83}</code>	↓	<code>\Pisymbol{cryst}{157}</code>
◒	<code>\Pisymbol{cryst}{20}</code>	▧	<code>\Pisymbol{cryst}{84}</code>	↓	<code>\Pisymbol{cryst}{158}</code>
◓	<code>\Pisymbol{cryst}{21}</code>	↖	<code>\Pisymbol{cryst}{85}</code>	↓	<code>\Pisymbol{cryst}{159}</code>
◔	<code>\Pisymbol{cryst}{22}</code>	↗	<code>\Pisymbol{cryst}{87}</code>	↖	<code>\Pisymbol{cryst}{175}</code>
◕	<code>\Pisymbol{cryst}{24}</code>	↘	<code>\Pisymbol{cryst}{88}</code>	↗	<code>\Pisymbol{cryst}{177}</code>
↙	<code>\Pisymbol{cryst}{25}</code>	↙	<code>\Pisymbol{cryst}{89}</code>	↘	<code>\Pisymbol{cryst}{178}</code>
↘	<code>\Pisymbol{cryst}{27}</code>	↖	<code>\Pisymbol{cryst}{95}</code>	↙	<code>\Pisymbol{cryst}{179}</code>
↗	<code>\Pisymbol{cryst}{28}</code>	↗	<code>\Pisymbol{cryst}{97}</code>	↖	<code>\Pisymbol{cryst}{185}</code>
↖	<code>\Pisymbol{cryst}{29}</code>	↖	<code>\Pisymbol{cryst}{98}</code>	↗	<code>\Pisymbol{cryst}{187}</code>
▲	<code>\Pisymbol{cryst}{30}</code>	↗	<code>\Pisymbol{cryst}{99}</code>	↘	<code>\Pisymbol{cryst}{188}</code>
▲	<code>\Pisymbol{cryst}{31}</code>	⬢	<code>\Pisymbol{cryst}{102}</code>	↙	<code>\Pisymbol{cryst}{189}</code>
▲	<code>\Pisymbol{cryst}{32}</code>	⬣	<code>\Pisymbol{cryst}{103}</code>	↖	<code>\Pisymbol{cryst}{195}</code>
↙	<code>\Pisymbol{cryst}{35}</code>	⬤	<code>\Pisymbol{cryst}{104}</code>	↗	<code>\Pisymbol{cryst}{197}</code>
◐	<code>\Pisymbol{cryst}{36}</code>	↖	<code>\Pisymbol{cryst}{105}</code>	↘	<code>\Pisymbol{cryst}{198}</code>
↘	<code>\Pisymbol{cryst}{37}</code>	←	<code>\Pisymbol{cryst}{107}</code>	↙	<code>\Pisymbol{cryst}{199}</code>
↗	<code>\Pisymbol{cryst}{38}</code>	←	<code>\Pisymbol{cryst}{108}</code>	⬢	<code>\Pisymbol{cryst}{202}</code>
↖	<code>\Pisymbol{cryst}{39}</code>	←	<code>\Pisymbol{cryst}{109}</code>	⬣	<code>\Pisymbol{cryst}{203}</code>
◆	<code>\Pisymbol{cryst}{40}</code>	⬢	<code>\Pisymbol{cryst}{112}</code>	▣	<code>\Pisymbol{cryst}{204}</code>
◆	<code>\Pisymbol{cryst}{41}</code>	⬣	<code>\Pisymbol{cryst}{113}</code>	⬤	<code>\Pisymbol{cryst}{210}</code>
◆	<code>\Pisymbol{cryst}{42}</code>	⬤	<code>\Pisymbol{cryst}{120}</code>	⬥	<code>\Pisymbol{cryst}{212}</code>
◆	<code>\Pisymbol{cryst}{43}</code>	⬥	<code>\Pisymbol{cryst}{121}</code>	⬦	<code>\Pisymbol{cryst}{213}</code>

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■	<code>\Pisymbol{cryst}{44}</code>	✂	<code>\Pisymbol{cryst}{123}</code>	⬇	<code>\Pisymbol{cryst}{220}</code>
↗	<code>\Pisymbol{cryst}{45}</code>	♠	<code>\Pisymbol{cryst}{124}</code>	⬇	<code>\Pisymbol{cryst}{221}</code>
↖	<code>\Pisymbol{cryst}{47}</code>	↗	<code>\Pisymbol{cryst}{125}</code>	✂	<code>\Pisymbol{cryst}{223}</code>
↗	<code>\Pisymbol{cryst}{48}</code>	↖	<code>\Pisymbol{cryst}{127}</code>	♠	<code>\Pisymbol{cryst}{224}</code>
↖	<code>\Pisymbol{cryst}{49}</code>	↗	<code>\Pisymbol{cryst}{128}</code>	⬇	<code>\Pisymbol{cryst}{230}</code>
♠	<code>\Pisymbol{cryst}{50}</code>	↖	<code>\Pisymbol{cryst}{129}</code>	✂	<code>\Pisymbol{cryst}{231}</code>
↑	<code>\Pisymbol{cryst}{55}</code>	♠	<code>\Pisymbol{cryst}{130}</code>	✂	<code>\Pisymbol{cryst}{232}</code>
↑	<code>\Pisymbol{cryst}{57}</code>	✂	<code>\Pisymbol{cryst}{131}</code>	♠	<code>\Pisymbol{cryst}{233}</code>
↑	<code>\Pisymbol{cryst}{58}</code>	✂	<code>\Pisymbol{cryst}{132}</code>	✂	<code>\Pisymbol{cryst}{236}</code>
↑	<code>\Pisymbol{cryst}{59}</code>	✂	<code>\Pisymbol{cryst}{133}</code>	♠	<code>\Pisymbol{cryst}{240}</code>
♠	<code>\Pisymbol{cryst}{60}</code>	↖	<code>\Pisymbol{cryst}{135}</code>	♠	<code>\Pisymbol{cryst}{241}</code>
♠	<code>\Pisymbol{cryst}{61}</code>	♠	<code>\Pisymbol{cryst}{136}</code>	♠	<code>\Pisymbol{cryst}{242}</code>
♠	<code>\Pisymbol{cryst}{62}</code>	↖	<code>\Pisymbol{cryst}{137}</code>	♠	<code>\Pisymbol{cryst}{243}</code>

TABLE 519: dice Dice

□	<code>\Pisymbol{dice3d}{49}</code>	□	<code>\Pisymbol{dice3d}{101}</code>	□	<code>\Pisymbol{dice3d}{111}</code>
□	<code>\Pisymbol{dice3d}{50}</code>	□	<code>\Pisymbol{dice3d}{102}</code>	□	<code>\Pisymbol{dice3d}{112}</code>
□	<code>\Pisymbol{dice3d}{51}</code>	□	<code>\Pisymbol{dice3d}{103}</code>	□	<code>\Pisymbol{dice3d}{113}</code>
□	<code>\Pisymbol{dice3d}{52}</code>	□	<code>\Pisymbol{dice3d}{104}</code>	□	<code>\Pisymbol{dice3d}{114}</code>
□	<code>\Pisymbol{dice3d}{53}</code>	□	<code>\Pisymbol{dice3d}{105}</code>	□	<code>\Pisymbol{dice3d}{115}</code>
□	<code>\Pisymbol{dice3d}{54}</code>	□	<code>\Pisymbol{dice3d}{106}</code>	□	<code>\Pisymbol{dice3d}{116}</code>
□	<code>\Pisymbol{dice3d}{97}</code>	□	<code>\Pisymbol{dice3d}{107}</code>	□	<code>\Pisymbol{dice3d}{117}</code>
□	<code>\Pisymbol{dice3d}{98}</code>	□	<code>\Pisymbol{dice3d}{108}</code>	□	<code>\Pisymbol{dice3d}{118}</code>
□	<code>\Pisymbol{dice3d}{99}</code>	□	<code>\Pisymbol{dice3d}{109}</code>	□	<code>\Pisymbol{dice3d}{119}</code>
□	<code>\Pisymbol{dice3d}{100}</code>	□	<code>\Pisymbol{dice3d}{110}</code>	□	<code>\Pisymbol{dice3d}{120}</code>

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 520: magic Trading Card Symbols

①	<code>\Pisymbol{magic}{48}</code>	⑥	<code>\Pisymbol{magic}{54}</code>	Ⓜ	<code>\Pisymbol{magic}{82}</code>
②	<code>\Pisymbol{magic}{49}</code>	⑦	<code>\Pisymbol{magic}{55}</code>	Ⓝ	<code>\Pisymbol{magic}{84}</code>
③	<code>\Pisymbol{magic}{50}</code>	⑧	<code>\Pisymbol{magic}{56}</code>	♠	<code>\Pisymbol{magic}{85}</code>
④	<code>\Pisymbol{magic}{51}</code>	⑨	<code>\Pisymbol{magic}{57}</code>	⊙	<code>\Pisymbol{magic}{87}</code>
⑤	<code>\Pisymbol{magic}{52}</code>	♣	<code>\Pisymbol{magic}{66}</code>	⊗	<code>\Pisymbol{magic}{88}</code>
	<code>\Pisymbol{magic}{53}</code>	♠	<code>\Pisymbol{magic}{71}</code>	⑩	<code>\Pisymbol{magic}{90}</code>

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:







































































































①–⑩	0–9	Circled numerals 0–9
♠	B	Black magic symbol
♣	G	Green magic symbol
Ⓜ	R	Red magic symbol
Ⓝ	T	Tap symbol (tilted “T” in a circle)
♠	U	Blue magic symbol
⊙	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 521: bartel-chess-fonts Chess Pieces and Chessboard Squares

♔	<code>\Pisymbol{fselch}{0}</code>	♞	<code>\Pisymbol{fselch}{55}</code>	♛	<code>\Pisymbol{fselch}{110}</code>
♚	<code>\Pisymbol{fselch}{1}</code>	♟	<code>\Pisymbol{fselch}{56}</code>	♜	<code>\Pisymbol{fselch}{111}</code>
♙	<code>\Pisymbol{fselch}{2}</code>	♞	<code>\Pisymbol{fselch}{57}</code>	♝	<code>\Pisymbol{fselch}{112}</code>
♖	<code>\Pisymbol{fselch}{3}</code>	♟	<code>\Pisymbol{fselch}{58}</code>	♚	<code>\Pisymbol{fselch}{113}</code>
♗	<code>\Pisymbol{fselch}{4}</code>	♞	<code>\Pisymbol{fselch}{59}</code>	♙	<code>\Pisymbol{fselch}{114}</code>
♕	<code>\Pisymbol{fselch}{5}</code>	♟	<code>\Pisymbol{fselch}{60}</code>	♞	<code>\Pisymbol{fselch}{115}</code>
♜	<code>\Pisymbol{fselch}{6}</code>	♞	<code>\Pisymbol{fselch}{61}</code>	♛	<code>\Pisymbol{fselch}{116}</code>
♝	<code>\Pisymbol{fselch}{7}</code>	♟	<code>\Pisymbol{fselch}{62}</code>	♜	<code>\Pisymbol{fselch}{117}</code>
♞	<code>\Pisymbol{fselch}{8}</code>	♞	<code>\Pisymbol{fselch}{63}</code>	♝	<code>\Pisymbol{fselch}{118}</code>
♟	<code>\Pisymbol{fselch}{9}</code>	♟	<code>\Pisymbol{fselch}{64}</code>	♚	<code>\Pisymbol{fselch}{119}</code>
♠	<code>\Pisymbol{fselch}{10}</code>	♞	<code>\Pisymbol{fselch}{65}</code>	♙	<code>\Pisymbol{fselch}{120}</code>
♡	<code>\Pisymbol{fselch}{11}</code>	♟	<code>\Pisymbol{fselch}{66}</code>	♞	<code>\Pisymbol{fselch}{121}</code>
♢	<code>\Pisymbol{fselch}{12}</code>	♞	<code>\Pisymbol{fselch}{67}</code>	♛	<code>\Pisymbol{fselch}{122}</code>
♣	<code>\Pisymbol{fselch}{13}</code>	♟	<code>\Pisymbol{fselch}{68}</code>	♜	<code>\Pisymbol{fselch}{123}</code>
♤	<code>\Pisymbol{fselch}{14}</code>	♞	<code>\Pisymbol{fselch}{69}</code>	♝	<code>\Pisymbol{fselch}{124}</code>
♥	<code>\Pisymbol{fselch}{15}</code>	♟	<code>\Pisymbol{fselch}{70}</code>	♚	<code>\Pisymbol{fselch}{125}</code>
♦	<code>\Pisymbol{fselch}{16}</code>	♞	<code>\Pisymbol{fselch}{71}</code>	♙	<code>\Pisymbol{fselch}{126}</code>
♧	<code>\Pisymbol{fselch}{17}</code>	♟	<code>\Pisymbol{fselch}{72}</code>	♞	<code>\Pisymbol{fselch}{127}</code>
♨	<code>\Pisymbol{fselch}{18}</code>	♞	<code>\Pisymbol{fselch}{73}</code>	♛	<code>\Pisymbol{fselch}{128}</code>
♩	<code>\Pisymbol{fselch}{19}</code>	♟	<code>\Pisymbol{fselch}{74}</code>	♜	<code>\Pisymbol{fselch}{129}</code>

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	<code>\Pisymbol{fselch}{20}</code>		<code>\Pisymbol{fselch}{75}</code>		<code>\Pisymbol{fselch}{130}</code>
	<code>\Pisymbol{fselch}{21}</code>		<code>\Pisymbol{fselch}{76}</code>		<code>\Pisymbol{fselch}{131}</code>
	<code>\Pisymbol{fselch}{22}</code>		<code>\Pisymbol{fselch}{77}</code>		<code>\Pisymbol{fselch}{132}</code>
	<code>\Pisymbol{fselch}{23}</code>		<code>\Pisymbol{fselch}{78}</code>		<code>\Pisymbol{fselch}{133}</code>
	<code>\Pisymbol{fselch}{24}</code>		<code>\Pisymbol{fselch}{79}</code>		<code>\Pisymbol{fselch}{134}</code>
	<code>\Pisymbol{fselch}{25}</code>		<code>\Pisymbol{fselch}{80}</code>		<code>\Pisymbol{fselch}{135}</code>
	<code>\Pisymbol{fselch}{26}</code>		<code>\Pisymbol{fselch}{81}</code>		<code>\Pisymbol{fselch}{136}</code>
	<code>\Pisymbol{fselch}{27}</code>		<code>\Pisymbol{fselch}{82}</code>		<code>\Pisymbol{fselch}{137}</code>
	<code>\Pisymbol{fselch}{28}</code>		<code>\Pisymbol{fselch}{83}</code>		<code>\Pisymbol{fselch}{138}</code>
	<code>\Pisymbol{fselch}{29}</code>		<code>\Pisymbol{fselch}{84}</code>		<code>\Pisymbol{fselch}{139}</code>
	<code>\Pisymbol{fselch}{30}</code>		<code>\Pisymbol{fselch}{85}</code>		<code>\Pisymbol{fselch}{140}</code>
	<code>\Pisymbol{fselch}{31}</code>		<code>\Pisymbol{fselch}{86}</code>		<code>\Pisymbol{fselch}{141}</code>
	<code>\Pisymbol{fselch}{32}</code>		<code>\Pisymbol{fselch}{87}</code>		<code>\Pisymbol{fselch}{142}</code>
	<code>\Pisymbol{fselch}{33}</code>		<code>\Pisymbol{fselch}{88}</code>		<code>\Pisymbol{fselch}{143}</code>
	<code>\Pisymbol{fselch}{34}</code>		<code>\Pisymbol{fselch}{89}</code>		<code>\Pisymbol{fselch}{144}</code>
	<code>\Pisymbol{fselch}{35}</code>		<code>\Pisymbol{fselch}{90}</code>		<code>\Pisymbol{fselch}{145}</code>
	<code>\Pisymbol{fselch}{36}</code>		<code>\Pisymbol{fselch}{91}</code>		<code>\Pisymbol{fselch}{151}</code>
	<code>\Pisymbol{fselch}{37}</code>		<code>\Pisymbol{fselch}{92}</code>		<code>\Pisymbol{fselch}{157}</code>
	<code>\Pisymbol{fselch}{38}</code>		<code>\Pisymbol{fselch}{93}</code>		<code>\Pisymbol{fselch}{163}</code>
	<code>\Pisymbol{fselch}{39}</code>		<code>\Pisymbol{fselch}{94}</code>		<code>\Pisymbol{fselch}{169}</code>
	<code>\Pisymbol{fselch}{40}</code>		<code>\Pisymbol{fselch}{95}</code>		<code>\Pisymbol{fselch}{175}</code>
	<code>\Pisymbol{fselch}{41}</code>		<code>\Pisymbol{fselch}{96}</code>		<code>\Pisymbol{fselch}{180}</code>
	<code>\Pisymbol{fselch}{42}</code>		<code>\Pisymbol{fselch}{97}</code>		<code>\Pisymbol{fselch}{186}</code>
	<code>\Pisymbol{fselch}{43}</code>		<code>\Pisymbol{fselch}{98}</code>		<code>\Pisymbol{fselch}{192}</code>
	<code>\Pisymbol{fselch}{44}</code>		<code>\Pisymbol{fselch}{99}</code>		<code>\Pisymbol{fselch}{198}</code>
	<code>\Pisymbol{fselch}{45}</code>		<code>\Pisymbol{fselch}{100}</code>		<code>\Pisymbol{fselch}{204}</code>
	<code>\Pisymbol{fselch}{46}</code>		<code>\Pisymbol{fselch}{101}</code>		<code>\Pisymbol{fselch}{210}</code>
	<code>\Pisymbol{fselch}{47}</code>		<code>\Pisymbol{fselch}{102}</code>		<code>\Pisymbol{fselch}{216}</code>
	<code>\Pisymbol{fselch}{48}</code>		<code>\Pisymbol{fselch}{103}</code>		<code>\Pisymbol{fselch}{222}</code>
	<code>\Pisymbol{fselch}{49}</code>		<code>\Pisymbol{fselch}{104}</code>		<code>\Pisymbol{fselch}{228}</code>
	<code>\Pisymbol{fselch}{50}</code>		<code>\Pisymbol{fselch}{105}</code>		<code>\Pisymbol{fselch}{234}</code>
	<code>\Pisymbol{fselch}{51}</code>		<code>\Pisymbol{fselch}{106}</code>		<code>\Pisymbol{fselch}{240}</code>
	<code>\Pisymbol{fselch}{52}</code>		<code>\Pisymbol{fselch}{107}</code>		<code>\Pisymbol{fselch}{246}</code>
	<code>\Pisymbol{fselch}{53}</code>		<code>\Pisymbol{fselch}{108}</code>		
	<code>\Pisymbol{fselch}{54}</code>		<code>\Pisymbol{fselch}{109}</code>		

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 2ε 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 L<sup>A</sup>T<sub>E</sub>X 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 L<sup>A</sup>T<sub>E</sub>X. 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, L<sup>A</sup>T<sub>E</sub>X will either output an error message or replace an earlier-defined symbol with a later-defined symbol. Table 522 on the following 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 522, not impossible. The general procedure is to load the first package, rename the conflicting symbols, and then load the second package. Examine the L<sup>A</sup>T<sub>E</sub>X 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  $\mathcal{A}\mathcal{M}\mathcal{S}$  symbol sets, and L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> 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 522 because they are designed to be compatible with the symbols they replace. Table 523 on page 213 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{cms}
\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 524 on page 213 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 L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>'s `\fontsize` command. Because the symbols shown belong to the Computer Modern family, the `typelcm` 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 T<sub>E</sub>X 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 213. 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 522: Symbol Name Clashes

Symbol	L <sup>A</sup> T <sub>E</sub> X 2 <sub>ε</sub>	$\mathcal{A}$	$\mathcal{M}$	$\mathcal{S}$	stmaryrd	wasysym	mathabx	marvosym	bbding	ifsym	dingbat	wsuipa
<code>\baro</code>					$\phi$							$\theta$
<code>\bigtriangledown</code>	$\nabla$				$\nabla$							
<code>\bigtriangleup</code>	$\triangle$				$\triangle$							
<code>\checkmark</code>		$\checkmark$									$\checkmark$	
<code>\Circle</code>						$\circ$				$\circ$		
<code>\Cross</code>								$\dagger$	$\dagger$	$\times$		
<code>\ggg</code>							$\gg$					
<code>\Letter</code>								$\boxtimes$		$\boxtimes$		
<code>\lightning</code>					$\lightning$			$\lightning$				
<code>\Lightning</code>								$\lightning$		$\lightning$		
<code>\lll</code>												
<code>\Square</code>						$\square$			$\square$	$\square$		
<code>\Sun</code>							$\odot$	$\odot$		$\odot$		
<code>\TriangleDown</code>									$\blacktriangle$	$\blacktriangledown$		
<code>\TriangleUp</code>									$\blacktriangle$	$\blacktriangleup$		



TABLE 523: Example of a Benign Name Clash

Symbol	Default (Computer Modern)	txfonts (Times Roman)
R	$\mathbb{R}$	<b>R</b>
<code>\textrecipe</code>	$\mathcal{R}$	<b>R</b>

TABLE 524: Sample resized delimiters

Symbol	Default size	<code>\big</code>	<code>\Big</code>	<code>\bigg</code>	<code>\Bigg</code>	<code>\left/\right</code>	<code>\fontsize</code>
<code>\}</code>	}	}	}	}	}	}	} }
<code>\uparrow</code>	↑	↑	↑	↑	↑	↑	↑

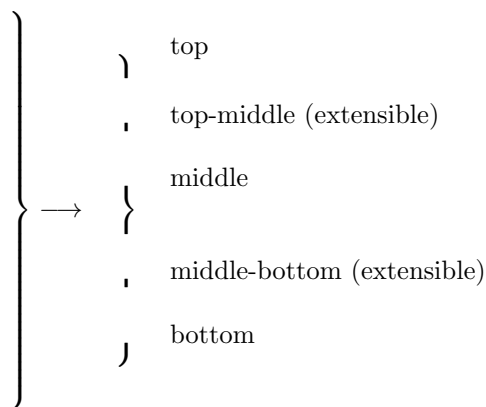


Figure 1: Implementation of variable-sized delimiters

- 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 L<sup>A</sup>T<sub>E</sub>X 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 L<sup>A</sup>T<sub>E</sub>X 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 L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>'s low-level font commands [L<sup>A</sup>T00] and use T<sub>E</sub>X'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 (“f”) 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 “fuccesful”—in the current font style (roman, italic, bold, etc.)

In fact, `\char` is not strictly necessary in all cases; the character can often be entered symbolically. For example, the symbol for an impulse train or Tate-Shafarevich group (“III”) 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 (“<sup>?</sup>”), and `\rotatebox[origin=c]{180}{\mathfrak{I}}` produces the definite-description operator (“<sup>?</sup>”). As noted by Marc Olschok in a July 2011 post on `comp.text.tex`, Project Gutenberg uses `\reflectbox` to typeset the part (“3”) and whole (“ε”) relations used in Dedekind's set notation:

```
\newcommand\partof{\mathrel{\raisebox{0.45ex}{\mathfrak{3}}}}
\newcommand\wholeof{\mathrel{\reflectbox{\mathfrak{3}}}}
```

The disadvantage of the `graphicx/graphics` approach is that not every T<sub>E</sub>X backend handles graphical transformations.<sup>5</sup> 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 “<sup>?</sup>”. Similarly, `tipa`'s `\textrepsilon` (“3”) or `wsuipa`'s `\revepsilon` (“3”) may be used to express the mathematical notion of “such that” in a cleaner manner than with `\reflectbox` or `\rotatebox`.<sup>6</sup>

<sup>5</sup>As an example, Xdvi ignores both `\reflectbox` and `\rotatebox`.

<sup>6</sup>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 L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> source file `fontdef.dtx` contains a number of such definitions. For example, `\models` (see Table 88 on page 48) is defined in that file with:

```
\def\models{\mathrel|\joinrel=}
```

where `\mathrel` and `\joinrel` are used to control the horizontal spacing. `\def` is the T<sub>E</sub>X primitive upon which L<sup>A</sup>T<sub>E</sub>X's `\newcommand` is based. See The T<sub>E</sub>Xbook [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, L<sup>A</sup>T<sub>E</sub>X 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-9mu h}
```

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 `-9mu` 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}`<sup>7</sup> 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 `\asterisk` (“ $\ast$ ”) from a June 2007 post to `comp.text.tex` by Peter Flynn:

```
\newcommand{\asterisk}{\smash{%
  \raisebox{-.5ex}{%
    \setlength{\tabcolsep}{-.5pt}%
    \begin{tabular}{@{}cc@{}}%
      \multicolumn{2c*}{\[-2ex\]*&*}%
    \end{tabular}}}}
```

Note how the space between columns (`\tabcolsep`) and rows (`\[-2ex\]`) is made negative to squeeze the asterisks closer together.

There is a T<sub>E</sub>X 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 `\dot`—as follows:

```
\newcommand{\dotcup}{\ensuremath{\mathaccent\dot{\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 T<sub>E</sub>Xbook [Knu86a] for more information.

Another T<sub>E</sub>X primitive that is useful for composing symbols is `\vcenter`. `\vcenter` is conceptually similar to “`\begin{tabular}{l}`” in L<sup>A</sup>T<sub>E</sub>X 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:

<sup>7</sup>L<sup>A</sup>T<sub>E</sub>X'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:  $a \div b \approx c \times d$ .

A related L<sup>A</sup>T<sub>E</sub>X command, borrowed from Plain T<sub>E</sub>X, 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 T<sub>E</sub>X’s `\ialign` primitive, `\ooalign` uses T<sub>E</sub>X’s tabular syntax instead of L<sup>A</sup>T<sub>E</sub>X’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`, “⊖”),<sup>8</sup> 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` (“o”).

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 214:

```

\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 “ $\mathcal{D}$ ”. 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 (“ $F$ ”). 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 `\rqr` therefore uses an extra set of curly braces to limit that scope to a single `\slashed{I}`. In addition, `\rqr` uses `amstext`’s `\text` macro (described on page 218) 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:

$$\not\Rightarrow \quad \backslash\text{not}\backslash\text{Longrightarrow}$$

vs.

$$\centernot\Rightarrow \quad \backslash\text{centernot}\backslash\text{Longrightarrow}$$

See the `centernot` documentation for more information.

<sup>8</sup>While `\barcirc` illustrates how to combine symbols using `\ooalign`, the `stmaryrd` package’s `\minuso` command (Table 52 on page 29) 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 T<sub>E</sub>X’s `\mathchoice` primitive. `\mathchoice` evaluates one of four expressions, based on whether the current math style is display, text, script, or scriptscript. (See The T<sub>E</sub>Xbook [Knu86a] for a more complete description.) For example, the following L<sup>A</sup>T<sub>E</sub>X code—posted to `comp.text.tex` by Torsten Bronger—composes a sub/superscriptable “ $\mathrel{\top}$ ” symbol out of `\top` and `\bot` (“ $\top$ ” and “ $\perp$ ”):

```
\def\topbotatom#1{\hbox{\hbox to Opt{ $\bot$ }{ $\top$ }}
\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{ $\int$ }
\vcenter{\hbox{ $\int$ }\kern-.5\wd0}}
\def\ddashint{\Xint=}
\def\dashint{\Xint-}
```

(The preceding code was taken verbatim from the UK T<sub>E</sub>X Users’ Group FAQ at <http://www.tex.ac.uk/faq>.) `\dashint` produces a single-dashed integral sign (“ $\int$ ”), while `\ddashint` produces a double-dashed one (“ $\int$ ”). The `\Xint` macro defined above can also be used to generate a wealth of new integrals: “ $\int$ ” (`\Xint\circlearrowright`), “ $\int$ ” (`\Xint\circlearrowleft`), “ $\subset$ ” (`\Xint\subset`), “ $\infty$ ” (`\Xint\infty`), and so forth.

L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> 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 (“ $\perp$ ”) to `comp.text.tex` in June 2000:

```
\newcommand\independent{\protect\mathpalette{\protect\independentT}\perp}
\def\independentT#1#2{\mathrel{\rlap{ $\int$ }\mkern2mu{#1#2}}}
```

The `\independent` macro uses `\mathpalette` to pass the `\independentT` helper macro both the current math style and the `\perp` symbol. `\independentT` 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 following page.

Some people like their square-root signs with a trailing “hook” (i.e., “ $\sqrt{\quad}$ ”) 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{ $\sqrt{#2}$ }\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` (“↙”):<sup>9</sup>

```
\newcommand{\neswarrow}{\mathrel{\text{\$ \nearrow$ \llap{\$ \swarrow$}}}}
\newcommand{\nwsearrow}{\mathrel{\text{\$ \nwarrow$ \llap{\$ \searrow$}}}}
```

`\text` resembles L<sup>A</sup>T<sub>E</sub>X’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 “**B**”. 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\cr}}
\makeatother
```

The `\makeatletter` and `\makeatother` commands are needed to coerce L<sup>A</sup>T<sub>E</sub>X into accepting “@” as part of a macro name. `\moverlay` takes a list of symbols separated by `\cr` (TeX’s equivalent of L<sup>A</sup>T<sub>E</sub>X’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 L<sup>A</sup>T<sub>E</sub>X-generated symbols

Oftentimes, symbols composed in the L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> source code can be modified with minimal effort to produce useful variations. For example, `fontdef.dtx` composes the `\ddots` symbol (see Table 269 on page 110) 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 L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> 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.

<sup>9</sup>Note that if your goal is to typeset commutative diagrams or pushout/pullback diagrams, then you should probably be using X<sub>Y</sub>-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 Thê Thành”. The `dblaccnt` package enables L<sup>A</sup>T<sub>E</sub>X 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{x}]` produces “ $\ddot{x}$ ”. 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 “ $f^{\star}$ ” and `\accentset{e}{X}` produces “ $X^e$ ”. `\underaccent` does the same thing, but places the accent beneath the character. This enables constructs like `\underaccent{\tilde}{V}`, which produces “ $\tilde{V}$ ”. `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 L<sup>A</sup>T<sub>E</sub>X’s `\hrulefill` command:

```
\makeatletter
\def\equalsfill{\m@th\mathord=\mkern-7mu
  \cleaders\hbox{$!\mathord=!\$}\hfill
  \mkern-7mu\mathord=$}
\makeatother
```

T<sub>E</sub>X’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 L<sup>A</sup>T<sub>E</sub>X’s `\stackrel` command, which stacks one mathematical expression (slightly reduced in size) atop another. Hence, “`\stackrel{a}{\rightarrow}`” produces “ $\xrightarrow{a}$ ” and “`\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—L<sup>A</sup>T<sub>E</sub>X’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 255).

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{##\crrc\noalign{\kern3\p@}
```

```

\downbracketfill\crr\noalign{\kern3\p@\nointerlineskip}
\hfil\displaystyle{#1}\hfil$\crr}}\limits}
\def\underbracket#1{\mathop{\vtop{\ialign{##\crr
\hfil\displaystyle{#1}\hfil$\crr\noalign{\kern3\p@\nointerlineskip}
\upbracketfill\crr\noalign{\kern3\p@}}}}\limits}
\def\overparenthesis#1{\mathop{\vbox{\ialign{##\crr\noalign{\kern3\p@}
\downparenthfill\crr\noalign{\kern3\p@\nointerlineskip}
\hfil\displaystyle{#1}\hfil$\crr}}}\limits}
\def\underparenthesis#1{\mathop{\vtop{\ialign{##\crr
\hfil\displaystyle{#1}\hfil$\crr\noalign{\kern3\p@\nointerlineskip}
\upparenthfill\crr\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 525 showcases these accents. The  $\TeX$ book [Knu86a] or another book on  $\TeX$  primitives is indispensable 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` [“ $\overline{\hspace{1cm}}$ ”] for `\downparenthfill`), a horizontal rule that stretches as wide as possible, and a right symbol (e.g., `\bracerd` [“ $\underbrace{\hspace{1cm}}$ ”] 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 525: Manually Composed Extensible Accents

$\overline{abc}$	<code>\overbracket{abc}</code>	$\widehat{abc}$	<code>\overparenthesis{abc}</code>
$\underline{abc}$	<code>\underbracket{abc}</code>	$\underbrace{abc}$	<code>\underparenthesis{abc}</code>

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}`” produces



See the `simplewick` documentation for more information.

### Developing new symbols from scratch

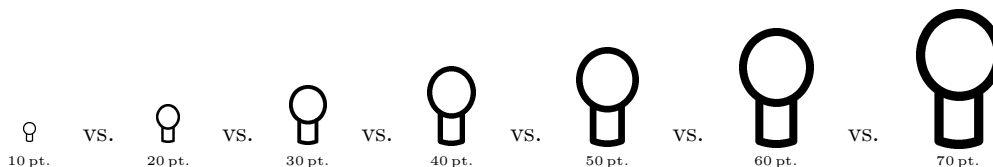
Sometimes it is simply not possible to define a new symbol in terms of existing symbols. Fortunately, most, if not all,  $\TeX$  distributions are shipped with a tool called `METAFONT` which is designed specifically for creating fonts to be used with  $\TeX$ . The `METAFONTbook` [Knu86b] is the authoritative 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 (“ $\mathcal{G}$ ”).<sup>10</sup> 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

<sup>10</sup>I’m not a very good artist; you’ll have to pretend that “ $\mathcal{G}$ ” 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  $\langle size \rangle$ 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  $\langle size \rangle$ , 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:  $z_1, z_2, \dots, z_8$  and  $z_{67}$ , which `lightbulb.mf` defines to lie between  $z_6$  and  $z_7$ .

Most, if not all, T<sub>E</sub>X distributions include a Plain T<sub>E</sub>X 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`)

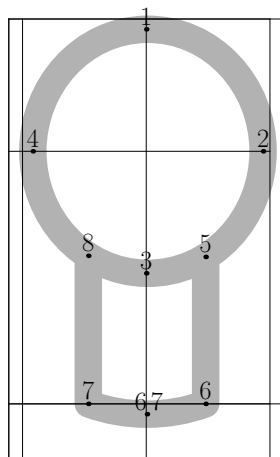


Figure 4: Proof diagram of `lightbulb10.mf`

[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).

	'0	'1	'2	'3	'4	'5	'6	'7	
'10x		8							"4x
'11x									
	"8	"9	"A	"B	"C	"D	"E	"F	

Figure 5: Font table produced by `testfont.tex`

The LightBulb10 font is now usable by  $\TeX$ .  $\LaTeX 2_{\epsilon}$ , however, needs more information before documents can use the font. First, we create a font-description file that tells  $\LaTeX 2_{\epsilon}$  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 is important; it must be of the form “ $\langle encoding \rangle \langle family \rangle .fd$ ”, where  $\langle encoding \rangle$  is the lowercase version of the encoding name (typically “u” for symbol fonts) and  $\langle family \rangle$  is the name of the font family. For LightBulb10, let’s call this “bulb”. Figure 6 lists the contents of `ubulb.fd`. The document “ $\LaTeX 2_{\epsilon}$  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  $\LaTeX 2_{\epsilon}$  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:  $\LaTeX 2_{\epsilon}$  font-description file (`ubulb.fd`)

The final step is to write a  $\LaTeX 2_{\epsilon}$  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"`, `\lightbulb typeset "\char"41"`, or `\lightbulb typeset "\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:  $\LaTeX 2_{\epsilon}$  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<sup>®</sup> Acrobat<sup>®</sup> (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=extrace> 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 L<sup>A</sup>T<sub>E</sub>X [Dow00] for a nice exposition on the subject.) To use a symbol for a different purpose, you can use the T<sub>E</sub>X 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 “ $3x + \mathord{\downarrow}$ ” 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 “ $A \mathbin{\dot{\cup}} B$ ” (“ $A \dot{\cup} B$ ”). See The T<sub>E</sub>Xbook [Knu86a] for the definitive description of math-mode spacing.

The purpose of the “log-like symbols” in Table 181 and Table 182 is to provide the correct amount of spacing around and within multiletter function names. Table 526 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 “ $\max_{p \in P}$ ” as part of a displayed formula.

TABLE 526: Spacing Around/Within Log-like Symbols

L <sup>A</sup> T <sub>E</sub> X expression	Output
<code>\$r \sin \theta\$</code>	$r \sin \theta$ (best)
<code>\$r sin \theta\$</code>	$rsin\theta$
<code>\$r \mbox{sin} \theta\$</code>	$rsin\theta$
<code>\$r \mathrm{sin} \theta\$</code>	$rsin\theta$

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 T<sub>E</sub>X 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 527 contrasts symbols declared with `\DeclareMathOperator` and `\DeclareMathOperator*` in both text style ( $\dots$ ) and display style ( $\dots$ ).<sup>11</sup>

TABLE 527: Defining new log-like symbols

Declaration function	$\dots$	$\dots$
<code>\DeclareMathOperator</code>	$\text{newlogsym}_{p \in P}$	$\text{newlogsym}_{p \in P}$
<code>\DeclareMathOperator*</code>	$\text{newlogsym}_{p \in P}$	$\text{newlogsym}_{p \in P}$

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 182 utilize this spacing convention.

## 10.5 Bold mathematical symbols

L<sup>A</sup>T<sub>E</sub>X 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

<sup>11</sup>Note that `\displaystyle` can be used to force display style within  $\dots$  and `\textstyle` can be used to force text style within  $\dots$ .

<http://www.tex.ac.uk/cgi-bin/texfaq2html?label=boldgreek> can be used to produce bold mathematical symbols. Table 528 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 528: Producing bold mathematical symbols

Package	Code	Output	
<i>none</i>	<code>\alpha + b = \Gamma \div D</code>	$\alpha + b = \Gamma \div D$	(no bold)
<i>none</i>	<code>\mathbf{\alpha + b = \Gamma \div D}</code>	$\alpha + \mathbf{b} = \mathbf{\Gamma} \div \mathbf{D}$	
<i>none</i>	<code>\boldmath\alpha + b = \Gamma \div D</code>	$\boldsymbol{\alpha} + \boldsymbol{b} = \boldsymbol{\Gamma} \div \boldsymbol{D}$	
<i>amsbsy</i>	<code>\pmb{\alpha + b = \Gamma \div D}</code>	$\boldsymbol{\alpha} + \boldsymbol{b} = \boldsymbol{\Gamma} \div \boldsymbol{D}$	(faked bold)
<i>amsbsy</i>	<code>\boldsymbol{\alpha + b = \Gamma \div D}</code>	$\boldsymbol{\alpha} + \boldsymbol{b} = \boldsymbol{\Gamma} \div \boldsymbol{D}$	
<i>bm</i>	<code>\bm{\alpha + b = \Gamma \div D}</code>	$\boldsymbol{\alpha} + \boldsymbol{b} = \boldsymbol{\Gamma} \div \boldsymbol{D}$	
<i>fixmath</i>	<code>\mathbf{\alpha + b = \Gamma \div D}</code>	$\boldsymbol{\alpha} + \boldsymbol{b} = \boldsymbol{\Gamma} \div \boldsymbol{D}$	

## 10.6 ASCII and Latin 1 quick reference

Table 529 amalgamates data from various other tables in this document into a convenient reference for  $\text{\LaTeX} 2_{\epsilon}$  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  $\text{\LaTeX} 2_{\epsilon}$  command to typeset the character as a text character. And the fourth column lists the  $\text{\LaTeX} 2_{\epsilon}$  command to typeset the character within a `\texttt{...}` command (or, more generally, when `\ttfamily` is in effect).

TABLE 529:  $\text{\LaTeX} 2_{\epsilon}$  ASCII Table

Dec	Hex	Char	Body text	<code>\texttt</code>	Dec	Hex	Char	Body text	<code>\texttt</code>
33	21	!	!	!	62	3E	>	<code>\textgreater</code>	>
34	22	"	<code>\textquotedbl</code>	"	63	3F	?	?	?
35	23	#	<code>\#</code>	<code>\#</code>	64	40	@	@	@
36	24	\$	<code>\\$</code>	<code>\\$</code>	65	41	A	A	A
37	25	%	<code>\%</code>	<code>\%</code>	66	42	B	B	B
38	26	&	<code>\&amp;</code>	<code>\&amp;</code>	67	43	C	C	C
39	27	,	,	,	:	:	:	:	:
40	28	(	(	(	90	5A	Z	Z	Z
41	29	)	)	)	91	5B	[	[	[
42	2A	*	*	*	92	5C	\	<code>\textbackslash</code>	<code>\char'\'</code>
43	2B	+	+	+	93	5D	]	]	]
44	2C	,	,	,	94	5E	^	<code>\^{}</code>	<code>\^{}</code>
45	2D	-	-	-	95	5F	_	<code>\_</code>	<code>\char'\_</code>
46	2E	.	.	.	96	60	'	'	'
47	2F	/	/	/	97	61	a	a	a
48	30	0	0	0	98	62	b	b	b
49	31	1	1	1	99	63	c	c	c
50	32	2	2	2	:	:	:	:	:
:	:	:	:	:	122	7A	z	z	z
57	39	9	9	9	123	7B	{	<code>\{</code>	<code>\char'\{</code>
58	3A	:	:	:	124	7C		<code>\textbar</code>	
59	3B	;	;	;	125	7D	}	<code>\}</code>	<code>\char'\}</code>
60	3C	<	<code>\textless</code>	<	126	7E	~	<code>\~{}</code>	<code>\~{}</code>
61	3D	=	=	=					

The following are some additional notes about the contents of Table 529:

- “” is not available in the OT1 font encoding.
- Table 529 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, “l”, “i”, and “—” in text mode when using the OT1 font encoding.<sup>12</sup> The following are some alternatives for typesetting “<”, “>”, and “|”:
  - Specify a document font encoding other than OT1 (as described on page 12).
  - Use the appropriate symbol commands from Table 2 on page 14, 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 `\texttriangle` and `\textrightangle` to `\textless` and `\textgreater`; i.e., “`\langle filename \rangle`” instead of “`<filename >`”.

- Although “/” does not require any special treatment, L<sup>A</sup>T<sub>E</sub>X 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 88 on page 48), which produces a somewhat wide “~”, or the `textcomp` package’s `\texttildelow` (shown in Table 46 on page 27), which produces a vertically centered “~” in most fonts but a baseline-oriented “~” in Computer Modern, `txfonts`, `pxfonts`, and various other fonts originating from the T<sub>E</sub>X 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 326 on page 126.
- 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 529, Table 530 on the next page is an amalgamation of data from other tables in this document. While Table 529 shows how to typeset the 7-bit ASCII character set, Table 530 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 530:

- 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 20 plus an empty argument. For instance, `\={}` is essentially the same as `\textasciimacron`.
- The commands in the “L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>” columns work both in body text and within a `\texttt{...}` command (or, more generally, when `\ttfamily` is in effect).

---

<sup>12</sup>Donald Knuth didn’t think such symbols were important outside of mathematics so he omitted them from his text fonts.

TABLE 530: L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> Latin 1 Table

Dec	Hex	Char	L <sup>A</sup> T <sub>E</sub> X 2 <sub>ε</sub>	Dec	Hex	Char	L <sup>A</sup> T <sub>E</sub> X 2 <sub>ε</sub>
161	A1	¡	!'	209	D1	Ñ	\~{N}
162	A2	¢	\textcent (tc)	210	D2	Ò	\~{O}
163	A3	£	\pounds	211	D3	Ó	\' {O}
164	A4	¤	\textcurrency (tc)	212	D4	Ô	\^ {O}
165	A5	¥	\textyen (tc)	213	D5	Õ	\~ {O}
166	A6	¦	\textbrokenbar (tc)	214	D6	Ö	\" {O}
167	A7	§	\S	215	D7	×	\texttimes (tc)
168	A8	¨	\textasciidieresis (tc)	216	D8	Ø	\O
169	A9	©	\textcopyright	217	D9	Ù	\' {U}
170	AA	ª	\textordfeminine	218	DA	Ú	\' {U}
171	AB	«	\guillemotleft (T1)	219	DB	Û	\^ {U}
172	AC	¬	\textlnot (tc)	220	DC	Ü	\" {U}
173	AD	-	\-	221	DD	Ý	\' {Y}
174	AE	®	\textregistered	222	DE	Þ	\TH (T1)
175	AF	ˆ	\textasciimacron (tc)	223	DF	ß	\ss
176	B0	°	\textdegree (tc)	224	E0	à	\' {a}
177	B1	±	\textpm (tc)	225	E1	á	\' {a}
178	B2	²	\texttwosuperior (tc)	226	E2	â	\^ {a}
179	B3	³	\textthreesuperior (tc)	227	E3	ã	\~ {a}
180	B4	´	\textasciiacute (tc)	228	E4	ä	\" {a}
181	B5	µ	\textmu (tc)	229	E5	å	\aa
182	B6	¶	\P	230	E6	æ	\ae
183	B7	·	\textperiodcentered	231	E7	ç	\c {c}
184	B8	¸	\c {}	232	E8	è	\' {e}
185	B9	¹	\textonesuperior (tc)	233	E9	é	\' {e}
186	BA	º	\textordmasculine	234	EA	ê	\^ {e}
187	BB	»	\guillemotright (T1)	235	EB	ë	\" {e}
188	BC	¼	\textonequarter (tc)	236	EC	ì	\' {i}
189	BD	½	\textonehalf (tc)	237	ED	í	\' {i}
190	BE	¾	\textthreequarters (tc)	238	EE	î	\^ {i}
191	BF	¿	?'	239	EF	ï	\" {i}
192	C0	À	\' {A}	240	F0	ð	\dh (T1)
193	C1	Á	\' {A}	241	F1	ñ	\~ {n}
194	C2	Â	\^ {A}	242	F2	ò	\' {o}
195	C3	Ã	\~ {A}	243	F3	ó	\' {o}
196	C4	Ä	\" {A}	244	F4	ô	\^ {o}
197	C5	Å	\AA	245	F5	õ	\~ {o}
198	C6	Æ	\AE	246	F6	ö	\" {o}
199	C7	Ç	\c {C}	247	F7	÷	\textdiv (tc)
200	C8	È	\' {E}	248	F8	ø	\o
201	C9	É	\' {E}	249	F9	ù	\' {u}
202	CA	Ê	\^ {E}	250	FA	ú	\' {u}
203	CB	Ë	\" {E}	251	FB	û	\^ {u}
204	CC	Ì	\' {I}	252	FC	ü	\" {u}
205	CD	Í	\' {I}	253	FD	ý	\' {y}
206	CE	Î	\^ {I}	254	FE	þ	\th (T1)
207	CF	Ï	\" {I}	255	FF	ÿ	\" {y}
208	D0	Ð	\DH (T1)				

- The “ℒ” and “\$” glyphs occupy the same slot (36) of the OT1 font encoding, with “ℒ” appearing in italic fonts and “\$” appearing in roman fonts. A problem with L<sup>A</sup>T<sub>E</sub>X’s default handling of this double-mapping is that “`{\sffamily\slshape\pounds}`” produces “\$”, not “ℒ”. Other font encodings use separate slots for the two characters and are therefore robust to the problem of “ℒ”/“\$” conflicts. Authors who use `\pounds` should select a font encoding other than OT1 (as explained on page 12) 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<sup>®</sup> Windows<sup>®</sup> 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 531 presents the characters with which CP1252 augments the standard Latin 1 table.

TABLE 531: L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> Code Page 1252 Table

Dec	Hex	Char	L <sup>A</sup> T <sub>E</sub> X 2 <sub>ε</sub>	Dec	Hex	Char	L <sup>A</sup> T <sub>E</sub> X 2 <sub>ε</sub>
128	80	€	<code>\texteuro</code> (tc)	145	91	‘	‘
130	82	,	<code>\quotesinglbase</code> (T1)	146	92	’	’
131	83	<i>f</i>	<code>\textit{f}</code>	147	93	“	“
132	84	„	<code>\quotedblbase</code> (T1)	148	94	”	”
133	85	...	<code>\dots</code>	149	95	•	<code>\textbullet</code>
134	86	†	<code>\dag</code>	150	96	–	--
135	87	‡	<code>\ddag</code>	151	97	—	---
136	88	ˆ	<code>\textasciicircum</code>	152	98	˜	<code>\textasciitilde</code>
137	89	‰	<code>\textperthousand</code> (tc)	153	99	™	<code>\texttrademark</code>
138	8A	Š	<code>\v{S}</code>	154	9A	š	<code>\v{s}</code>
139	8B	‹	<code>\guilsinglleft</code> (T1)	155	9B	›	<code>\guilsinglright</code> (T1)
140	8C	Œ	<code>\OE</code>	156	9C	œ	<code>\oe</code>
142	8E	Ž	<code>\v{Z}</code>	158	9E	ž	<code>\v{z}</code>
				159	9F	ÿ	<code>\{"Y}</code>

The following are some additional notes about the contents of Table 531:

- As in Table 530, 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 L<sup>A</sup>T<sub>E</sub>X equivalents is available from <http://www.bitjungle.com/isoent/>. Some of the characters presented there make use of `isoent`, a L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> package (available from the same URL) that fakes some of the missing ISO glyphs using the L<sup>A</sup>T<sub>E</sub>X `picture` environment.<sup>13</sup>

## 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 T<sub>E</sub>X and L<sup>A</sup>T<sub>E</sub>X predate the Unicode standard and Unicode fonts by almost a decade, support for Unicode has had to be added to the base T<sub>E</sub>X and L<sup>A</sup>T<sub>E</sub>X systems. Note first that L<sup>A</sup>T<sub>E</sub>X 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.

<sup>13</sup>`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.<sup>14</sup> These packages enable L<sup>A</sup>T<sub>E</sub>X to translate UTF-8 sequences to L<sup>A</sup>T<sub>E</sub>X commands, which are subsequently processed as normal. For example, the UTF-8 text “Copyright © 2017”—“©” 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{} 2017” and therefore typeset as “Copyright © 2017”.

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 L<sup>A</sup>T<sub>E</sub>X command to execute when the corresponding Unicode character is encountered in the input. For example, the Unicode character “degree celsius” (“°C”) appears at character position U+2103.<sup>15</sup> However, “°C” is not one of the characters that `ucs` and `inputenc` recognize. The following document shows how to use `\DeclareUnicodeCharacter` to tell L<sup>A</sup>T<sub>E</sub>X that the “°C” 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°C.
\end{document}
```

which produces

It was a balmy 21°C.

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 L<sup>A</sup>T<sub>E</sub>X input file is the ability to include a given Unicode character in the corresponding output file. By far the easiest approach is to use X<sub>Y</sub>L<sup>A</sup>T<sub>E</sub>X instead of pdfL<sup>A</sup>T<sub>E</sub>X or ordinary L<sup>A</sup>T<sub>E</sub>X. X<sub>Y</sub>L<sup>A</sup>T<sub>E</sub>X 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 X<sub>Y</sub>L<sup>A</sup>T<sub>E</sub>X document can either include that character directly as UTF-8 text or use T<sub>E</sub>X’s `\char` primitive, which X<sub>Y</sub>L<sup>A</sup>T<sub>E</sub>X 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 X<sub>Y</sub>L<sup>A</sup>T<sub>E</sub>X 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}
```

<sup>14</sup>UTF-8 is the 8-bit Unicode Transformation Format, a popular mechanism for representing Unicode symbol numbers as sequences of one to four bytes.

<sup>15</sup>The Unicode convention is to express character positions as “U+*hexadecimal number*”.

which produces

We use “ $\mathcal{V}$ ” for a versicle and “ $\mathcal{R}$ ” 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  $\text{\LaTeX}$  symbols (Table 50, Table 72, Table 88, Table 138, Table 181, Table 184, Table 218, Table 219, Table 232, Table 240, Table 294, 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 89, Table 90, Table 141, Table 142, Table 185, Table 194, Table 212, and Table 295) and an initial Math Alphabets table (Table 307) were added thereafter. Later, Alexander Holt provided the `stmaryrd` tables (Table 52, Table 74, Table 91, Table 144, Table 177, and Table 213).

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  $\text{\LaTeX}$  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  $\text{\LaTeX}$
- 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 532 on the following page lists some of this document’s build characteristics. Most important is the list of packages that  $\text{\LaTeX}$  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 533 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 532 or Table 533.

TABLE 532: Document Characteristics

Characteristic	Value
Source file:	<code>symbols.tex</code>
Build date:	January 19, 2017
Symbols documented:	14283
Packages included:	<code>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 ymath esint mathdots trsym universa upgreek overrightarrow chemarr chemarrow nath trfsigns mathtools phaistos arcs vietnam t4phonet holtpolt semtrans dictsym extarrows protosem harmony hieroglf ccllicenses mathdesign arev MnSymbol fdsymbol boisik cml extpfeil keystroke fge turnstile simpsons epsdice feyn staves igo colonequals shuffle fourier dozenal pmbboxdraw pigpen clock teubner linearA linearb cyriot sarabian china2e harpoon steinmetz milstd recycle DotArrow ushort hhcount ogonek combelow musixtex ccicons adfsymbols adorn bigints soyombo tfrupee knitting textgreek begriff frege abracas CountriesOfEurope cookingsymbols prodint epiolmec mdwmath rsfo 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 bclgo bullcncr rubikcube svrsymbols halloweenmath old-arrows allrunes emf esrelation accents nicefrac bm junicode mathrsfs chancery urwchancal calligra bbold mbboard dsfont bbm</code>
Packages omitted:	<i>none</i>

TABLE 533: Package versions used in the preparation of this document

Name	Date	Name	Date	Name	Date
<code>textcomp</code>	2016/06/19	<code>latexsym</code>	1998/08/17	<code>amssymb</code>	2013/01/14
<code>stmaryrd</code>	1994/03/03	<code>euscript</code>	2009/06/22	<code>wasysym</code>	2003/10/30
<code>pifont</code>	2005/04/12	<code>manfnt</code>	1999/07/01	<code>bbding</code>	1999/04/15
<code>undertilde</code>	2000/08/08	<code>ifsym</code>	2000/04/18	<code>tipa</code>	2002/08/08
<code>tipx</code>	2003/01/01	<code>wsuipa</code>	1994/07/16	<code>ar</code>	2012/01/23
<code>metre</code>	2001/12/05	<code>txfonts</code>	2008/01/22	<code>mathabx</code>	2003/07/29
<code>skak</code>	2013/07/18	<code>ascii</code>	2006/05/30	<code>dingbat</code>	2001/04/27
<code>skull</code>	2002/01/23	<code>eurosym</code>	1998/08/06	<code>yfonts</code>	2003/01/08
<code>mathdots</code>	2014/06/11	<code>trsym</code>	2000/06/25	<code>universa</code>	98/08/01
<code>upgreek</code>	2003/02/12	<code>chemarr</code>	2016/05/16	<code>mathtools</code>	2015/11/12
<code>phaistos</code>	2004/04/23	<code>arcs</code>	2004/05/09	<code>t4phonet</code>	2004/06/01
<code>semtrans</code>	1998/02/10	<code>dictsym</code>	2004/07/26	<code>extarrows</code>	2008/05/15
<code>protosem</code>	2005/03/18	<code>harmony</code>	2007/05/04	<code>hieroglf</code>	2015/06/02
<code>ccllicenses</code>	2005/05/20	<code>MnSymbol</code>	2007/01/21	<code>fdsymbol</code>	2011/11/01
<code>boisik</code>	2009/08/21	<code>extpfeil</code>	2009/10/31	<code>keystroke</code>	2010/04/23
<code>fge</code>	2015/05/19	<code>turnstile</code>	2007/06/23	<code>epsdice</code>	2007/02/15
<code>feyn</code>	2009/10/08	<code>colonequals</code>	2016/05/16	<code>shuffle</code>	2008/10/27
<code>dozenal</code>	2015/01/29	<code>pmbboxdraw</code>	2016/05/16	<code>pigpen</code>	2008/12/07

(continued on next page)

(continued from previous page)

Name	Date	Name	Date	Name	Date
clock	2001/04/10	teubner	2016/03/31	linearA	2006/03/13
linearb	2005/06/22	cyriot	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	adorn	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
epioldmec	2003/11/05	mdwmath	1996/04/11	fontawesome	2016/05/15
stix	2015/04/17	starfont	2010/09/29	tikzsymbols	2016/12/26
bclogo	2016/01/10	bullcntr	2007/04/02	rubikcube	2015/09/25
svrsymbols	2016/04/08	halloweenmath	2017/01/06	emf	2016/09/09
accents	2006/05/12	nicefrac	1998/08/04	bm	2016/07/07
calligra	2012/04/10				

## 10.9 Copyright and license

The Comprehensive L<sup>A</sup>T<sub>E</sub>X Symbol List  
Copyright © 2017, Scott Pakin

This work may be distributed and/or modified under the conditions of the L<sup>A</sup>T<sub>E</sub>X Project Public License, either version 1.3c of this license or (at your option) any later version. The latest version of this license is in

<http://www.latex-project.org/lppl.txt>

and version 1.3c or later is part of all distributions of L<sup>A</sup>T<sub>E</sub>X version 2006/05/20 or later.

This work has the LPPL maintenance status “maintained”.

The current maintainer of this work is Scott Pakin.

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- [LAT00]  $\LaTeX$ 3 Project Team.  $\LaTeX$ 2 $\epsilon$  font selection, January 30, 2000. Available from <http://www.ctan.org/tex-archive/macros/latex/doc/fntguide.pdf> (also included in many  $\TeX$  distributions).

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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., "á" 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.<sup>16</sup>

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






















































































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<code>\nrightpitchfork</code> (‡) . . . . .	86	<code>\nshortparallel</code> (∥) . . . . .	55	<code>\nsqsupset</code> (⊃) . . . . .	61
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<code>\nrightrightarrows</code> (↗) . . . . .	78	<code>\nshortparallel</code> (∥) . . . . .	52	<code>\nsqsupseteq</code> (⊇) . . . . .	60
<code>\nrightrightarrows</code> (↗) . . . . .	73	<code>\nshortparallel</code> (∥) . . . . .	57	<code>\nsqsupseteq</code> (⊇) . . . . .	60
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<code>\nrighthsspoon</code> (↗) . . . . .	86	<code>\nsim</code> (≈) . . . . .	49	<code>\nsqsupseteqq</code> (⊇) . . . . .	60
<code>\nrighthssquigarrow</code> (↗) . . . . .	79	<code>\nsim</code> (≈) . . . . .	55	<code>\nsqsupseteqq</code> (⊇) . . . . .	61
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<code>\nrighthssquigarrow</code> (↗) . . . . .	54	<code>\nsimeq</code> (≃) . . . . .	57	<code>\nsquigarrowleft</code> (↔) . . . . .	74
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<code>\nrighthssquigarrow</code> (↗) . . . . .	73	<code>\nsmileeq</code> (≃) . . . . .	54, 88	<code>\nsquigarrowright</code> (↔) . . . . .	74
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<code>\nseffpooncw</code> (↘) . . . . .	75	<code>\nsqfrown</code> (∨) . . . . .	87	<code>\nsubset</code> (⊂) . . . . .	61
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<code>\nseffsquigarrow</code> (↘) . . . . .	74	<code>\nsqsmile</code> (∨) . . . . .	87	<code>\nsubseq</code> (⊆) . . . . .	60
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<code>\nseffwarrows</code> (↘) . . . . .	74	<code>\nSqsubset</code> (⊆) . . . . .	61	<code>\nsubseqq</code> (⊆) . . . . .	60
<code>\nseffwcurvearrow</code> (↘) . . . . .	79	<code>\nsqSubset</code> (⊆) . . . . .	60	<code>\nsubseqq</code> (⊆) . . . . .	60
<code>\nseffwharpoons</code> (↘) . . . . .	80	<code>\nsqsubset</code> (⊆) . . . . .	60	<code>\nsubseqq</code> (⊆) . . . . .	61
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<code>\nseffsearrows</code> (↘) . . . . .	77	<code>\nsqsubset</code> (⊆) . . . . .	60	<code>\nsucc</code> (⋆) . . . . .	49
<code>\nseffsearrows</code> (↘) . . . . .	74	<code>\nsqsubset</code> (⊆) . . . . .	61	<code>\nsucc</code> (⋆) . . . . .	55
<code>\nseffspoon</code> (↘) . . . . .	86	<code>\nsqsubset</code> (⊆) . . . . .	61	<code>\nsucc</code> (⋆) . . . . .	54
<code>\nseffVdash</code> (↘) . . . . .	52	<code>\nsqsubset</code> (⊆) . . . . .	62	<code>\nsucc</code> (⋆) . . . . .	52
<code>\nseffvdash</code> (↘) . . . . .	52	<code>\nsqsubset</code> (⊆) . . . . .	60	<code>\nsucc</code> (⋆) . . . . .	57
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<code>\nseffshortlefttack</code> (⌣) . . . . .	54	<code>\nsqsubset</code> (⊆) . . . . .	61	<code>\nsuccapprox</code> (⊆) . . . . .	49
<code>\nseffshortmid</code> (†) . . . . .	49	<code>\nsqsubset</code> (⊆) . . . . .	61	<code>\nsuccapprox</code> (⊆) . . . . .	54
<code>\nseffshortmid</code> (†) . . . . .	55	<code>\nSqsupset</code> (⊇) . . . . .	61	<code>\nsuccapprox</code> (⊆) . . . . .	52
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<code>\nsupseteq</code> (⊃) . . . . .	60	<code>\ntriangleright</code> (▷) . . . . .	69	<code>\nUparrow</code> (↰) . . . . .	74
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<code>\nswharpoonccw</code> (↘) . . . . .	75	<code>\nttwoheadnearrow</code> (↗) . . . . .	78	<code>\nupdownharpoons</code> (⌘) . . . . .	80
<code>\nswharpooncw</code> (↘) . . . . .	75	<code>\nttwoheadnearrow</code> (↗) . . . . .	74	<code>\nupdownharpoons</code> (⌘) . . . . .	75
<code>\nswharpoonnw</code> (↘) . . . . .	80	<code>\nttwoheadnarrow</code> (↗) . . . . .	78	<code>\nupdownharpoonsleftright</code> (⌘) . . . . .	80
<code>\nswharpoonse</code> (↘) . . . . .	80	<code>\nttwoheadnarrow</code> (↗) . . . . .	74	<code>\nUpdownline</code> (⌘) . . . . .	52
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<code>\nswrsquigarrow</code> (↘) . . . . .	74				
<code>\nswspoon</code> (↘) . . . . .	86				

































































































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















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




















































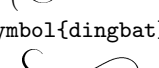

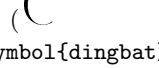

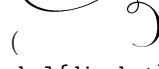



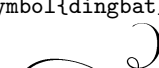

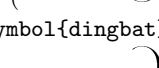

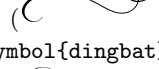

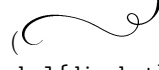



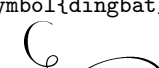

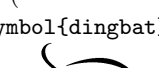

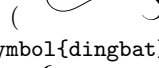





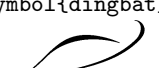

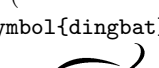

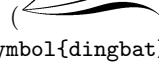







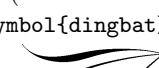

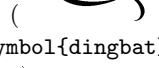





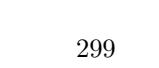

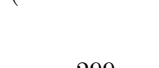






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\Pisymbol{cryst}{140} (■) .. ..... 207	\Pisymbol{cryst}{224} (↘) . ..... 208	\Pisymbol{dancers}{26} (♩) . ..... 203
\Pisymbol{cryst}{141} (♯) .. ..... 207	\Pisymbol{cryst}{230} (↘) . ..... 208	\Pisymbol{dancers}{27} (♩) . ..... 203
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\Pisymbol{cryst}{143} (♯) .. ..... 207	\Pisymbol{cryst}{232} (↘) . ..... 208	\Pisymbol{dancers}{29} (♩) . ..... 203
\Pisymbol{cryst}{145} (✓) 207	\Pisymbol{cryst}{233} (↘) . ..... 208	\Pisymbol{dancers}{30} (♩) . ..... 203
\Pisymbol{cryst}{147} (✓) .. ..... 207	\Pisymbol{cryst}{236} (↘) . ..... 208	\Pisymbol{dancers}{31} (♩) . ..... 203
\Pisymbol{cryst}{148} (✓) 207	\Pisymbol{cryst}{240} (♠) . ..... 208	\Pisymbol{dancers}{32} (♩) . ..... 203
\Pisymbol{cryst}{149} (✓) .. ..... 207	\Pisymbol{cryst}{241} (↘) . ..... 208	\Pisymbol{dancers}{33} (♩) . ..... 203
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\Pisymbol{cryst}{157} (♯) .. ..... 207	\Pisymbol{cryst}{243} (↘) . ..... 208	\Pisymbol{dancers}{35} (♩) . ..... 204
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\Pisymbol{cryst}{178} (↘) 207	\Pisymbol{dancers}{4} (♩) 203	\Pisymbol{dancers}{40} (♩) . ..... 204
\Pisymbol{cryst}{179} (↘) .. ..... 207	\Pisymbol{dancers}{5} (♩) 203	\Pisymbol{dancers}{41} (♩) . ..... 204
\Pisymbol{cryst}{185} (↘) .. ..... 207	\Pisymbol{dancers}{6} (♩) 203	\Pisymbol{dancers}{42} (♩) . ..... 204
\Pisymbol{cryst}{187} (↘) . ..... 207	\Pisymbol{dancers}{7} (♩) 203	\Pisymbol{dancers}{43} (♩) . ..... 204
\Pisymbol{cryst}{188} (↘) .. ..... 207	\Pisymbol{dancers}{8} (♩) 203	\Pisymbol{dancers}{44} (♩) . ..... 204
\Pisymbol{cryst}{189} (↘) . ..... 207	\Pisymbol{dancers}{9} (♩) 203	\Pisymbol{dancers}{45} (♩) . ..... 204
\Pisymbol{cryst}{195} (↘) .. ..... 207	\Pisymbol{dancers}{10} (♩) . ..... 203	\Pisymbol{dancers}{46} (♩) . ..... 204
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\Pisymbol{cryst}{198} (↘) .. ..... 207	\Pisymbol{dancers}{12} (♩) . ..... 203	\Pisymbol{dancers}{48} (♩) . ..... 204
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	\Pisymbol{dancers}{24} (♩) . ..... 203	







































































































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<code>\Pisymbol{dancers}{243}</code> 	<code>\Pisymbol{dice3d}{108}</code> 	<code>\Pisymbol{dingbat}{98}</code> 
..... 205	..... 208	(  ) ..... 199
<code>\Pisymbol{dancers}{244}</code> 	<code>\Pisymbol{dice3d}{109}</code> 	<code>\Pisymbol{dingbat}{99}</code> 
..... 205	..... 208	(  ) ..... 199
<code>\Pisymbol{dancers}{245}</code> 	<code>\Pisymbol{dice3d}{110}</code> 	<code>\Pisymbol{dingbat}{100}</code> 
..... 205	..... 208	(  ) ..... 199
<code>\Pisymbol{dancers}{246}</code> 	<code>\Pisymbol{dice3d}{111}</code> 	<code>\Pisymbol{dingbat}{101}</code> 
..... 205	..... 208	(  ) ..... 199
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..... 205	..... 208	(  ) ..... 199
<code>\Pisymbol{dancers}{248}</code> 	<code>\Pisymbol{dice3d}{113}</code> 	<code>\Pisymbol{dingbat}{103}</code> 
..... 205	..... 208	(  ) ..... 199
<code>\Pisymbol{dancers}{249}</code> 	<code>\Pisymbol{dice3d}{114}</code> 	<code>\Pisymbol{dingbat}{104}</code> 
..... 205	..... 208	(  ) ..... 199
<code>\Pisymbol{dancers}{250}</code> 	<code>\Pisymbol{dice3d}{115}</code> 	<code>\Pisymbol{dingbat}{104}</code> 
..... 205	..... 208	(  ) ..... 199
<code>\Pisymbol{dancers}{251}</code> 	<code>\Pisymbol{dice3d}{116}</code> 	<code>\Pisymbol{dingbat}{104}</code> 
..... 205	..... 208	(  ) ..... 199
<code>\Pisymbol{dancers}{252}</code> 	<code>\Pisymbol{dice3d}{117}</code> 	<code>\Pisymbol{fselch}{0}</code> (  ) ..
..... 205	..... 208	..... 209
<code>\Pisymbol{dancers}{253}</code> 	<code>\Pisymbol{dice3d}{118}</code> 	<code>\Pisymbol{fselch}{1}</code> (  ) ..
..... 205	..... 208	..... 209
<code>\Pisymbol{dancers}{254}</code> 	<code>\Pisymbol{dice3d}{119}</code> 	<code>\Pisymbol{fselch}{2}</code> (  ) ..
..... 205	..... 208	..... 209
<code>\Pisymbol{dancers}{255}</code> 	<code>\Pisymbol{dice3d}{120}</code> 	<code>\Pisymbol{fselch}{3}</code> (  ) ..
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<code>\Pisymbol{dice3d}{49}</code> (  )	<code>\Pisymbol{dingbat}{69}</code>	<code>\Pisymbol{fselch}{4}</code> (  ) ..
..... 208		..... 209
<code>\Pisymbol{dice3d}{50}</code> (  )	<code>\Pisymbol{dingbat}{70}</code> 	<code>\Pisymbol{fselch}{5}</code> (  ) ..
..... 208	(  ) ... 199	..... 209
<code>\Pisymbol{dice3d}{51}</code> (  )	<code>\Pisymbol{dingbat}{71}</code> 	<code>\Pisymbol{fselch}{6}</code> (  ) ..
..... 208	(  ) ... 199	..... 209
<code>\Pisymbol{dice3d}{52}</code> (  )	<code>\Pisymbol{dingbat}{72}</code> 	<code>\Pisymbol{fselch}{7}</code> (  ) ..
..... 208	(  ) ... 199	..... 209
<code>\Pisymbol{dice3d}{53}</code> (  )	<code>\Pisymbol{dingbat}{74}</code> 	<code>\Pisymbol{fselch}{8}</code> (  ) ..
..... 208	(  ) ... 199	..... 209
<code>\Pisymbol{dice3d}{54}</code> (  )	<code>\Pisymbol{dingbat}{75}</code> 	<code>\Pisymbol{fselch}{9}</code> (  ) ..
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<code>\Pisymbol{dice3d}{97}</code> (  )	<code>\Pisymbol{dingbat}{76}</code> 	<code>\Pisymbol{fselch}{10}</code> (  ) ..
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<code>\Pisymbol{dice3d}{98}</code> (  )	<code>\Pisymbol{dingbat}{77}</code> 	<code>\Pisymbol{fselch}{11}</code> (  ) ..
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<code>\Pisymbol{dice3d}{100}</code> (  )	<code>\Pisymbol{dingbat}{76}</code> 	<code>\Pisymbol{fselch}{13}</code> (  ) ..
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<code>\Pisymbol{dice3d}{102}</code> (  )	<code>\Pisymbol{dingbat}{77}</code> 	<code>\Pisymbol{fselch}{15}</code> (  ) ..
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<code>\Pisymbol{dice3d}{103}</code> (  )	<code>\Pisymbol{dingbat}{77}</code> 	<code>\Pisymbol{fselch}{16}</code> (  ) ..
..... 208	(  ) ... 199	..... 209
<code>\Pisymbol{dice3d}{104}</code> (  )	<code>\Pisymbol{dingbat}{77}</code> 	<code>\Pisymbol{fselch}{17}</code> (  ) ..
..... 208	(  ) ... 199	..... 209
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..... 208		
<code>\Pisymbol{dice3d}{106}</code> (  )		
..... 208		

















































<code>\Pisymbol{fselch}{102}</code> 	<code>\Pisymbol{fselch}{130}</code> 	<code>\Pisymbol{fselch}{222}</code> 
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<code>\Pisymbol{fselch}{103}</code> 	<code>\Pisymbol{fselch}{131}</code> 	<code>\Pisymbol{fselch}{228}</code> 
..... 210	..... 210	..... 210
<code>\Pisymbol{fselch}{104}</code> 	<code>\Pisymbol{fselch}{132}</code> 	<code>\Pisymbol{fselch}{234}</code> 
..... 210	..... 210	..... 210
<code>\Pisymbol{fselch}{105}</code> 	<code>\Pisymbol{fselch}{133}</code> 	<code>\Pisymbol{fselch}{240}</code> 
..... 210	..... 210	..... 210
<code>\Pisymbol{fselch}{106}</code> 	<code>\Pisymbol{fselch}{134}</code> 	<code>\Pisymbol{fselch}{246}</code> 
..... 210	..... 210	..... 210
<code>\Pisymbol{fselch}{107}</code> 	<code>\Pisymbol{fselch}{135}</code> 	<code>\Pisymbol{greenpoint}{71}</code> 
..... 210	..... 210	..... 191
<code>\Pisymbol{fselch}{108}</code> 	<code>\Pisymbol{fselch}{136}</code> 	<code>\Pisymbol{hands}{65}</code>  ..
..... 210	..... 210	..... 191
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


















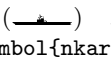


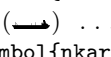


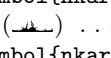





























































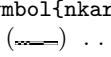


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..... 200	..... 200	..... 201
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<code>\Pisymbol{nkarta}{229}</code> (✳)	<code>\Pisymbol{smfpr10}{48}</code>	<code>\Pisymbol{smfpr10}{86}</code> (♠)
..... 192	(♠) ..... 205	..... 206
<code>\Pisymbol{nkarta}{230}</code> (○)	<code>\Pisymbol{smfpr10}{49}</code>	<code>\Pisymbol{smfpr10}{87}</code> (♠)
..... 192	(♠) ..... 205	..... 206
<code>\Pisymbol{nkarta}{231}</code> (□)	<code>\Pisymbol{smfpr10}{50}</code>	<code>\Pisymbol{smfpr10}{88}</code> (♠)
..... 192	(♠) ..... 205	..... 206
<code>\Pisymbol{nkarta}{232}</code> (▽)	<code>\Pisymbol{smfpr10}{51}</code>	<code>\Pisymbol{smfpr10}{89}</code> (♠)
..... 192	(♠) ..... 205	..... 206
<code>\Pisymbol{nkarta}{233}</code> (♠)	<code>\Pisymbol{smfpr10}{52}</code>	<code>\Pisymbol{smfpr10}{90}</code> (♠)
..... 192	(♠) ..... 205	..... 206
<code>\Pisymbol{nkarta}{234}</code> (♠)	<code>\Pisymbol{smfpr10}{53}</code>	<code>\Pisymbol{smfpr10}{97}</code> (♠)
..... 192	(♠) ..... 205	..... 206
<code>\Pisymbol{nkarta}{235}</code> (□)	<code>\Pisymbol{smfpr10}{54}</code>	<code>\Pisymbol{smfpr10}{98}</code> (♠)
..... 192	(♠) ..... 205	..... 206
<code>\Pisymbol{nkarta}{236}</code> (♠)	<code>\Pisymbol{smfpr10}{55}</code>	<code>\Pisymbol{smfpr10}{99}</code> (♠)
..... 192	(♠) ..... 205	..... 206
<code>\Pisymbol{nkarta}{237}</code> (○)	<code>\Pisymbol{smfpr10}{56}</code>	<code>\Pisymbol{smfpr10}{100}</code> (♠)
..... 192	(♠) ..... 205	..... 206
<code>\Pisymbol{nkarta}{238}</code> (○)	<code>\Pisymbol{smfpr10}{57}</code>	<code>\Pisymbol{smfpr10}{101}</code> (♠)
..... 192	(♠) ..... 205	..... 206
<code>\Pisymbol{nkarta}{239}</code> (♠)	<code>\Pisymbol{smfpr10}{65}</code> (♠)	<code>\Pisymbol{smfpr10}{102}</code> (♠)
..... 192	..... 206	..... 206
<code>\Pisymbol{nkarta}{240}</code> (♠)	<code>\Pisymbol{smfpr10}{66}</code> (♠)	<code>\Pisymbol{smfpr10}{103}</code> (♠)
..... 192	..... 206	..... 206
<code>\Pisymbol{nkarta}{241}</code> (♠)	<code>\Pisymbol{smfpr10}{67}</code> (♠)	<code>\Pisymbol{smfpr10}{104}</code> (♠)
..... 192	..... 206	..... 206
<code>\Pisymbol{nkarta}{242}</code> (♠)	<code>\Pisymbol{smfpr10}{68}</code> (♠)	<code>\Pisymbol{smfpr10}{105}</code> (♠)
..... 192	..... 206	..... 206
<code>\Pisymbol{nkarta}{243}</code> (✳)	<code>\Pisymbol{smfpr10}{69}</code> (♠)	<code>\Pisymbol{smfpr10}{106}</code> (♠)
..... 192	..... 206	..... 206
<code>\Pisymbol{nkarta}{244}</code> (♠)	<code>\Pisymbol{smfpr10}{70}</code> (♠)	<code>\Pisymbol{smfpr10}{107}</code> (♠)
..... 192	..... 206	..... 206
<code>\Pisymbol{nkarta}{245}</code> (♠)	<code>\Pisymbol{smfpr10}{71}</code> (♠)	<code>\Pisymbol{smfpr10}{108}</code> (♠)
..... 192	..... 206	..... 206
<code>\Pisymbol{nkarta}{246}</code> (♠)	<code>\Pisymbol{smfpr10}{72}</code> (♠)	<code>\Pisymbol{smfpr10}{109}</code> (♠)
..... 192	..... 206	..... 206
<code>\Pisymbol{nkarta}{247}</code> (♠)	<code>\Pisymbol{smfpr10}{73}</code> (♠)	<code>\Pisymbol{smfpr10}{110}</code> (♠)
..... 192	..... 206	..... 206
<code>\Pisymbol{nkarta}{248}</code> (♠)	<code>\Pisymbol{smfpr10}{74}</code> (♠)	<code>\Pisymbol{smfpr10}{111}</code> (♠)
..... 192	..... 206	..... 206
<code>\Pisymbol{nkarta}{249}</code> (♠)	<code>\Pisymbol{smfpr10}{75}</code> (♠)	<code>\Pisymbol{smfpr10}{112}</code> (♠)
..... 192	..... 206	..... 206
<code>\Pisymbol{nkarta}{250}</code> (♠)	<code>\Pisymbol{smfpr10}{76}</code> (♠)	<code>\Pisymbol{smfpr10}{113}</code> (♠)
..... 192	..... 206	..... 206





















































































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..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{60}</code> (◻)	<code>\Pisymbol{umranda}{87}</code> (⤿) .....	<code>\Pisymbol{umrandb}{12}</code> (⦶)
..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{61}</code> (⤿)	<code>\Pisymbol{umranda}{88}</code> (⤿)	<code>\Pisymbol{umrandb}{13}</code> (⦶)
..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{62}</code> (⤿)	<code>\Pisymbol{umranda}{89}</code> (⤿)	<code>\Pisymbol{umrandb}{14}</code> (⦶)
..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{63}</code> (⤿)	<code>\Pisymbol{umranda}{90}</code> (⤿) .....	<code>\Pisymbol{umrandb}{15}</code> (⦶)
..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{64}</code> (⤿)	<code>\Pisymbol{umranda}{91}</code> (⤿) .....	<code>\Pisymbol{umrandb}{16}</code> (⦶)
..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{65}</code> (⤿) .....	<code>\Pisymbol{umranda}{92}</code> (⤿)	<code>\Pisymbol{umrandb}{17}</code> (⦶)
..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{66}</code> (⤿) .....	<code>\Pisymbol{umranda}{93}</code> (⤿)	<code>\Pisymbol{umrandb}{18}</code> (⦶)
..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{67}</code> (⤿)	<code>\Pisymbol{umranda}{94}</code> (◻)	<code>\Pisymbol{umrandb}{19}</code> (⦶)
..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{68}</code> (⤿)	<code>\Pisymbol{umranda}{95}</code> (◻)	<code>\Pisymbol{umrandb}{20}</code> (⦶)
..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{69}</code> (⤿) .....	<code>\Pisymbol{umranda}{96}</code> (◻)	<code>\Pisymbol{umrandb}{21}</code> (⦶)
..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{70}</code> (⤿) .....	<code>\Pisymbol{umranda}{97}</code> (◻)	<code>\Pisymbol{umrandb}{22}</code> (⦶)
..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{71}</code> (⤿)	<code>\Pisymbol{umranda}{98}</code> (◻)	<code>\Pisymbol{umrandb}{23}</code> (⦶)
..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{72}</code> (⤿)	<code>\Pisymbol{umranda}{99}</code> (◻)	<code>\Pisymbol{umrandb}{24}</code> (⦶)
..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{73}</code> (⤿) .....	<code>\Pisymbol{umranda}{100}</code> (◻)	<code>\Pisymbol{umrandb}{25}</code> (⦶)
..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{74}</code> (⤿)	<code>\Pisymbol{umranda}{101}</code> (◻)	<code>\Pisymbol{umrandb}{26}</code> (⦶)
..... 197	..... 197	..... 198
<code>\Pisymbol{umranda}{75}</code> (○)	<code>\Pisymbol{umrandb}{0}</code> (▮) .	<code>\Pisymbol{umrandb}{27}</code> (⦶)
..... 197	..... 198	..... 198
<code>\Pisymbol{umranda}{76}</code> (◻)	<code>\Pisymbol{umrandb}{1}</code> (▮) .	<code>\Pisymbol{umrandb}{28}</code> (⦶)
..... 197	..... 198	..... 198
<code>\Pisymbol{umranda}{77}</code> (○)	<code>\Pisymbol{umrandb}{2}</code> (▮) .	<code>\Pisymbol{umrandb}{29}</code> (⦶)
..... 197	..... 198	..... 198
<code>\Pisymbol{umranda}{78}</code> (⤿)	<code>\Pisymbol{umrandb}{3}</code> (▮) .	<code>\Pisymbol{umrandb}{30}</code> (⦶)
..... 197	..... 198	..... 198
<code>\Pisymbol{umranda}{79}</code> (⤿)	<code>\Pisymbol{umrandb}{4}</code> (▮) .	<code>\Pisymbol{umrandb}{31}</code> (⦶)
..... 197	..... 198	..... 198
<code>\Pisymbol{umranda}{80}</code> (⤿)	<code>\Pisymbol{umrandb}{5}</code> (▮) .	<code>\Pisymbol{umrandb}{32}</code> (⦶)
..... 197	..... 198	..... 198
<code>\Pisymbol{umranda}{81}</code> (⤿)	<code>\Pisymbol{umrandb}{6}</code> (▮) .	<code>\Pisymbol{umrandb}{33}</code> (⦶)
..... 197	..... 198	..... 198
<code>\Pisymbol{umranda}{82}</code> (⤿)	<code>\Pisymbol{umrandb}{7}</code> (▮) .	<code>\Pisymbol{umrandb}{34}</code> (⦶)
..... 197	..... 198	..... 198
<code>\Pisymbol{umranda}{83}</code> (⤿)	<code>\Pisymbol{umrandb}{8}</code> (▮) .	<code>\Pisymbol{umrandb}{35}</code> (⦶)
..... 197	..... 198	..... 198
<code>\Pisymbol{umranda}{84}</code> (⤿)	<code>\Pisymbol{umrandb}{9}</code> (▮) .	<code>\Pisymbol{umrandb}{36}</code> (⦶)
..... 197	..... 198	..... 198
<code>\Pisymbol{umranda}{85}</code> (⤿)	<code>\Pisymbol{umrandb}{10}</code> (▮) .	<code>\Pisymbol{umrandb}{37}</code> (⦶)
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		<code>\Pisymbol{umrandb}{38}</code> (⦶)
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<code>\Pisymbol{umrandb}{123}</code> (  ) ..... 198	<code>\Pisymbol{WebOMintsGD}{84}</code> (  ) ..... 196	<code>\Pisymbol{WebOMintsGD}{119}</code> (  ) ..... 196
<code>\Pisymbol{WebOMintsGD}{47}</code> (  ) ..... 196	<code>\Pisymbol{WebOMintsGD}{85}</code> (  ) ..... 196	<code>\Pisymbol{WebOMintsGD}{120}</code> (  ) ..... 196
<code>\Pisymbol{WebOMintsGD}{48}</code> (  ) ..... 196	<code>\Pisymbol{WebOMintsGD}{86}</code> (  ) ..... 196	<code>\Pisymbol{WebOMintsGD}{121}</code> (  ) ..... 196
<code>\Pisymbol{WebOMintsGD}{49}</code> (  ) ..... 196	<code>\Pisymbol{WebOMintsGD}{87}</code> (  ) ..... 196	<code>\Pisymbol{WebOMintsGD}{122}</code> (  ) ..... 196
<code>\Pisymbol{WebOMintsGD}{50}</code> (  ) ..... 196	<code>\Pisymbol{WebOMintsGD}{88}</code> (  ) ..... 196	<code>\pitchfork</code> (  ) ..... 116
<code>\Pisymbol{WebOMintsGD}{51}</code> (  ) ..... 196	<code>\Pisymbol{WebOMintsGD}{89}</code> (  ) ..... 196	<code>\pitchfork</code> (  ) ..... 48
<code>\Pisymbol{WebOMintsGD}{52}</code> (  ) ..... 196	<code>\Pisymbol{WebOMintsGD}{90}</code> (  ) ..... 196	<code>\pitchfork</code> (  ) ..... 55
<code>\Pisymbol{WebOMintsGD}{53}</code> (  ) ..... 196	<code>\Pisymbol{WebOMintsGD}{91}</code> (  ) ..... 196	<code>\pitchfork</code> (  ) ..... 88
<code>\Pisymbol{WebOMintsGD}{54}</code> (  ) ..... 196	<code>\Pisymbol{WebOMintsGD}{93}</code> (  ) ..... 196	<code>\pitchfork</code> (  ) ..... 86
<code>\Pisymbol{WebOMintsGD}{55}</code> (  ) ..... 196	<code>\Pisymbol{WebOMintsGD}{97}</code> (  ) ..... 196	<code>\pitchfork</code> (  ) ..... 56
<code>\Pisymbol{WebOMintsGD}{56}</code> (  ) ..... 196	<code>\Pisymbol{WebOMintsGD}{98}</code> (  ) ..... 196	pitchforks 48, 86, 88, 110, 116
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




















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





















































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















































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


























































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<code>\smallblacklozenge</code> (◇) . . . . .	137	<code>\smallintcapup</code> (f) . . . . .	38	<code>\smallsqint</code> (f) . . . . .	38
<code>\smallblacksquare</code> (■) . . . . .	35	<code>\smallintclockwise</code> (f) . . . . .	38	<code>\smallsqintsl</code> (f) . . . . .	38
<code>\smallblackstar</code> (★) . . . . .	35	<code>\smallintclockwise sl</code> (f) . . . . .	38	<code>\smallsqintup</code> (f) . . . . .	38
<code>\smallblacktriangledown</code> (▼) . . . . .	35, 69	<code>\smallintclockwiseup</code> (f) . . . . .	38	<code>\SmallSquare</code> (□) . . . . .	139
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<code>\smallblacktriangleleft</code> (◀) . . . . .	138	<code>\smallintcupsl</code> (f) . . . . .	38	<code>\smallsquare</code> (▣) . . . . .	35
<code>\smallblacktriangleright</code> (▶) . . . . .	35, 69	<code>\smallintcupup</code> (f) . . . . .	38	<code>\smallstar</code> (★) . . . . .	35
<code>\smallblacktriangleright</code> (▶) . . . . .	138	<code>\smallintlarhk</code> (f) . . . . .	38	<code>\smallsumint</code> (∑) . . . . .	38
<code>\smallblacktriangleup</code> (▲) . . . . .	35, 69	<code>\smallintlarhksl</code> (f) . . . . .	38	<code>\smallsumintsl</code> (∑) . . . . .	38
<code>\smallbosenloops</code> (ℓ) . . . . .	128	<code>\smallintlarhkup</code> (f) . . . . .	38	<code>\smallsumintup</code> (∑) . . . . .	38
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<code>\smallcircle</code> (○) . . . . .	35	<code>\smallintxsl</code> (f) . . . . .	38	<code>\smalltriangledown</code> (▽) . . . . .	34
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




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