

The Comprehensive L^AT_EX Symbol List

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Abstract

This document lists 14032 symbols and the corresponding L^AT_EX commands that produce them. Some of these symbols are guaranteed to be available in every L^AT_EX 2 _{ε} 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_EX Archive Network (<http://www.ctan.org/>).

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

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1 Introduction

Welcome to the Comprehensive L^AT_EX Symbol List! This document strives to be your primary source of L^AT_EX symbol information: font samples, L^AT_EX 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_EX Archive Network (<http://www.ctan.org/>).
2. All of their symbols have L^AT_EX 2_E 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^AT_EX Symbol List, that second restriction has been relaxed with the inclusion of Section 9, which showcases fonts that provide, at a minimum, either T_EX font-metric files (.tfm) or the METAFONT sources (.mf) that produce those font-metric files. Some of the Section 9 fonts do include L^AT_EX 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^AT_EX style file (.sty) that individually names each of the glyphs.

The restrictions listed above are not particularly limiting criteria; the Comprehensive L^AT_EX Symbol List contains samples of 14032 symbols—quite a large number. Some of these symbols are guaranteed to be available in every L^AT_EX 2_E 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^AT_EX 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^AT_EX) 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^AT_EX ASCII and Latin 1 tables, shows how to input and output Unicode characters, and provides some information about this document itself. The Comprehensive L^AT_EX Symbol List ends with an index of all the symbols in the document and various additional useful terms.

1.2 Frequently Requested Symbols

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

| | | | |
|---|----|---------------------------|-----|
| _, as in “Spaces_are_significant.” | 13 | ƒ | 39 |
| ī, ī, į, ĩ, ĩ, etc. (versus ī, ī, į, ĩ, ĩ, and į) | 19 | ⋮ | 47 |
| ¢ | 24 | := and ::= | 48 |
| € | 24 | ≤ and ≥ | 61 |
| ©, ®, and ™ | 25 | ⋮⋮ | 109 |
| %o | 26 | °, as in “180°” or “15°C” | 114 |

| | | | |
|---|-----|---|-----|
| \mathcal{L}, \mathcal{F} , etc. | 116 | \acute{a}, \grave{e} , etc. (i.e., several accents per character) | 214 |
| $\mathbb{N}, \mathbb{Z}, \mathbb{R}$, etc. | 116 | $<, >$, and $ $ (instead of $\mathfrak{j}, \mathfrak{z}$, and —) | 221 |
| \mathbf{z} | 116 | $\hat{}$ and $\tilde{}$ (or \sim) | 221 |
| f | 212 | | |

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^AT_EX 2 _{ε} Escapable “Special” Characters

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

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

TABLE 2: Predefined L^AT_EX 2 _{ε} Text-mode Commands

| | | | |
|-----|------------------------------|-----------------|------------------------------|
| ^ | \textasciicircum* | < | \textless |
| ~ | \textasciitilde* | a | \textordfeminine |
| * | \textasteriskcentered | o | \textordmasculine |
| \ | \textbackslash | \P | \textparagraph [†] |
| | \textbar | . | \textperiodcentered |
| | \textbardbl | \%oo | \textpertenthousand |
| ○ | \textbigcircle | \%o | \textperthousand |
| { | \textbraceleft [†] | \textlangle | \textquestiondown |
| } | \textbraceright [†] | \textrangle | \textquotedblleft |
| • | \textbullet | \textquoteright | \textquotedblright |
| (C) | \textcopyright [†] | \textquoteright | \textquotelleft |
| † | \textdagger [†] | , | \textquoteright |
| ‡ | \textdaggerdbl [†] | \textcircledR | \textregistered |
| \$ | \textdollar [†] | \textsection | \textsection [†] |
| ... | \textellipsis | \textsterling | \textsterling [†] |
| — | \textemdash | \textTM | \texttrademark |
| — | \textendash | - | \textunderscore [†] |
| i | \textexclamdown | - | \textvisible |
| > | \textgreater | | |

The first symbol column represents the—sometimes “faked”—symbol that L^AT_EX 2 _{ε} provides by default. The second symbol column represents the symbol as redefined by `textcomp` (if `textcomp` redefines it). The `textcomp` package is generally required to typeset Table 2’s symbols in italic, and some symbols additionally require the T1 font encoding for italic.

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

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

TABLE 3: L^AT_EX 2 _{ε} 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^AT_EX 2 _{ε} provides by default. The second symbol column represents the symbol as redefined by `textcomp` (if `textcomp` redefines it). The `textcomp` package is generally required to typeset Table 3’s symbols in italic, and some symbols additionally require the T1 font encoding for italic.

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

| | | | | | |
|---|------------|---|-----------|---|----------|
| ✓ | \checkmark | ® | \circledR | ✗ | \maltese |
|---|------------|---|-----------|---|----------|

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

| | | | | | | | | | |
|---|-----|---|------|----|------|---|-----|----|------|
| å | \aa | D | \DH* | L | \L | ø | \o | ß | \ss |
| Å | \AA | ð | \dh* | ł | \l | Ø | \o | SS | \SS |
| Æ | \AE | D | \DJ* | IJ | \NG* | Œ | \OE | P | \TH* |
| æ | \ae | đ | \dj* | ŋ | \ng* | œ | \oe | þ | \th* |

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

TABLE 6: `textgreek` Upright Greek Letters

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

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

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

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

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

TABLE 7: Letters Used to Typeset African Languages

| | | | | | | | | | | | |
|---|-------|---|-------|---|-------|---|-------|---|-------|---|---------------------|
| D | \B{D} | ¢ | \m{c} | ƒ | \m{f} | ќ | \m{k} | ќ | \M{t} | ڇ | \m{Z} |
| d | \B{d} | ڏ | \m{D} | ڻ | \m{F} | ڏ | \m{N} | ڻ | \M{T} | ڦ | \T{E} |
| H | \B{H} | ڏ | \M{d} | ڙ | \m{G} | ڙ | \m{n} | ڙ | \m{t} | ڙ | \T{e} |
| h | \B{h} | ڏ | \M{D} | ڙ | \m{g} | ڙ | \m{o} | ڙ | \m{T} | ڦ | \T{O} |
| t | \B{t} | ڏ | \m{d} | ڙ | \m{I} | ڙ | \m{O} | ڙ | \m{u} | ڙ | \T{o} |
| T | \B{T} | ڦ | \m{E} | ڙ | \m{i} | ڦ | \m{P} | ڦ | \m{U} | ڦ | \m{U}* [*] |
| b | \m{b} | ڦ | \m{e} | ڙ | \m{J} | ڦ | \m{p} | ڦ | \m{Y} | ڦ | \m{Y} |
| B | \m{B} | ڦ | \M{E} | ڙ | \m{j} | ڦ | \m{s} | ڙ | \m{y} | ڦ | \m{y} |
| C | \m{C} | ڦ | \M{e} | ڙ | \m{K} | ڦ | \m{S} | ڦ | \m{z} | ڦ | \m{z} |

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

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

TABLE 8: Letters Used to Typeset Vietnamese

O \OHORN o \ohorn U \UHORN u \uhorn

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

TABLE 9: Punctuation Marks Not Found in OT1

```
< \guillemotleft < \guilsinglleft „ \quotedblbase " \textquotedbl
> \guillemotright > \guilsinglright , \quotesinglbase
```

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

TABLE 10: pifont Decorative Punctuation Marks

```
• \ding{123} “ \ding{125} ¶ \ding{161} ♦ \ding{163}
• \ding{124} ” \ding{126} : \ding{162}
```

TABLE 11: tipa Phonetic Symbols

| | | | | | |
|---|----------------------|---|---------------------|---|---------------------|
| ȝ | \textbabygamma | ȝ | \textglotstop | ɳ | \textrtailn |
| þ | \textbarb | þ | \texthalflength | Ծ | \textrtailr |
| Ҽ | \textbarc | Ԇ | \texthardsign | Ը | \textrtails |
| Ԇ | \textbard | Ԇ | \texthooktop | Ԇ | \textrtailt |
| ڶ | \textbardotlessj | ڏ | \texthtb | ڙ | \textrtailz |
| ڳ | \textbarg | ڏ | \texthtbardotlessj | ڻ | \textrhook |
| ڦ | \textbarglotstop | ڏ | \texthtc | ڦ | \textsca |
| ڦ | \textbari | ڏ | \texthtd | ڦ | \textscb |
| ڦ | \textbarl | ڏ | \texthtg | ڦ | \textscce |
| ڦ | \textbaro | ڏ | \texthth | ڦ | \textscg |
| ڦ | \textbarrevglotstop | ڏ | \texttheng | ڦ | \textsch |
| ڦ | \textbaru | ڏ | \texthtk | ڦ | \textschwa |
| ڦ | \textbeltl | ڏ | \texthtp | ڦ | \textsci |
| ڦ | \textbeta | ڏ | \texthtq | ڦ | \textscj |
| ڦ | \textbullseye | ڏ | \texthttaild | ڦ | \textsccl |
| ڦ | \textcelpal | ڏ | \texthtscg | ڦ | \textscn |
| ڦ | \textchi | ڏ | \texthtt | ڦ | \textscelig |
| ڦ | \textcloseepsilon | ڏ | \texthvlig | ڦ | \textscomega |
| ڦ | \textcloseomega | ڏ | \textinvglotstop | ڦ | \textscr |
| ڦ | \textcloserevepsilon | ڏ | \textinvscr | ڦ | \textscripta |
| ڦ | \textcommatailz | ڏ | \textiot | ڦ | \textscriptg |
| ڦ | \textcorner | ڏ | \textlambda | ڦ | \textscriptv |
| ڦ | \textcrb | ڏ | \textlengthmark | ڦ | \textscu |
| ڦ | \textcrd | ڏ | \textlhookt | ڦ | \textscy |
| ڦ | \textcrg | ڏ | \textlhtlongi | ڦ | \textsecstress |
| ڦ | \textcrh | ڏ | \textlhtlongy | ڦ | \textsoftsign |
| ڦ | \textcrinvglotstop | ڏ | \textlonglegr | ڦ | \textstretchc |
| ڦ | \textcrlambda | ڏ | \textlptr | ڦ | \texttctclig |
| ڦ | \textcrtwo | ڏ | \textltailm | ڦ | \textteshlig |
| ڦ | \textctc | ڏ | \textltailn | ڦ | \texttheta |
| ڦ | \textctd | ڏ | \textltilde | ڦ | \textthorn |
| ڦ | \textcdctzlig | ڏ | \textlyoghligr | ڦ | \texttoneletterstem |
| ڦ | \textctesh | ڏ | \textobardotlessj | ڦ | \texttslig |
| ڦ | \textctj | ڏ | \textolyoghligr | ڦ | \textturna |
| ڦ | \textctn | ڏ | \textomega | ڦ | \textturncelig |
| ڦ | \textctt | ڏ | \textopencorner | ڦ | \textturnh |
| ڦ | \textcttctclig | ڏ | \textopeno | ڦ | \textturnrnk |
| ڦ | \textctyogh | ڏ | \textpalhook | ڦ | \textturnlonglegr |
| ڦ | \textctz | ڏ | \textphi | ڦ | \textturnnm |
| ڦ | \textdctzlig | ڏ | \textpipe | ڦ | \textturnmrleg |
| ڦ | \textdoublebaresh | ڏ | \textprimstress | ڦ | \textturnnr |
| ڦ | \textdoublebarpipe | ڏ | \textraiseglotstop | ڦ | \textturnrrtail |
| ڦ | \textdoublebarslash | ڏ | \textraisevibyi | ڦ | \textturnscripta |
| ڦ | \textdoublepipe | ڏ | \textramshorns | ڦ | \textturnrt |
| ڦ | \textdoublevertline | ڏ | \textrevapostrophe | ڦ | \textturnrv |
| ڦ | \textdownstep | ڏ | \textreve | ڦ | \textturnnw |
| ڦ | \textdyoghlig | ڏ | \textrevesilon | ڦ | \textturny |
| ڦ | \textdzlig | ڏ | \textrevglotstop | ڦ | \textupsilon |
| ڦ | \textepsilon | ڏ | \textrevyogh | ڦ | \textupstep |
| ڦ | \textesh | ڏ | \textrhokrevepsilon | ڦ | \textvertline |
| ڦ | \textfishhookr | ڏ | \textrhookschwa | ڦ | \textvibyi |

(continued on next page)

(continued from previous page)

| | | | | | |
|---|---------------|---|----------------|---|------------|
| g | \texttg | ~ | \textrhoticity | ψ | \textvibyy |
| γ | \texttgamma | > | \textrptr | ƿ | \textwynn |
| ↙ | \textglobfall | ɖ | \textrtaild | ȝ | \textyogh |
| ↗ | \textglobrise | ӏ | \textrtaill | | |

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

TABLE 12: tipx Phonetic Symbols

| | | | | | |
|----|-----------------------|-------|-----------------------|-----|---------------------|
| ao | \textaolig | ʃ | \texthtbardotlessjvar | Ը | \textrthooklong |
| ȝ | \textbenttailyogh | ɔ | \textinvomega | Ծ | \textscaolig |
| γ | \textbktailgamma | ȝ | \textinvasca | Δ | \textscdelta |
| ڏ | \textctinvglotstop | ɑ | \textinvscripta | F | \textscf |
| j | \textctjvar | ଫ | \textlfishhookrlig | K | \textscck |
| ڻ | \textctstretchc | ڙ | \textlhookfour | M | \textscm |
| ڦ | \textctstretchcvar | ڦ | \textlhookp | P | \textscp |
| ڦ | \textctturnt | ି | \textlhti | Q | \textscq |
| ڦ | \textdblig | ଳ | \textlooptoprevesh | ୱ | \textspleftarrow |
| ڦ | \textdoublebarpipevar | ନ୍ତ୍ର | \textnrleg | C | \textstretchcvar |
| ڦ | \textdoublelepipevar | ଓ | \textObullseye | ୲ୱ | \textsubdoublearrow |
| ڦ | \textdownfullarrow | ଜ୍ଞ | \textpalhooklong | ୲ୱ | \textsubbrightarrow |
| ڦ | \textfemale | ଜ୍ଞ | \textpalhookvar | ପ୍ର | \textthornvari |
| ڦ | \textfrbarn | ପ୍ର | \textpipevar | ପ୍ର | \textthornvarii |
| ڦ | \textfrhookd | କ୍ଷ | \textqlig | ପ୍ର | \textthornvariii |
| ڦ | \textfrhookdvar | କ୍ଷ | \textrectangle | ପ୍ର | \textthornvariv |
| ڦ | \textfrhookt | କ୍ଷ | \textretractingvar | କ୍ଷ | \textturnglotstop |
| ڦ | \textfrtailgamma | କ୍ଷ | \textrevscl | କ୍ଷ | \textturnsck |
| ڦ | \textglotstopvari | କ୍ଷ | \textrevscr | କ୍ଷ | \textturnscu |
| ڦ | \textglotstopvari | କ୍ଷ | \textrhooka | କ୍ଷ | \textturnthree |
| ڦ | \textglotstopvari | କ୍ଷ | \textrhooke | କ୍ଷ | \textturntwo |
| ڦ | \textgrgamma | କ୍ଷ | \textrhookepsilon | କ୍ଷ | \textuncrfemale |
| ڦ | \textheng | କ୍ଷ | \textrhookopeno | କ୍ଷ | \textupfullarrow |
| hm | \texthmlig | କ୍ଷ | \textrtailhth | | |

TABLE 13: wsipa Phonetic Symbols

| | | | | | | | |
|-------------------|-------------------|-------------|-----------------|---------------|---------------|------------|-----------|
| γ | \babygamma | η | \eng | η_j | \labdentalnas | θ | \schwa |
| \flat | \barb | σ^* | \er | \sharp | \latfric | I | \sci |
| \ddot{d} | \bard | \int | \esh | \sqcup | \legm | N | \scn |
| \dot{i} | \bari | \eth | \eth | \sqcap | \legr | R | \scr |
| \ddot{t} | \barl | r | \flapr | \natural | \lz | a | \scripta |
| \ddot{o} | \baro | ? | \glotstop | α | \nialpha | g | \scriptg |
| \ddot{p} | \barp | b | \hookb | β | \nibeta | v | \scriptv |
| \ddot{f} | \barsci | d | \hookd | χ | \nichi | U | \scu |
| $\ddot{\psi}$ | \barscu | g | \hookg | ε | \niepsilon | Y | \scy |
| \ddot{u} | \baru | h | \hookh | γ | \nigamma | y | \slashb |
| \odot | \clickb | h | \hookheng | ι | \niota | z | \slashc |
| \textcircled{C} | \clickc | z | \hookrevepsilon | λ | \nilambda | d | \slashd |
| $\ddot{\imath}$ | \clickt | hv | | ω | \niomega | y | \slashu |
| $\ddot{\omega}$ | \closedniomega | e | \inva | ϕ | \niph | d | \taild |
| $\ddot{\sigma}$ | \closedrevepsilon | j | \invf | σ | \nisigma | l | \tailinvr |
| \ddot{b} | \crossb | s | \invglotstop | θ | \nitheta | l | \taill |
| \ddot{d} | \crossd | q | \invh | υ | \niupsilon | n | \tailn |
| \ddot{h} | \crossh | r | \invlegr | j | \nj | r | \tailr |
| $\ddot{\chi}$ | \crossnilambda | w | \invvm | ∞ | \oo | s | \tails |
| $\ddot{\epsilon}$ | \curlyc | x | \invr | \circ | \openo | t | \tailt |
| $\ddot{\ell}$ | \curlyesh | v | \invscr | e | \reve | z | \tailz |
| $\ddot{\text{z}}$ | \curlyyogh | w | \invscripta | f | \reject | f | \tesh |
| $\ddot{\text{z}}$ | \curlyz | x | \invv | g | \revepsilon | b | \thorn |
| $\ddot{\text{t}}$ | \dlbari | m | \invw | h | \revglotstop | t | \tildel |
| $\ddot{\text{d}}$ | \dz | x | \invy | D | \scd | z | \yogh |
| ? | \rejective | y | \ipagamma | G | \scg | | |

TABLE 14: wasysym Phonetic Symbols

| | | | | | |
|---|--------|----------|-------|------------|--------|
| D | \DH | δ | \dh | \circ | \openo |
| P | \Thorn | θ | \inve | þ | \thorn |

TABLE 15: phonetic Phonetic Symbols

| | | | | | | | | | |
|---------------|------------|------------|----------|------------|-----------|------------|----------|------------|-----------|
| J | \barj | f | \flap | i | \ibar | o | \rotvara | u | \vari |
| X | \barlambda | ? | \glottal | \circ | \openo | w | \rotw | o | \varomega |
| m_j | \emgma | B | \ausaB | h | \planck | x | \roty | o | \varopeno |
| y_j | \engma | b | \ausab | a | \pwedge | e | \schwa | v | \vod |
| ju_j | \enya | d | \ausad | D | \revD | p | \thorn | f | \voicedh |
| e_j | \epsi | D | \ausaD | r | \riota | u | \ubar | z | \yogh |
| f_j | \esh | k | \ausak | u | \rotm | q | \udesc | | |
| ð_j | \eth | K | \ausak | o | \rotOmega | a | \vara | | |
| fj_j | \fj | d | \hookd | a | \rotr | g | \varg | | |

TABLE 16: `t4phonet` Phonetic Symbols

| | | | | | |
|----------------|---------------------------|----------------|--------------------------|----------------|---------------------------|
| <code>đ</code> | <code>\textcrd</code> | <code>đ</code> | <code>\texthtd</code> | <code> </code> | <code>\textpipe</code> |
| <code>ḥ</code> | <code>\textcrh</code> | <code>ᬁ</code> | <code>\texthtk</code> | <code>ᬁ</code> | <code>\textrtaild</code> |
| <code>ጀ</code> | <code>\textepsilon</code> | <code>ጀ</code> | <code>\texthtp</code> | <code>ጀ</code> | <code>\textrtailt</code> |
| <code>ጀ</code> | <code>\textesh</code> | <code>ጀ</code> | <code>\texthtt</code> | <code>ጀ</code> | <code>\textschwa</code> |
| <code>ጀ</code> | <code>\textfjlig</code> | <code>ጀ</code> | <code>\textiota</code> | <code>ጀ</code> | <code>\textscriptv</code> |
| <code>ጀ</code> | <code>\texthtb</code> | <code>ጀ</code> | <code>\textltailn</code> | <code>ጀ</code> | <code>\textteshlig</code> |
| <code>ጀ</code> | <code>\texthtc</code> | <code>ጀ</code> | <code>\textopeno</code> | <code>ጀ</code> | <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 15) but using the same names as the `tipa` characters presented in Table 11 on page 16.

TABLE 17: `semtrans` Transliteration Symbols

`> \Alif` `< \Ayn`

TABLE 18: Text-mode Accents

| | | | | | | | |
|-----------------|---------------------------|-----------------|--------------------------|-----------------|------------------------------------|-----------------|---|
| <code>Ää</code> | <code>\\"{A}\\"{a}</code> | <code>Åå</code> | <code>\ {A}\ {a}‡</code> | <code>Ââ</code> | <code>\f{A}\f{a}¶</code> | <code>Ãâ</code> | <code>\t{A}\t{a}</code> |
| <code>Áá</code> | <code>\'{A}\'{a}</code> | <code>Ãã</code> | <code>\~{A}\~{a}</code> | <code>Ãä</code> | <code>\G{A}\G{a}‡</code> | <code>Ãă</code> | <code>\u{A}\u{a}</code> |
| <code>Àå</code> | <code>\.{A}\.{a}</code> | <code>Ãa</code> | <code>\b{A}\b{a}</code> | <code>Ãå</code> | <code>\h{A}\h{a}§</code> | <code>Ãä</code> | <code>\U{A}\U{a}‡</code> |
| <code>Āā</code> | <code>\={A}\={a}</code> | <code>Ãq</code> | <code>\c{A}\c{a}</code> | <code>Ãä</code> | <code>\H{A}\H{a}</code> | <code>Ãä</code> | <code>\U{A}\U{a}¶</code> |
| <code>Ââ</code> | <code>\^{A}\^{a}</code> | <code>Ãä</code> | <code>\C{A}\C{a}¶</code> | <code>Ãq</code> | <code>\k{A}\k{a}†</code> | <code>Ãă</code> | <code>\v{A}\v{a}</code> |
| <code>Àà</code> | <code>\'{A}\'{a}</code> | <code>Ãq</code> | <code>\d{A}\d{a}</code> | <code>Ãå</code> | <code>\r{A}\r{a}</code> | | |
| | | | | <code>Ââ</code> | <code>\newtie{A}\newtie{a}*</code> | | <code>\textcircled{A}\textcircled{a}</code> |

* 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^AT_EX. Font encodings other than OT1 and newer versions of L^AT_EX properly typeset “na\"{\i}ve” as “naïve”.

TABLE 19: tipa Text-mode Accents

| | |
|----|--|
| Áá | \textacute{A}\textacute{a} |
| Áá | \textacute{e}{A}\textacute{e}{a} |
| Áá | \textadvancing{A}\textadvancing{a} |
| Áá | \textbottomtiebar{A}\textbottomtiebar{a} |
| Áá | \textbreve{A}\textbreve{a} |
| Áá | \textcircum{A}\textcircum{a} |
| Áá | \textcircumdot{A}\textcircumdot{a} |
| Áá | \textdotacute{A}\textdotacute{a} |
| Áá | \textdotbreve{A}\textdotbreve{a} |
| Áá | \textdoublegrave{A}\textdoublegrave{a} |
| Áá | \textdoublebaraccent{A}\textdoublebaraccent{a} |
| Áá | \textfallrise{A}\textfallrise{a} |
| Áá | \textgravecircum{A}\textgravecircum{a} |
| Áá | \textgravedot{A}\textgravedot{a} |
| Áá | \textgravemacron{A}\textgravemacron{a} |
| Áá | \textgravemid{A}\textgravemid{a} |
| Áá | \texthighrise{A}\texthighrise{a} |
| Áá | \textinvsubbridge{A}\textinvsubbridge{a} |
| Áá | \textlowering{A}\textlowering{a} |
| Áá | \textlowrise{A}\textlowrise{a} |
| Áá | \textmidacute{A}\textmidacute{a} |
| Áá | \textovercross{A}\textovercross{a} |
| Áá | \textoverw{A}\textoverw{a} |
| Áá | \textpolhook{A}\textpolhook{a} |
| Áá | \textraising{A}\textraising{a} |
| Áá | \textretracting{A}\textretracting{a} |
| Áá | \textringmacron{A}\textringmacron{a} |
| Áá | \textrisefall{A}\textrisefall{a} |
| Áá | \textroundcap{A}\textroundcap{a} |
| Áá | \textseagull{A}\textseagull{a} |
| Áá | \textsubacute{A}\textsubacute{a} |
| Áá | \textsubarch{A}\textsubarch{a} |
| Áá | \textsubbar{A}\textsubbar{a} |
| Áá | \textsubbridge{A}\textsubbridge{a} |
| Áá | \textsubcircum{A}\textsubcircum{a} |
| Áá | \textsubdot{A}\textsubdot{a} |
| Áá | \textsubgrave{A}\textsubgrave{a} |
| Áá | \textsublhalfing{A}\textsublhalfing{a} |
| Áá | \textsubplus{A}\textsubplus{a} |
| Áá | \textsubrhalfing{A}\textsubrhalfing{a} |
| Áá | \textsubring{A}\textsubring{a} |

(continued on next page)

(continued from previous page)

| | |
|-----------------------|---|
| A_{a} | <code>\textsubsquare{A}\textsubsquare{a}</code> |
| A_{a} | <code>\textsubtilde{A}\textsubtilde{a}</code> |
| A_{a} | <code>\textsubumlaut{A}\textsubumlaut{a}</code> |
| A_{a} | <code>\textsubw{A}\textsubw{a}</code> |
| A_{a} | <code>\textsubwedge{A}\textsubwedge{a}</code> |
| A_{a} | <code>\textsuperimpostilde{A}\textsuperimpostilde{a}</code> |
| A_{a} | <code>\textsyllabic{A}\textsyllabic{a}</code> |
| A_{a} | <code>\texttildedot{A}\texttildedot{a}</code> |
| A_{a} | <code>\texttoptiebar{A}\texttoptiebar{a}</code> |
| A_{a} | <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

| | | | |
|-----------------------|---|-----------------------|---|
| A_{a} | <code>\bibbridge{A}\bibbridge{a}</code> | A_{a} | <code>\partvoiceless{A}\partvoiceless{a}</code> |
| A_{a} | <code>\crttilde{A}\crttilde{a}</code> | A_{a} | <code>\sliding{A}\sliding{a}</code> |
| A_{a} | <code>\dottedtilde{A}\dottedtilde{a}</code> | A_{a} | <code>\spreadlips{A}\spreadlips{a}</code> |
| A_{a} | <code>\doubletilde{A}\doubletilde{a}</code> | A_{a} | <code>\subcorner{A}\subcorner{a}</code> |
| A_{a} | <code>\finpartvoice{A}\finpartvoice{a}</code> | A_{a} | <code>\subdoublebar{A}\subdoublebar{a}</code> |
| A_{a} | <code>\finpartvoiceless{A}\finpartvoiceless{a}</code> | A_{a} | <code>\subdoublevert{A}\subdoublevert{a}</code> |
| A_{a} | <code>\inipartvoice{A}\inipartvoice{a}</code> | A_{a} | <code>\sublptr{A}\sublptr{a}</code> |
| A_{a} | <code>\inipartvoiceless{A}\inipartvoiceless{a}</code> | A_{a} | <code>\subrptr{A}\subrptr{a}</code> |
| A_{a} | <code>\overbridge{A}\overbridge{a}</code> | A_{a} | <code>\whistle{A}\whistle{a}</code> |
| A_{a} | <code>\partvoice{A}\partvoice{a}</code> | | |

TABLE 21: wsuipa Text-mode Accents

| | |
|-----------------------|---|
| A_{a} | <code>\dental{A}\dental{a}</code> |
| A_{a} | <code>\underarch{A}\underarch{a}</code> |

TABLE 22: phonetic Text-mode Accents

| | | | | | |
|----------------|---------------------------------|-----------------|-----------------------------|--------------|---------------------------|
| $\hat{A}a$ | <code>\hill{A}\hill{a}</code> | $\dot{A}a$ | <code>\rc{A}\rc{a}</code> | $\tilde{A}a$ | <code>\ut{A}\ut{a}</code> |
| $\ddot{A}a$ | <code>\od{A}\od{a}</code> | $\ddot{\cdot}a$ | <code>\syl{A}\syl{a}</code> | | |
| $\hat{\cdot}a$ | <code>\ohill{A}\ohill{a}</code> | $\ddot{A}a$ | <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 “ \acute{a} ” and `\acarc{"}{e}` produces “ \ddot{e} ”. `\labvel` joins two characters with an arc: `\labvel{mn}` → “ \widehat{mn} ”. `\upbar` is intended to go between characters as in “`x\upbar{}y`” → “ $x\bar{y}$ ”. Lastly, `\uplett` behaves like `\textsuperscript` but uses a smaller font. Contrast “`p\uplett{h}`” → “ p^h ” with “`ph`” → “ p^{h} ”.

TABLE 23: metre Text-mode Accents

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

TABLE 24: t4phonet Text-mode Accents

| | |
|-----------------|---|
| $\ddot{A}a$ | <code>\textdoublegrave{A}\textdoublegrave{a}</code> |
| $\ddot{\cdot}a$ | <code>\textvbaraccent{A}\textvbaraccent{a}</code> |
| $\ddot{\cdot}a$ | <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 19) but using the same names as the `tipa` accents presented in Table 19 on page 20.

TABLE 25: arcs Text-mode Accents

| | | | |
|----------------|-------------------------------------|------------------|---------------------------------------|
| $\widehat{A}a$ | <code>\overarc{A}\overarc{a}</code> | $\underline{A}a$ | <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 `relsize` package, upon which `arcs` depends. As a workaround, one should apply the patch proposed by Michael Sharpe on the X_ET_EX 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

| | | | |
|----------|-------------------------|-------|--------------------------|
| \AA | <code>\D{A}\D{a}</code> | \AA | <code>\U{A}\U{a}</code> |
| ∇ | | | <code>\T{A}\T{a}*</code> |

`\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

| | |
|-------|-------------------------|
| \AA | <code>\k{A}\k{a}</code> |
|-------|-------------------------|

TABLE 28: `combbelow` Accents

| | |
|-------|---------------------------|
| \AA | <code>\cb{A}\cb{a}</code> |
|-------|---------------------------|

`\cb` places a comma *above* letters with descenders. Hence, while “`\cb{s}`” produces “ \mathring{s} ”, “`\cb{g}`” produces “ \mathring{g} ”.

TABLE 29: `wsipa` Diacritics

| | | | | | | | | | |
|---|--------------------------|---|------------------------|---|--------------------------|---|--------------------------|---|--------------------------|
| ‘ | <code>\ain</code> | ‘ | <code>\leftp</code> | ‘ | <code>\overring</code> | ‘ | <code>\stress</code> | ‘ | <code>\underwedge</code> |
| ˉ | <code>\corner</code> | ˉ | <code>\leftt</code> | ˉ | <code>\polishhook</code> | ˉ | <code>\syllabic</code> | ˉ | <code>\upp</code> |
| ˇ | <code>\downp</code> | ˇ | <code>\length</code> | ˇ | <code>\rightp</code> | ˇ | <code>\underdots</code> | ˇ | <code>\upt</code> |
| ˉ | <code>\downt</code> | ˉ | <code>\midtilde</code> | ˉ | <code>\rightt</code> | ˉ | <code>\underring</code> | ˉ | |
| ˘ | <code>\halflength</code> | ˘ | <code>\open</code> | ˘ | <code>\secstress</code> | ˘ | <code>\undertilde</code> | ˘ | |

The `wsipa` 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 “ \mathring{a} ”, and `\diaunder[\underdots|a]` produces “ $\mathring{\mathring{a}}$ ”. See the `wsipa` documentation for more information.

TABLE 30: `textcomp` Diacritics

| | | | | | |
|---|------------------------------|---|---------------------------------|---|-------------------------------|
| ” | <code>\textacutedbl</code> | ” | <code>\textasciicaron</code> | ” | <code>\textasciimacron</code> |
| ˊ | <code>\textasciacute</code> | ˊ | <code>\textasciidieresis</code> | ˊ | <code>\textgravedbl</code> |
| ˘ | <code>\textasciibreve</code> | ˘ | <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 213 for more information.

TABLE 31: `marvosym` Diacritics

| | | | |
|---------------------|-------------------|-----|---------------------------|
| \arrowOver | \barOver | $/$ | \StrikingThrough |
| \ArrowOver | \BarOver | | |

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

TABLE 32: `textcomp` Currency Symbols

| | | | |
|-----------------------------|------------------------------|--------------------------|-------------------|
| \textbaht | \textdollar^* | \textguarani | \textwon |
| \textcent | $\text{\textdollaroldstyle}$ | \textlira | \textyen |
| \textcentoldstyle | \textdong | \textnaira | |
| $\text{\textcolonmonetary}$ | \texteuro | \textpeso | |
| \textcurrency | \textflorin | \textsterling^* | |

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

TABLE 33: `marvosym` Currency Symbols

| | | | |
|---------------------|------------------|----------------------|--------------------|
| \Denarius | \EURcr | \EURtm | \Pfund |
| \Ecommerce | \EURdig | \EyesDollar | \Shilling |
| \EUR | \EURhv | \Florin | |

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

TABLE 34: `fontawesome` Currency Symbols

| | | | |
|---------------------|-----------------|-----------------|---------------------|
| \faBitcoin | \faILS | \faKRW | \faUSD |
| \faEuro | \faINR | \faRub | \faViacoin |
| \faGbp | \faJPY | \faTRY | |

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

TABLE 35: `wasysym` Currency Symbols

| | |
|----------------|--------------------|
| \cent | \currency |
|----------------|--------------------|

TABLE 36: *GooglA2e* Currency Symbols
 \texteuro \Euro \textpound \Pound
TABLE 37: *teubner* Currency Symbols
 \texttimes \denarius \textc \hemibelion $\text{\textcircled{o}}$ \tetartemorion
 \textleftarrow \dracma \textdollar \stater
TABLE 38: *tfrupee* Currency Symbols
 \textrupee \rupee
TABLE 39: *eurosym* Euro Signs
 \texteuro \geneuro \texteuro \geneuronarrow \texteuro \geneurowide \texteuro \officialeuro

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

TABLE 40: *fourier* Euro Signs
 \texteuro \eurologo \texteuro \texteuro
TABLE 41: *textcomp* Legal Symbols

| | | | | | |
|--------------------------|----------------------------|--------------------------|------------------------------|--------------------------|-------------------------------|
| $\text{\textcircled{P}}$ | <code>\textcircledP</code> | $\text{\textcircled{C}}$ | <code>\textcopyright</code> | $\text{\textcircled{S}}$ | <code>\textservicemark</code> |
| $\text{\textcircled{O}}$ | <code>\textcircledO</code> | $\text{\textcircled{R}}$ | <code>\textregistered</code> | $\text{\textcircled{T}}$ | <code>\texttrademark</code> |

The first symbol column represents the—sometimes “faked”—symbol that LATEX 2E 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 “ $\text{\textcircled{R}}$ ” when you expected to get a “ $\text{\textcircled{R}}$ ”).

TABLE 42: *fontawesome* Legal Symbols

| | | | |
|--------------------------|---------------------------------|--------------------------|----------------------------|
| $\text{\textcircled{C}}$ | <code>\faCopyright</code> | $\text{\textcircled{R}}$ | <code>\faRegistered</code> |
| $\text{\textcircled{C}}$ | <code>\faCreativeCommons</code> | $\text{\textcircled{T}}$ | <code>\faTrademark</code> |

TABLE 43: *cclicenses* Creative Commons License Icons

| | | | | | | | | | |
|--|-----|--|-------|--|--------|--|-------|--|--------|
| | \cc | | \ccby | | \ccnc* | | \ccnd | | \ccsa* |
|--|-----|--|-------|--|--------|--|-------|--|--------|

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

TABLE 44: *ccicons* Creative Commons License Icons

| | | | | | |
|--|------------------|--|--------------------|--|---------------|
| | \ccAttribution | | \ccNonCommercialEU | | \ccShare |
| | \ccCopy | | \ccNonCommercialJP | | \ccShareAlike |
| | \ccLogo | | \ccPublicDomain | | \ccZero |
| | \ccNoDerivatives | | \ccRemix | | |
| | \ccNonCommercial | | \ccSampling | | |

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

TABLE 45: *textcomp* Old-style Numerals

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

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

TABLE 46: Miscellaneous *textcomp* Symbols

| | | | |
|---|----------------------|---|---------------------------|
| b | \textblank | ¶ | \textpilcrow |
| | \textbrokenbar | ' | \textquotesingle |
| = | \textdblhyphen | , | \textquotestraightbase |
| = | \textdblhyphenchar | " | \textquotestraightdblbase |
| % | \textdiscount | R | \textrecipe |
| e | \textestimated | ※ | \textreferencemark |
| ? | \textinterrobang | — | \textthreequartersemdash |
| ↳ | \textinterrobangdown | ~ | \texttildelow |
| № | \textnumero | — | \texttwelveudash |
| ○ | \textopenbullet | | |

TABLE 47: Miscellaneous *wasysym* Text-mode Symbols

| | |
|----|---------|
| %% | \permil |
|----|---------|

3 Mathematical symbols

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

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

Although there have been many requests on `comp.text.tex` for a contradiction symbol, the ensuing discussion invariably reveals innumerable ways to represent contradiction in a proof, including “ \nexists ” (`\blitza`), “ $\Rightarrow\Leftarrow$ ” (`\Rightarrow\Leftarrow`), “ \perp ” (`\bot`), “ \leftrightarrow ” (`\nleftrightarrow`), and “ $\text{\texttt{*}}$ ” (`\texttt{*}`). 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`), “ \coloneqq ” (*various*¹), and “ $\stackrel{\text{def}}{=}$ ” (`\stackrel{\text{def}}{=}`). See also the example of `\equalsfill` on page 214. Depending upon the context, disjoint union may be represented as “ \coprod ”, “ \sqcup ” (`\sqcup`), “ \dotcup ” (`\dotcup`), “ \oplus ” (`\oplus`), or any of a number of other symbols.² Finally, the average value of a variable x is written by some people as “ \overline{x} ” (`\overline{x}`), by some people as “ $\langle x \rangle$ ” (`\langle x \rangle`), and by some people as “ $\mathcal{O}x$ ” or “ $\mathcal{D}x$ ” (`\mathcal{O}x` or `\mathcal{D}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>\$</code> | <code>\mathdollar</code> | <code>¶</code> | <code>\mathparagraph</code> | <code>£</code> | <code>\mathsterling</code> |
| ... | <code>\mathellipsis</code> | <code>§</code> | <code>\mathsection</code> | <code>_</code> | <code>\mathunderscore</code> |

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

TABLE 49: cml1 Unary Operators

| | | | | | |
|----------------|---------------------|----------------|---------------------|----------------|-------------------|
| <code>!</code> | <code>\oc*</code> | <code>↑</code> | <code>\shneg</code> | <code>?</code> | <code>\wn*</code> |
| <code>‡</code> | <code>\shift</code> | <code>↓</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 “ $A = !B$ ”.

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

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

TABLE 50: Binary Operators

| | | | | | | | |
|----|------------------|---|----------|---|-----------|---|----------------|
| II | \amalg | U | \cup | ⊕ | \oplus | × | \times |
| * | \ast | † | \dagger | ⊖ | \oslash | △ | \triangleleft |
| ○ | \bigcirc | ‡ | \ddagger | ⊗ | \otimes | ▷ | \triangleright |
| ▽ | \bigtriangledown | ◊ | \diamond | ± | \pm | ⊓ | \unlhd* |
| △ | \bigtriangleup | ÷ | \div | ▷ | \rhd* | ⊔ | \unrhd* |
| • | \bullet | □ | \lhd* | ＼ | \setminus | ⊕ | \uplus |
| □ | \cap | 干 | \mp | □ | \sqcap | ∨ | \vee |
| · | \cdot | ○ | \odot | □ | \sqcup | ∧ | \wedge |
| ◦ | \circ | ⊖ | \ominus | ★ | \star | ⌚ | \wr |

* Not predefined by the L^AT_EX 2_ε core. Use the `latexsym` package to expose this symbol.

TABLE 51: *AMS* Binary Operators

| | | | | | |
|---|-------------|---|-----------------|---|------------------|
| ⊸ | \barwedge | ◎ | \circledcirc | ⊤ | \intercal* |
| ⊡ | \boxdot | ⊖ | \circleddash | ⊸ | \leftthreetimes |
| ⊞ | \boxminus | ⊠ | \Cup | ⊴ | \ltimes |
| ⊞ | \boxplus | ⊴ | \curlyvee | ⊵ | \rightthreetimes |
| ⊗ | \boxtimes | ⊸ | \curlywedge | ⊶ | \rtimes |
| ⊸ | \Cap | ＊ | \divideontimes | ⊷ | \smallsetminus |
| · | \centerdot | + | \dotplus | ⊸ | \veebar |
| ⊛ | \circledast | ⊸ | \doublebarwedge | | |

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

TABLE 52: stmaryrd Binary Operators

| | | | | | |
|----|----------------------|----|----------------|---|------------------|
| ∅ | \baro | | \interleave | ⊗ | \varoast |
| // | \bbslash | ⊲ | \leftslice | ⊠ | \varobar |
| & | \binampersand | ℳ | \merge | ⊖ | \varobslash |
| ⊗ | \bindnasrepma | ⊖ | \minuso | ◎ | \varocircle |
| ☒ | \boxast | ± | \moo | ○ | \varodot |
| ☒ | \boxbar | ⊕ | \nplus | ⊗ | \varogreaterthan |
| ☒ | \boxbox | ⊖ | \obar | ⊖ | \varolessthan |
| ☒ | \boxbslash | □ | \oblong | ⊖ | \varominus |
| ☒ | \boxcircle | ⊖ | \obslash | ⊕ | \varoplus |
| ⊡ | \boxdot | ⊖ | \ogreaterthan | ⊖ | \varoslash |
| □ | \boxempty | ⊖ | \olessthan | ⊗ | \varotimes |
| ☒ | \boxslash | ⊖ | \ovee | ⊖ | \varovee |
| ⤻ | \curlyveedownarrow | ⊖ | \owedge | ⊖ | \varowedge |
| ⤻ | \curlyveeuparrow | ▷ | \rightslice | ✗ | \vartimes |
| ⤻ | \curlywedgedownarrow | // | \sslash | ⤻ | \Ydown |
| ⤻ | \curlywedgeuparrow | | \talloblong | ⤻ | \Yleft |
| ⤻ | \fatbslash | ○ | \varbigcirc | ⤻ | \Yright |
| ⤻ | \fatsemi | ⤻ | \varcurlyvee | ⤻ | \Yup |
| // | \fatslash | ⤻ | \varcurlywedge | | |

TABLE 53: wasysym Binary Operators

| | | | | | | | |
|----------------------|------------------|------------------|----------------------|-------------------|--------------------|--------------------|--------------------|
| \triangleleft | $\backslash lhd$ | \circ | $\backslash ocircle$ | \triangleright | $\backslash RHD$ | \trianglerighteq | $\backslash unrhd$ |
| \blacktriangleleft | $\backslash LHD$ | \triangleright | $\backslash rhd$ | \trianglelefteq | $\backslash unlhd$ | | |

TABLE 54: txfonts/pfxfonts Binary Operators

| | | | | | |
|------------------|----------------------------|----------------|---------------------------|-------------|------------------------|
| \circledcirc | $\backslash circledbar$ | \circledcirc | $\backslash circledwedge$ | \circ | $\backslash medcirc$ |
| \circledbslash | $\backslash circledbslash$ | \circledast | $\backslash invamp$ | \boxplus | $\backslash sqcapplus$ |
| \circledvee | $\backslash circledvee$ | \bullet | $\backslash medbullet$ | \boxminus | $\backslash sqcupplus$ |

TABLE 55: mathabx Binary Operators

| | | | | | |
|-----------------|---------------------------|------------------|-----------------------------|-------------|---------------------------|
| $*$ | $\backslash ast$ | \wedge | $\backslash curlywedge$ | \sqcap | $\backslash sqcap$ |
| \ast | $\backslash Asterisk$ | \div | $\backslash divdot$ | \sqcup | $\backslash sqcup$ |
| π | $\backslash barwedge$ | \divideontimes | $\backslash divideontimes$ | \boxtimes | $\backslash sqdoublecap$ |
| \star | $\backslash bigstar$ | \div | $\backslash dotdiv$ | \boxtimes | $\backslash sqdoublecup$ |
| \bigstar | $\backslash bigvarstar$ | \dotplus | $\backslash dotplus$ | \square | $\backslash square$ |
| \blacklozenge | $\backslash blackdiamond$ | \dottimes | $\backslash dottimes$ | \boxplus | $\backslash squplus$ |
| \cap | $\backslash cap$ | \barwedge | $\backslash doublebarwedge$ | \cdot | $\backslash udot$ |
| \circ | $\backslash circplus$ | \cap | $\backslash doublecap$ | \oplus | $\backslash uplus$ |
| \circ | $\backslash coasterisk$ | \cup | $\backslash doublecup$ | \star | $\backslash varstar$ |
| \ast | $\backslash coAsterisk$ | \ltimes | $\backslash ltimes$ | \vee | $\backslash vee$ |
| \ast | $\backslash convolution$ | \dagger | $\backslash pluscirc$ | \veebar | $\backslash veebar$ |
| \cup | $\backslash cup$ | \rtimes | $\backslash rtimes$ | \asymp | $\backslash veedoublebar$ |
| \curlyvee | $\backslash curlyvee$ | \blacksquare | $\backslash sqbullet$ | \wedge | $\backslash wedge$ |

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

TABLE 56: MnSymbol Binary Operators

| | | | | | |
|------------|---------------------------|----------------|----------------------------|------------------|------------------------------|
| \sqcup | $\backslash amalg$ | \sqcup | $\backslash doublesqcup$ | \sqsupseteq | $\backslash righttherefore$ |
| \ast | $\backslash ast$ | \wp | $\backslash doublevee$ | \times | $\backslash rightthreetimes$ |
| \times | $\backslash backslashdiv$ | \wedge | $\backslash doublewedge$ | \succ | $\backslash rightY$ |
| \bowtie | $\backslash bowtie$ | \therefore | $\backslash downtherefore$ | \rtimes | $\backslash rtimes$ |
| \bullet | $\backslash bullet$ | \succcurlyeq | $\backslash downY$ | \divideontimes | $\backslash slashdiv$ |
| \cap | $\backslash cap$ | \times | $\backslash dtimes$ | Π | $\backslash smallprod$ |
| \capdot | $\backslash capdot$ | \therefore | $\backslash fivedots$ | \sqcap | $\backslash sqcap$ |
| \capplus | $\backslash capplus$ | ∞ | $\backslash hbioproto$ | \sqcapdot | $\backslash sqcapdot$ |
| \cdotp | $\backslash cdot$ | \ldots | $\backslash hdotdot$ | \boxplus | $\backslash sqcapplus$ |
| \circ | $\backslash circ$ | \sqcap | $\backslash lefthalfcap$ | \sqcup | $\backslash sqcup$ |

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| | | | | | |
|---|-------------------|---|-----------------|----|--------------|
| ⋮ | \closedcurlyvee | ⊓ | \lefthalfcup | ⊤ | \sqcupdot |
| Ⓐ | \closedcurlywedge | ⊴ | \lefttherefore | ⊲ | \sqcupplus |
| ∪ | \cup | × | \leftthreetimes | ⊶ | \squaredots |
| ⊻ | \cupdot | ⊸ | \leftY | × | \times |
| ⊼ | \cupplus | ⊹ | \ltimes | .. | \udotdot |
| ⋮ | \curlyvee | ⊷ | \medbackslash | ⊸ | \uptherefore |
| ⋮ | \curlyveedot | ○ | \medcircle | ⊸ | \upY |
| ⋈ | \curlywedge | ⊸ | \medslash | × | \utimes |
| ⊸ | \curlywedgedot | ⊸ | \medvert | ⊸ | \vbipropto |
| ⊸ | \ddotdot | ⊸ | \medvertdot | : | \vdotdot |
| ⊸ | \diamondddots | – | \minus | ∨ | \vee |
| ÷ | \div | – | \minusdot | ∨ | \veedot |
| ⊸ | \dotmedvert | ⊸ | \mp | ⊸ | \vertbowtie |
| ⊸ | \dotminus | ∅ | \neswbipropto | ⊸ | \vertdiv |
| ⊸ | \doublecap | ∅ | \nwsebipropto | ⊸ | \wedge |
| ⊸ | \doublecup | + | \plus | ⊸ | \wedgedot |
| ⊸ | \doublecurlyvee | ± | \pm | ⊸ | \wreath |
| ⊸ | \doublecurlywedge | ⊸ | \righthalfcap | | |
| ⊸ | \doublesqcap | ⊸ | \righthalfcup | | |

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

TABLE 57: fdsymbol Binary Operators

| | | | | | |
|---|----------------|----|-----------------|----|------------|
| ⊠ | \amalg | ⊸ | \doublevee | ⊸ | \rtimes |
| * | \ast | ⊸ | \doublewedge | ⊸ | \setminus |
| ⊸ | \barwedge | ⊸ | \downY | ⊸ | \sqcap |
| ⊸ | \cap | ⊸ | \dtimes | ⊸ | \sqcapdot |
| ⊸ | \capdot | .. | \hdotdot | ⊸ | \sqcapplus |
| ⊸ | \capplus | ⊸ | \intercal | ⊸ | \sqcup |
| · | \cdot | ⊸ | \intprod | ⊸ | \sqcupdot |
| · | \centerdot | ⊸ | \intprodR | ⊸ | \sqcupplus |
| ⊸ | \cup | × | \leftthreetimes | × | \times |
| ⊸ | \cupdot | ⊸ | \leftY | ⊸ | \timesbar |
| ⊼ | \cupplus | ⊹ | \ltimes | .. | \udotdot |
| ⋮ | \curlyvee | ⊷ | \medbackslash | ⊸ | \upbowtie |
| ⋈ | \curlywedge | ⊸ | \medslash | ⊸ | \upY |
| ⊸ | \ddotdot | – | \minus | × | \utimes |
| ÷ | \div | – | \minusdot | ⊸ | \varamalg |
| ※ | \divideontimes | ÷ | \minusfdots | : | \vdotdot |
| / | \divslash | ÷ | \minusrdots | : | \vdots |
| ÷ | \dotminus | ⊸ | \mp | ∨ | \vee |
| + | \dotplus | + | \plus | ⊸ | \veebar |

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| | | | | | |
|------------------|------------------------------|-------------|-------------------------------|----------------------|----------------------------|
| \times | <code>\dottimes</code> | \dagger | <code>\plusdot</code> | \vee | <code>\veedot</code> |
| $\bar{\wedge}$ | <code>\doublebarwedge</code> | \pm | <code>\pm</code> | $\underline{\wedge}$ | <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> |
| $\Cap\!\!\!\Cap$ | <code>\doublesqcap</code> | \times | <code>\rightthreetimes</code> | \wr | <code>\wreath</code> |
| $\Cup\!\!\!\Cup$ | <code>\doublesqcup</code> | \succ | <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 `\intprod`; `\hourglass` as a synonym for `\upbowtie`; `\land` as a synonym for `\wedge`; `\lor` as a synonym for `\vee`; `\minushookup` as a synonym for `\intprod`; `\smalldivslash` as a synonym for `\medslash`; `\smallsetminus` as a synonym for `\medbackslash`; `\Sqcap` as a synonym for `\doublesqcap`; `\Sqcup` as a synonym for `\doublesqcup`; `\ttimes` as a synonym for `\utimes`; `\lJoin` as a synonym for `\ltimes`; `\rJoin` as a synonym for `\rtimes`; `\Join` and `\lrtimes` as synonyms for `\bowtie`; `\uplus` as a synonym for `\cupplus`; `\veeonvee` as a synonym for `\doublevee`; `\wedgeonwedge` as a synonym for `\doublewedge`; and `\wr` as a synonym for `\wreath`).

TABLE 58: boisik Binary Operators

| | | | | | |
|------------------------|-----------------------------|------------------|-------------------------------|------------------|-----------------------------|
| $*$ | <code>\ast</code> | \times | <code>\dottimes</code> | \rtimes | <code>\rtimesblack</code> |
| ϕ | <code>\baro</code> | $\bar{\wedge}$ | <code>\doublebarwedge</code> | \smallsetminus | <code>\smallsetminus</code> |
| \wedge | <code>\barwedge</code> | $:$ | <code>\fatsemi</code> | \divideontimes | <code>\smashtimes</code> |
| $\backslash\backslash$ | <code>\bbslash</code> | $>$ | <code>\gtrdot</code> | \sqcup | <code>\squplus</code> |
| $\&$ | <code>\binampersand</code> | T | <code>\intercal</code> | $//$ | <code>\sslash</code> |
| \wp | <code>\bindnasrepma</code> | $\{$ | <code>\lbag</code> | \times | <code>\times</code> |
| \blacksquare | <code>\blackbowtie</code> | \blacksquare | <code>\lblackbowtie</code> | \uplus | <code>\uplus</code> |
| \bowtie | <code>\bowtie</code> | \diamond | <code>\leftslice</code> | \cap | <code>\varcap</code> |
| \cap | <code>\cap</code> | λ | <code>\leftthreetimes</code> | \cup | <code>\varcup</code> |
| \Cap | <code>\Cap</code> | \lessdot | <code>\lessdot</code> | \intercal | <code>\varintercal</code> |
| \cdot | <code>\cdot</code> | \ltimes | <code>\ltimes</code> | \sqcap | <code>\varsqcap</code> |
| \cdot | <code>\centerdot</code> | \blacksquare | <code>\ltimesblack</code> | \sqcup | <code>\varsqcup</code> |
| $\dot{+}$ | <code>\circplus</code> | \wedge | <code>\merge</code> | \vartimes | |
| $*$ | <code>\coAsterisk</code> | \ominus | <code>\minuso</code> | \vee | <code>\vee</code> |
| $*$ | <code>\convolution</code> | $\ddot{+}$ | <code>\moo</code> | \Vee | <code>\Vee</code> |
| \cup | <code>\cup</code> | \mp | | \veebar | |
| \Cup | <code>\Cup</code> | \wedge | <code>\nplus</code> | \veeonvee | |
| \leftrightharpoonup | <code>\cupleftarrow</code> | \oplus | <code>\pluscirc</code> | \wedge | <code>\wedge</code> |
| \curlyvee | <code>\curlyvee</code> | \star | <code>\plustrif</code> | \wedge | <code>\Wedge</code> |
| \curlywedge | <code>\curlywedge</code> | \pm | <code>\pm</code> | \downarrow | <code>\Ydown</code> |
| \dagger | <code>\dagger</code> | \int | <code>\rbag</code> | \prec | <code>\Yleft</code> |
| \ddagger | <code>\ddagger</code> | \blacksquare | <code>\rblackbowtie</code> | \succ | <code>\Yright</code> |
| \div | <code>\div</code> | \triangleright | <code>\rightslice</code> | \succsim | <code>\Yup</code> |
| $*$ | <code>\divideontimes</code> | \times | <code>\rightthreetimes</code> | | |
| $\dot{+}$ | <code>\dotplus</code> | \rtimes | <code>\rtimes</code> | | |

TABLE 59: stix Binary Operators

| | | | | | |
|--------------------------|-------------------------------------|-------------------------|------------------------------------|----------------------|---------------------------------|
| \amalg | <code>\amalg</code> | \fcmp | <code>\fcmp</code> | \sqcup | <code>\sqcup</code> |
| \ast | <code>\ast</code> | \fracslash | <code>\fracslash</code> | \sqcup | <code>\Sqcup</code> |
| \barcap | <code>\barcap</code> | \intercal | <code>\intercal</code> | \sslash | <code>\sslash</code> |
| \barcup | <code>\barcup</code> | \interleave | <code>\interleave</code> | \threedotcolon | <code>\threedotcolon</code> |
| \barvee | <code>\barvee</code> | \intprod | <code>\intprod</code> | \times | <code>\times</code> |
| \barwedge | <code>\barwedge</code> | \intprod_{r} | <code>\intprod_{\mathrm{r}}</code> | \timesbar | <code>\timesbar</code> |
| \bigslopedvee | <code>\bigslopedvee</code> | \invlazys | <code>\invlazys</code> | \tminus | <code>\tminus</code> |
| \bigslopedwedge | <code>\bigslopedwedge</code> | \leftthreetimes | <code>\leftthreetimes</code> | \tplus | <code>\tplus</code> |
| \btimes | <code>\btimes</code> | \lhd | <code>\lhd</code> | \tripleplus | <code>\tripleplus</code> |
| \cap | <code>\cap</code> | \ltimes | <code>\ltimes</code> | \trslash | <code>\trslash</code> |
| \Cap | <code>\Cap</code> | \midbarvee | <code>\midbarvee</code> | \twocaps | <code>\twocaps</code> |
| \capbarcup | <code>\capbarcup</code> | \midbarwedge | <code>\midbarwedge</code> | \twocups | <code>\twocups</code> |
| \capdot | <code>\capdot</code> | \minusdot | <code>\minusdot</code> | \typecolon | <code>\typecolon</code> |
| \capovercup | <code>\capovercup</code> | \minusfdots | <code>\minusfdots</code> | \uminus | <code>\uminus</code> |
| \capwedge | <code>\capwedge</code> | \minusrdots | <code>\minusrdots</code> | \unlhd | <code>\unlhd</code> |
| \closedvarcap | <code>\closedvarcap</code> | \mp | <code>\mp</code> | \unrhd | <code>\unrhd</code> |
| \closedvarcup | <code>\closedvarcup</code> | \nhVvert | <code>\nhVvert</code> | \upand | <code>\upand</code> |
| \closedvarcupsmashprod | <code>\closedvarcupsmashprod</code> | \opluslhrim | <code>\opluslhrim</code> | \uplus | <code>\uplus</code> |
| \commaminus | <code>\commaminus</code> | \oplusrhrim | <code>\oplusrhrim</code> | \varbarwedge | <code>\varbarwedge</code> |
| \cup | <code>\cup</code> | \otimeslhrim | <code>\otimeslhrim</code> | \vardoublebarwedge | <code>\vardoublebarwedge</code> |
| \Cup | <code>\Cup</code> | \otimesrhrim | <code>\otimesrhrim</code> | \varveebar | <code>\varveebar</code> |
| \cupbarcap | <code>\cupbarcap</code> | \plusdot | <code>\plusdot</code> | \vectimes | <code>\vectimes</code> |
| \cupdot | <code>\cupdot</code> | \pluseqq | <code>\pluseqq</code> | \Vee | <code>\Vee</code> |
| \cupleftarrow | <code>\cupleftarrow</code> | \plushat | <code>\plushat</code> | \vee | <code>\vee</code> |
| \cupovercap | <code>\cupovercap</code> | \plussim | <code>\plussim</code> | \veebar | <code>\veebar</code> |
| \cupvee | <code>\cupvee</code> | \plussubtwo | <code>\plussubtwo</code> | \veedot | <code>\veedot</code> |
| \curlyvee | <code>\curlyvee</code> | \plustrif | <code>\plustrif</code> | \veedoublebar | <code>\veedoublebar</code> |
| \curlywedge | <code>\curlywedge</code> | \pm | <code>\pm</code> | \veemidvert | <code>\veemidvert</code> |
| \dagger | <code>\dagger</code> | \rhd | <code>\rhd</code> | \veeodot | <code>\veeodot</code> |
| \ddagger | <code>\ddagger</code> | \rightthreetimes | <code>\rightthreetimes</code> | \veeonvee | <code>\veeonvee</code> |
| \div | <code>\div</code> | \ringplus | <code>\ringplus</code> | \Wedge | <code>\Wedge</code> |
| \divideontimes | <code>\divideontimes</code> | \rsolbar | <code>\rsolbar</code> | \wedge | <code>\wedge</code> |
| \dotminus | <code>\dotminus</code> | \rtimes | <code>\rtimes</code> | \wedgebar | <code>\wedgebar</code> |
| \dotplus | <code>\dotplus</code> | \setminus | <code>\setminus</code> | \wedgedot | <code>\wedgedot</code> |
| \dottimes | <code>\dottimes</code> | \shuffle | <code>\shuffle</code> | \wedgedoublebar | <code>\wedgedoublebar</code> |
| \doublebarvee | <code>\doublebarvee</code> | \simplus | <code>\simplus</code> | \wedgemidvert | <code>\wedgemidvert</code> |
| \doublebarwedge | <code>\doublebarwedge</code> | \smallsetminus | <code>\smallsetminus</code> | \wedgeodot | <code>\wedgeodot</code> |
| \doubleplus | <code>\doubleplus</code> | \smashtimes | <code>\smashtimes</code> | \wedgeonwedge | <code>\wedgeonwedge</code> |
| \dsol | <code>\dsol</code> | \sqcap | <code>\sqcap</code> | \wr | <code>\wr</code> |
| \eqqplus | <code>\eqqplus</code> | \Sqcup | <code>\Sqcup</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

\dtimes `\dtimes` \utimes `\utimes` \utimes `\utimes`

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

TABLE 61: cml Binary Operators

 $\wp \quad \backslash parr^*$ & $\backslash with^\dagger$

* cml defines $\backslash invamp$ as a synonym for $\backslash parr$.

$\dagger \backslash with$ differs from $\&$ in terms of its math-mode spacing: $\$A \& B\$$ produces “ $A \& B$ ”, for example, while $\$A \backslash with B\$$ produces “ $A \& B$ ”.

TABLE 62: shuffle Binary Operators

 $\boxplus \quad \backslash cshuffle \quad \boxminus \quad \backslash shuffle$

TABLE 63: uisy Geometric Binary Operators

 $\odot \quad \backslash odplus$

TABLE 64: mathabx Geometric Binary Operators

| | | | | | |
|---|---------------------------------|---|----------------------------|---|---------------------------------|
| ▼ | $\backslash blacktriangledown$ | □ | $\backslash boxright$ | ⊖ | $\backslash ominus$ |
| ◀ | $\backslash blacktriangleleft$ | □ | $\backslash boxslash$ | ⊕ | $\backslash oplus$ |
| ▶ | $\backslash blacktriangleright$ | □ | $\backslash boxtimes$ | ⊕ | $\backslash oright$ |
| ▲ | $\backslash blacktriangleup$ | □ | $\backslash boxtop$ | ⊗ | $\backslash oslash$ |
| ✳ | $\backslash boxasterisk$ | □ | $\backslash boxtriangleup$ | ⊗ | $\backslash otimes$ |
| ✉ | $\backslash boxbackslash$ | □ | $\backslash boxvoid$ | ⊕ | $\backslash otop$ |
| ✉ | $\backslash boxbot$ | ✳ | $\backslash oasterisk$ | ⊛ | $\backslash otriangleup$ |
| ✉ | $\backslash boxcirc$ | ✳ | $\backslash obackslash$ | ○ | $\backslash ovoid$ |
| ✳ | $\backslash boxcoasterisk$ | ⊕ | $\backslash obot$ | ▽ | $\backslash smalltriangledown$ |
| ✉ | $\backslash boxdiv$ | ⊙ | $\backslash ocirc$ | ◀ | $\backslash smalltriangleleft$ |
| ✉ | $\backslash boxdot$ | ✳ | $\backslash ocoasterisk$ | ▶ | $\backslash smalltriangleright$ |
| ✉ | $\backslash boxleft$ | ÷ | $\backslash odiv$ | △ | $\backslash smalltriangleup$ |
| ✉ | $\backslash boxminus$ | ○ | $\backslash odot$ | | |
| ✉ | $\backslash boxplus$ | ⊕ | $\backslash oleft$ | | |

TABLE 65: MnSymbol Geometric Binary Operators

| | | | | | |
|---|-------------------|---|-------------------------|---|---------------------|
| □ | \boxbackslash | ▼ | \filledmedtriangledown | ◎ | \ocirc |
| ▣ | \boxbox | ◀ | \filledmedtriangleleft | ○ | \odot |
| ▤ | \boxdot | ▶ | \filledmedtriangleright | ⊖ | \ominus |
| ▢ | \boxminus | ▲ | \filledmedtriangleup | ⊕ | \oplus |
| ▤ | \boxplus | ■ | \filledsquare | ⊘ | \oslash |
| ▢ | \boxslash | ★ | \filledstar | ⊗ | \ostar |
| ▢ | \boxtimes | ▼ | \filledtriangledown | ⊗ | \otimes |
| ▤ | \boxvert | ◀ | \filledtriangleleft | ⊛ | \otriangle |
| ◊ | \diamondbackslash | ▶ | \filledtriangleright | ∅ | \overt |
| ◊ | \diamondiamond | ▲ | \filledtriangleup | ☆ | \pentagram |
| ◊ | \diamondddot | ◊ | \meddiamond | ◊ | \smalldiamond |
| ◊ | \diamondminus | □ | \medsquare | □ | \smallsquare |
| ◊ | \diamondplus | ☆ | \medstar | ☆ | \smallstar |
| ◊ | \diamondslash | ▽ | \medtriangledown | ▽ | \smalltriangledown |
| ◊ | \diamondtimes | ◀ | \medtriangleleft | ◀ | \smalltriangleleft |
| ◊ | \diamondvert | ▶ | \medtriangleright | ▶ | \smalltriangleright |
| ▽ | \downslice | △ | \medtriangleup | △ | \smalltriangleup |
| ◆ | \filleddiamond | ⊗ | \oast | ★ | \thinstar |
| ■ | \filledmedsquare | ◎ | \backslash | △ | \upslice |

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

TABLE 66: fdsymbol Geometric Binary Operators

| | | | | | |
|---|-------------------|---|------------------------|---|--------------------------|
| □ | \boxbackslash | ▼ | \medblacktriangledown | ⊕ | \oplus |
| ▣ | \boxbox | ◀ | \medblacktriangleleft | ⊘ | \oslash |
| ▤ | \boxdot | ▶ | \medblacktriangleright | ⊗ | \otimes |
| ▢ | \boxminus | ▲ | \medblacktriangleup | ∅ | \overt |
| ▤ | \boxplus | ○ | \medcircle | ● | \smallblackcircle |
| ▢ | \boxslash | ◊ | \meddiamond | ◆ | \smallblackdiamond |
| ▢ | \boxtimes | / | \medslash | ■ | \smallblacksquare |
| ▤ | \boxvert | □ | \medsquare | ★ | \smallblackstar |
| ◊ | \diamondbackslash | ▽ | \medtriangledown | ▼ | \smallblacktriangledown |
| ◊ | \diamondiamond | ◀ | \medtriangleleft | ◀ | \smallblacktriangleleft |
| ◊ | \diamondddot | ▶ | \medtriangleright | ▶ | \smallblacktriangleright |
| ◊ | \diamondminus | △ | \medtriangleup | ▲ | \smallblacktriangleup |
| ◊ | \diamondplus | ☆ | \medwhitestar | ○ | \smallcircle |
| ◊ | \diamondslash | ⊗ | \oast | ◊ | \smalldiamond |
| ◊ | \diamondtimes | ◎ | \backslash | □ | \smallsquare |
| ◊ | \diamondvert | ⊖ | \ocirc | ▽ | \smalltriangledown |
| ● | \medblackcircle | ⊖ | \odash | ◀ | \smalltriangleleft |
| ◆ | \medblackdiamond | ○ | \odot | ▶ | \smalltriangleright |
| ■ | \medblacksquare | ⊖ | \oequal | △ | \smalltriangleup |
| ★ | \medblackstar | ⊖ | \ominus | ☆ | \smallwhitestar |

fdsymbol defines synonyms for most of the preceding symbols:

| | | | | | |
|---|---------------------|---|-----------------|---|----------------|
| ◆ | \blackdiamond | ◊ | \diamond | ● | \smb1kcircle |
| ▲ | \blacktriangle | ◇ | \Diamond | ◆ | \smb1kdiamond |
| ▼ | \blacktriangledown | ❖ | \diamonddbslash | ■ | \smb1ksquare |
| ◀ | \blacktriangleleft | ❖ | \diamondcdot | ☆ | \smwhitestar |
| ▶ | \blacktriangleright | ◆ | \mdblkdiamond | ○ | \smwhtcircle |
| □ | \Box | ■ | \mdblksquare | ◊ | \smwhtdiamond |
| ▣ | \boxbar | ● | \mdlgb1kcircle | □ | \smwhtsquare |
| ▣ | \boxbslash | ◆ | \mdlgb1kdiamond | □ | \square |
| ▣ | \boxdiag | ■ | \mdlgb1ksquare | ★ | \star |
| • | \bullet | ○ | \mdlgwhtcircle | △ | \triangle |
| ○ | \circ | ◊ | \mdlgwhtdiamond | ▽ | \triangledown |
| ⊗ | \circledast | □ | \mdlgwhtsquare | ◀ | \triangleleft |
| ◎ | \circledcirc | ◊ | \mdwhtdiamond | ▷ | \triangleright |
| ⊖ | \circleddash | □ | \mdwhtsquare | △ | \vartriangle |
| ⊖ | \circledequal | ★ | \medstar | | |
| ∅ | \circledvert | ◎ | \obslash | | |

TABLE 67: boisik Geometric Binary Operators

| | | | | | |
|---|---------------------|---|------------------|---|---------------|
| ♦ | \blacklozenge | ☒ | \boxright | □ | \oblong |
| ■ | \blacksquare | ☒ | \boxslash | ⊕ | \obot |
| ▲ | \blacktriangle | ☒ | \boxtimes | ⊗ | \obslash |
| ▼ | \blacktriangledown | ☒ | \boxtop | ⊗ | \ogreaterthan |
| ◀ | \blacktriangleleft | ☒ | \boxtriangle | ⊕ | \oleft |
| ▶ | \blacktriangleright | ⊗ | \circledast | ⊗ | \olessthan |
| ▣ | \boxast | ⊗ | \circledcirc | ⊖ | \ominus |
| ▣ | \boxbar | ⊖ | \circleddash | ⊕ | \oplus |
| ▣ | \boxbot | ◊ | \diamond | ⊕ | \oright |
| ▣ | \boxbox | ◊ | \diamondbar | ⊖ | \oslash |
| ▣ | \boxbslash | ◊ | \diamondcircle | ⊗ | \otimes |
| ▣ | \boxcircle | ◊ | \diamondminus | ⊕ | \otop |
| ▣ | \boxdivision | ◊ | \diamondop | ⊗ | \otriangle |
| ▣ | \boxdot | ⊕ | \diamondplus | ⊗ | \ovee |
| ▣ | \boxleft | ◊ | \diamondtimes | ⊗ | \owedge |
| ▣ | \boxminus | ◊ | \diamondtriangle | ★ | \star |
| ▣ | \boxplus | ⊖ | \obar | | \talloblong |

TABLE 68: stix Geometric Binary Operators

| | | | | | |
|---|------------------|----|---------------------------|----|------------------------------|
| ☒ | \blackhourglass | ◊ | \concavediamondtickleleft | ⊕ | \oplus |
| ✳ | \boxast | ◊ | \concavediamondtickright | ⊖ | \oslash |
| □ | \boxbar | ◊ | \diamond | ⊗ | \otimes |
| ▣ | \boxbox | ◀ | \dsub | ⊗⊗ | \Otimes |
| ▢ | \boxbslash | ▢ | \hourglass | ⊗⊗ | \otimeshat |
| ○ | \boxcircle | ◊ | \lozengeminus | ▷ | \rsub |
| ▢ | \boxdiag | ◆ | \mdlgblklozenge | ● | \smbblkcircle |
| ▪ | \boxdot | ○ | \mdlwghtcircle | ★ | \star |
| □ | \boxminus | ∅ | \obar | □ | \talloblong |
| ■ | \boxplus | ⊕ | \obot* | △ | \triangle |
| ▢ | \boxtimes | ⊗ | \obslash | △ | \triangleminus |
| ✳ | \circledast | ⊕ | \odiv | △ | \triangleplus |
| ○ | \circledcirc | ○ | \odot | △ | \trianglerif |
| ⊖ | \circleddash | ⊗ | \odotslashdot* | △ | \triangletimes |
| ⊖ | \circledequal | ⊗ | \ogreaterthan | ● | \vysmbblkcircle [†] |
| □ | \circledparallel | ⊗⊗ | \olcross* | ○ | \vysmwhtcircle |
| ○ | \circledvert | ⊗ | \olessthan | □- | \whitesquaretickleleft |
| ⊖ | \circlehbar | ⊖ | \ominus | □- | \whitesquaretickright |
| ◊ | \concavediamond | ⊗ | \operp | | |

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

[†] stix defines \bullet as a synonym for \vysmbblkcircle.

TABLE 69: stix Small Integrals

| | | | | | |
|-----|-----------------|----|--------------------|---|-------------------------|
| ∫ | \smallawint | ∫ | \smallintcap | ∫ | \smalloint |
| ∫ | \smallcircfnint | ∫ | \smallintclockwise | ∫ | \smallointctrcclockwise |
| ∫ | \smallfint | ∫ | \smallintcup | ∫ | \smallpointint |
| ∫∫∫ | \smalliiint | ∫ | \smallintlarhk | ∫ | \smallrppoint |
| ∫∫∫ | \smalliiint | ∫ | \smallintx | ∫ | \smallscpolint |
| ∫∫ | \smalliiint | ∫ | \smalllowint | ∫ | \smallsqint |
| ∫ | \smallint | ∫ | \smallnoint | ∫ | \smallsumint |
| ∫ | \smallintbar | ∫∫ | \smalloiint | ∫ | \smallupint |
| ∫ | \smallintBar | ∫∫ | \smalloioint | ∫ | \smallvarointclockwise |

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

TABLE 70: stix Small Integrals with Explicit Slant

| | | | |
|------------|---|------------|---|
| \int | <code>\smalllawintsl</code> | \oint | <code>\smallawintup</code> |
| \oint | <code>\smallcirlfnintsl</code> | \oint | <code>\smallcirlfnintup</code> |
| \int | <code>\smallfintsl</code> | \oint | <code>\smallfintup</code> |
| $\int\int$ | <code>\smallliiintsl</code> | $\int\int$ | <code>\smallliiintup</code> |
| $\int\int$ | <code>\smallliiintsl</code> | $\int\int$ | <code>\smallliiintup</code> |
| $\int\int$ | <code>\smallliiintsl</code> | $\int\int$ | <code>\smallliiintup</code> |
| \int | <code>\smalllintbarsl</code> | \int | <code>\smalllintBarup</code> |
| \int | <code>\smalllintBarsl</code> | \int | <code>\smalllintbarup</code> |
| \int | <code>\smalllintcapsl</code> | \int | <code>\smalllintcapup</code> |
| \int | <code>\smalllintclockwisesl</code> | \int | <code>\smalllintclockwiseup</code> |
| \oint | <code>\smalllintcupsl</code> | \oint | <code>\smalllintcupup</code> |
| \int | <code>\smalllintlarhksl</code> | \int | <code>\smalllintlarhkup</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>\smallnpointsl</code> | \int | <code>\smallnpointup</code> |
| $\int\int$ | <code>\smallloioiintsl</code> | $\int\int$ | <code>\smallloioiintup</code> |
| $\int\int$ | <code>\smallloioiintsl</code> | $\int\int$ | <code>\smallloioiintup</code> |
| \int | <code>\smalllointctrcclockwisesl</code> | \int | <code>\smalllointctrcclockwiseup</code> |
| \int | <code>\smallloints</code> | \int | <code>\smalllointup</code> |
| \int | <code>\smallpointintsl</code> | \int | <code>\smallpointintup</code> |
| \int | <code>\smallrppoints</code> | \int | <code>\smallrppointup</code> |
| \int | <code>\smallscpolnts</code> | \int | <code>\smallscpolintup</code> |
| \int | <code>\smallsqintsl</code> | \int | <code>\smallsqintup</code> |
| \int | <code>\smallsumintsl</code> | \int | <code>\smallsumintup</code> |
| \int | <code>\smallupints</code> | \int | <code>\smallupintup</code> |
| \int | <code>\smallvarointclockwisesl</code> | \int | <code>\smallvarointclockwiseup</code> |

Instead of using the preceding symbols directly, it is generally preferable to use the symbols listed in Table 69 either with or without the `upint` package option. Specifying `upint` selects each integral's upright (`up`) variant, while omitting `upint` selects each integral's slanted (`s1`) variant. Use the symbols shown in Table 70 only when you need to include both upright and slanted variations of a symbol in the same document.

TABLE 71: Variable-sized Math Operators

| | | | | | | | |
|-----------------|------------------------|-------------------|-------------------------|-------------------|------------------------|---------------|--------------------|
| $\cap \cap$ | <code>\bigcap</code> | $\otimes \otimes$ | <code>\bigotimes</code> | $\wedge \wedge$ | <code>\bigwedge</code> | $\prod \prod$ | <code>\prod</code> |
| $\cup \cup$ | <code>\bigcup</code> | $\sqcup \sqcup$ | <code>\bigsqcup</code> | $\coprod \coprod$ | <code>\coprod</code> | $\sum \sum$ | <code>\sum</code> |
| $\odot \odot$ | <code>\bigodot</code> | $\uplus \uplus$ | <code>\biguplus</code> | $\int \int$ | <code>\int</code> | | |
| $\oplus \oplus$ | <code>\bigoplus</code> | $\vee \vee$ | <code>\bigvee</code> | $\oint \oint$ | <code>\oint</code> | | |

TABLE 72: *AMS* Variable-sized Math Operators

| | | | | | |
|--------------------|------------------------|------------------|--------------------|------------------------|--------------------|
| $\int\int$ | $\int\int\int$ | \iint | $\int\int\int\int$ | $\int\int\int\int\int$ | \iiint |
| $\int\int\int\int$ | $\int\int\int\int\int$ | \iiiint | $\int \cdots \int$ | $\int \cdots \int$ | \idotsint |

TABLE 73: *stmaryrd* Variable-sized Math Operators

| | | | | | |
|--------------------------|-------------------------|----------------------|-------------------------|------------------|---------------------------|
| $\square\square$ | \bigbox | $\parallel\parallel$ | \biginterleave | $\square\square$ | \bigsqcap |
| $\curlyvee\curlyvee$ | \bigcurlyvee | $\oplus\oplus$ | \bignplus | $\nabla\nabla$ | \bigtriangledown |
| $\curlywedge\curlywedge$ | \bigcurlywedge | $\parallel\parallel$ | \bigparallel | $\Delta\Delta$ | \bigtriangleup |

TABLE 74: *wasy sym* Variable-sized Math Operators

| | | | | | |
|--------------|----------------|------------------------|-----------------|----------------------------|-----------------|
| $\int\int$ | \int | $\int\int\int\int$ | \iint | $\int\int\int\int\int\int$ | \iiint |
| $\oint\oint$ | \oint | $\oint\oint\oint\oint$ | \oiint | | |

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

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

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

TABLE 75: *mathabx* Variable-sized Math Operators

| | | | | | |
|--------------------------|-------------------------|----------------------|-----------------------|------------------|---------------------|
| $\curlyvee\curlyvee$ | \bigcurlyvee | $\square\square$ | \bigboxslash | $\oplus\oplus$ | \bigoright |
| $\square\square$ | \bigsqcap | $\boxtimes\boxtimes$ | \bigboxtimes | $\oslash\oslash$ | \bigoslash |
| $\curlywedge\curlywedge$ | \bigcurlywedge | $\boxdot\boxdot$ | \bigboxtop | $\ominus\ominus$ | \bigotop |

(continued on next page)

(continued from previous page)

| | | | | | |
|-----------------------|--------------------------------|-----------------------------|--------------------------------|--------------------------------------|------------------------------|
| $\boxtimes \boxtimes$ | <code>\bigboxasterisk</code> | $\triangle \triangle$ | <code>\bigboxtriangleup</code> | $\circlearrowleft \circlearrowright$ | <code>\bigotriangleup</code> |
| $\boxminus \boxminus$ | <code>\bigboxbackslash</code> | $\square \square$ | <code>\bigboxvoid</code> | $\bigcirc \bigcirc$ | <code>\bigovoid</code> |
| $\boxdot \boxdot$ | <code>\bigboxbot</code> | $\complement \complement$ | <code>\bigcomplementtop</code> | $++$ | <code>\bigplus</code> |
| $\boxcirc \boxcirc$ | <code>\bigboxcirc</code> | $\circledast \circledast$ | <code>\bigoasterisk</code> | $\boxplus \boxplus$ | <code>\bigsqplus</code> |
| $\boxtimes \boxtimes$ | <code>\bigboxcoasterisk</code> | $\circletimes \circletimes$ | <code>\bigobackslash</code> | $\times \times$ | <code>\bigtimes</code> |
| $\boxdot \boxdot$ | <code>\bigboxdiv</code> | $\oplus \oplus$ | <code>\bigobot</code> | $\iiint \iiint$ | <code>\iiint</code> |
| $\bullet \bullet$ | <code>\bigboxdot</code> | $\odot \odot$ | <code>\bigocirc</code> | $\iint \iint$ | <code>\iint</code> |
| $\boxminus \boxminus$ | <code>\bigboxleft</code> | $\circledast \circledast$ | <code>\bigocoasterisk</code> | $\int \int$ | <code>\int</code> |
| $\boxminus \boxminus$ | <code>\bigboxminus</code> | $\div \div$ | <code>\bigodiv</code> | $\oiint \oiint$ | <code>\oiint</code> |
| $\boxplus \boxplus$ | <code>\bigboxplus</code> | $\oplus \oplus$ | <code>\bigoleft</code> | $\oint \oint$ | <code>\oint</code> |
| $\boxplus \boxplus$ | <code>\bigboxright</code> | $\ominus \ominus$ | <code>\bigominus</code> | | |

TABLE 76: `txfonts/pfmath` Variable-sized Math Operators

| | | | |
|------------------------------|----------------------------|-----------------|---------------------------------|
| $\boxplus \boxplus$ | <code>\bigsqcapplus</code> | $\oint \oint$ | <code>\ointclockwise</code> |
| $\boxplus \boxplus$ | <code>\bigsqcupplus</code> | $\oint \oint$ | <code>\ointctrcclockwise</code> |
| $f f$ | <code>\fint</code> | $\iiint \iiint$ | <code>\sqiint</code> |
| $\int \dots \int \dots \int$ | <code>\idotsint</code> | $\iiint \iiint$ | <code>\sqiint</code> |
| $\iiint \iiint$ | <code>\iiint</code> | $\oint \oint$ | <code>\sqint</code> |

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| | | | | | |
|----------|-------------|----------------------------------|-------------|----------------|-------------------------------------|
| \iiint | \iiiiint | <code>\iiint</code> | \oiint | \oiiiint | <code>\oiintclockwise</code> |
| \iint | \iijjint | <code>\iint</code> | \oiiint | \oiiiiint | <code>\oiiintctrcclockwise</code> |
| \oiint | \oiijjint | <code>\oiintclockwise</code> | \varoiint | \varoiijjint | <code>\varoiintclockwise</code> |
| \oiint | \oiijjint | <code>\oiintctrcclockwise</code> | \varoiint | \varoiijjint | <code>\varoiintctrcclockwise</code> |
| \oiint | \oiijjint | <code>\oiint</code> | \oint | \oiijjint | <code>\ointclockwise</code> |
| \oiint | \oiijjint | <code>\oiintclockwise</code> | \oint | \oiijjint | <code>\ointctrcclockwise</code> |
| \oiint | \oiijjint | <code>\oiintctrcclockwise</code> | \times | \times | <code>\varprod</code> |
| \oiint | \oiijjint | <code>\oiint</code> | | | |

TABLE 77: esint Variable-sized Math Operators

| | | | | | |
|-------------|----------------|------------------------|-------------|-------------|------------------------------------|
| $\dots\int$ | $\dots\int$ | <code>\dotsint</code> | \oint | \oint | <code>\ointclockwise</code> |
| f | f | <code>\fint</code> | \oint | \oint | <code>\ointctrcclockwise</code> |
| \iiiiint | \iiiiiiint | <code>\iiiiint</code> | \oiijjint | \oiijjint | <code>\sqaint</code> |
| \iiiiint | \iiiiiiint | <code>\iiiiint</code> | \oint | \oint | <code>\sqaint</code> |
| \iijjint | \iijjijjint | <code>\iijjint</code> | \oint | \oint | <code>\varoiint</code> |
| \iijjint | \iijjijjint | <code>\iijjint</code> | \oint | \oint | <code>\varointclockwise</code> |
| \iijjint | \iijjijjint | <code>\iijjint</code> | \oint | \oint | <code>\varointctrcclockwise</code> |
| \oiijjint | \oiijjijjint | <code>\oiijjint</code> | | | |

TABLE 78: `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>\bigintss</code> |
| \int | \int | <code>\bigintsss</code> | \oint | \oint | <code>\bigintsss</code> |
| \int | \int | <code>\bigintssss</code> | \oint | \oint | <code>\bigintssss</code> |

 TABLE 79: `MnSymbol` Variable-sized Math Operators

| | | | | | | | | |
|------------------------|------------------------|-----------------------------------|----------------|----------------|-------------------------------|--------------------|--------------------|-------------------------------|
| \cap | \cap | <code>\bigcap</code> | \ominus | \ominus | <code>\bigominus</code> | \complement | \complement | <code>\complement</code> |
| \capdot | \capdot | <code>\bigcapdot</code> | \oplus | \oplus | <code>\bigoplus</code> | \coprod | \coprod | <code>\coprod</code> |
| \capplus | \capplus | <code>\bigcapplus</code> | \oslash | \oslash | <code>\bigoslash</code> | $\int \cdots \int$ | $\int \cdots \int$ | <code>\idotsint</code> |
| \circlearrowleft | \circlearrowleft | <code>\bigcircle</code> | \star | \star | <code>\bigstar</code> | \iiint | \iiint | <code>\iiint</code> |
| \bigcup | \bigcup | <code>\bigcup</code> | \otimes | \otimes | <code>\bigotimes</code> | \iiint | \iiint | <code>\iiint</code> |
| \bigcupdot | \bigcupdot | <code>\bigcupdot</code> | \triangle | \triangle | <code>\bigtriangleleft</code> | \iint | \iint | <code>\iint</code> |
| \bigcupplus * | \bigcupplus * | <code>\bigcupplus</code> * | \circledcirc | \circledcirc | <code>\bigovert</code> | \int | \int | <code>\int</code> |
| \bigcurlyvee | \bigcurlyvee | <code>\bigcurlyvee</code> | $+$ | $+$ | <code>\bigplus</code> | \oint | \oint | <code>\landdownint</code> |
| \bigcurlyveedot | \bigcurlyveedot | <code>\bigcurlyveedot</code> | \sqcap | \sqcap | <code>\bigsqcap</code> | \oint | \oint | <code>\landupint</code> |
| \bigcurlywedge | \bigcurlywedge | <code>\bigcurlywedge</code> | \sqcapdot | \sqcapdot | <code>\bigsqcapdot</code> | \oint | \oint | <code>\lcircleleftint</code> |
| \bigcurlywedgedot | \bigcurlywedgedot | <code>\bigcurlywedgedot</code> | \sqcapplus | \sqcapplus | <code>\bigsqcapplus</code> | \oint | \oint | <code>\lcirclerightint</code> |
| \bigdoublecurlyvee | \bigdoublecurlyvee | <code>\bigdoublecurlyvee</code> | \sqcup | \sqcup | <code>\bigsqcup</code> | $\oint\oint$ | $\oint\oint$ | <code>\oiint</code> |
| \bigdoublecurlywedge | \bigdoublecurlywedge | <code>\bigdoublecurlywedge</code> | \sqcupdot | \sqcupdot | <code>\bigsqcupdot</code> | \oint | \oint | <code>\oint</code> |
| \bigdoublevee | \bigdoublevee | <code>\bigdoublevee</code> | \sqcupplus | \sqcupplus | <code>\bigsqcupplus</code> | \prod | \prod | <code>\prod</code> |
| \bigdoublewedge | \bigdoublewedge | <code>\bigdoublewedge</code> | \times | \times | <code>\bigtimes</code> | \oint | \oint | <code>\rcircleleftint</code> |
| \bigoast | \bigoast | <code>\bigoast</code> | \veevee | \veevee | <code>\bigveevee</code> | \oint | \oint | <code>\rcirclerightint</code> |

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| | | | | | | | | |
|-----------|-----------|-----------------------------|----------|----------|---------------------------|----------|----------|--------------------------|
| \oslash | \oslash | <code>\bigobackslash</code> | \vee | \vee | <code>\bigveedot</code> | f | f | <code>\strokedint</code> |
| \odot | \odot | <code>\bigocirc</code> | \wedge | \wedge | <code>\bigwedge</code> | Σ | Σ | <code>\sum</code> |
| \odot | \odot | <code>\bigodot</code> | \wedge | \wedge | <code>\bigwedgedot</code> | \oint | \oint | <code>\sumint</code> |

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

TABLE 80: `fdsymbol` Variable-sized Math Operators

| | | | | | | | | |
|----------------|----------------|------------------------------|----------------|----------------|----------------------------|-------------------|-------------------|-------------------------------|
| \cap | \cap | <code>\bigcap</code> | \sqcup | \sqcup | <code>\bigsqcup</code> | \oint | \oint | <code>\landupint</code> |
| \capdot | \capdot | <code>\bigcapdot</code> | \sqcupdot | \sqcupdot | <code>\bigsqcupdot</code> | \oint | \oint | <code>\lcircleleftint</code> |
| \capplus | \capplus | <code>\bigcapplus</code> | \squplus | \squplus | <code>\bigsqcupplus</code> | \oint | \oint | <code>\lcirclerightint</code> |
| \cup | \cup | <code>\bigcup</code> | \times | \times | <code>\bigtimes</code> | $\oint\oint\oint$ | $\oint\oint\oint$ | <code>\oiint</code> |
| \cupdot | \cupdot | <code>\bigcupdot</code> | \vee | \vee | <code>\bigvee</code> | $\oint\oint$ | $\oint\oint$ | <code>\ointint</code> |
| \cupplus | \cupplus | <code>\bigcupplus</code> | \forall | \forall | <code>\bigveedot</code> | \oint | \oint | <code>\oint</code> |
| \curlyvee | \curlyvee | <code>\bigcurlyvee</code> | \wedge | \wedge | <code>\bigwedge</code> | Σ | Σ | <code>\osum</code> |
| \curlywedge | \curlywedge | <code>\bigcurlywedge</code> | \wedge | \wedge | <code>\bigwedgedot</code> | \prod | \prod | <code>\prod</code> |
| \doublevee | \doublevee | <code>\bigdoublevee</code> | \coprod | \coprod | <code>\coprod</code> | \oint | \oint | <code>\rcircleleftint</code> |
| \doublewedge | \doublewedge | <code>\bigdoublewedge</code> | \fint | \fint | <code>\fint</code> | \oint | \oint | <code>\rcirclerightint</code> |
| \oast | \oast | <code>\bigoast</code> | \dotsf | \dotsf | <code>\idotsint</code> | \sum | \sum | <code>\sum</code> |
| \odot | \odot | <code>\bigodot</code> | \iiif | \iiif | <code>\iiint</code> | \oint | \oint | <code>\sumint</code> |
| \oplus | \oplus | <code>\bigoplus</code> | \iiii | \iiii | <code>\iiint</code> | \sqcup | \sqcup | <code>\varcoprod</code> |
| \otimes | \otimes | <code>\bigotimes</code> | \iint | \iint | <code>\iint</code> | Σ | Σ | <code>\varosum</code> |
| \bigoplus | \bigoplus | <code>\bigoplus</code> | \int | \int | <code>\int</code> | \prod | \prod | <code>\varprod</code> |
| \bigcap | \bigcap | <code>\bigsqcap</code> | \intbar | \intbar | <code>\intbar</code> | \sum | \sum | <code>\varsum</code> |
| \bigcapdot | \bigcapdot | <code>\bigsqcapdot</code> | \intBar | \intBar | <code>\intBar</code> | \oint | \oint | <code>\varsumint</code> |
| \bigcapplus | \bigcapplus | <code>\bigsqcapplus</code> | \landdownint | \landdownint | | | | |

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

TABLE 81: `boisik` Variable-sized Math Operators

$$\int \quad \int \quad \text{\intup}$$

`boisik` additionally provides all of the symbols in Table 71.

TABLE 82: `stix` Variable-sized Math Operators

| | | | | | | | | |
|-------------|-------------|-----------------------------|--------------|--------------|----------------------------|--------------|--------------|---------------------------------|
| \oint | \oint | <code>\awint</code> | \coprod | \coprod | <code>\coprod</code> | $\oint\oint$ | $\oint\oint$ | <code>\oiint</code> |
| \sum | \sum | <code>\Bbbsum</code> | \mathbb{W} | \mathbb{W} | <code>\disjquant</code> | $\oint\oint$ | $\oint\oint$ | <code>\oiint</code> |
| \cap | \cap | <code>\bigcap</code> | \oint | \oint | <code>\fint</code> | \oint | \oint | <code>\oint</code> |
| \cup | \cup | <code>\bigcup</code> | $\oint\oint$ | $\oint\oint$ | <code>\iiiint</code> | $\oint\oint$ | $\oint\oint$ | <code>\ointctrcclockwise</code> |
| \uplus | \uplus | <code>\bigcupdot</code> | $\oint\oint$ | $\oint\oint$ | <code>\iiint</code> | $\oint\oint$ | $\oint\oint$ | <code>\pointint</code> |
| \odot | \odot | <code>\bigodot</code> | $\oint\oint$ | $\oint\oint$ | <code>\aint</code> | \prod | \prod | <code>\prod</code> |
| \oplus | \oplus | <code>\bigoplus</code> | \int | \int | <code>\int</code> | \oint | \oint | <code>\rppoint</code> |
| \otimes | \otimes | <code>\bigotimes</code> | \oint | \oint | <code>\intbar</code> | \oint | \oint | <code>\scpoint</code> |
| \sqcap | \sqcap | <code>\bigsqcap</code> | \oint | \oint | <code>\intBar</code> | \oint | \oint | <code>\sqint</code> |
| \sqcup | \sqcup | <code>\bigsqcup</code> | \oint | \oint | <code>\intcap</code> | \sum | \sum | <code>\sum</code> |
| \parallel | \parallel | <code>\bigtalloblong</code> | \oint | \oint | <code>\intclockwise</code> | \oint | \oint | <code>\sumint</code> |

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| | | | | | | | | |
|----------------|----------------|-----------------------------|--------------------|--------------------|-------------------------|--------------|--------------|--------------------------------|
| \times | \times | <code>\bigtimes</code> | \wp | \wp | <code>\intcup</code> | \bar{J} | \bar{J} | <code>\upint</code> |
| \uplus | \uplus | <code>\biguplus</code> | \oint | \oint | <code>\intlarhk</code> | \oint | \oint | <code>\varointclockwise</code> |
| \veevee | \veevee | <code>\bigveevee</code> | \oint | \oint | <code>\intx</code> | \backslash | \backslash | <code>\xbsol</code> |
| \wedgewedge | \wedgewedge | <code>\bigwedgewedge</code> | $\underline{\int}$ | $\underline{\int}$ | <code>\lowint</code> | $/$ | $/$ | <code>\xsol</code> |
| \oint | \oint | <code>\cirfnint</code> | Σ | Σ | <code>\modtwosum</code> | | | |
| $\wedge\wedge$ | $\wedge\wedge$ | <code>\conjquant</code> | \oint | \oint | <code>\npolint</code> | | | |

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

TABLE 83: `stix` Integrals with Explicit Slant

| | | | | | |
|------------------------|------------------------|-----------------------------------|------------------------|------------------------|-----------------------------------|
| \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>\ointup</code> |
| \oiint | \oiint | <code>\oiintsl</code> | \oiint | \oiint | <code>\ointup</code> |
| \intclockwisesl | \intclockwisesl | <code>\intclockwisesl</code> | \intclockwisesl | \intclockwisesl | <code>\intclockwiseup</code> |
| \varointclockwisesl | \varointclockwisesl | <code>\varointclockwisesl</code> | \varointclockwisesl | \varointclockwisesl | <code>\varointclockwiseup</code> |
| \ointctrcclockwisesl | \ointctrcclockwisesl | <code>\ointctrcclockwisesl</code> | \ointctrcclockwisesl | \ointctrcclockwisesl | <code>\ointctrcclockwiseup</code> |

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| | | | | | |
|--------------------|-------------------|--------------------------|--------------------|-------------------|--------------------------|
| \oint | \oint | <code>\sumintsl</code> | \oint | \oint | <code>\sumintup</code> |
| \iiint | \iiint | <code>\iiaintsl</code> | \iiint | \iiint | <code>\iiaintup</code> |
| \int | \int | <code>\intbarsl</code> | \int | \int | <code>\intbarup</code> |
| \int | \int | <code>\intBarsl</code> | \int | \int | <code>\intBarup</code> |
| \int | \int | <code>\fintsl</code> | \int | \int | <code>\fintup</code> |
| \int | \int | <code>\cirfnintsl</code> | \int | \int | <code>\cirfnintup</code> |
| \int | \int | <code>\awintsl</code> | \int | \int | <code>\awintup</code> |
| \int | \int | <code>\rppolintsl</code> | \int | \int | <code>\rppolintup</code> |
| \int | \int | <code>\scpolintsl</code> | \int | \int | <code>\scpolintup</code> |
| \int | \int | <code>\nopolintsl</code> | \int | \int | <code>\nopolintup</code> |
| \int | \int | <code>\pointintsl</code> | \int | \int | <code>\pointintup</code> |
| \int | \int | <code>\sqintsl</code> | \int | \int | <code>\sqintup</code> |
| \int | \int | <code>\intlarhksl</code> | \int | \int | <code>\intlarhkup</code> |
| \oint | \oint | <code>\intxsl</code> | \oint | \oint | <code>\intxup</code> |
| \int | \int | <code>\intcapsl</code> | \int | \int | <code>\intcapup</code> |
| ψ | ψ | <code>\intcups1</code> | ψ | ψ | <code>\intcupup</code> |
| $\overline{\int}$ | $\overline{\int}$ | <code>\upintsl</code> | $\overline{\int}$ | $\overline{\int}$ | <code>\upintup</code> |
| $\underline{\int}$ | \int | <code>\lowintsl</code> | $\underline{\int}$ | \int | <code>\lowintup</code> |

Instead of using the preceding symbols directly, it is generally preferable to use the symbols listed in Table 82 either with or without the `upint` package option. Specifying `upint` selects each integral's upright (`up`) variant, while omitting `upint` selects each integral's slanted (`s1`) variant. Use the symbols shown in Table 83 only when you need to include both upright and slanted variations of a symbol in the same document.

TABLE 84: `mathdesign` Variable-sized Math Operators

| | | | |
|----------|------------------|---------|----------------------|
| \oint | \ointclockwise | \oint | \ointclockwise |
| \iiint | \oiint | \oint | $\ointctr-clockwise$ |
| \oiint | \oiint | | |

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

TABLE 85: `prodint` Variable-sized Math Operators

| | | | | | |
|---------|----------|---------|----------|---------|----------|
| \prod | \prodi | \prod | \Prodi | \prod | \PRODI |
|---------|----------|---------|----------|---------|----------|

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

TABLE 86: `cml` Large Math Operators

| | | | |
|--------------------|--------------|------|------------|
| \bigtriangledown | \bigparr^* | $\&$ | \bigwith |
|--------------------|--------------|------|------------|

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

TABLE 87: Binary Relations

| | | | | | | | | |
|-----------|-----------|-------------|-------------|-----------|-----------|-----------|-----------|-----------|
| \approx | \approx | \equiv | \equiv | \perp | \perp | \cup | \cup | \smile |
| \asymp | \asymp | \frown | \frown | \prec | \prec | \succ | \succ | \succ |
| \bowtie | \bowtie | \Join^* | \Join^* | \preceq | \preceq | \succeq | \succeq | \succeq |
| \cong | \cong | \mid | \mid | \propto | \propto | \vdash | \vdash | \vdash |
| \dashv | \dashv | \models | \models | \sim | \sim | | | |
| \doteq | \doteq | \parallel | \parallel | \simeq | \simeq | | | |

* 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, \LaTeX typesets the two with different surrounding spacing. Contrast “ $P(A | B)$ ” \mapsto “ $P(A|B)$ ” with “ $P(A \mid B)$ ” \mapsto “ $P(A | B)$ ”.

TABLE 88: *AMS* Binary Relations

| | | | | | |
|-------------------|---------------------------|----------------------|-----------------------------|------------------|---------------------------|
| \approx | <code>\approxeq</code> | $=$ | <code>\eqcirc</code> | $\approx\approx$ | <code>\succapprox</code> |
| \backepsilon | <code>\backepsilon</code> | \vdash | <code>\faldingdotseq</code> | \succcurlyeq | <code>\succcurlyeq</code> |
| \backsim | <code>\backsim</code> | \multimap | | \succsim | <code>\succsim</code> |
| \backsim | <code>\backsimeq</code> | \pitchfork | | \therefore | <code>\therefore</code> |
| \because | <code>\because</code> | $\approx\approx$ | <code>\precapprox</code> | \approx | <code>\thickapprox</code> |
| \between | <code>\between</code> | $\approx\approx$ | <code>\preccurlyeq</code> | \sim | <code>\thicksim</code> |
| \bowtie | <code>\BumpEq</code> | $\approx\approx$ | <code>\precsim</code> | \propto | <code>\varpropto</code> |
| \trianglelefteq | <code>\bumpeq</code> | $\vdash\vdash$ | <code>\risingdotseq</code> | \Vdash | <code>\Vdash</code> |
| \circledcirc | <code>\circeq</code> | $\vdash\vdash$ | <code>\shortmid</code> | \vDash | <code>\vDash</code> |
| \curlyeqsucc | <code>\curlyeqprec</code> | $\parallel\parallel$ | <code>\shortparallel</code> | \Vdash | <code>\Vdash</code> |
| \curlyeqsucc | <code>\curlyeqsucc</code> | \curvearrowleft | <code>\smallfrown</code> | | |
| \doteqdot | <code>\doteqdot</code> | \curvearrowright | <code>\smallsmile</code> | | |

TABLE 89: *AMS* Negated Binary Relations

| | | | | | |
|-----------------|-------------------------|---------------|------------------------------|---------------|---------------------------|
| $\not\equiv$ | <code>\ncong</code> | $\not\vdash$ | <code>\nshortparallel</code> | $\not\models$ | <code>\nvDash</code> |
| $\not\vdash$ | <code>\nmid</code> | $\not\sim$ | <code>\nsim</code> | $\not\approx$ | <code>\precnapprox</code> |
| $\not\parallel$ | <code>\nparallel</code> | $\not\vdash$ | <code>\nsucc</code> | $\not\approx$ | <code>\precnsim</code> |
| $\not\approx$ | <code>\nprec</code> | $\not\vdash$ | <code>\nsuccceq</code> | $\not\approx$ | <code>\succnapprox</code> |
| $\not\vdash$ | <code>\npreceq</code> | $\not\models$ | <code>\nvDash</code> | $\not\approx$ | <code>\succnsim</code> |
| $\not\models$ | <code>\nshortmid</code> | $\not\vdash$ | <code>\nvDash</code> | | |

TABLE 90: stmaryrd Binary Relations

$\in \inplus \ni \niplus$

TABLE 91: wasysym Binary Relations

| | | | | | |
|-----------|----------------------|--------------------|-----------------------|-----------|-------------------------|
| \vdash | <code>\invneg</code> | \rightsquigarrow | <code>\leadsto</code> | \propto | <code>\wasypromo</code> |
| \bowtie | <code>\Join</code> | \oplus | <code>\logof</code> | | |

TABLE 92: txfonts/pffonts Binary Relations

| | | | | | |
|------------------|---------------------------|-------------------------|------------------------------------|----------------------|------------------------------|
| \oslash | <code>\circledgtr</code> | \bowtie | <code>\lJoin</code> | \times | <code>\opentimes</code> |
| \oslash | <code>\circledless</code> | \bowtie | <code>\lRtimes</code> | $\perp\!\!\!\perp$ | <code>\Perp</code> |
| \approx | <code>\colonapprox</code> | \multimap | <code>\multimap</code> | \asymp | <code>\preceqq</code> |
| $\approx\approx$ | <code>\Colonapprox</code> | \multimapboth | <code>\multimapboth</code> | $\not\asymp$ | <code>\precneqq</code> |
| \vdash | <code>\coloneq</code> | \circ | <code>\multimapbothvert</code> | \bowtie | <code>\rJoin</code> |
| \vdash | <code>\Coloneq</code> | \bullet | <code>\multimapdot</code> | \sqsubset | <code>\strictfi</code> |
| $\vdash\vdash$ | <code>\Coloneqq</code> | $\bullet\bullet$ | <code>\multimapdotboth</code> | \exists | <code>\strictif</code> |
| $\vdash\vdash$ | <code>\Coloneqq^*</code> | $\circ\bullet$ | <code>\multimapdotbothA</code> | $\exists\exists$ | <code>\strictiff</code> |
| $\approx\approx$ | <code>\Colonsim</code> | $\bullet\circ$ | <code>\multimapdotbothAvert</code> | \geq | <code>\succeqq</code> |
| $\approx\approx$ | <code>\Colonsim</code> | $\bullet\circ$ | <code>\multimapdotbothB</code> | \asymp | <code>\succneqq</code> |
| $\vdash\vdash$ | <code>\Eqcolon</code> | $\bullet\circ\circ$ | <code>\multimapdotbothBvert</code> | \parallel | <code>\varparallel</code> |
| $\vdash\vdash$ | <code>\eqcolon</code> | $\bullet\bullet\circ$ | <code>\multimapdotbothvert</code> | $\parallel\parallel$ | <code>\varparallelinv</code> |
| $\vdash\vdash$ | <code>\eqqcolon</code> | $\bullet\bullet\bullet$ | <code>\multimapdotinv</code> | \nparallel | <code>\VvDash</code> |
| $\vdash\vdash$ | <code>\Eqqcolon</code> | \circ | <code>\multimapinv</code> | | |
| $\approx\approx$ | <code>\eqsim</code> | \times | <code>\openJoin</code> | | |

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

TABLE 93: txfonts/pffonts Negated Binary Relations

| | | | | | |
|---------------|--------------------------|--------------|----------------------------|--------------|----------------------------------|
| $\not\approx$ | <code>\napproxeq</code> | $\not\asymp$ | <code>\npreccurlyeq</code> | $\not\asymp$ | <code>\nthickapprox</code> |
| $\not\ast$ | <code>\nasmp</code> | $\not\asymp$ | <code>\npreceqq</code> | $\not\ll$ | <code>\ntwoheadleftarrow</code> |
| $\not\prec$ | <code>\backsim</code> | $\not\asymp$ | <code>\nprecsim</code> | $\not\gg$ | <code>\ntwoheadrightarrow</code> |
| $\not\approx$ | <code>\backsimeq</code> | $\not\asymp$ | <code>\nsimeq</code> | $\not\#$ | <code>\nvarparallel</code> |
| $\not\approx$ | <code>\bumpeq</code> | $\not\asymp$ | <code>\nsuccapprox</code> | $\not\#$ | <code>\nvarparallelinv</code> |
| $\not\approx$ | <code>\Bumpeq</code> | $\not\asymp$ | <code>\nsucccurlyeq</code> | $\not\#$ | <code>\nVdash</code> |
| $\not\approx$ | <code>\nequiv</code> | $\not\asymp$ | <code>\nsucceqq</code> | | |
| $\not\approx$ | <code>\precapprox</code> | $\not\asymp$ | <code>\nsuccssim</code> | | |

TABLE 94: mathabx Binary Relations

| | | | | | |
|-------------------|---------------------------|--------------------|-----------------------------|--------------------------------|----------------------------|
| \between | <code>\between</code> | $ $ | <code>\divides</code> | \therefore | <code>\risingdotseq</code> |
| \bot | <code>\botdoteq</code> | \div | <code>\dotseq</code> | $\approx\approx$ | <code>\succapprox</code> |
| \bowtie | <code>\Bumpedeq</code> | \div | <code>\eqbumped</code> | $\asymp\asymp$ | <code>\succcurlyeq</code> |
| \trianglelefteq | <code>\bumpedeq</code> | $=$ | <code>\eqcirc</code> | $\triangleright\triangleright$ | <code>\succdot</code> |
| \trianglelefteq | <code>\circeq</code> | $=$ | <code>\eqcolon</code> | $\asymp\asymp$ | <code>\succsim</code> |
| \coloneq | <code>\coloneq</code> | \doteq | <code>\fallingdotseq</code> | $\therefore\therefore$ | <code>\therefore</code> |
| \trianglelefteq | <code>\corresponds</code> | \gg | <code>\ggcurly</code> | $\doteq\doteq$ | <code>\topdoteq</code> |
| \curlyeqprec | <code>\curlyeqprec</code> | \ll | <code>\llcurly</code> | $\models\models$ | <code>\vDash</code> |
| \curlyeqsucc | <code>\curlyeqsucc</code> | $\asymp\asymp$ | <code>\precapprox</code> | $\models\models$ | <code>\Vdash</code> |
| \DashV | <code>\DashV</code> | $\asymp\asymp$ | <code>\preccurlyeq</code> | $\models\models$ | <code>\VDash</code> |
| \Dashv | <code>\Dashv</code> | $\lessdot\lessdot$ | <code>\precdot</code> | $\models\models$ | <code>\Vvdash</code> |
| \dashv | <code>\dashv</code> | $\lesssim\lesssim$ | <code>\precsim</code> | | |

TABLE 95: mathabx Negated Binary Relations

| | | | | | |
|---------------|----------------------------|---------------|----------------------------|---------------|--------------------------|
| \approx | <code>\napprox</code> | $\not\perp$ | <code>\notperp</code> | $\not\equiv$ | <code>\nvDash</code> |
| $\not\approx$ | <code>\ncong</code> | $\not\vdash$ | <code>\nprec</code> | $\not\models$ | <code>\nVdash</code> |
| $\not\approx$ | <code>\ncurlyeqprec</code> | $\not\models$ | <code>\nprecapprox</code> | $\not\models$ | <code>\nVdash</code> |
| $\not\approx$ | <code>\ncurlyeqsucc</code> | $\not\models$ | <code>\npreccurlyeq</code> | $\not\models$ | <code>\nvdash</code> |
| $\not\models$ | <code>\nDashv</code> | $\not\models$ | <code>\npreceq</code> | $\not\models$ | <code>\nVash</code> |
| $\not\models$ | <code>\ndashV</code> | $\not\models$ | <code>\nprecsim</code> | $\not\models$ | <code>\precapprox</code> |
| $\not\models$ | <code>\ndashv</code> | $\not\models$ | <code>\nsim</code> | $\not\models$ | <code>\precneq</code> |
| $\not\models$ | <code>\nDashV</code> | $\not\models$ | <code>\nsimeq</code> | $\not\models$ | <code>\precnsim</code> |
| $\not\models$ | <code>\ndashVv</code> | $\not\models$ | <code>\nsucc</code> | $\not\models$ | <code>\succapprox</code> |
| \neq | <code>\neq</code> | $\not\models$ | <code>\nsuccapprox</code> | $\not\models$ | <code>\succneq</code> |
| $\not\approx$ | <code>\notasymp</code> | $\not\models$ | <code>\nsucccurlyeq</code> | $\not\models$ | <code>\succnsim</code> |
| $\not\models$ | <code>\notdivides</code> | $\not\models$ | <code>\nsuccceq</code> | | |
| $\not\models$ | <code>\notequiv</code> | $\not\models$ | <code>\nsuccsim</code> | | |

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

TABLE 96: MnSymbol Binary Relations

| | | | | | |
|-----------------|-----------------------------|-------------------|-----------------------------|------------------|-----------------------------|
| \approx | <code>\approx</code> | \trianglelefteq | <code>\hateq</code> | \triangleright | <code>\rightpropto</code> |
| \approx | <code>\approxeq</code> | \times | <code>\hcrossing</code> | \triangleright | <code>\rightslice</code> |
| \lessapprox | <code>\backapprox</code> | \leftarrow | <code>\leftfootline</code> | \Vdash | <code>\rightVdash</code> |
| \lessapprox | <code>\backapproxeq</code> | \leftarrow | <code>\leftfree</code> | \vdash | <code>\rightvdash</code> |
| \lessapprox | <code>\backcong</code> | \exists | <code>\leftmodels</code> | \doteqdot | <code>\risingdotseq</code> |
| \lessapprox | <code>\backeqsim</code> | \exists | <code>\leftModels</code> | \searrow | <code>\sefootline</code> |
| \lessapprox | <code>\backsim</code> | \bowtie | <code>\leftpropto</code> | \searrow | <code>\sefree</code> |
| \lessapprox | <code>\backsimeq</code> | \dashv | <code>\leftrightline</code> | \bowtie | <code>\seModels</code> |
| \lessapprox | <code>\backtriplesim</code> | $=$ | <code>\Leftrightline</code> | \bowtie | <code>\semmodels</code> |
| \between | <code>\between</code> | \triangleleft | <code>\leftslice</code> | \parallel | <code>\separated</code> |
| \bumpeq | <code>\bumpeq</code> | \dashv | <code>\leftVdash</code> | \bowtie | <code>\seVdash</code> |
| \bumpeq | <code>\Bumpeq</code> | \dashv | <code>\leftvdash</code> | \wedge | <code>\sevdash</code> |
| \circeq | <code>\circeq</code> | \nearrow | <code>\nefootline</code> | \parallel | <code>\shortparallel</code> |
| \closedeq | <code>\closedeq</code> | \nearrow | <code>\nefree</code> | \sim | <code>\sim</code> |
| \closedprec | <code>\closedprec</code> | \bowtie | <code>\neModels</code> | \simeq | <code>\simeq</code> |
| \closedsucc | <code>\closedsucc</code> | \bowtie | <code>\nemodels</code> | $>$ | <code>\succ</code> |
| \coloneq | <code>\coloneq</code> | \nearrow | <code>\neswline</code> | \approx | <code>\succapprox</code> |
| \cong | <code>\cong</code> | \bowtie | <code>\Neswline</code> | \approx | <code>\succcurlyeq</code> |
| \curlyeqprec | <code>\curlyeqprec</code> | \bowtie | <code>\nevDash</code> | \succeq | <code>\succeq</code> |
| \curlyeqsucc | <code>\curlyeqsucc</code> | \bowtie | <code>\nevDash</code> | \succeq | <code>\succsim</code> |
| \Doteq | <code>\Doteq</code> | \nwarrow | <code>\nwfootline</code> | \swarrow | <code>\swfootline</code> |
| \doteq | <code>\doteq</code> | \nwarrow | <code>\nwfree</code> | \swarrow | <code>\swfree</code> |
| \downfootline | <code>\downfootline</code> | \nwarrow | <code>\nwmodels</code> | \bowtie | <code>\swModels</code> |
| \downfree | <code>\downfree</code> | \nwarrow | <code>\nwModels</code> | \swarrow | <code>\swmodels</code> |
| \downmodels | <code>\downmodels</code> | \oplus | <code>\nwsecrossing</code> | \bowtie | <code>\swdash</code> |
| \downModels | <code>\downModels</code> | \bowtie | <code>\Nwsepline</code> | $>$ | <code>\swdash</code> |
| \downpropto | <code>\downpropto</code> | \nwarrow | <code>\nwsepline</code> | \approx | <code>\triplesim</code> |
| \downvdash | <code>\downvdash</code> | \nwarrow | <code>\nwvdash</code> | $ $ | <code>\updownline</code> |

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| | | | | | |
|-----------------|-----------------------------|---------------|-----------------------------|-------------|--------------------------|
| $\bar{\top}$ | <code>\downVdash</code> | \gg | <code>\nwVdash</code> | \parallel | <code>\Updownline</code> |
| $\bar{=}$ | <code>\eqbump</code> | $<$ | <code>\prec</code> | \top | <code>\upfootline</code> |
| $\bar{\approx}$ | <code>\eqcirc</code> | \lessapprox | <code>\precapprox</code> | \uparrow | <code>\upfree</code> |
| $\bar{\equiv}$ | <code>\eqdot</code> | \lessdot | <code>\preccurlyeq</code> | \upmodels | <code>\upModels</code> |
| $\bar{\sim}$ | <code>\eqsim</code> | \lessdot | <code>\preceq</code> | \upmodels | <code>\upmodel</code> |
| $\bar{=}$ | <code>\equal</code> | \lessdot | <code>\precsim</code> | \gtrdot | <code>\upproto</code> |
| $\bar{\equiv}$ | <code>\equalclosed</code> | \rightarrow | <code>\rightfootline</code> | \perp | <code>\upvdash</code> |
| $\bar{\equiv}$ | <code>\equiviv</code> | \rightarrow | <code>\rightfree</code> | \perp | <code>\upVdash</code> |
| $\bar{\equiv}$ | <code>\equivvclosed</code> | \models | <code>\rightmodels</code> | \times | <code>\vcrossing</code> |
| $\bar{\equiv}$ | <code>\fallingdotseq</code> | \Vdash | <code>\rightModels</code> | \Vdash | <code>\Vvdash</code> |

MnSymbol additionally defines synonyms for some of the preceding symbols:

| | | |
|--------------|-------------------------|--|
| \dashv | <code>\dashv</code> | (same as <code>\leftVdash</code>) |
| \diagdown | <code>\diagdown</code> | (same as <code>\nwsepline</code>) |
| \diagup | <code>\diagup</code> | (same as <code>\neseline</code>) |
| \divides | <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>\leftproto</code>) |
| \relbar | <code>\relbar</code> | (same as <code>\leftrightline</code>) |
| \Relbar | <code>\Relbar</code> | (same as <code>\Leftrightline</code>) |
| \varpropto | <code>\varpropto</code> | (same as <code>\leftproto</code>) |
| \vDash | <code>\vDash</code> | (same as <code>\rightmodels</code>) |
| \Vdash | <code>\Vdash</code> | (same as <code>\rightModel</code>) |
| \vdash | <code>\vdash</code> | (same as <code>\rightVdash</code>) |
| \Vdash | <code>\Vdash</code> | (same as <code>\rightVdash</code>) |

TABLE 97: MnSymbol Negated Binary Relations

| | | | | | |
|---------------|------------------------------|---------------|------------------------------|---------------|------------------------------|
| $\not\approx$ | <code>\napprox</code> | $\not\vdash$ | <code>\nleftfootline</code> | $\not\models$ | <code>\nrisingdotseq</code> |
| $\not\approx$ | <code>\napproxeq</code> | $\not\vdash$ | <code>\nleftfree</code> | $\not\models$ | <code>\nsefootline</code> |
| $\not\approx$ | <code>\nbackapprox</code> | $\not\models$ | <code>\nleftmodels</code> | $\not\models$ | <code>\nsefree</code> |
| $\not\approx$ | <code>\nbackapproxeq</code> | $\not\models$ | <code>\nleftModels</code> | $\not\models$ | <code>\nseModel</code> |
| $\not\approx$ | <code>\nbackcong</code> | $\not\models$ | <code>\nleftrightline</code> | $\not\models$ | <code>\nsemode</code> |
| $\not\approx$ | <code>\nbackeqsim</code> | $\not\models$ | <code>\nLeftrightline</code> | $\not\models$ | <code>\nsevdash</code> |
| $\not\approx$ | <code>\nbacksim</code> | $\not\models$ | <code>\nleftVdash</code> | $\not\models$ | <code>\nseVdash</code> |
| $\not\approx$ | <code>\nbacksimeq</code> | $\not\models$ | <code>\nleftVdash</code> | $\not\models$ | <code>\nshortmid</code> |
| $\not\approx$ | <code>\nbacktriplesim</code> | $\not\models$ | <code>\nnefootline</code> | $\not\models$ | <code>\nshortparallel</code> |
| $\not\models$ | <code>\nbump</code> | $\not\models$ | <code>\nnefree</code> | $\not\models$ | <code>\nsim</code> |
| $\not\models$ | <code>\nBump</code> | $\not\models$ | <code>\nnemodels</code> | $\not\models$ | <code>\nsimeq</code> |
| $\not\models$ | <code>\ncirceq</code> | $\not\models$ | <code>\nneModels</code> | $\not\models$ | <code>\nsucc</code> |
| $\not\models$ | <code>\nclosedequal</code> | $\not\models$ | <code>\nneswline</code> | $\not\models$ | <code>\nsuccapprox</code> |
| $\not\models$ | <code>\ncong</code> | $\not\models$ | <code>\nNeswline</code> | $\not\models$ | <code>\nsucccurlyeq</code> |
| $\not\models$ | <code>\ncurlyeqprec</code> | $\not\models$ | <code>\nneVdash</code> | $\not\models$ | <code>\nsuccceq</code> |
| $\not\models$ | <code>\ncurlyeqsucc</code> | $\not\models$ | <code>\nnevdash</code> | $\not\models$ | <code>\nsuccsim</code> |

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| | | | | | |
|--------------|------------------------------|--------------|------------------------------|--------------|---------------------------|
| $\not\equiv$ | <code>\ndoteq</code> | $\not\asymp$ | <code>\nnwfootline</code> | $\not\asymp$ | <code>\nswfootline</code> |
| $\not\equiv$ | <code>\nDoteq</code> | $\not\asymp$ | <code>\nnwfree</code> | $\not\asymp$ | <code>\nswfree</code> |
| \pm | <code>\ndownfootline</code> | $\not\asymp$ | <code>\nnwmodels</code> | $\not\asymp$ | <code>\nswModels</code> |
| \pm | <code>\ndownfree</code> | $\not\asymp$ | <code>\nnwModels</code> | $\not\asymp$ | <code>\nswmodels</code> |
| \mp | <code>\ndownModels</code> | $\not\asymp$ | <code>\nNwseLINE</code> | $\not\asymp$ | <code>\nswVdash</code> |
| \mp | <code>\ndownmodels</code> | \times | <code>\nnwseLINE</code> | $\not\asymp$ | <code>\nswVdash</code> |
| \mp | <code>\ndownVdash</code> | $\not\asymp$ | <code>\nnwvdash</code> | $\not\asymp$ | <code>\ntriplesim</code> |
| \mp | <code>\ndownvDash</code> | $\not\asymp$ | <code>\nnwVdash</code> | \mp | <code>\nUpdownline</code> |
| \neq | <code>\neqbump</code> | $\not\asymp$ | <code>\nprec</code> | \mp | <code>\nupdownline</code> |
| \neq | <code>\neqcirc</code> | $\not\asymp$ | <code>\nprecapprox</code> | \mp | <code>\nupfootline</code> |
| \neq | <code>\neqdot</code> | $\not\asymp$ | <code>\npreccurlyeq</code> | \mp | <code>\nupfree</code> |
| \neq | <code>\neqsim</code> | $\not\asymp$ | <code>\npreceq</code> | \mp | <code>\nupModels</code> |
| \neq | <code>\nequal</code> | $\not\asymp$ | <code>\nprecsim</code> | \mp | <code>\nupmodels</code> |
| \neq | <code>\nequalclosed</code> | \mp | <code>\nrightfootline</code> | \pm | <code>\nupVdash</code> |
| \neq | <code>\nequiv</code> | \mp | <code>\nrightfree</code> | \pm | <code>\nupvDash</code> |
| $\not\equiv$ | <code>\nequivclosed</code> | $\mp\mp$ | <code>\nrightModels</code> | $\not\asymp$ | <code>\precnapprox</code> |
| \mp | <code>\neswcrossing</code> | \mp | <code>\nrightmodels</code> | $\not\asymp$ | <code>\precnSIM</code> |
| \neq | <code>\nfallingdotseq</code> | \mp | <code>\nrightvDash</code> | $\not\asymp$ | <code>\succnapprox</code> |
| \neq | <code>\nhateq</code> | $\mp\mp$ | <code>\nrightVdash</code> | $\not\asymp$ | <code>\succnSIM</code> |

MnSymbol additionally defines synonyms for some of the preceding symbols:

| | | |
|----------|-------------------------|---|
| \mp | <code>\ndashv</code> | (same as <code>\nleftvDash</code>) |
| \times | <code>\ndiagdown</code> | (same as <code>\nnwseLINE</code>) |
| \times | <code>\ndiagup</code> | (same as <code>\nneswLINE</code>) |
| \mp | <code>\ndivides</code> | (same as <code>\nupdownline</code>) |
| \neq | <code>\ne</code> | (same as <code>\nequal</code>) |
| \neq | <code>\neq</code> | (same as <code>\nequal</code>) |
| \mp | <code>\nmid</code> | (same as <code>\nupdownline</code>) |
| \neq | <code>\nmodels</code> | (same as <code>\nrightmodels</code>) |
| \mp | <code>\nparallel</code> | (same as <code>\nUpdownline</code>) |
| \pm | <code>\nperp</code> | (same as <code>\nupvDash</code>) |
| \mp | <code>\nrelbar</code> | (same as <code>\nleftrightline</code>) |
| \neq | <code>\nRelbar</code> | (same as <code>\nLeftrightline</code>) |
| \neq | <code>\nvDash</code> | (same as <code>\nrightmodels</code>) |
| \mp | <code>\nvDash</code> | (same as <code>\nrightvDash</code>) |
| $\mp\mp$ | <code>\nVdash</code> | (same as <code>\nrightVdash</code>) |
| $\mp\mp$ | <code>\nVDash</code> | (same as <code>\nrightModels</code>) |

TABLE 98: fdsymbol Binary Relations

| | | | | | |
|------------|-------------------------|----------|-----------------------------|-----------|----------------------------|
| \approx | <code>\approx</code> | \equiv | <code>\equiv</code> | \models | <code>\rightmodels</code> |
| \approx | <code>\approxeq</code> | \doteq | <code>\fallingdotseq</code> | \vdash | <code>\rightVdash</code> |
| \approx | <code>\backcong</code> | \sim | <code>\frown</code> | \Vdash | <code>\rightVDash</code> |
| \succ | <code>\backproto</code> | \equiv | <code>\frowneq</code> | \vdash | <code>\rightvDash</code> |
| \sim | <code>\backsimeq</code> | \circ | <code>\frownsmile</code> | \models | <code>\rightvDash</code> |
| \simeq | <code>\backsimeq</code> | \in | <code>\in</code> | \doteq | <code>\risingdotseq</code> |
| \between | <code>\between</code> | \dashv | <code>\leftassert</code> | \mid | <code>\shortmid</code> |

(continued on next page)

(continued from previous page)

| | | | | | |
|------------------|-----------------------------|----------------|---------------------------------|-------------------|-----------------------------|
| \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> | $\not\vdash$ | <code>\leftmodels</code> | \simeq | <code>\simeq</code> |
| \bumpeqq | <code>\bumpeqq</code> | \dashv | <code>\leftvdash</code> | \smile | <code>\smile</code> |
| \circeq | <code>\circeq</code> | $\not\dashv$ | <code>\leftvDash</code> | \smileeq | <code>\smileeq</code> |
| \coloneq | <code>\coloneq</code> | \dashv | <code>\leftVdash</code> | \frown | <code>\smilefrown</code> |
| \cong | <code>\cong</code> | \dashv | <code>\leftVDash</code> | \star | <code>\stareq</code> |
| \crossing | <code>\crossing</code> | \dashv | <code>\longleftfootline</code> | \succ | <code>\succ</code> |
| \curlyeqprec | <code>\curlyeqprec</code> | \iff | <code>\Longmapsfrom</code> | \approx | <code>\succapprox</code> |
| \curlyeqsucc | <code>\curlyeqsucc</code> | \iff | <code>\longmapsfrom</code> | \approx | <code>\succcurlyeq</code> |
| \dashv | <code>\dashVv</code> | \dashv | <code>\longrightfootline</code> | \geq | <code>\succeq</code> |
| \equiv | <code>\Dashv</code> | \mid | <code>\mid</code> | \leq | <code>\succeqq</code> |
| \dotcong | <code>\dotcong</code> | \ni | <code>\owns</code> | \approx | <code>\succsim</code> |
| \doteq | <code>\doteq</code> | \parallel | <code>\parallel</code> | \approx | <code>\thickapprox</code> |
| \Doteq | <code>\Doteq</code> | \wedge | <code>\prec</code> | \sim | <code>\thicksim</code> |
| \dotsminusdots | <code>\dotsminusdots</code> | \approx | <code>\precapprox</code> | \approx | <code>\triplesim</code> |
| \downAssert | <code>\downAssert</code> | \wedge | <code>\preccurlyeq</code> | \perp | <code>\upassert</code> |
| \downassert | <code>\downassert</code> | \wedge | <code>\preceq</code> | \perp | <code>\upAssert</code> |
| \downmodels | <code>\downmodels</code> | $\wedge\wedge$ | <code>\preceqq</code> | \perp | <code>\upmodels</code> |
| \downvDash | <code>\downvDash</code> | $\wedge\wedge$ | <code>\precnapprox</code> | \perp | <code>\upvDash</code> |
| \downVdash | <code>\downVdash</code> | $\wedge\wedge$ | <code>\precneq</code> | \perp | <code>\upvDash</code> |
| \downvdash | <code>\downvdash</code> | $\wedge\wedge$ | <code>\precneqq</code> | \perp | <code>\upVdash</code> |
| \downVDash | <code>\downVDash</code> | $\wedge\wedge$ | <code>\precsim</code> | \perp | <code>\upVDash</code> |
| \eqcirc | <code>\eqcirc</code> | \approx | <code>\precsim</code> | \equiv | <code>\vDash</code> |
| \eqcolon | <code>\eqcolon</code> | \propto | <code>\proto</code> | \leq | <code>\veeeq</code> |
| \eqdot | <code>\eqdot</code> | \vdash | <code>\rightassert</code> | \Vdash | <code>\Vdash</code> |
| \eqsim | <code>\eqsim</code> | \vdash | <code>\rightAssert</code> | \trianglelefteq | <code>\wedgeq</code> |
| $=$ | <code>\equal</code> | \vdash | <code>\rightfootline</code> | | |

`fdsymbol` defines synonyms for many of the preceding symbols:

| | | | | | |
|-------------|---------------------------|-------------------|-----------------------------|---------------|------------------------------|
| \approx | <code>\approxident</code> | \dashv | <code>\dashV</code> | \vdash | <code>\shortrighttack</code> |
| \equiv | <code>\arceq</code> | \div | <code>\doteqdot</code> | \perp | <code>\shortuptack</code> |
| \Vdash | <code>\Assert</code> | \coloneq | <code>\eqcolon</code> | \smallfrown | <code>\smallfrown</code> |
| \vdash | <code>\assert</code> | \trianglelefteq | <code>\hateq</code> | \smallsmile | <code>\smallsmile</code> |
| \asymp | <code>\asym</code> | \bowtie | <code>\Join</code> | \varpropto | <code>\varpropto</code> |
| \Barv | <code>\Barv</code> | \dashv | <code>\longdashv</code> | \perp | <code>\vBar</code> |
| \barV | <code>\barV</code> | \vdash | <code>\models</code> | \perp | <code>\Vbar</code> |
| \closure | <code>\closure</code> | \ni | <code>\ni</code> | \vDash | <code>\vDash</code> |
| \coloneqq | <code>\coloneqq</code> | \perp | <code>\perp</code> | \Vdash | <code>\Vdash</code> |
| \dashv | <code>\dashv</code> | ∞ | <code>\propfrom</code> | \Vdash | <code>\Vdash</code> |
| \DashV | <code>\DashV</code> | \top | <code>\shortdowntack</code> | \vdash | <code>\vdash</code> |
| \Dashv | <code>\Dashv</code> | \dashv | <code>\shortlefttack</code> | \dashv | <code>\vlongdash</code> |

TABLE 99: *fdsymbol* Negated Binary Relations

| | | | | | |
|--------------------|------------------------------|-----------------------|----------------------------------|--------------|----------------------------|
| $\not\equiv$ | <code>\backsimneqq</code> | $\not\in$ | <code>\nin</code> | $\not+$ | <code>\nsim</code> |
| $\not\approx$ | <code>\napprox</code> | $\not\parallel$ | <code>\nleftAssert</code> | $\not\equiv$ | <code>\nsimeq</code> |
| $\not\approxeq$ | <code>\napproxeq</code> | $\not\parallel$ | <code>\nleftassert</code> | $\not\equiv$ | <code>\nsmile</code> |
| $\not\backcong$ | <code>\nbackcong</code> | $\not\perp$ | <code>\nleftfootline</code> | $\not\equiv$ | <code>\nsmileeq</code> |
| $\not\backsim$ | <code>\nbacksim</code> | $\not\#$ | <code>\nleftmodels</code> | $\not\equiv$ | <code>\nsmilefrown</code> |
| $\not\backsimeq$ | <code>\nbacksimeq</code> | $\not\#$ | <code>\nleftvDash</code> | $\not\equiv$ | <code>\nstareq</code> |
| $\not\bumpeq$ | <code>\nbumpEq</code> | $\not\#$ | <code>\nleftvdash</code> | $\not\equiv$ | <code>\nsucc</code> |
| $\not\Bumpeq$ | <code>\nBumpeq</code> | $\not\parallel$ | <code>\nleftVdash</code> | $\not\equiv$ | <code>\nsuccapprox</code> |
| $\not\bumpeqq$ | <code>\nbumpeqq</code> | $\not\parallel$ | <code>\nleftVDash</code> | $\not\equiv$ | <code>\nsucccurlyeq</code> |
| $\not\circeq$ | <code>\ncirceq</code> | $\not\perp$ | <code>\nlongleftfootline</code> | $\not\equiv$ | <code>\nsucceq</code> |
| $\not\cong$ | <code>\ncong</code> | $\not\leftrightarrow$ | <code>\nLongmapsfrom</code> | $\not\equiv$ | <code>\nsucceqq</code> |
| $\not\curlyeqprec$ | <code>\ncurlyeqprec</code> | $\not\leftrightarrow$ | <code>\nlongmapsfrom</code> | $\not\equiv$ | <code>\nsuccsim</code> |
| $\not\curlyeqsucc$ | <code>\ncurlyeqsucc</code> | $\not\perp$ | <code>\nlongrightfootline</code> | $\not\equiv$ | <code>\ntriplesim</code> |
| $\not\parallel$ | <code>\ndashVv</code> | $\not\perp$ | <code>\nmid</code> | $\not\equiv$ | <code>\nupassert</code> |
| $\not\#$ | <code>\nDdashv</code> | $\not\#$ | <code>\nowns</code> | $\not\equiv$ | <code>\nupAssert</code> |
| $\not\#$ | <code>\ndoteq</code> | $\not\parallel$ | <code>\nparallel</code> | $\not\equiv$ | <code>\nupmodels</code> |
| $\not\#$ | <code>\nDoteq</code> | $\not\times$ | <code>\nprec</code> | $\not\equiv$ | <code>\nupVDash</code> |
| $\not\#$ | <code>\downassert</code> | $\not\#$ | <code>\nprecapprox</code> | $\not\equiv$ | <code>\nupvDash</code> |
| $\not\#$ | <code>\downAssert</code> | $\not\#$ | <code>\npreccurlyeq</code> | $\not\equiv$ | <code>\nupVdash</code> |
| $\not\#$ | <code>\downmodels</code> | $\not\#$ | <code>\npreceq</code> | $\not\equiv$ | <code>\nupvDash</code> |
| $\not\#$ | <code>\downvdash</code> | $\not\#$ | <code>\npreceqq</code> | $\not\equiv$ | <code>\nvDash</code> |
| $\not\#$ | <code>\downVdash</code> | $\not\#$ | <code>\nprecsim</code> | $\not\equiv$ | <code>\nveeeq</code> |
| $\not\#$ | <code>\downVDash</code> | $\not\#$ | <code>\nrightassert</code> | $\not\equiv$ | <code>\nVdash</code> |
| $\not\#$ | <code>\downnvDash</code> | $\not\#$ | <code>\nrightAssert</code> | $\not\equiv$ | <code>\nwedgeq</code> |
| $\not\#$ | <code>\neqcirc</code> | $\not\#$ | <code>\nrightfootline</code> | $\not\equiv$ | <code>\precneq</code> |
| $\not\#$ | <code>\neqdot</code> | $\not\#$ | <code>\nrightmodels</code> | $\not\equiv$ | <code>\precneqq</code> |
| $\not\#$ | <code>\neqsim</code> | $\not\#$ | <code>\nrightvdash</code> | $\not\equiv$ | <code>\simneqq</code> |
| $\not\#$ | <code>\nequal</code> | $\not\#$ | <code>\nrightVdash</code> | $\not\equiv$ | <code>\succnapprox</code> |
| $\not\#$ | <code>\nequiv</code> | $\not\#$ | <code>\nrightvDash</code> | $\not\equiv$ | <code>\succneq</code> |
| $\not\#$ | <code>\nfallingdotseq</code> | $\not\#$ | <code>\nrightVDash</code> | $\not\equiv$ | <code>\succneqq</code> |
| $\not\#$ | <code>\nfrown</code> | $\not\#$ | <code>\nrisingdotseq</code> | $\not\equiv$ | <code>\succnsim</code> |
| $\not\#$ | <code>\nfrownEq</code> | $\not\#$ | <code>\nshortmid</code> | $\not\equiv$ | |
| $\not\#$ | <code>\nfrownsmile</code> | $\not\#$ | <code>\nshortparallel</code> | $\not\equiv$ | |

fdsymbol defines synonyms for many of the preceding symbols:

| | | | | | |
|----------|----------------------------|-----------------|------------------------------|--------------|-------------------------------|
| $\not\#$ | <code>\napproxident</code> | $\not\parallel$ | <code>\ndashV</code> | $\not\#$ | <code>\nshortrighttack</code> |
| $\not\#$ | <code>\narceq</code> | $\not\#$ | <code>\ne</code> | $\not\equiv$ | <code>\nshortuptack</code> |
| $\not\#$ | <code>\nAssert</code> | $\not\#$ | <code>\neq</code> | $\not\equiv$ | <code>\nsime</code> |
| $\not\#$ | <code>\nassert</code> | $\not\#$ | <code>\nhateq</code> | $\not\equiv$ | <code>\nvBar</code> |
| $\not\#$ | <code>\nasympt</code> | $\not\perp$ | <code>\nlongdashv</code> | $\not\equiv$ | <code>\nVbar</code> |
| $\not\#$ | <code>\nBarv</code> | $\not\#$ | <code>\nmodels</code> | $\not\#$ | <code>\nVdash</code> |
| $\not\#$ | <code>\nbarV</code> | $\not\#$ | <code>\nni</code> | $\not\#$ | <code>\nvDash</code> |
| $\not\#$ | <code>\nclosure</code> | $\not\#$ | <code>\notinin</code> | $\not\#$ | <code>\nVDash</code> |
| $\not\#$ | <code>\nDashV</code> | $\not\equiv$ | <code>\nperp</code> | $\not\#$ | <code>\nvDash</code> |
| $\not\#$ | <code>\nDashv</code> | $\not\#$ | <code>\nshortdowntack</code> | $\not\perp$ | <code>\nvlongdash</code> |
| $\not\#$ | <code>\ndashv</code> | $\not\#$ | <code>\nshortlefttack</code> | | |

TABLE 100: boisik Binary Relations

| | | | | | |
|------------------|-----------------------------|-------------------------|------------------------------------|-------------------|------------------------------|
| \approx | <code>\ac</code> | $\not\approx$ | <code>\fatslash</code> | \simeq | <code>\scurel</code> |
| \approxeq | <code>\approxeq</code> | \cap | <code>\forkv</code> | \shortmid | <code>\shortmidid</code> |
| \arceq | <code>\arceq</code> | \cup | <code>\frown</code> | \shortparallel | <code>\shortparallel</code> |
| \backsim | <code>\backsimeq</code> | \gg | <code>\ggcurly</code> | \simdot | <code>\simrdots</code> |
| \backsimeq | <code>\backsimeq</code> | $\#$ | <code>\hash</code> | \smallfrown | <code>\smallfrown</code> |
| \bagmember | <code>\bagmember</code> | \in | <code>\inplus</code> | \smallsmile | <code>\smallsmile</code> |
| \because | <code>\because</code> | \approx | <code>\kernelcontraction</code> | \smile | <code>\smile</code> |
| \between | <code>\between</code> | \ll | <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> | \trianglelefteq | <code>\trianglelefteq</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> |
| \fatslash | <code>\fatslash</code> | \risingdotseq | <code>\risingdotseq</code> | | |

TABLE 101: boisik Negated Binary Relations

| | | | | | |
|-----------------|-------------------------|----------------------|------------------------------|--------------|----------------------|
| $\not\cong$ | <code>\ncong</code> | $\not\preceq$ | <code>\npreceq</code> | $\not\nDash$ | <code>\nVDash</code> |
| \neq | <code>\neq</code> | $\not\shortmid$ | <code>\nshortmid</code> | $\not\nDash$ | <code>\nDash</code> |
| $\not\equiv$ | <code>\nequiv</code> | $\not\shortparallel$ | <code>\nshortparallel</code> | $\not\nDash$ | <code>\nvDash</code> |
| $\not\mid$ | <code>\nmid</code> | $\not\sim$ | <code>\nsim</code> | $\not\nDash$ | <code>\nvDash</code> |
| $\not\parallel$ | <code>\nparallel</code> | $\not\succ$ | <code>\nsucc</code> | | |
| $\not\prec$ | <code>\nprec</code> | $\not\succceq$ | <code>\nsuccceq</code> | | |

TABLE 102: stix Binary Relations

| | | | | | |
|------------------|-----------------------------|-------------------------|---------------------------------|--|-----------------------------|
| \approx | <code>\approx</code> | $\#$ | <code>\eqvparsl</code> | \rightarrow | <code>\rightfishtail</code> |
| \approxeq | <code>\approxeq</code> | $\vdash.$ | <code>\fallingdotseq</code> | \Rightarrow | <code>\rightimply</code> |
| \approxeqq | <code>\approxeqq</code> | \blacktriangleright | <code>\fbowtie</code> | \succ | <code>\righttail</code> |
| \approxdot | <code>\approxdot</code> | \downarrow | <code>\forksnot</code> | $\vdash.$ | <code>\risingdotseq</code> |
| \arceq | <code>\arceq</code> | \cap | <code>\forkv</code> | \sqcup | <code>\rsqhook</code> |
| \assert | <code>\assert</code> | $)$ | <code>\frown</code> | $\rightarrow:$ | <code>\ruledelayed</code> |
| \asteq | <code>\asteq</code> | \exists | <code>\gleichstark</code> | \simeq | <code>\scurel</code> |
| \asymp | <code>\asymp</code> | \approx | <code>\hatatapprox</code> | \shortdowntack | <code>\shortdowntack</code> |
| \backcong | <code>\backcong</code> | $\bullet\circ$ | <code>\imageof</code> | \shortlefttack | <code>\shortlefttack</code> |
| \backsimeq | <code>\backsimeq</code> | \in | <code>\in</code> | \shortmid | <code>\shortmid</code> |
| \backsimeqdot | <code>\backsimeqdot</code> | $\dot{\in}$ | <code>\isindot</code> | \shortparallel | <code>\shortparallel</code> |
| \bagmember | <code>\bagmember</code> | \equiv | <code>\isinE</code> | \shortuparrow | <code>\shortuparrow</code> |
| \Barv | <code>\Barv</code> | \equiv | <code>\isinobar</code> | \sim | <code>\sim</code> |
| \barV | <code>\barV</code> | \equiv | <code>\isins</code> | \simeq | <code>\simeq</code> |
| \between | <code>\between</code> | $\equiv\cap$ | <code>\isinvb</code> | \approx | <code>\simminussim</code> |
| \bNot | <code>\bNot</code> | \rightsquigarrow | <code>\kernelcontraction</code> | $\not\simeq$ | <code>\simneqq</code> |
| \bowtie | <code>\bowtie</code> | \rightsquigarrow | <code>\leftdbltail</code> | \approx | <code>\simrdots</code> |
| \Bumpeq | <code>\Bumpeq</code> | $\rightarrow\sqcap$ | <code>\leftfishtail</code> | \circ | <code>\smallfrown</code> |
| \bumpeq | <code>\bumpeq</code> | \rightsquigarrow | <code>\lefttail</code> | ϵ | <code>\smalllin</code> |
| \bumpeqq | <code>\bumpeqq</code> | \blacktriangleright | <code>\lfbowtie</code> | \ni | <code>\smalllni</code> |
| \cirbot | <code>\cirbot</code> | \blacktriangleright | <code>\lftimes</code> | \circ | <code>\smallsmile</code> |
| \circeq | <code>\circeq</code> | \sqcap | <code>\longdashv</code> | $\#$ | <code>\smeparsl</code> |
| \cirmid | <code>\cirmid</code> | $\sqcap\sqcup$ | <code>\lsqhook</code> | $\approx()$ | <code>\smile</code> |
| \closure | <code>\closure</code> | $\equiv\sqcap$ | <code>\measeq</code> | \star | <code>\stareq</code> |
| \Coloneq | <code>\Coloneq</code> | \sqcap | <code>\mid</code> | \succ | <code>\succc</code> |
| \coloneq | <code>\coloneq</code> | $\circ\sqcap$ | <code>\midcir</code> | \gg | <code>\Succ</code> |
| \cong | <code>\cong</code> | $\circ\sqcap$ | <code>\mlcp</code> | $\approx\approx\approx$ | <code>\succcapprox</code> |
| \congdot | <code>\congdot</code> | $\sqcap\sqcap$ | <code>\models</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\succcurlyeq</code> |
| \curlyeqprec | <code>\curlyeqprec</code> | $\rightarrow\circ$ | <code>\multimap</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\succceq</code> |
| \curlyeqsucc | <code>\curlyeqsucc</code> | $\circ\rightarrow$ | <code>\multimapinv</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\succceqq</code> |
| \dashcolon | <code>\dashcolon</code> | $\ni\cap$ | <code>\ni</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\succcnapprox</code> |
| \dashv | <code>\dashv</code> | \ni | <code>\niobar</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\succcneq</code> |
| \dashV | <code>\dashV</code> | $\ni\cap$ | <code>\nis</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\succcneqq</code> |
| \Dashv | <code>\Dashv</code> | $\ni\cap$ | <code>\nisd</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\succcnsim</code> |
| \DashV | <code>\DashV</code> | $\ni\cap$ | <code>\Not</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\succcsim</code> |
| \DashVDash | <code>\DashVDash</code> | $/$ | <code>\notchar</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\thickapprox</code> |
| \dashVdash | <code>\dashVdash</code> | $\circ\bullet$ | <code>\origof</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\thicksim</code> |
| $\ddot{ }$ | <code>\ddot{ }</code> | \equiv | <code>\parallel</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\topfork</code> |
| \disin | <code>\disin</code> | \nexists | <code>\parsim</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\upfishtail</code> |
| \Doteq | <code>\Doteq</code> | \perp | <code>\perp</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\upin</code> |
| \doteq | <code>\doteq</code> | \nexists | <code>\pitchfork</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\varisobar</code> |
| \dotequiv | <code>\dotequiv</code> | \wedge | <code>\prec</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\varisins</code> |
| \dotsim | <code>\dotsim</code> | $\approx\approx$ | <code>\Prec</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\varniobar</code> |
| \dotsminusdots | <code>\dotsminusdots</code> | $\approx\approx\approx$ | <code>\precapprox</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\varnis</code> |
| \downfishtail | <code>\downfishtail</code> | $\approx\approx\approx$ | <code>\preccurlyeq</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\varproto</code> |
| \dualmap | <code>\dualmap</code> | $\approx\approx\approx$ | <code>\preceq</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\varVdash</code> |
| \eparsl | <code>\eparsl</code> | $\approx\approx\approx$ | <code>\preceqq</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\vBar</code> |
| \eqcirc | <code>\eqcirc</code> | $\approx\approx\approx$ | <code>\precnapprox</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\Vbar</code> |
| \eqcolon | <code>\eqcolon</code> | $\approx\approx\approx$ | <code>\precneq</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\vBarv</code> |
| \eqdef | <code>\eqdef</code> | $\approx\approx\approx$ | <code>\precneqq</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\Vdash</code> |
| \eqdot | <code>\eqdot</code> | $\approx\approx\approx$ | <code>\precnsim</code> | $\approx\approx\approx\approx\approx\approx$ | <code>\vdash</code> |

(continued on next page)

(continued from previous page)

| | | | | | |
|----------------|-----------------------------|-----------------------|----------------------------|------------------------------|---------------------------|
| \equiv | <code>\eqqeq</code> | \approx | <code>\precsim</code> | \vDash | <code>\vDash</code> |
| $\equiv\equiv$ | <code>\eqqeqq</code> | \propto | <code>\proto</code> | \Vdash | <code>\VDash</code> |
| \approx | <code>\eqqsim</code> | \curlyeqsucc | <code>\prurel</code> | \vDash | <code>\vDash</code> |
| \approx | <code>\eqsim</code> | \sqcup | <code>\pullback</code> | \vdots | <code>\vdots</code> |
| $\#$ | <code>\equalparallel</code> | \sqcap | <code>\pushout</code> | $\vee\vee$ | <code>\veeeq</code> |
| \equiv | <code>\equiv</code> | $\stackrel{?}{=}$ | <code>\questeq</code> | \times | <code>\veeonwedge</code> |
| \equiv | <code>\Equiv</code> | \dagger | <code>\revnmid</code> | $ $ | <code>\vertoverlay</code> |
| $\equiv\equiv$ | <code>\equivDD</code> | \blacktriangleright | <code>\rfbowtie</code> | $\overline{\rule{1pt}{1ex}}$ | <code>\vlongdash</code> |
| $\#$ | <code>\equivVert</code> | \blacktriangleright | <code>\rftimes</code> | $\overline{\rule{1pt}{1ex}}$ | <code>\Vdash</code> |
| $\#$ | <code>\equivVvert</code> | \rightarrowtail | <code>\rightdbltail</code> | \trianglelefteq | <code>\wedgeq</code> |

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

TABLE 103: stix Negated Binary Relations

| | | | | | |
|----------------------|--------------------------|---------------|------------------------------|---------------|----------------------------|
| $\not\equiv$ | <code>\forks</code> | $\not\#$ | <code>\nhpar</code> | $\not\approx$ | <code>\nsime</code> |
| $\not\approx$ | <code>\napprox</code> | $\not\dashv$ | <code>\nmid</code> | $\not\times$ | <code>\nsucc</code> |
| $\not\approx\approx$ | <code>\napproxeqq</code> | $\not\exists$ | <code>\nni</code> | $\not\times$ | <code>\nsucccurlyeq</code> |
| $\not\approx$ | <code>\nasmp</code> | $\not\in$ | <code>\notinin</code> | $\not\times$ | <code>\nsucceq</code> |
| $\not\approx$ | <code>\nBumpeq</code> | $\not\#$ | <code>\nparallel</code> | $\not\exists$ | <code>\nvarisinoar</code> |
| $\not\approx$ | <code>\nbumpaq</code> | $\not\times$ | <code>\nprec</code> | $\not\exists$ | <code>\nvarniobar</code> |
| $\not\approx$ | <code>\ncong</code> | $\not\approx$ | <code>\npreccurlyeq</code> | $\not\times$ | <code>\nvDash</code> |
| $\not\approx$ | <code>\ncongdot</code> | $\not\approx$ | <code>\npreceq</code> | $\not\times$ | <code>\nvdash</code> |
| $\not\approx$ | <code>\ne</code> | $\not\dashv$ | <code>\nshortmid</code> | $\not\exists$ | <code>\nVDash</code> |
| $\not\approx$ | <code>\neqsim</code> | $\not\#$ | <code>\nshortparallel</code> | $\not\exists$ | <code>\nVdash</code> |
| $\not\approx$ | <code>\nequiv</code> | $\not\approx$ | <code>\nsim</code> | | |

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

TABLE 104: mathtools Binary Relations

| | | | | | |
|------------------|---------------------------|------------------|------------------------|----------------|------------------------|
| $\approx\approx$ | <code>\Colonapprox</code> | $\vdash\vdash$ | <code>\coloneq</code> | $\dashv\dashv$ | <code>\Eqcolon</code> |
| \approx | <code>\colonapprox</code> | $\approx\approx$ | <code>\colonsim</code> | $=:=$ | <code>\eqqcolon</code> |
| $\vdash\vdash$ | <code>\coloneqq</code> | $\vdash\vdash$ | <code>\Colonsim</code> | $=::$ | <code>\Eqqcolon</code> |
| $\vdash\vdash$ | <code>\Coloneqq</code> | $::$ | <code>\dblcolon</code> | | |
| $\vdash\vdash$ | <code>\Coloneq</code> | $\dashv\vdash$ | <code>\eqcolon</code> | | |

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

$$\text{---}:\text{---} \quad \text{vs.} \quad \text{---}:\text{---} \\ ``=:=" \qquad \qquad ``=\vcentcolon="$$

TABLE 105: turnstile Binary Relations

| | | | | | |
|-------------------|-----------------------------------|-------------------|-----------------------------------|-------------------|-----------------------------------|
| $\frac{def}{abc}$ | <code>\dddtstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\nntstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\stdtstile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\ddststile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\nnttstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\stststile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\ddtstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\nsdtstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\sttstile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\ddttstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\nsststile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\stttstile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\nddtstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\nststile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\tddtstile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\dnststile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\nstattile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\tdststile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\dntstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\ntdtstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\tdtstile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\dnttstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\ntststile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\tdttstile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\dsdtstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\nttstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\tndtstile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\dsststile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\ntttstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\tnststile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\dststile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\sddtstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\tnbstile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\dstattile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\sdststile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\tnbstile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\dtdtstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\sdtstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\tsdtstile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\dtststile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\sdttstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\tsststile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\dttstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\sndtstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\tststile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\dtttstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\snststile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\tsttstile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\nddtstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\sntstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\ttdtstile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\ndststile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\snttstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\tttstile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\ndtstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\ssdtstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\tttstile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\ndttstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\ssststile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\ttttstile{abc}{def}</code> |
| $\frac{def}{abc}$ | <code>\nndtstile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\sststile{abc}{def}</code> | | |
| $\frac{def}{abc}$ | <code>\nnststile{abc}{def}</code> | $\frac{def}{abc}$ | <code>\sststile{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 106: `trsymb` Binary Relations

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

TABLE 107: `trfsigns` Binary Relations

| | | | |
|------------------------------|------------------------|------------------------------|------------------------|
| $\circ\swarrow$ | <code>\dfourier</code> | $\nwarrow\circ$ | <code>\Dfourier</code> |
| $\circ\longrightarrow$ | <code>\fourier</code> | $\longrightarrow\circ$ | <code>\Fourier</code> |
| $\circ\bullet\longleftarrow$ | <code>\laplace</code> | $\bullet\longleftarrow\circ$ | <code>\Laplace</code> |
| $\circ\swarrow\bullet$ | <code>\ztransf</code> | $\bullet\swarrow\circ$ | <code>\Ztransf</code> |

TABLE 108: `cml` Binary Relations

| | | | |
|-----------------------|----------------------------|------------------------|-----------------------|
| $\circ\subset$ | <code>\coh</code> | $\cap\circ$ | <code>\scoh</code> |
| $\asymp\subset$ | <code>\incoh</code> | $\cup\circ$ | <code>\sincoh</code> |
| $\perp\perp\subset$ | <code>\Perp</code> | $\downarrow\perp\perp$ | <code>\simperp</code> |
| $\circ\multimap\circ$ | <code>\multimapboth</code> | | |

TABLE 109: `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>\coloncolononequals</code> | $::=$ | <code>\equalscolon</code> | $\sim::$ | <code>\simcoloncolon</code> |

TABLE 110: `fourier` Binary Relations

$\# \quad \nparallel \text{\parallel}$ // $\parallel \text{\parallel}$

TABLE 111: 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> | \sqsubseteq | <code>\sqsubseteq</code> | | |

* Not predefined by the L^AT_EX 2 _{ε} core. Use the `latexsym` package to expose this symbol.

TABLE 112: *AMS* Subset and Superset Relations

| | | | | | |
|------------------|-------------------------|---------------|-------------------------|-----------------|----------------------------|
| $\not\subseteq$ | $\backslash nsubseteq$ | \subseteq | $\backslash subseteqq$ | \supseteq | $\backslash supsetneqq$ |
| $\not\supseteq$ | $\backslash nsupseteq$ | \subsetneq | $\backslash subsetneq$ | \supsetneq | $\backslash varsubsetneq$ |
| $\not\supseteqq$ | $\backslash nsupseteqq$ | \subsetneqq | $\backslash subsetneqq$ | \supsetneqq | $\backslash varsubsetneqq$ |
| \sqsubset | $\backslash sqsubset$ | \sqsupset | $\backslash Supset$ | \sqsupsetneq | $\backslash varsupsetneq$ |
| \sqsupset | $\backslash sqsupset$ | \sqsubseteq | $\backslash supseteqq$ | \sqsupsetneqq | $\backslash varsupsetneqq$ |
| \Subset | $\backslash Subset$ | \Supset | $\backslash supsetneq$ | | |

TABLE 113: *stmaryrd* Subset and Superset Relations

| | | | |
|-------------|---------------------------|-------------|---------------------------|
| \Subset | $\backslash subsetplus$ | \Supset | $\backslash supsetplus$ |
| \Subseteq | $\backslash subsetpluseq$ | \Supseteq | $\backslash supsetpluseq$ |

TABLE 114: *wasy sym* Subset and Superset Relations

| | | | |
|-------------|-----------------------|-------------|-----------------------|
| \sqsubset | $\backslash sqsubset$ | \sqsupset | $\backslash sqsupset$ |
|-------------|-----------------------|-------------|-----------------------|

TABLE 115: *txfonts/pffonts* Subset and Superset Relations

| | | | | | |
|-----------------|--------------------------|-------------------|---------------------------|-------------------|----------------------|
| $\not\sqsubset$ | $\backslash nsqsubset$ | $\not\sqsupset$ | $\backslash nsqsupseteq$ | $\not\sqsupseteq$ | $\backslash nSupset$ |
| $\not\sqsubset$ | $\backslash nsqsubseteq$ | $\not\sqsupseteq$ | $\backslash nSubset$ | | |
| $\not\sqsupset$ | $\backslash nsqsupset$ | $\not\sqsubset$ | $\backslash nsqsubseteqq$ | | |

TABLE 116: *mathabx* Subset and Superset Relations

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

TABLE 117: MnSymbol Subset and Superset Relations

| | | | | | | | |
|---------------------|---------------------------|---------------------|--------------------------|---------------------|---------------------------|---------------------|-------------------------|
| $\not\subseteq$ | $\backslash nSqsubset$ | $\not\subseteq$ | $\backslash nsubseteq$ | $\not\subseteq$ | $\backslash sqsubsetneq$ | \subseteq | $\backslash subseteq$ |
| $\not\subset$ | $\backslash nsqsubset$ | $\not\subset$ | $\backslash nsubseteqq$ | $\not\subset$ | $\backslash sqsubsetneqq$ | \subseteq | $\backslash subseteqq$ |
| $\not\sqsubseteq$ | $\backslash nsqsubseteq$ | $\not\sqsubseteq$ | $\backslash nSupset$ | $\not\sqsubseteq$ | $\backslash Sqsupset$ | $\not\sqsubseteq$ | $\backslash subsetneq$ |
| $\not\sqsubset$ | $\backslash nsqsubseteqq$ | $\not\sqsubset$ | $\backslash nSupset$ | $\not\sqsubset$ | $\backslash Sqsupset$ | $\not\sqsubset$ | $\backslash subsetneqq$ |
| $\not\sqsupseteq$ | $\backslash nSqsupset$ | $\not\sqsupseteq$ | $\backslash nsupseteq$ | $\not\sqsupseteq$ | $\backslash sqsupseteq$ | \sqsupseteq | $\backslash Supset$ |
| $\not\sqsupseteqq$ | $\backslash nsupset$ | $\not\sqsupseteqq$ | $\backslash nsupseteqq$ | $\not\sqsupseteqq$ | $\backslash sqsupseteqq$ | \sqsupseteq | $\backslash supset$ |
| $\not\sqsupseteqq$ | $\backslash nsqsupset$ | $\not\sqsupseteqq$ | $\backslash Sqsubset$ | $\not\sqsupseteqq$ | $\backslash sqsupsetneq$ | \sqsupseteq | $\backslash supseteq$ |
| $\not\sqsupsetneq$ | $\backslash nsqsupseteq$ | $\not\sqsupsetneq$ | $\backslash Sqsubset$ | $\not\sqsupsetneq$ | $\backslash sqsupsetneqq$ | \sqsupseteq | $\backslash supseteqq$ |
| $\not\sqsupsetneqq$ | $\backslash nsqsubset$ | $\not\sqsupsetneqq$ | $\backslash subset$ | $\not\sqsupsetneqq$ | $\backslash Subset$ | $\not\sqsupsetneqq$ | $\backslash supsetneq$ |
| $\not\sqsubset$ | $\backslash nsubset$ | $\not\sqsubset$ | $\backslash sqsubseteq$ | \subset | $\backslash subset$ | $\not\sqsubset$ | $\backslash supsetneqq$ |
| $\not\sqsubset$ | $\backslash nSubset$ | $\not\sqsubset$ | $\backslash sqsubseteqq$ | \subset | $\backslash subset$ | $\not\sqsubset$ | $\backslash supsetneqq$ |

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

TABLE 118: fdsymbol Subset and Superset Relations

| | | | | | | | |
|---------------------|---------------------------|---------------------|--------------------------|---------------------|---------------------------|---------------------|-------------------------|
| $\not\subseteq$ | $\backslash nsqsubset$ | $\not\subseteq$ | $\backslash nsubseteq$ | $\not\subseteq$ | $\backslash sqsubsetneq$ | \subseteq | $\backslash subseteq$ |
| $\not\subset$ | $\backslash nSqsubset$ | $\not\subset$ | $\backslash nsubseteqq$ | $\not\subset$ | $\backslash sqsubsetneqq$ | \subseteq | $\backslash subseteqq$ |
| $\not\sqsubseteq$ | $\backslash nsqsubseteq$ | $\not\sqsubseteq$ | $\backslash nSupset$ | $\not\sqsubseteq$ | $\backslash Sqsupset$ | $\not\sqsubseteq$ | $\backslash subsetneq$ |
| $\not\sqsubset$ | $\backslash nsqsubseteqq$ | $\not\sqsubset$ | $\backslash nSupset$ | $\not\sqsubset$ | $\backslash Sqsupset$ | $\not\sqsubset$ | $\backslash subsetneqq$ |
| $\not\sqsupseteq$ | $\backslash nSqsupset$ | $\not\sqsupseteq$ | $\backslash nsupseteq$ | $\not\sqsupseteq$ | $\backslash sqsupseteq$ | \sqsupseteq | $\backslash supset$ |
| $\not\sqsupseteqq$ | $\backslash nsupset$ | $\not\sqsupseteqq$ | $\backslash nsupseteqq$ | $\not\sqsupseteqq$ | $\backslash sqsupseteqq$ | \sqsupseteq | $\backslash Supset$ |
| $\not\sqsupseteqq$ | $\backslash nsqsupset$ | $\not\sqsupseteqq$ | $\backslash Sqsubset$ | $\not\sqsupseteqq$ | $\backslash sqsupsetneq$ | \sqsupseteq | $\backslash supseteq$ |
| $\not\sqsupsetneq$ | $\backslash nsqsupseteq$ | $\not\sqsupsetneq$ | $\backslash Sqsubset$ | $\not\sqsupsetneq$ | $\backslash sqsupsetneqq$ | \sqsupseteq | $\backslash supseteqq$ |
| $\not\sqsupsetneqq$ | $\backslash nsqsubset$ | $\not\sqsupsetneqq$ | $\backslash subset$ | $\not\sqsupsetneqq$ | $\backslash Subset$ | $\not\sqsupsetneqq$ | $\backslash supsetneq$ |
| $\not\sqsubset$ | $\backslash nsubset$ | $\not\sqsubset$ | $\backslash sqsubseteq$ | \subset | $\backslash subset$ | $\not\sqsubset$ | $\backslash supsetneqq$ |
| $\not\sqsubset$ | $\backslash nSubset$ | $\not\sqsubset$ | $\backslash sqsubseteqq$ | \subset | $\backslash subset$ | $\not\sqsubset$ | $\backslash supsetneqq$ |

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

TABLE 119: boisik Subset and Superset Relations

| | | | | | | | |
|-----------------|-------------------------|-----------------|------------------------|-----------------|---------------------------|-----------------|----------------------------|
| $\not\subseteq$ | $\backslash nsubset$ | \equiv | $\backslash sqSubset$ | \in | $\backslash subsetplus$ | \ni | $\backslash supsetpluseq$ |
| $\not\subseteq$ | $\backslash nsubseteq$ | \equiv | $\backslash sqSupset$ | \in | $\backslash subsetpluseq$ | $\not\subseteq$ | $\backslash varsubsetneq$ |
| $\not\subseteq$ | $\backslash nsubseteqq$ | $\not\subseteq$ | $\backslash sqsupset$ | $\not\subseteq$ | $\backslash Supset$ | $\not\subseteq$ | $\backslash varsubsetneqq$ |
| $\not\subset$ | $\backslash nsupset$ | \equiv | $\backslash Subset$ | \supseteq | $\backslash supseteqq$ | $\not\supseteq$ | $\backslash varsupsetneq$ |
| $\not\subset$ | $\backslash nsupseteq$ | \subseteq | $\backslash subsepeq$ | $\not\supseteq$ | $\backslash supsetneq$ | $\not\supseteq$ | $\backslash varsupsetneq$ |
| $\not\subset$ | $\backslash nsupseteqq$ | $\not\subset$ | $\backslash subsequeq$ | $\not\supseteq$ | $\backslash supsetneqq$ | $\not\supseteq$ | $\backslash varsupsetneqq$ |
| $\not\sqsubset$ | $\backslash sqsubset$ | $\not\sqsubset$ | $\backslash subsetneq$ | $\not\sqsubset$ | $\backslash supsetneq$ | $\not\sqsubset$ | $\backslash varsupsetneqq$ |

TABLE 120: stix Subset and Superset Relations

| | | | | | |
|----------------------|---------------------------------|----------------|----------------------------|------------------|-----------------------------|
| \subset | <code>\bsolhsub</code> | \sqsupseteq | <code>\sqsupseteqq</code> | \supset | <code>\suphsub</code> |
| \sqsubset | <code>\csub</code> | \sqsupsetneq | <code>\sqsupsetneqq</code> | \supsetarr | <code>\suplarr</code> |
| \sqsubseteq | <code>\csube</code> | \subdot | <code>\subdot</code> | \supmult | <code>\supmulf</code> |
| \sqsupset | <code>\csup</code> | \submult | <code>\submult</code> | \Supset | <code>\Supset</code> |
| \sqsupsete | <code>\csupe</code> | \subrarr | <code>\subrarr</code> | \supset | <code>\supset</code> |
| $\leftarrow\subset$ | <code>\leftarrow\subset</code> | \Subset | <code>\Subset</code> | \supsetapprox | <code>\supsetapprox</code> |
| \sqsubset | <code>\nsqsubset</code> | \subset | <code>\subset</code> | \supsetcirc^* | <code>\supsetcirc*</code> |
| \sqapprox | <code>\nsqsubseteq</code> | \approx | <code>\approx</code> | \supsetdot | <code>\supsetdot</code> |
| \sqsupset | <code>\nsqsupset</code> | \supsetcirc | <code>\supsetcirc</code> | \supseteq | <code>\supseteq</code> |
| \sqsupseteq | <code>\nsqsupseteq</code> | \supsetdot | <code>\supsetdot</code> | \supseteqq | <code>\supseteqq</code> |
| \nssubset | <code>\nssubset</code> | \subsetneq | <code>\subsetneq</code> | \supsetneq | <code>\supsetneq</code> |
| \nssubseteq | <code>\nssubseteq</code> | \subsetneqq | <code>\subsetneqq</code> | \supsetneqq | <code>\supsetneqq</code> |
| \nssubseteqq | <code>\nssubseteqq</code> | \subsetneqq | <code>\subsetneqq</code> | \supsetplus | <code>\supsetplus</code> |
| \nsupset | <code>\nsupset</code> | \subsetneqq | <code>\subsetneqq</code> | \supsim | <code>\supsim</code> |
| \nsupseteq | <code>\nsupseteq</code> | \subsetplus | <code>\subsetplus</code> | \supsub | <code>\supsub</code> |
| \nsupseteqq | <code>\nsupseteqq</code> | \subsetsim | <code>\subsetsim</code> | \supsup | <code>\supsup</code> |
| $\rightarrow\supset$ | <code>\rightarrow\supset</code> | \subsub | <code>\subsub</code> | \varsubsetneq | <code>\varsubsetneq</code> |
| \sqsubset | <code>\sqsubset</code> | \subsup | <code>\subsup</code> | \varsubsetneqq | <code>\varsubsetneqq</code> |
| \sqapprox | <code>\sqsubseteq</code> | \supsub | <code>\supsub</code> | \varsupsetneq | <code>\varsupsetneq</code> |
| \sqsupset | <code>\sqsubsetneq</code> | \supdot | <code>\supdot</code> | \varsupsetneqq | <code>\varsupsetneqq</code> |
| \sqsupset | <code>\sqsupset</code> | \supsol | <code>\supsol</code> | | |

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

TABLE 121: Inequalities

$\geq \quad \text{\geq}$ $\gg \quad \text{\gg}$ $\leq \quad \text{\leq}$ $\ll \quad \text{\ll}$ $\neq \quad \text{\neq}$

 TABLE 122: *AMS* Inequalities

| | | | | | |
|--------------|---------------------------|---------------|-------------------------|--------------|-------------------------|
| \gg | <code>\eqslantgtr</code> | \gtreqdot | <code>\lesseqgtr</code> | \ngeq | <code>\ngeq</code> |
| \ll | <code>\eqslantless</code> | \gtreqless | <code>\lesseqgtr</code> | \ngeqq | <code>\ngeqq</code> |
| \geqslant | <code>\geqq</code> | \gtreqless | <code>\lessgtr</code> | \ngeqslant | <code>\ngeqslant</code> |
| \geqslant | <code>\geqslant</code> | \gtreqless | <code>\lessgtr</code> | \ngtr | <code>\ngtr</code> |
| \ggg | <code>\ggg</code> | \gtreqsim | <code>\lll</code> | \nleq | <code>\nleq</code> |
| \gtrapprox | <code>\gtrapprox</code> | \gvertneqq | <code>\lnapprox</code> | \nleqq | <code>\nleqq</code> |
| \gneq | <code>\gneq</code> | \leqq | <code>\lneq</code> | \nleqslant | <code>\nleqslant</code> |
| \gneqq | <code>\gneqq</code> | \leqslant | <code>\lneqq</code> | \nless | <code>\nless</code> |
| \gnsim | <code>\gnsim</code> | \lessapprox | <code>\lnsim</code> | | |
| \gtrapprox | <code>\gtrapprox</code> | \lessdot | <code>\lvertneqq</code> | | |

TABLE 123: *wasy sym* Inequalities
 $\gtrapprox \backslash apprge \quad \lessapprox \backslash apprle$
TABLE 124: *txfonts/pxfonts* Inequalities

| | | |
|------------------------------------|--------------------------------------|----------------------------------|
| $\ggtr \backslash ngg$ | $\lltr \backslash ngtrsim$ | $\lessapprox \backslash nlessim$ |
| $\gtrapprox \backslash ngtrapprox$ | $\lessapprox \backslash nlessapprox$ | $\lessdot \backslash nll$ |
| $\lessapprox \backslash ngtrless$ | $\gtrapprox \backslash nlessgtr$ | |

TABLE 125: *mathabx* Inequalities

| | | | |
|-----------------------------------|-------------------------------------|------------------------------------|--------------------------------------|
| $\gtrless \backslash eqslantgt$ | $\lessgtr \backslash gtreqless$ | $\lessapprox \backslash lesssim$ | $\lessdot \backslash ngtr$ |
| $\lessgtr \backslash eqslantless$ | $\lessgtr \backslash gtreqless$ | $\ll \backslash ll$ | $\gtrapprox \backslash ngtrapprox$ |
| $\gtrless \backslash geq$ | $\lessgtr \backslash gtrless$ | $\ll \backslash lll$ | $\lessapprox \backslash ngtrsim$ |
| $\gtrless \backslash geqq$ | $\gtrless \backslash gtrsim$ | $\lessapprox \backslash lnapprox$ | $\lessapprox \backslash nleq$ |
| $\gtrless \backslash gg$ | $\gtrless \backslash gvertneqq$ | $\lessapprox \backslash lneq$ | $\lessapprox \backslash nleqq$ |
| $\gtrless \backslash ggg$ | $\lessapprox \backslash leq$ | $\lessapprox \backslash lneqq$ | $\lessdot \backslash nless$ |
| $\gtrless \backslash gnapprox$ | $\lessapprox \backslash leqq$ | $\lessapprox \backslash lnsim$ | $\lessapprox \backslash nlessapprox$ |
| $\gtrless \backslash gneq$ | $\lessapprox \backslash lessapprox$ | $\lessapprox \backslash lvertneqq$ | $\lessapprox \backslash nlessim$ |
| $\gtrless \backslash gneqq$ | $\lessapprox \backslash lessdot$ | $\lessdot \backslash neqslantgt$ | $\lessdot \backslash nvargeq$ |
| $\gtrless \backslash gnsim$ | $\lessapprox \backslash lesseqgtr$ | $\lessdot \backslash neqslantless$ | $\lessdot \backslash nvarleq$ |
| $\gtrless \backslash gtrapprox$ | $\lessapprox \backslash lesseqgqtr$ | $\lessdot \backslash ngeq$ | $\gtrless \backslash vargeq$ |
| $\gtrless \backslash gtrdot$ | $\lessapprox \backslash lessgtr$ | $\lessdot \backslash ngeqq$ | $\lessapprox \backslash varleq$ |

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

TABLE 126: MnSymbol Inequalities

| | | | | | | |
|----------------|------------------------------|--------------------|------------------------------|-------------|----------------------------|-------------------|
| \geq | <code>\eqslantgtr</code> | \geqslant | <code>\gtreqless</code> | \lesssim | <code>\lesssim</code> | \ngtrless |
| \leq | <code>\eqslantless</code> | \leqslant | <code>\gtrless</code> | \ll | <code>\ll</code> | \ngtrlessslant |
| \geq | <code>\geq</code> | \geqslant | <code>\gtrneqless</code> | \lll | <code>\lll</code> | \ngtrqless |
| \leq | <code>\geqclosed</code> | \leqslant | <code>\gtrsim</code> | \approx | <code>\lnapprox</code> | \ngtrless |
| \geq | <code>\geqdot</code> | \leq | <code>\leq</code> | \leqslant | <code>\lneqq</code> | \nleq |
| \leq | <code>\geqq</code> | \leq | <code>\leqclosed</code> | \approx | <code>\lnsim</code> | \nleqclosed |
| \geq | <code>\geqlant</code> | \leq | <code>\leqdot</code> | \approx | <code>\neqslantgtr</code> | \nleqdot |
| \geq | <code>\geqlantdot</code> | \leq | <code>\leqq</code> | \approx | <code>\neqslantless</code> | \nleqq |
| \gg | <code>\gg</code> | \leq | <code>\leqlant</code> | \approx | <code>\ngeq</code> | \nleqlant |
| \ggg | <code>\ggg</code> | \leq | <code>\leqlantdot</code> | \approx | <code>\ngeqclosed</code> | \nleqlantdot |
| \nless | <code>\gnapprox</code> | $<$ | <code>\less</code> | \approx | <code>\ngeqdot</code> | \nless |
| \nlessapprox | <code>\gneqq</code> | \approx | <code>\lessapprox</code> | \approx | <code>\ngeqq</code> | \nlessclosed |
| \nless | <code>\gnsim</code> | \triangleleft | <code>\lessclosed</code> | \approx | <code>\ngeqlant</code> | \nlessdot |
| \nless | <code>\gtr</code> | \triangleleft | <code>\lessdot</code> | \approx | <code>\neqslantdot</code> | \nlesseqgtr |
| \nless | <code>\gtrapprox</code> | $\vee\wedge$ | <code>\lesseqgtr</code> | \gg | <code>\ngg</code> | \nlesseqtrslant |
| \nless | <code>\gtrclosed</code> | $\vee\vee\wedge$ | <code>\lesseqgtrslant</code> | $\gg\gg$ | <code>\nggg</code> | \nlesseqggr |
| \nless | <code>\gtrdot</code> | $\vee\vee\wedge$ | <code>\lesseqgqtr</code> | \gg | <code>\ngtr</code> | \nlessgtr |
| \nless | <code>\gtreqless</code> | $\vee\vee\wedge$ | <code>\lessgtr</code> | \gg | <code>\ngtrclosed</code> | \nll |
| \nless | <code>\gtreqlessslant</code> | $\vee\wedge\wedge$ | <code>\lessneqqgtr</code> | \gg | <code>\ngtrdot</code> | \nlll |

MnSymbol additionally defines synonyms for some of the preceding symbols:

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

TABLE 127: `fdsymbol` Inequalities

| | | | | | |
|---------------------------|------------------------------|---------------------------------------|------------------------------|---------------|-------------------------------|
| \geq | <code>\eqslantgtr</code> | \leq | <code>\leqslantdot</code> | $\not\equiv$ | <code>\ngtrapprox</code> |
| \leq | <code>\eqslantless</code> | \geq | <code>\leqslcc</code> | $\not\geq$ | <code>\ngtrcc</code> |
| \geq | <code>\geq</code> | $<$ | <code>\less</code> | $\not\geq$ | <code>\ngtrclosed</code> |
| \sqsupseteq | <code>\geqclosed</code> | \approx | <code>\lessapprox</code> | $\not\approx$ | <code>\ngtrdot</code> |
| \sqsupseteq | <code>\geqdot</code> | \triangleleft | <code>\lesscc</code> | $\not\approx$ | <code>\ngtreqless</code> |
| \sqsupseteq | <code>\geqq</code> | \triangleleft | <code>\lessclosed</code> | $\not\approx$ | <code>\ngtreqqless</code> |
| \geq | <code>\geqslant</code> | \triangleleft | <code>\lessdot</code> | $\not\approx$ | <code>\ngtreqslantless</code> |
| \geq | <code>\geqslantdot</code> | $\sqsupseteq \sqsupseteq \sqsupseteq$ | <code>\lesseqgtr</code> | $\not\approx$ | <code>\ngtrless</code> |
| \geq | <code>\geqslcc</code> | $\sqsupseteq \sqsupseteq \sqsupseteq$ | <code>\lesseqqgtr</code> | $\not\approx$ | <code>\ngtrsim</code> |
| \gg | | $\sqsupseteq \sqsupseteq \sqsupseteq$ | <code>\lesseqslantgtr</code> | $\not\approx$ | <code>\nleq</code> |
| \ggg | | $\sqsupseteq \sqsupseteq \sqsupseteq$ | <code>\lessgtr</code> | $\not\approx$ | <code>\nleqclosed</code> |
| \napprox | <code>\gnapprox</code> | \approx | <code>\lessim</code> | $\not\approx$ | <code>\nleqdot</code> |
| \napprox | <code>\gneq</code> | \ll | <code>\ll</code> | $\not\approx$ | <code>\nleqq</code> |
| \napprox | <code>\gneqq</code> | \lll | | $\not\approx$ | <code>\nleqslant</code> |
| \napprox | <code>\gnsim</code> | $\not\approx$ | <code>\lnapprox</code> | $\not\approx$ | <code>\nleqslantdot</code> |
| $>$ | <code>\gtr</code> | $\not\leq$ | <code>\lneq</code> | $\not\geq$ | <code>\nleqslcc</code> |
| \approx | <code>\gtrapprox</code> | $\not\leq$ | <code>\lneqq</code> | $\not\geq$ | <code>\nless</code> |
| \triangleright | <code>\gtrcc</code> | $\not\leq$ | <code>\lnsim</code> | $\not\geq$ | <code>\nlessapprox</code> |
| \triangleright | <code>\gtrclosed</code> | $\not\approx$ | <code>\neqslantgtr</code> | $\not\geq$ | <code>\nlesscc</code> |
| $>$ | <code>\gtrdot</code> | $\not\approx$ | <code>\neqslantless</code> | $\not\geq$ | <code>\nlessclosed</code> |
| $\approx \approx \approx$ | <code>\gtreqless</code> | $\not\approx$ | <code>\ngeq</code> | $\not\approx$ | <code>\nlessdot</code> |
| $\approx \approx \approx$ | <code>\gtreqqless</code> | $\not\approx$ | <code>\ngeqclosed</code> | $\not\approx$ | <code>\nlesseqgtr</code> |
| $\approx \approx \approx$ | <code>\gtreqslantless</code> | $\not\approx$ | <code>\ngeqdot</code> | $\not\approx$ | <code>\nlesseqqgtr</code> |
| $\approx \approx \approx$ | <code>\gtrless</code> | $\not\approx$ | <code>\ngeqq</code> | $\not\approx$ | <code>\nlesseqslantgtr</code> |
| \approx | <code>\trsim</code> | $\not\approx$ | <code>\nqslant</code> | $\not\approx$ | <code>\nlessgtr</code> |
| \leq | <code>\leq</code> | $\not\approx$ | <code>\nqslantdot</code> | $\not\approx$ | <code>\nlesssim</code> |
| \trianglelefteq | <code>\leqclosed</code> | $\not\approx$ | <code>\nqslcc</code> | $\not\approx$ | <code>\nll</code> |
| \trianglelefteq | <code>\leqdot</code> | $\not\geq$ | <code>\gg</code> | $\not\ll$ | <code>\nlll</code> |
| \leqq | <code>\leqq</code> | \ggg | | | |
| \leq | <code>\leqslant</code> | $\not\geq$ | <code>\ngtr</code> | | |

`fdsymbol` defines synonyms for some of the preceding symbols:

| | | | | | |
|------------------|------------------------------|-----------------|------------------------------|------------------|-------------------------------|
| \geq | <code>\ge</code> | \leq | <code>\lesdot</code> | $\not\geq$ | <code>\ngtcc</code> |
| \geq | <code>\gescc</code> | \leq | <code>\lesg</code> | $\not\geq$ | <code>\ngtreqlessslant</code> |
| \geq | <code>\gesdot</code> | \leq | <code>\lesseqgtrslant</code> | $\not\geq$ | <code>\nlescc</code> |
| \approx | <code>\gesl</code> | \triangleleft | <code>\lhd</code> | $\not\geq$ | <code>\nlesdot</code> |
| \ggg | <code>\gggtr</code> | \lll | <code>\llless</code> | $\not\geq$ | <code>\nlesg</code> |
| \triangleright | <code>\gtcc</code> | \triangleleft | <code>\ltcc</code> | $\not\geq$ | <code>\nlesseqgtrslant</code> |
| \approx | <code>\gtreqlessslant</code> | $\not\geq$ | <code>\lvertneqq</code> | $\not\geq$ | <code>\nltcc</code> |
| \approx | <code>\gvertneqq</code> | $\not\geq$ | <code>\ngescc</code> | \triangleright | <code>\rhd</code> |

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| | | | |
|-------------|------------|------------|----------|
| \leq | \leq | \leq | \leq |
| \leqslant | \lesssim | \lessdot | \unlhd |

TABLE 128: boisik Inequalities

| | | | | | | | |
|-------------|----------------|-------------|---------------|---------------|--------------|-------------|--------------|
| \geq | \eqslantgtr | \geq | \gtcir | \geq | \lesseqgtr | \geq | \ngeq |
| \leq | \eqslantless | \leq | \gtrapprox | \leq | \lessgtr | \leq | \ngeqq |
| \geqslant | \geqq | \geqslant | \gtreqless | \geqslant | \lesssim | \geqslant | \ngeqslant |
| \geqslant | \geqslant | \geqslant | \gtreqqless | \geqslant | \lll | \geqslant | \ngtr |
| \ggg | \ggg | \ggg | \gtrless | \ggg | \lnapprox | \ggg | \nleq |
| \gtrless | \glj | \gtrless | \gtrsim | \gtrless | \lneq | \gtrless | \nleqq |
| \gnapprox | \gnapprox | \gnapprox | \gvertneqq | \gnapprox | \lneqq | \gnapprox | \nleqslant |
| \gneq | \gneq | \gneq | \leqq | \gneq | \lnsim | \gneq | \nless |
| \gneqq | \gneqq | \gneqq | \leqslant | \gneqq | \lt | | |
| \gnsim | \gnsim | \gnsim | \lessapprox | \lessapprox | \ltcir | | |
| \Gt | \Gt | \Gt | \lesseqgtr | \Gt | \lvertneqq | | |

TABLE 129: stix Inequalities

| | | | | | |
|-------------|----------------|-------------|------------------|-------------|----------------|
| \geq | \egsdot | \geq | \gtquest | \geq | \lnsim |
| \leq | \elsdot | \leq | \gtrapprox | \leq | \lsime |
| $>$ | \eqgtr | $>$ | \gtrarr | $>$ | \lsimg |
| $<$ | \eqless | $<$ | \gtrdot | $<$ | \lt |
| \geqslant | \eqgtr | \geqslant | \gtreqless | \geqslant | \ltcc |
| \leqslant | \eqless | \leqslant | \gtreqqless | \leqslant | \ltcir |
| \geqslant | \eqslantgtr | \geqslant | \gtrless | \geqslant | \ltlarr |
| \leqslant | \eqslantless | \leqslant | \gtrsim | \leqslant | \ltquest |
| \geq | \eqslantgtr | \geq | \gvertneqq | \geq | \lvertneqq |
| \leq | \eqslantless | \leq | \lat | \leq | \eqslantgtr |
| \geq | \geq | \geq | \late | \geq | \eqslantless |
| \geq | \geqq | \geq | \leftarrowless | \geq | \ngeq |
| \geq | \geqslant | \geq | \leq | \geq | \ngeqq |
| \geq | \geqslant | \geq | \leqq | \geq | \ngeqslant |
| \geq | \gescc | \geq | \leqslant | \geq | \ngg |
| \geq | \gesdot | \geq | \leqslant | \geq | \ngtr |
| \geq | \gesdoto | \geq | \lescc | \geq | \ngtrless |
| \geq | \gesdotol | \geq | \lesdot | \geq | \ngtrsim |

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| | | | | | |
|-------------|-------------|------------|---------------|----------------|---------------|
| \asymp | \gesles | \asymp | \lesdoto | $\not\asymp$ | \nleq |
| \gg | \gg | \lessdot | \lesdotor | $\not\lessdot$ | \nleqq |
| \ggg | \ggg | \asymp | \lesges | $\not\asymp$ | \nleqslant |
| \gggnest | \gggnest | \approx | \lessapprox | $\not\approx$ | \nless |
| \gla | \gla | \wedge | \lessdot | $\not\wedge$ | \nlessgtr |
| \glE | \glE | \asymp | \lesseqtr | $\not\asymp$ | \nlesssim |
| \glj | \glj | \asymp | \lesseqqgtr | $\not\asymp$ | \nll |
| \gnapprox | \gnapprox | \asymp | \lessgtr | $\not\asymp$ | ∂ |
| \gneq | \gneq | \asymp | \lesssim | $\not\asymp$ | \rightarrow |
| \gneqq | \gneqq | \asymp | \lgE | $\not\asymp$ | \simeq |
| \gnsim | \gnsim | \ll | \ll | \asymp | \simgtr |
| \gsime | \gsime | \ll | \lll | \asymp | \simlE |
| \gsiml | \gsiml | \ll | \lllnest | \asymp | \simless |
| \Gt | \Gt | \approx | \lnapprox | $\not\approx$ | \smt |
| \gtcc | \gtcc | \leq | \lneq | \leq | \smte |
| \gtcir | \gtcir | \leq | \lneqq | | |

stix defines \leq as a synonym for \leq , \geq as a synonym for \geq , \llless as a synonym for \lll , \ggtr as a synonym for \ggg , \nleq as a synonym for \nleq , and \ngeq as a synonym for \ngeq .

TABLE 130: \mathcal{AM} Triangle Relations

| | | | | | |
|-----------------------|-----------------------|-------------------|-------------------|-------------------|----------------------|
| \blacktriangleleft | \blacktriangleright | \ntriangleleft | \ntriangleright | \triangleleft | \trianglelefteq |
| \blacktriangleright | \blacktriangleleft | \ntriangleright | \ntriangleleft | \triangleleft | \vartriangleleft |
| \ntriangleleft | \ntriangleright | \triangleleft | \trianglelefteq | \triangleleft | \vartriangleleft |
| \ntrianglelefteq | \ntrianglerighteq | \trianglelefteq | \trianglelefteq | \trianglelefteq | \vartrianglelefteq |

TABLE 131: stmaryrd Triangle Relations

| | |
|-------------------------|--------------------------|
| \trianglelefteqslant | \trianglerighteqslant |
| \ntrianglelefteqslant | \ntrianglerighteqslant |

TABLE 132: mathabx Triangle Relations

| | | | |
|---------------------|--------------------|--------------------|-----------------------|
| \ntriangleleft | \triangleleft | \triangleleft | \vartriangleleft |
| \ntrianglelefteq | \trianglelefteq | \trianglelefteq | \vartrianglelefteq |
| \ntriangleright | \triangleright | \triangleright | \vartriangleright |
| \ntrianglerighteq | \trianglerighteq | \trianglerighteq | \vartrianglerighteq |

TABLE 133: MnSymbol Triangle Relations

| | | | | | |
|---|-------------------------|---|-------------------|---|---------------------|
| ▼ | \filledmedtriangledown | △ | \largetriangleup | ▽ | \smalltriangledown |
| ◀ | \filledmedtriangleleft | ▽ | \medtriangledown | ◀ | \smalltriangleleft |
| ▶ | \filledmedtriangleright | ◀ | \medtriangleleft | ▶ | \smalltriangleright |
| ▲ | \filledmedtriangleup | ▷ | \medtriangleright | △ | \smalltriangleup |
| ▼ | \filledtriangledown | △ | \medtriangleup | △ | \triangleeq |
| ◀ | \filledtriangleleft | ≠ | \ntriangleeq | ≤ | \trianglelefteq |
| ▶ | \filledtriangleright | ≠ | \ntriangleleft | ≥ | \trianglerighteq |
| ▲ | \filledtriangleup | ≠ | \ntrianglelefteq | ◀ | \vartriangleleft |
| ▽ | \largetriangledown | ≠ | \ntriangleright | ▷ | \vartriangleright |
| ◀ | \largetriangleleft | ≠ | \ntrianglerighteq | ▷ | \vartrianglerighteq |
| ▶ | \largetriangleright | ⊗ | \otriangle | | |

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

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

TABLE 134: *fdsymbol* Triangle Relations

| | | | | | |
|----------------------|-------------------------------------|------------------|--------------------------------------|-----------------------|---------------------------------------|
| \triangleright | <code>\geqclosed</code> | ∇ | <code>\medtriangledown</code> | \blacktriangleleft | <code>\smallblacktriangleleft</code> |
| \triangleright | <code>\gtrclosed</code> | \triangleleft | <code>\medtriangleleft</code> | \blacktriangleright | <code>\smallblacktriangleright</code> |
| \triangledown | <code>\largetriangledown</code> | \triangleright | <code>\medtriangleright</code> | \blacktriangleup | <code>\smallblacktriangleup</code> |
| \triangle | <code>\largetriangleup</code> | \triangleleft | <code>\medtriangleup</code> | \blacktriangledown | <code>\smalltriangledown</code> |
| \trianglelefteq | <code>\leqclosed</code> | $\not\equiv$ | <code>\ngeqclosed</code> | \triangleleft | <code>\smalltriangleleft</code> |
| \triangleleft | <code>\lessclosed</code> | $\not\equiv$ | <code>\ngtrclosed</code> | \triangleright | <code>\smalltriangleright</code> |
| \triangledown | <code>\medblacktriangledown</code> | $\not\equiv$ | <code>\nleqclosed</code> | \triangleup | <code>\smalltriangleup</code> |
| \blacktriangleleft | <code>\medblacktriangleleft</code> | $\not\equiv$ | <code>\nlessclosed</code> | \triangleq | <code>\triangleeq</code> |
| \triangleright | <code>\medblacktriangleright</code> | $\not\equiv$ | <code>\ntriangleeq</code> | | |
| \blacktriangleup | <code>\medblacktriangleup</code> | ∇ | <code>\smallblacktriangledown</code> | | |

fdsymbol defines synonyms for almost all of the preceding symbols:

| | | | | | |
|-----------------------|----------------------------------|-----------------|--------------------------------|--------------------|--------------------------------|
| ∇ | <code>\bigtriangledown</code> | $\not\equiv$ | <code>\ntrianglelefteq</code> | \triangleq | <code>\triangleeq</code> |
| \triangle | <code>\bigtriangleup</code> | $\not\equiv$ | <code>\ntriangleright</code> | \triangleright | <code>\triangleright</code> |
| \blacktriangle | <code>\blacktriangle</code> | $\not\equiv$ | <code>\ntrianglerighteq</code> | \trianglerighteq | <code>\trianglerighteq</code> |
| \blacktriangledown | <code>\blacktriangledown</code> | \triangle | <code>\triangle</code> | \triangle | <code>\vartriangle</code> |
| \blacktriangleleft | <code>\blacktriangleleft</code> | ∇ | <code>\medtriangledown</code> | \triangleleft | <code>\vartriangleleft</code> |
| \blacktriangleright | <code>\blacktriangleright</code> | \triangleleft | <code>\medtriangleleft</code> | \triangleright | <code>\vartriangleright</code> |
| $\not\equiv$ | <code>\ntriangleleft</code> | \leq | <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 135: *boisik* Triangle Relations

| | | | | |
|-----------------|--------------------------------|-------------------------|------------------|--------------------------------|
| $\not\equiv$ | <code>\ntriangleleft</code> | \trianglelefteq | \triangleleft | <code>\varlrttriangle</code> |
| $\not\equiv$ | <code>\ntrianglelefteq</code> | \trianglelefteqslant | \triangleleft | <code>\vartriangle</code> |
| $\not\equiv$ | <code>\ntriangleright</code> | \triangleright | \triangleleft | <code>\vartriangleleft</code> |
| $\not\equiv$ | <code>\ntrianglerighteq</code> | \trianglerighteq | \triangleright | <code>\vartriangleright</code> |
| \triangleleft | <code>\triangleleft</code> | \trianglerighteqslant | | |

TABLE 136: *stix* Triangle Relations

| | | | | | |
|-------------------|--------------------------------|-------------------|---------------------------------|--------------------------------|-------------------------------|
| \trianglelefteq | <code>\lrtriangleeq</code> | $\not\equiv$ | <code>\nvartriangleright</code> | \triangle | <code>\vartriangle</code> |
| \triangleleft | <code>\ltrivb</code> | $\not\equiv$ | <code>\rtriltri</code> | \triangleleft | <code>\vartriangleleft</code> |
| $\not\equiv$ | <code>\ntrianglelefteq</code> | \trianglelefteq | \triangleright | <code>\vartriangleright</code> | |
| $\not\equiv$ | <code>\ntrianglerighteq</code> | \triangleq | <code>\triangleq</code> | \triangleright | <code>\vbrtri</code> |
| \triangleleft | <code>\nvartriangleleft</code> | \triangleq | <code>\trianglerighteq</code> | | |

TABLE 137: 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> |
| \leftarrowtail | <code>\leftarrowtail</code> | \longleftrightarrow | <code>\longleftrightarrow</code> | \rightarrowtail | <code>\rightarrowtail</code> |
| \rightarrowtail | <code>\rightarrowtail</code> | \Longleftrightarrow | <code>\Longleftrightarrow</code> | \searrowtail | <code>\searrowtail</code> |
| \rightsquigarrow | <code>\rightsquigarrow</code> | \longmapsto | <code>\longmapsto</code> | \swarrowtail | <code>\swarrowtail</code> |
| \leftarrowarrow | <code>\leftarrowarrow</code> | \Longrightarrow | <code>\Longrightarrow</code> | \uparrowarrow | <code>\uparrowarrow</code> |
| \Leftarrowarrow | <code>\Leftarrowarrow</code> | \longrightarrow | <code>\longrightarrow</code> | \Uparrowarrow | <code>\Uparrowarrow</code> |
| \Leftrightarrowarrow | <code>\Leftrightarrowarrow</code> | \mapsto | <code>\mapsto</code> | \updownarrowarrow | <code>\updownarrowarrow</code> |
| \leftrightarrowarrow | <code>\leftrightarrowarrow</code> | \nearrowtail^{\dagger} | <code>\nearrowtail</code> | \Updownarrowarrow | <code>\Updownarrowarrow</code> |

* Not predefined by the L^AT_EX 2_ε core. Use the `latexsym` package to expose this symbol.

† See the note beneath Table 236 for information about how to put a diagonal arrow across a mathematical expression (as in “ $\nabla \cdot \overset{0}{B}$ ”).

TABLE 138: Harpoons

| | | | | | |
|-------------------|------------------------------|--------------------|-------------------------------|----------------------|---------------------------------|
| \leftarrowtail | <code>\leftarrowtail</code> | \rightarrowtail | <code>\rightarrowtail</code> | \rightleftharpoons | <code>\rightleftharpoons</code> |
| \leftarrowarrow | <code>\leftarrowarrow</code> | \rightarrowarrow | <code>\rightarrowarrow</code> | | |

TABLE 139: `textcomp` Text-mode Arrows

| | | | | |
|--------------|-----------------------------|---------------|--------------------------|-------------------|
| \downarrow | <code>\textdownarrow</code> | \rightarrow | <code>\rightarrow</code> | \textrightarrow |
| \leftarrow | <code>\textleftarrow</code> | \uparrow | <code>\uparrow</code> | \textuparrow |

TABLE 140: *AMS* Arrows

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

TABLE 141: *AMS* Negated Arrows

| | | | | | |
|-----------------------|----------------------------------|------------------------|-----------------------------------|------------------------|-----------------------------------|
| $\not\leftarrowtail$ | <code>\not\leftarrowtail</code> | $\not\rightarrowtail$ | <code>\not\rightarrowtail</code> | $\not\rightarrowtail$ | <code>\not\rightarrowtail</code> |
| $\not\leftarrowarrow$ | <code>\not\leftarrowarrow</code> | $\not\rightarrowarrow$ | <code>\not\rightarrowarrow</code> | $\not\rightarrowarrow$ | <code>\not\rightarrowarrow</code> |

TABLE 142: *AMS* 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 143: stmaryrd Arrows

| | | | | | |
|-------------------|--------------------------------------|----------------|----------------------------------|---------------|-------------------------------|
| \leftarrow | <code>\leftarrowtriangle</code> | \Leftarrow | <code>\Mapsfrom</code> | \leftarrow | <code>\shortleftarrow</code> |
| \Leftarrow | <code>\leftrightarroweq</code> | \Leftarrow | <code>\mapsfrom</code> | \rightarrow | <code>\shortrightarrow</code> |
| \Leftrightarrow | <code>\leftrightarrowtriangle</code> | \Rrightarrow | <code>\Mapsto</code> | \uparrow | <code>\shortuparrow</code> |
| $\not\sim$ | <code>\lightning</code> | \nearrow | <code>\narrow</code> | \downarrow | <code>\ssearrow</code> |
| \Longleftarrow | <code>\Longmapsfrom</code> | \nwarrow | <code>\nnarrow</code> | \swarrow | <code>\ssarrow</code> |
| \Longleftarrow | <code>\longmapsfrom</code> | \rightarrow | <code>\rightarrowtriangle</code> | \downarrow | <code>\shortdownarrow</code> |
| \Rrightarrow | <code>\Longmapsto</code> | | | | |

TABLE 144: txfonts/pxfonts Arrows

| | | | | | |
|--------|------------------------------|--------|----------------------------------|--------------------|------------------------------|
| \Lsh | <code>\boxdotLeft</code> | \Rsh | <code>\circleddotright</code> | \Lsh | <code>\Diamondleft</code> |
| \Lsh | <code>\boxdotleft</code> | \Rsh | <code>\circleleft</code> | \Rsh | <code>\Diamondright</code> |
| \Rsh | <code>\boxdotright</code> | \Rsh | <code>\circleright</code> | \Rsh | <code>\DiamondRight</code> |
| \Rsh | <code>\boxdotRight</code> | \Rsh | <code>\dashleftrightarrow</code> | \rightsquigarrow | <code>\leftsquigarrow</code> |
| \Lsh | <code>\boxLeft</code> | \Rsh | <code>\DiamonddotLeft</code> | \nearrow | <code>\Narrow</code> |
| \Lsh | <code>\boxleft</code> | \Rsh | <code>\Diamonddotleft</code> | \nwarrow | <code>\Nwarrow</code> |
| \Rsh | <code>\boxright</code> | \Rsh | <code>\Diamonddotright</code> | \Rightarrow | <code>\Rightarrow</code> |
| \Rsh | <code>\boxRight</code> | \Rsh | <code>\DiamonddotRight</code> | \searrow | <code>\Sarrow</code> |
| \Rsh | <code>\circleddotleft</code> | \Rsh | <code>\DiamondLeft</code> | \swarrow | <code>\Swarrow</code> |

TABLE 145: mathabx Arrows

| | | | | | |
|---------------------------|--------------------------------------|--------------------|-----------------------------------|--------------------|--------------------------------|
| \circlearrowleft | <code>\circlearrowleft</code> | \leftarrow | <code>\leftarrow</code> | \nearrow | <code>\narrow</code> |
| \circlearrowright | <code>\circlearrowright</code> | \Leftarrow | <code>\leftleftarrows</code> | \restriction | <code>\restriction</code> |
| \curvearrowbotleft | <code>\curvearrowbotleft</code> | \Leftrightarrow | <code>\leftrightarrow</code> | \rightarrow | <code>\rightarrow</code> |
| \curvearrowbotleftright | <code>\curvearrowbotleftright</code> | \Leftrightarrow | <code>\leftrightsquigarrow</code> | \rightarrow | <code>\rightleftarrows</code> |
| \curvearrowbotright | <code>\curvearrowbotright</code> | \rightsquigarrow | <code>\leftrightsquigarrow</code> | \rightarrow | <code>\rightrightarrows</code> |
| \curvearrowleft | <code>\curvearrowleft</code> | \rightsquigarrow | <code>\leftsquigarrow</code> | \rightsquigarrow | <code>\rightsquigarrow</code> |
| \curvearrowleftright | <code>\curvearrowleftright</code> | \rightsquigarrow | <code>\lefttarrowright</code> | \curvearrowright | <code>\righttoleftarrow</code> |
| \curvearrowright | <code>\curvearrowright</code> | \Lsh | <code>\looparrowdownleft</code> | \Rsh | <code>\Rsh</code> |
| \dsh | <code>\dsh</code> | \Rsh | <code>\looparrowdownright</code> | \searrow | <code>\searrow</code> |
| \downdownarrows | <code>\downdownarrows</code> | \Lsh | <code>\looparrowleft</code> | \swarrow | <code>\swarrow</code> |
| \downtuparrow | <code>\downtuparrow</code> | \Rsh | <code>\looparrowright</code> | \updownarrows | <code>\updownarrows</code> |
| \downuparrows | <code>\downuparrows</code> | \Lsh | <code>\Lsh</code> | \downtuparrow | <code>\uptodownarrow</code> |
| \drsh | <code>\drsh</code> | \nearrow | <code>\nearrow</code> | \upuparrows | <code>\upuparrows</code> |

TABLE 146: mathabx Negated Arrows

| | | | | | |
|--------------|--------------------------|-------------------|-------------------------------|---------------|---------------------------|
| \Leftarrow | <code>\nLeftarrow</code> | \Leftrightarrow | <code>\nleftrightarrow</code> | \rightarrow | <code>\nrightarrow</code> |
| \Leftarrow | <code>\nleftarrow</code> | \Leftrightarrow | <code>\nLeftrightarrow</code> | \Rightarrow | <code>\nRightarrow</code> |

TABLE 147: mathabx Harpoons

| | | | | | |
|----|-------------------|---|--------------------|---|---------------------|
| = | \barleftharpoon | ← | \leftharpoonup | ⇒ | \rightleftharpoons |
| → | \barrightharpoon | ⇐ | \leftleftharpoons | ⇒ | \rightrightharpoons |
| ↓↓ | \downdownharpoons | ↔ | \leftrightharpoon | ⇓ | \updownharpoons |
| ↓↓ | \downharpoonleft | ⇒ | \leftrightharpoons | ↑ | \upharpoonleft |
| ↓↓ | \downharpoonright | ⇒ | \rightbarharpoon | ↑ | \upharpoonright |
| ↓↓ | \downupharpoons | → | \rightharpoondown | ⇓ | \upupharpoons |
| ≡≡ | \leftbarharpoon | → | \rightharpoonup | | |
| ←→ | \leftharpoondown | ↔ | \rightleftharpoon | | |

TABLE 148: MnSymbol Arrows

| | | | | | |
|----|----------------------|----|-----------------------------------|----|-----------------------|
| ⤠ | \curvearrowdownup | ⤠ | \longleftarrow | ⤠ | \rhookswarrow |
| ⤡⤢ | \curvearrowleftright | ⤡⤢ | \Longleftarrow | ⤡⤢ | \rhookuparrow |
| ⤢⤣ | \curvearrownesw | ⤢⤣ | \longleftrightarrow | ⤢⤣ | \rightarrow |
| ⤢⤤ | \curvearrownwse | ⤢⤤ | \Longleftrightarrow | ⤢⤤ | \Rightarrow |
| ⤢⤥ | \curvearrowrightleft | ⤢⤥ | \longmapsto | ⤢⤥ | \rightarrowtail |
| ⤢⤦ | \curvearrowsenw | ⤢⤦ | \longrightarrow | ⤢⤦ | \rightleftarrows |
| ⤢⤧ | \curvearrowswne | ⤢⤧ | \Longrightarrow | ⤢⤧ | \rightarrowtail |
| ⤢⤨ | \curvearrowupdown | ⤢⤨ | \looparrowleft | ⤢⤨ | \rightmapsto |
| ⤢⤩ | \dasheddownarrow | ⤢⤩ | \looparrowright | ⤢⤩ | \rightrightarrowtail |
| ⤢⤪ | \dashedleftarrow | ⤢⤪ | \Lsh | ⤢⤪ | \rightarrowsquigarrow |
| ⤢⤫ | \dashednearrow | ⤢⤫ | \nearrow | ⤢⤫ | \Rsh |
| ⤢⤬ | \dashednarrow | ⤢⤬ | \nearrowtail | ⤢⤬ | \searrow |
| ⤢⤭ | \dashedrightarrow | ⤢⤭ | \nearrowtail | ⤢⤭ | \Searrow |
| ⤢⤮ | \dashedsearrow | ⤢⤮ | \nelsquigarrow | ⤢⤮ | \searrowtail |
| ⤢⤯ | \dashedswarrow | ⤢⤯ | \nemapsto | ⤢⤯ | \selsquigarrow |
| ⤢⤰ | \dasheduparrow | ⤢⤰ | \nenarrows | ⤢⤰ | \semapsto |
| ⤢⤱ | \Downarrow | ⤢⤱ | \nersquigarrow | ⤢⤱ | \senarrows |
| ⤢⤲ | \downarrow | ⤢⤲ | \neswarrow | ⤢⤲ | \sersquigarrow |
| ⤢⤳ | \downarrowtail | ⤢⤳ | \Neswarrow | ⤢⤳ | \sesearrows |
| ⤢⤴ | \downdownarrows | ⤢⤴ | \neswarrows | ⤢⤴ | \squigarrowdownup |
| ⤢⤵ | \downlsquigarrow | ⤢⤵ | \narrow | ⤢⤵ | \squigarrowleftright |
| ⤢⤶ | \downmapsto | ⤢⤶ | \Narrow | ⤢⤶ | \squigarrownesw |
| ⤢⤷ | \downrsquigarrow | ⤢⤷ | \narrowtail | ⤢⤷ | \squigarrownwse |
| ⤢⤸ | \downuparrows | ⤢⤸ | \nlslsquigarrow | ⤢⤸ | \squigarrowrightleft |
| ⤢⤹ | \lcirclearrowdown | ⤢⤹ | \nwmapsto | ⤢⤹ | \squigarrowsewn |
| ⤢⤺ | \lcirclearrowleft | ⤢⤺ | \nwnwarrows | ⤢⤺ | \squigarrowswne |
| ⤢⤻ | \lcirclearrowright | ⤢⤻ | \nwsquigarrow | ⤢⤻ | \squigarrowupdown |
| ⤢⤼ | \lcirclearrowup | ⤢⤼ | \nwsearrow | ⤢⤼ | \swarrow |
| ⤢⤽ | \lcurvearrowdown | ⤢⤽ | \Nwsearrow | ⤢⤽ | \Swarrow |
| ⤢⤾ | \lcurvearrowleft | ⤢⤾ | \nwsearrows | ⤢⤾ | \swarrowtail |
| ⤢⤿ | \lcurvearrowne | ⤢⤿ | \partialovalldlcircleleftint* | ⤢⤿ | \swarrowtail |
| ⤢⤿ | \lcurvearrownw | ⤢⤿ | \partialovalldlcirclerightint* | ⤢⤿ | \swlsquigarrow |
| ⤢⤿ | \lcurvearrowright | ⤢⤿ | \partialovalvrdrcircleleftint* | ⤢⤿ | \swmapsto |
| ⤢⤿ | \lcurvearrowse | ⤢⤿ | \partialovalvrdrcirclerightint* | ⤢⤿ | \swnearrows |
| ⤢⤿ | \lcurvearrowsw | ⤢⤿ | \partialovalvartlccircleleftint* | ⤢⤿ | \swrsquigarrow |
| ⤢⤿ | \lcurvearrowup | ⤢⤿ | \partialovalvartlccirclerightint* | ⤢⤿ | \swwarrows |
| ⤢⤿ | \Leftarrow | ⤢⤿ | \partialovalvartrccircleleftint* | ⤢⤿ | \twoheaddownarrow |

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(continued from previous page)

| | | | | | | | |
|------------------|-----------------------------|---------------------|-----------------------|-----------------------|---------------------|--------------------|---------------------------------|
| \leftarrow | <code>\leftarrow</code> | \circlearrowleft | <code>\partial</code> | <code>\partial</code> | ∂ | \rightarrow | <code>\twoheadleftarrow</code> |
| \leftarrowtail | <code>\leftarrowtail</code> | \circlearrowright | <code>\partial</code> | <code>\partial</code> | \circlearrowright | \nearrow | <code>\twoheadnearrow</code> |
| \Leftarrowtail | <code>\Leftarrowtail</code> | \circlearrowleft | <code>\partial</code> | <code>\partial</code> | \circlearrowleft | \nwarrow | <code>\twoheadnarrow</code> |
| \Leftarrow | <code>\Leftarrow</code> | \circlearrowright | <code>\partial</code> | <code>\partial</code> | \circlearrowright | \rightarrowtail | <code>\twoheadrightarrow</code> |
| \Leftarrowtail | <code>\Leftarrowtail</code> | \circlearrowup | <code>\partial</code> | <code>\partial</code> | \circlearrowup | \swarrow | <code>\twoheadsearrow</code> |
| \Leftarrow | <code>\Leftarrow</code> | \circlearrowdown | <code>\partial</code> | <code>\partial</code> | \circlearrowdown | \nwarrowtail | <code>\twoheadswarrow</code> |
| \Leftarrowtail | <code>\Leftarrowtail</code> | \curvearrowleft | <code>\partial</code> | <code>\partial</code> | \curvearrowleft | \uparrow | <code>\twoheaduparrow</code> |
| \Leftarrow | <code>\Leftarrow</code> | \curvearrowright | <code>\partial</code> | <code>\partial</code> | \curvearrowright | \uparrow | <code>\uparrow</code> |
| \Leftarrowtail | <code>\Leftarrowtail</code> | \curvearrowup | <code>\partial</code> | <code>\partial</code> | \curvearrowup | \uparrow | <code>\Uparrow</code> |
| \Leftarrow | <code>\Leftarrow</code> | \curvearrowdown | <code>\partial</code> | <code>\partial</code> | \curvearrowdown | \uparrowtail | <code>\uparrowtail</code> |
| \Leftarrowtail | <code>\Leftarrowtail</code> | \curvearrowse | <code>\partial</code> | <code>\partial</code> | \curvearrowse | \updownarrow | <code>\updownarrow</code> |
| \Leftarrowtail | <code>\Leftarrowtail</code> | \curvearrowsw | <code>\partial</code> | <code>\partial</code> | \curvearrowsw | \Downarrow | <code>\Downarrow</code> |
| \Leftarrowtail | <code>\Leftarrowtail</code> | \curvearrowup | <code>\partial</code> | <code>\partial</code> | \curvearrowup | \Downarrow | <code>\Downarrow</code> |
| \Leftarrowtail | <code>\Leftarrowtail</code> | \hookdownarrow | <code>\partial</code> | <code>\partial</code> | \hookdownarrow | \nwarrow | <code>\uplsquigarrow</code> |
| \Leftarrowtail | <code>\Leftarrowtail</code> | \hookleftarrow | <code>\partial</code> | <code>\partial</code> | \hookleftarrow | \uparrow | <code>\upmapsto</code> |
| \Leftarrowtail | <code>\Leftarrowtail</code> | \hooknearrow | <code>\partial</code> | <code>\partial</code> | \hooknearrow | \uparrow | <code>\uprsquigarrow</code> |
| \Leftarrowtail | <code>\Leftarrowtail</code> | \hookuparrow | <code>\partial</code> | <code>\partial</code> | \hookuparrow | $\uparrow\uparrow$ | <code>\upuparrows</code> |
| \Leftarrowtail | <code>\Leftarrowtail</code> | \lightning | <code>\partial</code> | <code>\partial</code> | \lightning | \uparrow | <code>\upuparrow</code> |
| \Leftarrowtail | <code>\Leftarrowtail</code> | \Lleftarrow | <code>\partial</code> | <code>\partial</code> | \Lleftarrow | \uparrow | <code>\Luparrow</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>\rightsquigarrow</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...int` macros are intended to be used internally by MnSymbol to produce various types of integrals.

TABLE 149: MnSymbol Negated Arrows

| | | | | | | | |
|----------------------|------------------------------|----------------------------|-----------------------------------|----------------------|--------------------------------|----------------------|---------------------------------|
| $\not\leftarrowtail$ | <code>\nleftarrowtail</code> | $\not\curvearrowdownup$ | <code>\ncurvaturedownup</code> | $\not\leftarrowtail$ | <code>\nlhooknarrow</code> | $\not\leftarrowtail$ | <code>\nrightleftarrows</code> |
| $\not\leftarrowtail$ | <code>\nleftarrowtail</code> | $\not\curvearrowleftright$ | <code>\ncurvatureleftright</code> | $\not\leftarrowtail$ | <code>\nlhookrightarrow</code> | $\not\leftarrowtail$ | <code>\nrightlsquigarrow</code> |
| $\not\leftarrowtail$ | <code>\nleftarrowtail</code> | $\not\curvearrownesw$ | <code>\ncurvaturenesw</code> | $\not\leftarrowtail$ | <code>\nlhooksearrow</code> | $\not\leftarrowtail$ | <code>\nrightmapsto</code> |
| $\not\leftarrowtail$ | <code>\nleftarrowtail</code> | $\not\curvearrowrownwse$ | <code>\ncurvaturerownwse</code> | $\not\leftarrowtail$ | <code>\nlhookswarrow</code> | $\not\leftarrowtail$ | <code>\nrightrightarrows</code> |
| $\not\leftarrowtail$ | <code>\nleftarrowtail</code> | $\not\curvearrowrightleft$ | <code>\ncurvaturerightleft</code> | $\not\leftarrowtail$ | <code>\nlhookuparrow</code> | $\not\leftarrowtail$ | <code>\nrightrsquigarrow</code> |
| $\not\leftarrowtail$ | <code>\nleftarrowtail</code> | $\not\curvearrowrowsenw$ | <code>\ncurvaturerowsenw</code> | $\not\leftarrowtail$ | <code>\nLleftarrow</code> | $\not\leftarrowtail$ | <code>\nRightarrow</code> |
| $\not\leftarrowtail$ | <code>\nleftarrowtail</code> | $\not\curvearrowswne$ | <code>\ncurarrowswne</code> | $\not\leftarrowtail$ | <code>\nnearrow</code> | $\not\leftarrowtail$ | <code>\nSearrow</code> |
| $\not\leftarrowtail$ | <code>\nleftarrowtail</code> | $\not\curvearrowupdown$ | <code>\ncurvatureupdown</code> | $\not\leftarrowtail$ | <code>\nNearrow</code> | $\not\leftarrowtail$ | <code>\nsearrow</code> |

(continued on next page)

(continued from previous page)

| | | | | | |
|--------------------|-----------------------------------|----------------|---------------------------------|----------------|------------------------------------|
| \downarrow | <code>\ndasheddownarrow</code> | \nearrow | <code>\nnearrowtail</code> | \nwarrowtail | <code>\nsearrowtail</code> |
| \leftarrow | <code>\ndashedleftarrow</code> | \nwarrowtail | <code>\nnelsquigarrow</code> | \nwarrowtail | <code>\nselsquigarrow</code> |
| \nearrow | <code>\ndashednearrow</code> | \nwarrowtail | <code>\nnemapsto</code> | \nwarrowtail | <code>\nsemapsto</code> |
| \nwarrowtail | <code>\ndashednarrow</code> | \nwarrowtail | <code>\nnenearrows</code> | \nwarrowtail | <code>\nsenwarrows</code> |
| \rightarrow | <code>\ndashedrightarrow</code> | \nwarrowtail | <code>\nnersquigarrow</code> | \nwarrowtail | <code>\nsersquigarrow</code> |
| \searrow | <code>\ndashedsearrow</code> | \nwarrowtail | <code>\nNeswarrow</code> | \nwarrowtail | <code>\nsesearrows</code> |
| \swarrow | <code>\ndashedswarrow</code> | \nwarrowtail | <code>\nneswarrow</code> | \nwarrowtail | <code>\nsquigarrowdownup</code> |
| \uparrow | <code>\ndasheduparrow</code> | \nwarrowtail | <code>\nneswarrows</code> | \nwarrowtail | <code>\nsquigarrowleftright</code> |
| \downarrow | <code>\ndownarrow</code> | \nwarrowtail | <code>\nNarrow</code> | \nwarrowtail | <code>\nsquigarrownesw</code> |
| $\#$ | <code>\nDownarrow</code> | \nwarrowtail | <code>\nnarrow</code> | \nwarrowtail | <code>\nsquigarrownwse</code> |
| \Downarrow | <code>\ndownarrowtail</code> | \nwarrowtail | <code>\nnarrowtail</code> | \nwarrowtail | <code>\nsquigarrowrightleft</code> |
| \Downarrow | <code>\ndowndownarrows</code> | \nwarrowtail | <code>\nnwlsquigarrow</code> | \nwarrowtail | <code>\nsquigarrowsenw</code> |
| \Downarrow | <code>\ndownlsquigarrow</code> | \nwarrowtail | <code>\nnwmapsto</code> | \nwarrowtail | <code>\nsquigarrowswne</code> |
| \Downarrow | <code>\ndownmapsto</code> | \nwarrowtail | <code>\nnwnwarrows</code> | \nwarrowtail | <code>\nsquigarrowupdown</code> |
| \Downarrow | <code>\ndownrsquigarrow</code> | \nwarrowtail | <code>\nnwrsquigarrow</code> | \nwarrowtail | <code>\nswarrow</code> |
| \Downarrow | <code>\downuparrows</code> | \nwarrowtail | <code>\nnwsearrow</code> | \nwarrowtail | <code>\nSwarrow</code> |
| \bullet | <code>\nlccleararrowdown</code> | \nwarrowtail | <code>\nNsearrow</code> | \nwarrowtail | <code>\nswarrowtail</code> |
| \bullet | <code>\nlccleararrowleft</code> | \nwarrowtail | <code>\nnwsearrows</code> | \nwarrowtail | <code>\nswlsquigarrow</code> |
| \bullet | <code>\nlccleararrowright</code> | \nwarrowtail | <code>\nrcleararrowdown</code> | \nwarrowtail | <code>\nswmapsto</code> |
| \bullet | <code>\nlccleararrowup</code> | \nwarrowtail | <code>\nrcleararrowleft</code> | \nwarrowtail | <code>\nswnearrows</code> |
| \curvearrowright | <code>\nlcurvearrowdown</code> | \nwarrowtail | <code>\nrcleararrowright</code> | \nwarrowtail | <code>\nswrsquigarrow</code> |
| \curvearrowright | <code>\nlcurvearrowleft</code> | \nwarrowtail | <code>\nrcleararrowup</code> | \nwarrowtail | <code>\nswswarrows</code> |
| \curvearrowright | <code>\nlcurvearrowne</code> | \nwarrowtail | <code>\nrcurvearrowdown</code> | \nwarrowtail | <code>\ntwoheaddownarrow</code> |
| \curvearrowright | <code>\nlcurvearrownw</code> | \nwarrowtail | <code>\nrcurvearrowleft</code> | \nwarrowtail | <code>\ntwoheadleftarrow</code> |
| \curvearrowright | <code>\nlcurvearrowright</code> | \nwarrowtail | <code>\nrcurvearrowne</code> | \nwarrowtail | <code>\ntwoheadnearrow</code> |
| \curvearrowright | <code>\nlcurvearrowse</code> | \nwarrowtail | <code>\nrcurvearrownw</code> | \nwarrowtail | <code>\ntwoheadnarrow</code> |
| \curvearrowright | <code>\nlcurvearrowsw</code> | \nwarrowtail | <code>\nrcurvearrowright</code> | \nwarrowtail | <code>\ntwoheadrightarrow</code> |
| \curvearrowright | <code>\nlcurvearrowup</code> | \nwarrowtail | <code>\nrcurvearrowse</code> | \nwarrowtail | <code>\ntwoheadsearrow</code> |
| \Leftarrow | <code>\nLeftarrow</code> | \nwarrowtail | <code>\nrcurvearrowsw</code> | \nwarrowtail | <code>\ntwoheadswarrow</code> |
| \leftarrow | <code>\nleftarrow</code> | \nwarrowtail | <code>\nrcurvearrowup</code> | \nwarrowtail | <code>\ntwoheaduparrow</code> |
| \leftarrow | <code>\nleftarrowtail</code> | \nwarrowtail | <code>\nrhookdownarrow</code> | \nwarrowtail | <code>\nuparrow</code> |
| \leftarrow | <code>\nleftleftarrows</code> | \nwarrowtail | <code>\nrhookleftarrow</code> | \nwarrowtail | <code>\nUparrow</code> |
| \leftarrow | <code>\nleftlsquigarrow</code> | \nwarrowtail | <code>\nrhooknearrow</code> | \nwarrowtail | <code>\nuparrowtail</code> |
| \leftarrow | <code>\nleftmapsto</code> | \nwarrowtail | <code>\nrhooknarrow</code> | \nwarrowtail | <code>\nupdownarrow</code> |
| \leftarrow | <code>\nleftrightarrow</code> | \nwarrowtail | <code>\nrhookrightarrow</code> | \nwarrowtail | <code>\nUpdownarrow</code> |
| \leftarrow | <code>\nLeftrightarrow</code> | \nwarrowtail | <code>\nrhooksearrow</code> | \nwarrowtail | <code>\nupdownarrows</code> |
| \leftarrow | <code>\nleftrightarrows</code> | \nwarrowtail | <code>\nrhookswarrow</code> | \nwarrowtail | <code>\nuplsquigarrow</code> |
| \leftarrow | <code>\nlefrightsquigarrow</code> | \nwarrowtail | <code>\nrhookuparrow</code> | \nwarrowtail | <code>\nupmapsto</code> |
| \leftarrow | <code>\nlhookdownarrow</code> | \nwarrowtail | <code>\nrightarrow</code> | \nwarrowtail | <code>\nuprsquigarrow</code> |
| \leftarrow | <code>\nlhookleftarrow</code> | \nwarrowtail | <code>\nRightarrow</code> | \nwarrowtail | <code>\nupuparrows</code> |
| \leftarrow | <code>\nlhooknearrow</code> | \nwarrowtail | <code>\nrightarrowtail</code> | \nwarrowtail | |

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>\curvearrowleft</code> | (same as <code>\nrcurvearrowleft</code>) |
| \curvearrowright | <code>\curvearrowright</code> | (same as <code>\nlcurvearrowright</code>) |
| \dasharrow | <code>\ndasharrow</code> | (same as <code>\ndashedrightarrow</code>) |
| \dashleftarrow | <code>\dashleftarrow</code> | (same as <code>\ndashedleftarrow</code>) |
| \dashrightarrow | <code>\dashrightarrow</code> | (same as <code>\ndashedrightarrow</code>) |
| \leftarrow | <code>\ngleftarrow</code> | (same as <code>\nleftarrow</code>) |
| \leftarrow | <code>\nhookleftarrow</code> | (same as <code>\nrhookleftarrow</code>) |
| \leftarrow | <code>\nhookrightarrow</code> | (same as <code>\nlhookrightarrow</code>) |
| \leadsto | <code>\leadsto</code> | (same as <code>\nrightarrow</code>) |
| \leftrightsquigarrow | <code>\leftrightsquigarrow</code> | (same as <code>\nsquigarrowleft</code>) |
| \mapsto | <code>\mapsto</code> | (same as <code>\nrightarrowmapsto</code>) |
| \rightsquigarrow | <code>\rightsquigarrow</code> | (same as <code>\nrightarrow</code>) |
| \rightarrowto | <code>\rightarrowto</code> | (same as <code>\nrightarrow</code>) |

TABLE 150: MnSymbol Harpoons

| | | | | | |
|----------------|--------------------------------------|---------------|---------------------------------|--------------|--------------------------------------|
| \downarrow | <code>\downharpoonccw*</code> | \nearrow | <code>\neswharpoons</code> | \searrow | <code>\seharpooncw</code> |
| \downarrow | <code>\downharpooncw*</code> | \swarrow | <code>\neswharpoonsenw</code> | \nwarrow | <code>\senwharpoons</code> |
| \updownarrow | <code>\downupharpoons</code> | \nearrow | <code>\nwharpoonccw</code> | \swarrow | <code>\swharpoonccw</code> |
| \leftarrow | <code>\leftharpoonccw*</code> | \nwarrow | <code>\nwharpooncw</code> | \nearrow | <code>\swharpooncw</code> |
| \leftarrow | <code>\leftharpooncw*</code> | \nwarrow | <code>\nwseharpoonnesw</code> | \swarrow | <code>\swneharpoons</code> |
| \leftarrow | <code>\leftrightharpoondownup</code> | \nwarrow | <code>\nwseharpoons</code> | \downarrow | <code>\updownharpoonleftright</code> |
| \leftarrow | <code>\leftrightharpoons</code> | \nwarrow | <code>\nwseharpoonswne</code> | \downarrow | <code>\updownharpoonrightleft</code> |
| \leftarrow | <code>\leftrightharpoonupdown</code> | \rightarrow | <code>\rightharpoonccw*</code> | \uparrow | <code>\updownharpoons</code> |
| \nearrow | <code>\neharpoonccw</code> | \rightarrow | <code>\rightharpooncw*</code> | \uparrow | <code>\upharpoonccw*</code> |
| \nearrow | <code>\neharpooncw</code> | \Rightarrow | <code>\rightleftharpoons</code> | \uparrow | <code>\upharpooncw*</code> |
| \nearrow | <code>\neswharpoonnwse</code> | \nearrow | <code>\seharpoonccw</code> | | |

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

TABLE 151: MnSymbol Negated Harpoons

| | | | | | |
|------------|---------------------------------------|------------------|----------------------------------|------------------|---------------------------------------|
| \dagger | <code>\ndownharpoonccw*</code> | \ddagger | <code>\nneswharpoons</code> | \times | <code>\nseharpooncw</code> |
| \dagger | <code>\ndownharpooncw*</code> | \times | <code>\nneswharpoonsenw</code> | \divideontimes | <code>\nsenwharpoons</code> |
| \ddagger | <code>\ndownupharpoons</code> | \times | <code>\nnwharpoonccw</code> | \times | <code>\nswharpoonccw</code> |
| \ddagger | <code>\nleftharpoonccw*</code> | \times | <code>\nnwharpooncw</code> | \times | <code>\nswharpooncw</code> |
| \ddagger | <code>\nleftharpooncw*</code> | \times | <code>\nnwseharpoonnesw</code> | \divideontimes | <code>\nswneharpoons</code> |
| \ddagger | <code>\nleftrightharpoondownup</code> | \divideontimes | <code>\nnwseharpoons</code> | \dagger | <code>\nupdownharpoonleftright</code> |
| \ddagger | <code>\nleftrightharpoons</code> | \times | <code>\nnwseharpoonswne</code> | \dagger | <code>\nupdownharpoonrightleft</code> |
| \ddagger | <code>\nleftrightharpoonupdown</code> | \divideontimes | <code>\nrightharpoonccw*</code> | \dagger | <code>\nupdownharpoons</code> |
| \times | <code>\nneharpoonccw</code> | \divideontimes | <code>\nrightharpooncw*</code> | \dagger | <code>\nupharpoonccw*</code> |
| \times | <code>\nneharpooncw</code> | \divideontimes | <code>\nrightleftharpoons</code> | \dagger | <code>\nupharpooncw*</code> |
| \times | <code>\nneswharpoonnwse</code> | \times | <code>\nseharpoonccw</code> | | |

* 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 `\restriction`.)

TABLE 152: *fdsymbol* Arrows

| | | | | | |
|---|----------------------|----|---------------------|----|------------------------|
| ↺ | \acwcirclearrowdown | ← | \leftarrow | ↗ | \rightrightarrows |
| ↻ | \acwcirclearrowleft | ↔ | \leftarrowtail | ↝ | \rightwavearrow |
| ↶ | \acwcirclearrowright | ↔- | \leftbkarrow | ⇒ | \Rrightarrow |
| ↷ | \acwcirclearrowup | ↔= | \leftleftarrows | ↑ | \Rsh |
| ↖ | \acwlefttarcarrow | ↔↑ | \leftmapsto | ↙ | \searrow |
| ↗ | \acwnearcarrow | ↔↓ | \Leftmapsto | ↘ | \Searrow |
| ↙ | \acwnwarcarrow | ↔↔ | \Leftrightarrow | ↙ | \searrowtail |
| ↖ | \acwoverarcarrow | ↔↔ | \leftrightarrow | ↘ | \sebkarrown |
| ↗ | \acwrightarcarrow | ↔⤒ | \leftrightarrows | ⤒ | \senwarrows |
| ⤓ | \acwsearcarrow | ⤓⤒ | \leftrightwavearrow | ⤒⤓ | \sesearrows |
| ⤔ | \acwswarcarrow | ⤔⤒ | \leftwavearrow | ⤔⤒ | \Swarrow |
| ⤖ | \acwunderarcarrow | ⤖⤒ | \lightning | ⤖⤒ | \swarrow |
| ⤗ | \bdlefttarcarrow | ⤗⤒ | \Lleftarrow | ⤗⤒ | \swarrowtail |
| ⤘ | \bdnearcarrow | ⤘⤒ | \Longleftarrow | ⤘⤒ | \swbkarrown |
| ⤙ | \bdnwarcarrow | ⤙⤒ | \longleftarrow | ⤙⤒ | \swnearrows |
| ⤚ | \bdoverarcarrow | ⤚⤒ | \longleftrightarrow | ⤚⤒ | \swswarrows |
| ⤛ | \bdrightarcarrow | ⤛⤒ | \Longleftrightarrow | ⤛⤒ | \twoheaddownarrow |
| ⤜ | \bdsearcarrow | ⤜⤒ | \longleftwavearrow | ⤜⤒ | \twoheadleftarrow |
| ⤝ | \bdswarcarrow | ⤝⤒ | \Longmapsfrom | ⤝⤒ | \twoheadnearrow |
| ⤞ | \bdunderarcarrow | ⤞⤒ | \longmapsfrom | ⤞⤒ | \twoheadnarrow |
| ⤟ | \cwcirclearrowdown | ⤟⤒ | \Longmapsto | ⤟⤒ | \twoheadrightarrow |
| ⤠ | \cwcirclearrowleft | ⤠⤒ | \longmapsto | ⤠⤒ | \twoheadsearrow |
| ⤡ | \cwcirclearrowright | ⤡⤒ | \longrightarrow | ⤡⤒ | \twoheadsarrow |
| ⤢ | \cwcirclearrowup | ⤢⤒ | \Longrightarrow | ⤢⤒ | \twoheaduparrow |
| ⤣ | \cwlefttarcarrow | ⤣⤒ | \longrightwavearrow | ⤣⤒ | \uparrow |
| ⤤ | \cwnearcarrow | ⤤⤒ | \looparrowleft | ⤤⤒ | \Uparrow |
| ⤥ | \cwnwarcarrow | ⤥⤒ | \looparrowright | ⤥⤒ | \uparrowtail |
| ⤦ | \cwoverarcarrow | ⤦⤒ | \Lsh | ⤦⤒ | \upbkarrown |
| ⤧ | \cwrightarcarrow | ⤧⤒ | \nearrow | ⤧⤒ | \Updownarrow |
| ⤨ | \cwsearcarrow | ⤨⤒ | \Narrow | ⤨⤒ | \updownarrow |
| ⤩ | \cwswarcarrow | ⤩⤒ | \nearrowtail | ⤩⤒ | \updownarrows |
| ⤪ | \cwunderarcarrow | ⤪⤒ | \nebkarrown | ⤪⤒ | \updownwavearrow |
| ⤫ | \Ddownarrow | ⤫⤒ | \nenarrows | ⤫⤒ | \upmapsto |
| ⤬ | \Downarrow | ⤬⤒ | \Nesarrow | ⤬⤒ | \Upmapsto |
| ⤭ | \downarrow | ⤭⤒ | \nesarrow | ⤭⤒ | \upuparrows |
| ⤮ | \downarrowtail | ⤮⤒ | \neswarrows | ⤮⤒ | \upwavearrow |
| ⤯ | \downbkarrown | ⤯⤒ | \Narrow | ⤯⤒ | \Uparrow |
| ⤰ | \downdownarrows | ⤰⤒ | \narrow | ⤰⤒ | \vardownwavearrow |
| ⤱ | \Downmapsto | ⤱⤒ | \narrowtail | ⤱⤒ | \varhookdownarrow |
| ⤲ | \downmapsto | ⤲⤒ | \nwbkarrown | ⤲⤒ | \varhookleftarrow |
| ⤳ | \downuparrows | ⤳⤒ | \nwnwarrows | ⤳⤒ | \varhooknearrow |
| ⤴ | \downwavearrow | ⤴⤒ | \Nwsearrow | ⤴⤒ | \varhooknarrow |
| ⤵ | \hookdownarrow | ⤵⤒ | \nwsearrow | ⤵⤒ | \varhookrightarrow |
| ⤶ | \hookleftarrow | ⤶⤒ | \nwsearrows | ⤶⤒ | \varhooksearrow |
| ⤷ | \hooknearrow | ⤷⤒ | \Rdsh | ⤷⤒ | \varhookswarrow |
| ⤸ | \hooknarrow | ⤸⤒ | \Rightarrow | ⤸⤒ | \varhookuparrow |
| ⤹ | \hookrightarrow | ⤹⤒ | \rightarrow | ⤹⤒ | \varleftrightwavearrow |
| ⤺ | \hooksearrow | ⤺⤒ | \rightarrowtail | ⤺⤒ | \varleftwavearrow |
| ⤻ | \hookswarrow | ⤻⤒ | \rightbkarrown | ⤻⤒ | \varrightwavearrow |
| ⤼ | \hookuparrow | ⤼⤒ | \rightleftarrows | ⤼⤒ | \varupdownwavearrow |
| ⤽ | \Ldsh | ⤽⤒ | \Rightmapsto | ⤽⤒ | \varupwavearrow |

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(continued from previous page)

\Leftarrow \Leftarrow \rightmapsto

fdsymbol defines synonyms for most of the preceding symbols:

| | | | | | |
|----------------------|-----------------------|------------------------|----------------------|------------------------|-----------------------|
| \circlearrowleft | \acwgapcirclearrow | \rightsquigarrow | \leftrightsquigarrow | \nwarrow | \rhooknarrow |
| \circlearrowright | \acwopencirclearrow | \leftrightsquigarrow | \leftrightsquigarrow | \rightarrowtail | \rhookrightarrow |
| \circlearrowleft | \circlearrowleft | \leftarrowtail | \leftarrowtail | \searrowtail | \rhooksearrow |
| \circlearrowright | \circlearrowright | \uparrowtail | \uparrowtail | \swarrowtail | \rhookswarrow |
| \curvearrowleft | \curvearrowleft | \downarrowtail | \downarrowtail | \uparrowtail | \rhookuparrow |
| \curvearrowright | \curvearrowright | \leftarrowtail | \leftarrowtail | \rightarrowtail | \rightcurvedarrow |
| \curvearrowleft | \curvearrowleft | \leftarrowtail | \leftarrowtail | \leftarrowtail | \rightdowncurvedarrow |
| \curvearrowright | \curvearrowright | \rightarrowtail | \rightarrowtail | \rightarrowtail | \rightlcurvearrow |
| \cwgapcirclearrow | \cwgapcirclearrow | \rightarrowtail | \rightarrowtail | \rightarrowtail | \rightleftcurvearrow |
| \cwopencirclearrow | \cwopencirclearrow | \rightarrowtail | \rightarrowtail | \rightarrowtail | \rightupcurvedarrow |
| \dasharrow | \dasharrow | \rightarrowtail | \rightarrowtail | \rightarrowtail | \rightleftcurvearrow |
| \dashleftarrow | \dashleftarrow | \rightarrowtail | \rightarrowtail | \rightarrowtail | \rightleftsquigarrow |
| \dashrightarrow | \dashrightarrow | \rightarrowtail | \rightarrowtail | \rightarrowtail | \rightlsquigarrow |
| \downarrow | \downlcurvearrow | \uparrowtail | \uparrowtail | \uparrowtail | \rightrcurvearrow |
| \downarrow | \downleftcurvedarrow | \rightsquigarrowtail | \longleadsto | \rightsquigarrowtail | \rightrsquigarrow |
| \downarrow | \downlsquigarrow | \rightsquigarrowtail | \longleftsquigarrow | \rightsquigarrowtail | \rightsquigarrow |
| \downarrow | \downrcurvearrow | \rightsquigarrowtail | \longrightsquigarrow | \rightsquigarrowtail | \rightupcurvedarrow |
| \downarrow | \downrightcurvedarrow | \downarrowtail | \mapsdown | \downarrowtail | \selcurvearrow |
| \downarrow | \downrsquigarrow | \downarrowtail | \Mapsdown | \downarrowtail | \senwcurvearrow |
| \downarrow | \downupcurvearrow | \leftarrowtail | \mapsfrom | \downarrowtail | \sercurvearrow |
| \downarrow | \downupsquigarrow | \leftarrowtail | \Mapsfrom | \downarrowtail | \swlcurvearrow |
| \downarrow | \downzigzagarrow | \rightarrowtail | \mapsto | \rightarrowtail | \swnecurvearrow |
| \leftarrow | \gets | \Rightarrowtail | \Mapsto | \leftarrowtail | \swrcurvearrow |
| \uparrow | \hknearrow | \uparrowtail | \mapsup | \rightarrowtail | \to |
| \uparrow | \hknarrow | \uparrowtail | \Mapsup | \uparrowtail | \updowncurvearrow |
| \uparrow | \hksearrow | \rightarrowtail | \nelcurvearrow | \uparrowtail | \updownsquigarrow |
| \uparrow | \hkswarrow | \rightarrowtail | \nercurvearrow | \uparrowtail | \uplcurvearrow |
| \rightarrowtail | \leadsto | \rightarrowtail | \neswcurvearrow | \uparrowtail | \upleftcurvedarrow |
| \leftarrowtail | \leftcurvedarrow | \leftarrowtail | \nlcurvearrow | \uparrowtail | \uplsquigarrow |
| \leftarrowtail | \leftdowncurvedarrow | \leftarrowtail | \nrcurvearrow | \uparrowtail | \uprcurvearrow |
| \leftarrowtail | \leftlcurvearrow | \leftarrowtail | \nwsecurvearrow | \uparrowtail | \uprightcurvearrow |
| \leftarrowtail | \leftlsquigarrow | \downarrowtail | \rhookdownarrow | \uparrowtail | \uprsquigarrow |
| \leftarrowtail | \leftrccurvearrow | \leftarrowtail | \rhookleftarrow | | |
| \leftarrowtail | \leftrightcurvearrow | \rightarrowtail | \rhooknearrow | | |

TABLE 153: fdsymbol Negated Arrows

| | | | | | |
|-------------------------|-----------------------|----------------------|------------------|----------------------|---------------|
| $\not\circlearrowleft$ | \nacwcirclearrowdown | $\not\Leftarrow$ | \nleftarrow | $\not\Rightarrow$ | \nRightarrow |
| $\not\circlearrowright$ | \nacwcirclearrowleft | $\not\Rightarrow$ | \nLeftarrow | $\not\Leftarrowtail$ | \nsearrow |
| $\not\circlearrowright$ | \nacwcirclearrowright | $\not\Leftarrowtail$ | \nleftarrowtail | $\not\Leftarrowtail$ | \nSearrow |
| $\not\circlearrowright$ | \nacwcirclearrowup | $\not\Leftarrowtail$ | \nleftbarrow | $\not\Leftarrowtail$ | \nsearrowtail |
| $\not\curvearrowleft$ | \nacwleftarcarrow | $\not\Leftarrowtail$ | \nleftleftarrows | $\not\Leftarrowtail$ | \nsebkarrow |
| $\not\curvearrowright$ | \nacwnearcarrow | $\not\Leftarrowtail$ | \nleftmapsto | $\not\Leftarrowtail$ | \nsenwarrows |
| $\not\curvearrowright$ | \nacwnwarccarw | $\not\Leftarrowtail$ | \nLeftmapsto | $\not\Leftarrowtail$ | \nsesearrows |
| $\not\curvearrowright$ | \nacwoverarcarrow | $\not\Leftarrowtail$ | \nleftrightarrow | $\not\Leftarrowtail$ | \nswarrow |

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(continued from previous page)

| | | | | | |
|--------------------|-----------------------------------|--------------------|-----------------------------------|------------|--------------------------------------|
| \nwarrow | <code>\nacwrightarcarrow</code> | \nleftrightarrow | <code>\nLeftrightarrow</code> | \nwarrow | <code>\nSwarrow</code> |
| \nearrow | <code>\nacwsearcarrow</code> | \nleftrightarrow | <code>\nleftrightarrows</code> | \nearrow | <code>\nswarrowtail</code> |
| \nwarrow | <code>\nacwswarcarrow</code> | \nleftrightarrow | <code>\nleftrightwavearrow</code> | \nwarrow | <code>\nswbkarrow</code> |
| \nwarrow | <code>\nacwunderarcarrow</code> | \nleftrightarrow | <code>\nleftwavearrow</code> | \nwarrow | <code>\nswnearrows</code> |
| \nwarrow | <code>\nbdbleftarcarrow</code> | \nleftrightarrow | <code>\nLeftarrow</code> | \nwarrow | <code>\nswwarrows</code> |
| \nwarrow | <code>\nbdbnearcarrow</code> | \nleftrightarrow | <code>\nlongleftarrow</code> | \nwarrow | <code>\ntwoheaddownarrow</code> |
| \nwarrow | <code>\nbdbnwarcarrow</code> | \nleftrightarrow | <code>\nLongleftarrow</code> | \nwarrow | <code>\ntwoheadleftarrow</code> |
| \nwarrow | <code>\nbdboverarcarrow</code> | \nleftrightarrow | <code>\nlongleftrightarrow</code> | \nwarrow | <code>\ntwoheadnearrow</code> |
| \nwarrow | <code>\nbdbrightarcarrow</code> | \nleftrightarrow | <code>\nLongleftrightarrow</code> | \nwarrow | <code>\ntwoheadnarrow</code> |
| \nwarrow | <code>\nbdssearcarrow</code> | \nleftrightarrow | <code>\nlongleftwavearrow</code> | \nwarrow | <code>\ntwoheadrightarrow</code> |
| \nwarrow | <code>\nbdbswarcarrow</code> | \nleftrightarrow | <code>\nlongmapsfrom</code> | \nwarrow | <code>\ntwoheadsearrow</code> |
| \nwarrow | <code>\nbdunderarcarrow</code> | \nleftrightarrow | <code>\nLongmapsfrom</code> | \nwarrow | <code>\ntwoheadswarrow</code> |
| \circlearrowleft | <code>\ncwcirclearrowdown</code> | \nleftrightarrow | <code>\nlongmapsto</code> | \nwarrow | <code>\ntwoheaduparrow</code> |
| \circlearrowleft | <code>\ncwcirclearrowleft</code> | \nleftrightarrow | <code>\nLongmapsto</code> | \uparrow | <code>\nuparrow</code> |
| \circlearrowleft | <code>\ncwcirclearrowright</code> | \nleftrightarrow | <code>\nlongrightarrow</code> | \uparrow | <code>\nUparrow</code> |
| \circlearrowleft | <code>\ncwcirclearrowup</code> | \nleftrightarrow | <code>\nLongrightarrow</code> | \uparrow | <code>\nuparrowtail</code> |
| \nwarrow | <code>\ncwleftarcarrow</code> | \nleftrightarrow | <code>\nlongrightwavearrow</code> | \uparrow | <code>\nupbkarw</code> |
| \nwarrow | <code>\ncwnearcarrow</code> | \nwarrow | <code>\nnearrow</code> | \uparrow | <code>\nupdownarrow</code> |
| \nwarrow | <code>\ncwnwarcarrow</code> | \nwarrow | <code>\nNearrow</code> | \uparrow | <code>\nUpdownarrow</code> |
| \nwarrow | <code>\ncwoverarcarrow</code> | \nwarrow | <code>\nnarrowtail</code> | \uparrow | <code>\nupdownarrows</code> |
| \nwarrow | <code>\ncwrightarcarrow</code> | \nwarrow | <code>\nnebkarw</code> | \uparrow | <code>\nupdownwavearrow</code> |
| \nwarrow | <code>\ncwsearcarrow</code> | \nwarrow | <code>\nnenearrows</code> | \uparrow | <code>\nupmapsto</code> |
| \nwarrow | <code>\ncwswarcarrow</code> | \nwarrow | <code>\nneswarw</code> | \uparrow | <code>\nUpmapsto</code> |
| \nwarrow | <code>\ncwunderarcarrow</code> | \nwarrow | <code>\nNeswarw</code> | \uparrow | <code>\nupuparrows</code> |
| \nwarrow | <code>\ndownarrow</code> | \nwarrow | <code>\nneswarrows</code> | \uparrow | <code>\nupwavearrow</code> |
| \nwarrow | <code>\ndownarrow</code> | \nwarrow | <code>\nnarrow</code> | \uparrow | <code>\nUparrow</code> |
| \nwarrow | <code>\Downarrow</code> | \nwarrow | <code>\nNarrow</code> | \uparrow | <code>\nvardownwavearrow</code> |
| \nwarrow | <code>\ndownarrowtail</code> | \nwarrow | <code>\nnarrowtail</code> | \uparrow | <code>\nvarhookdownarrow</code> |
| \nwarrow | <code>\ndownbkarrow</code> | \nwarrow | <code>\nnwbkarw</code> | \nwarrow | <code>\nvarhookleftarrow</code> |
| \nwarrow | <code>\ndowndownarrows</code> | \nwarrow | <code>\nnwnwarrows</code> | \nwarrow | <code>\nvarhooknearrow</code> |
| \nwarrow | <code>\downmapsto</code> | \nwarrow | <code>\nnsearrow</code> | \nwarrow | <code>\nvarhooknarrow</code> |
| \nwarrow | <code>\Downmapsto</code> | \nwarrow | <code>\nNsearrow</code> | \nwarrow | <code>\nvarhookrightarrow</code> |
| \nwarrow | <code>\downuparrows</code> | \nwarrow | <code>\nnsearrows</code> | \nwarrow | <code>\nvarhooksearrow</code> |
| \nwarrow | <code>\downwavearrow</code> | \nwarrow | <code>\rightarrow</code> | \nwarrow | <code>\nvarhookswarrow</code> |
| \nwarrow | <code>\hookdownarrow</code> | \nwarrow | <code>\Rightarrow</code> | \nwarrow | <code>\nvarhookuparrow</code> |
| \nwarrow | <code>\hookleftarrow</code> | \nwarrow | <code>\rightarrowtail</code> | \nwarrow | <code>\nvarleftrightwavearrow</code> |
| \nwarrow | <code>\hooknearrow</code> | \nwarrow | <code>\rightbkarrow</code> | \nwarrow | <code>\nvarleftwavearrow</code> |
| \nwarrow | <code>\hooknarrow</code> | \nwarrow | <code>\rightleftarrows</code> | \nwarrow | <code>\nvarrightwavearrow</code> |
| \nwarrow | <code>\hookrightarrow</code> | \nwarrow | <code>\rightmapsto</code> | \nwarrow | <code>\nvarupdownwavearrow</code> |
| \nwarrow | <code>\hooksearrow</code> | \nwarrow | <code>\Rightmapsto</code> | \nwarrow | <code>\nvarupwavearrow</code> |
| \nwarrow | <code>\hookswarrow</code> | \nwarrow | <code>\rightrightarrows</code> | \nwarrow | |
| \nwarrow | <code>\hookuparrow</code> | \nwarrow | <code>\rightwavearrow</code> | \nwarrow | |

`fdsymbol` defines synonyms for most of the preceding symbols:

| | | | | | |
|--------------------|-----------------------------------|------------|-----------------------------------|------------|------------------------------------|
| \circlearrowleft | <code>\nacwgpcirclearrow</code> | \nwarrow | <code>\leftdowncurvedarrow</code> | \nwarrow | <code>\rightdowncurvedarrow</code> |
| \circlearrowleft | <code>\nacwopencirclearrow</code> | \nwarrow | <code>\leftlcurvearrow</code> | \nwarrow | <code>\rightlcurvearrow</code> |
| \circlearrowleft | <code>\ncirclearrowleft</code> | \nwarrow | <code>\leftlsquigarrow</code> | \nwarrow | <code>\rightlcurvearrow</code> |
| \circlearrowleft | <code>\ncirclearrowright</code> | \nwarrow | <code>\leftrcurvearrow</code> | \nwarrow | <code>\rightleftcurvearrow</code> |
| \nwarrow | <code>\ncurvearrowleft</code> | \nwarrow | <code>\leftrightcurvearrow</code> | \nwarrow | <code>\rightleftsquigarrow</code> |
| \nwarrow | <code>\ncurvearrowright</code> | \nwarrow | <code>\leftrightsquigarrow</code> | \nwarrow | <code>\rightlsquigarrow</code> |
| \circlearrowleft | <code>\ncwgpcirclearrow</code> | \nwarrow | <code>\leftrsquigarrow</code> | \nwarrow | <code>\rightrcurvearrow</code> |
| \circlearrowleft | <code>\ncwopencirclearrow</code> | \nwarrow | <code>\leftsquigarrow</code> | \nwarrow | <code>\rightrsquigarrow</code> |

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| | | | | | |
|-------------------|-------------------------------------|--------------|------------------------------------|---------------|-----------------------------------|
| \dashrightarrow | <code>\ndasharrow</code> | \nwarrow | <code>\nleftupcurvedarrow</code> | \nearrow | <code>\nrightsquigarrow</code> |
| \dashleftarrow | <code>\ndashleftarrow</code> | \nwswarrow | <code>\nlongleadsto</code> | \nearrow | <code>\nrightupcurvedarrow</code> |
| \dashrightarrow | <code>\ndashrightarrow</code> | \nwsearrow | <code>\nlongleftsquigarrow</code> | \nearrow | <code>\nselcurvearrow</code> |
| \dashv | <code>\ndownlcurvearrow</code> | \nwswarrow | <code>\nlongrightsquigarrow</code> | \nearrow | <code>\nsenwcurvearrow</code> |
| \dashleftarrow | <code>\ndownleftcurvedarrow</code> | \nwarrow | <code>\nmapsdown</code> | \nearrow | <code>\nsercurvearrow</code> |
| \dashleftarrow | <code>\ndownlsquigarrow</code> | \nwarrow | <code>\nMapsdown</code> | \nearrow | <code>\nswlcurvearrow</code> |
| \dashleftarrow | <code>\ndownrcurvearrow</code> | \nwarrow | <code>\nmapsfrom</code> | \nearrow | <code>\nswnecurvearrow</code> |
| \dashleftarrow | <code>\ndownrightcurvedarrow</code> | \nwarrow | <code>\nMapsfrom</code> | \nearrow | <code>\nswrcurvearrow</code> |
| \dashleftarrow | <code>\downrsquigarrow</code> | \nwarrow | <code>\nmapsto</code> | \rightarrow | <code>\nto</code> |
| \dashleftarrow | <code>\downupcurvearrow</code> | \nwarrow | <code>\nMapsto</code> | \nwarrow | <code>\nupdowncurvearrow</code> |
| \dashleftarrow | <code>\downupsquigarrow</code> | \nwarrow | <code>\nmapsup</code> | \nwarrow | <code>\nupdownsquigarrow</code> |
| \dashleftarrow | <code>\ngets</code> | \nwarrow | <code>\nMapsup</code> | \nwarrow | <code>\nuplcurvearrow</code> |
| \dashleftarrow | <code>\nhknearrow</code> | \nwarrow | <code>\nnelcurvearrow</code> | \nwarrow | <code>\nupleftcurvedarrow</code> |
| \dashleftarrow | <code>\nhknarrow</code> | \nwarrow | <code>\nnercurvearrow</code> | \nwarrow | <code>\nuplsquigarrow</code> |
| \dashleftarrow | <code>\nhksearrow</code> | \nwarrow | <code>\nneswcurvearrow</code> | \nwarrow | <code>\nuprcurvearrow</code> |
| \dashleftarrow | <code>\nhkswarrow</code> | \nwarrow | <code>\nnwlcurvearrow</code> | \nwarrow | <code>\nuprightcurvearrow</code> |
| \dashleftarrow | <code>\nleadsto</code> | \nwarrow | <code>\nnwrcurvearrow</code> | \nwarrow | <code>\nuprsquigarrow</code> |
| \dashleftarrow | <code>\nleftcurvedarrow</code> | \nwarrow | <code>\nnwsecurvearrow</code> | | |

TABLE 154: *fdsymbol* Harpoons

| | | | | | |
|--------------|--------------------------------------|--------------|---------------------------------|--------------|--------------------------------------|
| \downarrow | <code>\downharpoonleft</code> | \nwswarrow | <code>\neswharpoons</code> | \searrow | <code>\seharpoonsw</code> |
| \downarrow | <code>\downharpoonright</code> | \swarrow | <code>\neswharpoonew</code> | \nwarrow | <code>\senwharpoons</code> |
| \Downarrow | <code>\downupharpoons</code> | \nwarrow | <code>\nwharpoonne</code> | \swarrow | <code>\swharpoonnw</code> |
| \lrcorner | <code>\leftharpoondown</code> | \nwarrow | <code>\nwharpoonsw</code> | \swarrow | <code>\swharpoonse</code> |
| \lrcorner | <code>\leftharpoonup</code> | \nwarrow | <code>\nwseharpoonnesw</code> | \swarrow | <code>\swneharpoons</code> |
| \lrcorner | <code>\leftrightharpoondownup</code> | \nwswarrow | <code>\nwseharpoons</code> | \lrcorner | <code>\updownharpoonleftright</code> |
| \lrcorner | <code>\leftrightharpoons</code> | \nwarrow | <code>\nwseharpoonswne</code> | \lrcorner | <code>\updownharpoonrightleft</code> |
| \lrcorner | <code>\leftrightharpoonupdown</code> | \nwarrow | <code>\rightharpoondown</code> | \Downarrow | <code>\updownharpoons</code> |
| \lrcorner | <code>\leftrightharpoonup</code> | \nwarrow | <code>\rightharpoonup</code> | \lrcorner | <code>\upharpoonleft</code> |
| \lrcorner | <code>\neharpoonnw</code> | \nwarrow | <code>\rightleftharpoons</code> | \lrcorner | <code>\upharpoonright</code> |
| \lrcorner | <code>\neharpoonse</code> | \nwarrow | <code>\seharpoonne</code> | | |
| \lrcorner | <code>\neswharpoonnwse</code> | \nwarrow | | | |

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

TABLE 155: *fdsymbol* Negated Harpoons

| | | | | | |
|---|--------------------------|---|---------------------|---|--------------------------|
| ‡ | \ndownharpoonleft | § | \nneswharpoons | × | \nseharpoonsw |
| † | \ndownharpoonright | ✗ | \nneswharpoonsw | ✗ | \nsenwharpoons |
| # | \ndownupharpoons | ✗ | \nnwharpoonne | ✗ | \nswharpoonnw |
| ↶ | \nleftharpoondown | ✗ | \nnwharpoonsw | ✗ | \nswharpoonse |
| ↷ | \nleftharpoonup | ✗ | \nnwseharpoonnesw | ✗ | \nswneharpoons |
| ↶ | \nleftrightharpoondownup | ✗ | \nnwseharpoons | ↶ | \nupdownharpoonleftright |
| # | \nleftrightharpoons | ✗ | \nnwseharpoonswne | ↶ | \nupdownharpoonrightleft |
| ↶ | \nleftrightharpoonupdown | ↶ | \nrightharpoondown | ↷ | \nupdownharpoons |
| ✗ | \nneharpoonnw | ↶ | \nrightharpoonup | ↶ | \nupharpoonleft |
| ✗ | \nneharpoonse | ↷ | \nrightleftharpoons | ↶ | \nupharpoonright |
| ✗ | \nneswharpoonnwse | ✗ | \nseharpoonne | | |

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

TABLE 156: *boisik* Arrows

| | | | |
|---|----------------------------|---|------------------------|
| ← | \barleftarrow | ↑ | \Lsh |
| ↖ | \barleftarrowrightarrowbar | ↓ | \mapsdown |
| ↗ | \barovernorthwestarrow | ⇐ | \Mapsfrom |
| ↶ | \carriagereturn | ⇒ | \mapsfrom |
| ↺ | \circlearrowleft | ⇒ | \Mapsto |
| ↻ | \circlearrowright | ⇒ | \mapsto |
| ↶ | \cupleftarrow | ↑ | \mapsup |
| ⤸ | \curlyveedownarrow | ⤸ | \Nearrow |
| ⤹ | \curlyveeuparrow | ⤸ | \nearrowcorner |
| ⤻ | \curlywedgedownarrow | ⤸ | \nnarrow |
| ⤸ | \curlywedgeuparrow | ⤸ | \nnarrow |
| ⤻ | \curvearrowbotleft | ⤸ | \Narrow |
| ⤻ | \curvearrowbotleftright | ⤸ | \narrowcorner |
| ⤻ | \curvearrowbotright | ⤸ | \rightarrowbar |
| ⤻ | \curvearrowleft | ⤸ | \rightarrowcirclearrow |
| ⤻ | \curvearrowleftright | ⤸ | \rightarrowtail |
| ⤻ | \curvearrowright | ⤸ | \rightarrowtriangle |
| ⤸ | \dsh | ⤸ | \rightarrowtriangle |
| ⤸ | \downblackarrow | ⤸ | \rightblackarrow |
| ⤸ | \downdasharrow | ⤸ | \rightdasharrow |
| ⤸ | \downdownarrows | ⤸ | \rightleftarrows |
| ⤸ | \downtouparrow | ⤸ | \rightrightarrows |
| ⤸ | \downwhitearrow | ⤸ | \rightsquigarrow |
| ⤸ | \downzigzagarrow | ⤸ | \rightthreearrows |
| ⤸ | \drsh | ⤸ | \righttoleftarrow |
| ⤸ | \eqleftrightarrow | ⤸ | \rightwhitearrow |
| ⤸ | \hookleftarrow | ⤸ | \rightwhiteroundarrow |
| ⤸ | \hookrightarrow | ⤸ | \Rightarrow |
| ⤸ | \leftarrowtail | ⤸ | \Rsh |
| ⤸ | \leftarrowTriangle | ⤸ | \Searrow |

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| | | | |
|---------------------------|--------------------------------------|----------------------------------|---|
| \leftarrow | <code>\leftarrowtriangle</code> | \downarrow | <code>\ssearrow</code> |
| \blackleftarrow | <code>\leftarrowblackarrow</code> | \swarrow | <code>\sswarrow</code> |
| \dashleftarrow | <code>\lefttdasharrow</code> | $\swarrow\swarrow$ | <code>\Swarrow</code> |
| \leftleftarrows | <code>\leftleftarrows</code> | $\downarrow\downarrow$ | <code>\twoheaddownarrow</code> |
| \leftrightarroweq | <code>\leftrightarroweq</code> | $\leftleftarrows\leftleftarrows$ | <code>\twoheadleftarrow</code> |
| \leftrightarrows | <code>\leftrightarrows</code> | $\rightarrow\rightarrow$ | <code>\twoheadrightarrow</code> |
| \leftrightarrowTriangle | <code>\leftrightarrowTriangle</code> | $\uparrow\uparrow$ | <code>\twoheaduparrow</code> |
| \leftrightarrowtriangle | <code>\leftrightarrowtriangle</code> | $\uparrow\uparrow$ | <code>\twoheadwhiteuparrow</code> |
| \rightleftarrows | <code>\rightleftarrows</code> | $\uparrow\uparrow$ | <code>\twoheadwhiteuparrowpedestal</code> |
| \leftrightsquigarrow | <code>\leftrightsquigarrow</code> | $\uparrow\uparrow$ | <code>\upblackarrow</code> |
| \leftsquigarrow | <code>\leftsquigarrow</code> | $\uparrow\uparrow$ | <code>\updasharrow</code> |
| \lefttrightarrow | <code>\lefttrightarrow</code> | $\uparrow\uparrow$ | <code>\updownarrowbar</code> |
| \leftwhitearrow | <code>\leftwhitearrow</code> | $\uparrow\uparrow$ | <code>\updownblackarrow</code> |
| \leftwhiteroundarrow | <code>\leftwhiteroundarrow</code> | $\uparrow\uparrow$ | <code>\updownwhitearrow</code> |
| \leftzigzagarrow | <code>\leftzigzagarrow</code> | $\uparrow\uparrow$ | <code>\uptodownarrow</code> |
| \linefeed | <code>\linefeed</code> | $\uparrow\uparrow$ | <code>\upuparrows</code> |
| \Leftarrow | <code>\Leftarrow</code> | $\uparrow\uparrow$ | <code>\upwhitearrow</code> |
| \looparrowdownleft | <code>\looparrowdownleft</code> | $\uparrow\uparrow$ | <code>\whitearrowupfrombar</code> |
| \looparrowdownright | <code>\looparrowdownright</code> | $\uparrow\uparrow$ | <code>\whitearrowuppedestal</code> |
| \looparrowleft | <code>\looparrowleft</code> | $\uparrow\uparrow$ | <code>\whitearrowuppedestalhbar</code> |
| \looparrowright | <code>\looparrowright</code> | $\uparrow\uparrow$ | <code>\whitearrowuppedestalvbar</code> |

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

TABLE 157: boisik Negated Arrows

| | | | | | |
|---------------|---------------------------|-------------------|------------------------------------|---------------|----------------------------|
| \nexists | <code>\nHdownarrow</code> | \Leftrightarrow | <code>\nLeftrightarrow</code> | \Rightarrow | <code>\nRightarrow</code> |
| \nexists | <code>\nHuparrow</code> | \Leftrightarrow | <code>\nleftrightsquigarrow</code> | \Leftarrow | <code>\nVleftarrow</code> |
| \nLeftarrow | <code>\nLeftarrow</code> | \Leftrightarrow | <code>\nLeftrightarrow</code> | \Rightarrow | <code>\nVrightarrow</code> |
| \nLeftarrow | <code>\nleftarrow</code> | \Rightarrow | <code>\nrightarrow</code> | | |

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

TABLE 158: boisik Harpoons

| | | | | | |
|--------------|--------------------------------|---------------|---------------------------------|------------|------------------------------|
| \downarrow | <code>\downharpoonleft</code> | \Rightarrow | <code>\leftrightharpoons</code> | \uparrow | <code>\upharpoonleft</code> |
| \downarrow | <code>\downharpoonright</code> | \rightarrow | <code>\rightharpoondown</code> | \uparrow | <code>\upharpoonright</code> |
| \leftarrow | <code>\leftharpoondown</code> | \rightarrow | <code>\rightharpoonup</code> | | |
| \leftarrow | <code>\leftharpoonup</code> | \Rightarrow | <code>\rightleftharpoons</code> | | |

TABLE 159: stix Arrows

| | | | |
|----|-----------------------------|-----|---------------------------|
| ○ | \acwcirclearrow | →→→ | \longmapsto |
| ○ | \acwgapcirclearrow | ⇒⇒⇒ | \Longmapsto |
| ↶ | \acwleftarcarrow | →→ | \longrightarrow |
| ↷ | \acwoverarcarrow | ⇒⇒ | \Longrightarrow |
| ↶ | \acwunderarcarrow | ~~~ | \longrightsquigarrow |
| ↖ | \barleftarrow | ↔ | \looparrowleft |
| ↗ | \barleftarrowrightarrowbar* | ↑↑ | \looparrowright |
| ⤠ | \barrightarrowdiamond | ↑↑↑ | \Lsh |
| ⤡ | \baruparrow | ↓↓↓ | \mapsdown |
| ⤢ | \bsimilarleftarrow | ⤢⤢⤢ | \Mapsfrom |
| ⤣ | \bsimilarrightarrow | ⤢⤢⤢ | \mapsfrom |
| ⤤ | \carriagereturn* | ⤢⤢⤢ | \mapsto |
| ⤥ | \ccwundercurvearrow | ⤢⤢⤢ | \Mapsto |
| ⤦ | \circlearrowleft | ⤢⤢⤢ | \mapsup |
| ⤧ | \circlearrowright | ⤢⤢⤢ | \Narrow |
| ⤨ | \circleonleftarrow | ⤢⤢⤢ | \nearrow |
| ⤩ | \circleonrightarrow | ⤢⤢⤢ | \neovnarrow* |
| ⤪ | \curvearrowleft | ⤢⤢⤢ | \neovsearrow* |
| ⤫ | \curvearrowleftplus | ⤢⤢⤢ | \nesarrow |
| ⤬ | \curvearrowright | ⤢⤢⤢ | \narrow |
| ⤭ | \curvearrowrightminus | ⤢⤢⤢ | \Narrow |
| ⤮ | \cwccirclearrow | ⤢⤢⤢ | \nwovnearrow* |
| ⤯ | \cwgapcirclearrow | ⤢⤢⤢ | \nwsearrow |
| ⤰ | \cwrightarcarrow | ⤢⤢⤢ | \rdiagovsearrow* |
| ⤱ | \cwundercurvearrow | ⤢⤢⤢ | \Rdsh |
| ⤲ | \dbkarow | ⤢⤢⤢ | \Rightarrow |
| ⤳ | \DDownarrow | ⤢⤢⤢ | \rightarrow |
| ⤴ | \Ddownarrow | ⤢⤢⤢ | \rightarrow |
| ⤵ | \diamondleftarrow | ⤢⤢⤢ | \rightarrowapprox |
| ⤶ | \diamondleftarrowbar | ⤢⤢⤢ | \rightarrowbar |
| ⤷ | \downarrow | ⤢⤢⤢ | \rightarrowbsimilar |
| ⤸ | \Downarrow | ⤢⤢⤢ | \rightarrowdiamond |
| ⤹ | \downarrowbar | ⤢⤢⤢ | \rightarrowonoplus |
| ⤺ | \downarrowbarred | ⤢⤢⤢ | \rightarrowplus |
| ⤻ | \downdasharrow* | ⤢⤢⤢ | \rightarrowshortleftarrow |
| ⤼ | \downdownarrows | ⤢⤢⤢ | \rightarrowsimilar |
| ⤽ | \downrightcurvedarrow* | ⤢⤢⤢ | \rightarrowtail |
| ⤾ | \downuparrows | ⤢⤢⤢ | \rightarrowtriangle |
| ⤿ | \downwhitearrow* | ⤢⤢⤢ | \rightarrowx |
| ⤿ | \downzigzagarrow | ⤢⤢⤢ | \rightbkarow |
| ⤾ | \draftingarrow* | ⤢⤢⤢ | \rightcurvedarrow |
| ⤿⤾ | \drbkarow | ⤢⤢⤢ | \rightdasharrow* |
| ⤿⤿ | \equalleftarrow | ⤢⤢⤢ | \rightdotarrow |
| ⤿⤿ | \equalrightarrow | ⤢⤢⤢ | \rightdowncurvedarrow |
| ⤿⤿ | \fdiagovnearrow* | ⤢⤢⤢ | \rightleftarrows |
| ⤿⤿ | \hknarrow | ⤢⤢⤢ | \rightrightarrows |
| ⤿⤿ | \hknnarrow | ⤢⤢⤢ | \rightsquigarrow |
| ⤿⤿ | \hksearrow | ⤢⤢⤢ | \rightthreearrows |
| ⤿⤿ | \hkswarrow | ⤢⤢⤢ | \rightwavearrow |
| ⤿⤿ | \hookleftarrow | ⤢⤢⤢ | \rightwhitearrow* |
| ⤿⤿ | \hookrightarrow | ⤢⤢⤢ | \RRightarrow |
| ⤿⤿ | \Ldsh | ⤢⤢⤢ | \RRightarrow |

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(continued from previous page)

| | | | |
|------------------------------|---|---|---|
| \leftarrow | <code>\leftarrow</code> | \nearrow | <code>\Rsh</code> |
| \Leftarrow | <code>\Leftarrow</code> | \searrow | <code>\searrow</code> |
| \approx | <code>\leftarrowapprox</code> | \Searrow | <code>\Searrow</code> |
| \lessapprox | <code>\leftarrowbackapprox</code> | \seovnearrow^* | <code>\seovnearrow*</code> |
| \lessdot | <code>\leftarrowbsimilar</code> | $\shortrightarrow\leftarrow$ | <code>\shortrightarrow\leftarrow</code> |
| \oplus | <code>\leftarrowonoplus</code> | \simeq | <code>\similarleftarrow</code> |
| \dashv | <code>\leftarrowplus</code> | \Rightarrow | <code>\similarrightarrow</code> |
| \dashv | <code>\leftarrowshortrightarrow</code> | \swarrow | <code>\swarrow</code> |
| \approx | <code>\leftarrowsimilar</code> | \Swarrow | <code>\Swarrow</code> |
| \Leftarrowtail | <code>\leftarrowtail</code> | \times | <code>\toea</code> |
| \Leftarrowtriangle | <code>\leftarrowtriangle</code> | \times | <code>\tona</code> |
| \Leftarrowx | <code>\leftarrowx</code> | \times | <code>\tosa</code> |
| \leftarrowtail | <code>\leftarrowtail</code> | \times | <code>\towa</code> |
| \twoheadleftarrow | <code>\twoheadleftarrow</code> | \downarrow | <code>\twoheaddownarrow</code> |
| \leftarrowdasharrow^* | <code>\leftarrowdasharrow*</code> | $\leftarrow\leftarrow$ | <code>\twoheadleftarrow</code> |
| \leftarrowdbkarw | <code>\leftarrowdbkarw</code> | $\leftarrow\leftarrow\leftarrow$ | <code>\twoheadleftarrowtail</code> |
| \leftarrowdotarrow | <code>\leftarrowdotarrow</code> | $\leftarrow\leftarrow\leftarrow\leftarrow$ | <code>\twoheadleftdbkarw</code> |
| $\leftarrowdowncurvedarrow$ | <code>\leftarrowdowncurvedarrow</code> | $\leftarrow\leftarrow\leftarrow\leftarrow\leftarrow$ | <code>\twoheadmapsfrom</code> |
| \leftarrowleftarrows | <code>\leftarrowleftarrows</code> | $\rightarrow\rightarrow\rightarrow\rightarrow\rightarrow$ | <code>\twoheadmapsto</code> |
| \Leftrightarrow | <code>\Leftrightarrow</code> | $\rightarrow\rightarrow\rightarrow\rightarrow\rightarrow\rightarrow$ | <code>\twoheadrightarrow</code> |
| \leftarrowrightarrow | <code>\leftarrowrightarrow</code> | $\rightarrow\rightarrow\rightarrow\rightarrow\rightarrow\rightarrow\rightarrow$ | <code>\twoheadrightarrowtail</code> |
| $\leftrightsquigarrowcircle$ | <code>\leftrightsquigarrowcircle</code> | \uparrow | <code>\twoheaduparrow</code> |
| \leftrightsquigarrow | <code>\leftrightsquigarrow</code> | $\uparrow\uparrow$ | <code>\twoheaduparrowcircle</code> |
| \leftarrowthreearrows | <code>\leftarrowthreearrows</code> | $\uparrow\uparrow\uparrow$ | <code>\uparrowarrow</code> |
| \leftarrowwavearrow | <code>\leftarrowwavearrow</code> | $\uparrow\uparrow\uparrow\uparrow$ | <code>\uparrowarrowbarred</code> |
| \leftarrowwhitearrow^* | <code>\leftarrowwhitearrow*</code> | $\uparrow\uparrow\uparrow\uparrow\uparrow$ | <code>\updasharrow^*</code> |
| \linefeed^* | <code>\linefeed*</code> | \Downarrow | <code>\Updownarrow</code> |
| \Lleftarrow | <code>\Lleftarrow</code> | $\Downarrow\Downarrow$ | <code>\updownarrowbar^*</code> |
| \Lleftarrow | <code>\Lleftarrow</code> | $\Downarrow\Downarrow\Downarrow$ | <code>\updownarrows</code> |
| \longleftarrow | <code>\longleftarrow</code> | \uparrow | <code>\uprightcurvearrow^*</code> |
| \Longleftarrow | <code>\Longleftarrow</code> | $\uparrow\uparrow$ | <code>\upuparrows</code> |
| \Longleftarrow | <code>\Longleftarrow</code> | $\uparrow\uparrow\uparrow$ | <code>\upwhitearrow^*</code> |
| \longleftrightarrow | <code>\longleftrightarrow</code> | $\uparrow\uparrow\uparrow\uparrow$ | <code>\UUparrow</code> |
| \longleftrightarrow | <code>\longleftrightarrow</code> | $\uparrow\uparrow\uparrow\uparrow\uparrow$ | <code>\Uuparrow</code> |
| \longsquigarrow | <code>\longsquigarrow</code> | \Downarrow | <code>\varcarriagereturn^*</code> |
| \longmapsfrom | <code>\longmapsfrom</code> | \Updownarrow | <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 `\leftarrowdbkarw`, and `\dashrightarrow` and `\dasharrow` as synonyms for `\dbkarw`.

TABLE 160: stix Negated Arrows

| | | | |
|---|-------------------|---|--------------------------|
| ‡ | \nHdownarrow* | ‡ | \nvLeftrightarrow |
| ‡ | \nHuparrow* | ‡ | \nVrightarrow |
| ↔ | \nleftarrow† | ↔ | \nvRightarrow |
| ↔ | \nLeftarrow | ↔ | \nvrightarrow |
| ↔ | \nleftrightarrow | ↔ | \nVrightarrowtail |
| ↔ | \nLeftrightarrow | ↔ | \nvrightarrowtail |
| ↔ | \nRightarrow | ↔ | \nVtwoheadleftarrow |
| ↔ | \nrightarrow | ↔ | \nVtwoheadleftarrow |
| ↔ | \nvleftarrow | ↔ | \nVtwoheadleftarrowtail |
| ↔ | \nvLeftarrow | ↔ | \nVtwoheadleftarrowtail |
| ↔ | \nVleftarrow | ↔ | \nVtwoheadrightarrow |
| ↔ | \nVrightarrowtail | ↔ | \nVtwoheadrightarrow |
| ↔ | \nvleftarrowtail | ↔ | \nVtwoheadrightarrowtail |
| ↔ | \nvLeftrightarrow | ↔ | \nVtwoheadrightarrowtail |
| ↔ | \nVleftrightarrow | ↔ | \nVtwoheadrightarrowtail |

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

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

TABLE 161: stix Harpoons

| | | | |
|----|---------------------------|---|--------------------------|
| ⊤ | \bardownharpoonleft | ⊜ | \leftrightharpoons |
| ⊤ | \bardownharpoonright | ⊜ | \leftrightharpoonsdown |
| ⊤ | \barleftharpoondown | ⊜ | \leftrightharpoonsup |
| ⊤ | \barleftharpoonup | ⊜ | \leftrightharpoonupdown |
| ⊤ | \barrightharpoondown | ⊜ | \leftrightharpoonupup |
| ⊤ | \barrightharpoonup | ⊜ | \rightharpoondown |
| ⊤ | \barupharpoonleft | ⊜ | \rightharpoondownbar |
| ⊤ | \barupharpoonright | ⊜ | \rightharpoonsupdown |
| ⊤ | \dashleftharpoondown | ⊜ | \rightharpoonup |
| ⊤ | \dashrightharpoondown | ⊜ | \rightharpoonupbar |
| ↓ | \downharpoonleft | ⊜ | \rightharpoonupdash |
| ↓ | \downharpoonleftbar | ⊜ | \rightleftharpoons |
| ↓ | \downharpoonright | ⊜ | \rightleftharpoonsdown |
| ↓ | \downharpoonrightbar | ⊜ | \rightleftharpoonsup |
| ↓↓ | \downharpoonsleftright | ↓ | \updownharpoonleftleft |
| ↓↓ | \downupharpoonsleftright | ↓ | \updownharpoonleftright |
| ⊤ | \leftharpoondown | ↓ | \updownharpoonrightleft |
| ⊤ | \leftharpoondownbar | ↓ | \updownharpoonrightright |
| ⊤ | \leftharpoonsupdown | ↓ | \updownharpoonsleftright |
| ⊤ | \leftharpoonup | ↓ | \upharpoonleft |
| ⊤ | \leftharpoonupbar | ↓ | \upharpoonleftbar |
| ⊤ | \leftharpoonupdash | ↓ | \upharpoonright* |
| ⊤ | \leftrightharpoondowndown | ↓ | \upharpoonrightbar |
| ⊤ | \leftrightharpoondownup | ↓ | \upharpoonsleftright |

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

TABLE 162: harpoon Extensible Harpoons

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

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

TABLE 163: chemarrow Arrows

\rightarrow `\chemarrow`

TABLE 164: fge Arrows

\Rightarrow `\fgerightarrow` \uparrow `\fgeuparrow`

TABLE 165: MnSymbol Spoons

| | | | | | |
|--------------|--------------------------------|---------------|---------------------------------|---------------|--------------------------------|
| \downarrow | <code>\downfilledspoon</code> | \nwarrow | <code>\nnespoon</code> | \nwarrow | <code>\nwfilledspoon</code> |
| \downarrow | <code>\downspoon</code> | \nwarrow | <code>\nnwfilledspoon</code> | \nwarrow | <code>\nwspoon</code> |
| \leftarrow | <code>\leftfilledspoon</code> | \nwarrow | <code>\nnwspoon</code> | \rightarrow | <code>\rightfilledspoon</code> |
| \leftarrow | <code>\leftspoon</code> | \rightarrow | <code>\nrightfilledspoon</code> | \rightarrow | <code>\rightspoon*</code> |
| \downarrow | <code>\ndownfilledspoon</code> | \rightarrow | <code>\nrightspoon*</code> | \nwarrow | <code>\sefilledspoon</code> |
| \downarrow | <code>\ndownspoon</code> | \rightarrow | <code>\nsefilledspoon</code> | \nwarrow | <code>\sespoon</code> |
| \nearrow | <code>\nefilledspoon</code> | \nwarrow | <code>\nsespoon</code> | \nearrow | <code>\swfilledspoon</code> |
| \nearrow | <code>\nespoon</code> | \nwarrow | <code>\nswfilledspoon</code> | \nearrow | <code>\swspoon</code> |
| \nearrow | <code>\nleftfilledspoon</code> | \nwarrow | <code>\nswspoon</code> | \uparrow | <code>\upfilledspoon</code> |
| \nearrow | <code>\nleftspoon</code> | \uparrow | <code>\nupfilledspoon</code> | \uparrow | <code>\upspoon</code> |
| \nearrow | <code>\nnefilledspoon</code> | \uparrow | <code>\nupspoon</code> | | |

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

TABLE 166: MnSymbol Pitchforks

| | | | | | |
|--------------|------------------------------|--------------|-------------------------------|---------------|------------------------------|
| Ψ | <code>\downpitchfork</code> | \times | <code>\nnpitchfork</code> | \ni | <code>\rightpitchfork</code> |
| \dashv | <code>\leftpitchfork</code> | $\not\equiv$ | <code>\nrightpitchfork</code> | $\not\approx$ | <code>\sepitchfork</code> |
| Ψ | <code>\ndownpitchfork</code> | \times | <code>\nsepitchfork</code> | $\not\approx$ | <code>\swpitchfork</code> |
| $\not\equiv$ | <code>\nepitchfork</code> | \times | <code>\nswpitchfork</code> | $\not\vdash$ | <code>\uppitchfork</code> |
| \dashv | <code>\nleftpitchfork</code> | $\not\vdash$ | <code>\nuppitchfork</code> | | |
| $\not\equiv$ | <code>\nnepitchfork</code> | $\not\vdash$ | <code>\nwpitchfork</code> | | |

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

TABLE 167: MnSymbol Smiles and Frowns

| | | | | | |
|--------------|-------------------------------|-----------------|---------------------------------|----------|--------------------------------|
| \approx | <code>\doublefrown</code> | $\not\approx$ | <code>\nsmileeq</code> | \asymp | <code>\smileeq</code> |
| \approxeq | <code>\doublefrownneq</code> | $\not\approxeq$ | <code>\nsmileeqfrown</code> | \asymp | <code>\smileeqfrown</code> |
| \asymp | <code>\doublesmile</code> | $\not\asymp$ | <code>\nsmilefrown</code> | \asymp | <code>\smilefrown</code> |
| \asymp | <code>\doublesmileeq</code> | $\not\asymp$ | <code>\nsmilefrownneq</code> | \asymp | <code>\smilefrownneq</code> |
| \asymp | <code>\eqfrown</code> | $\not\asymp$ | <code>\nsqdoublefrown</code> | \asymp | <code>\sqdoublefrown</code> |
| \asymp | <code>\eqsmile</code> | $\not\asymp$ | <code>\nsqdoublefrownneq</code> | \asymp | <code>\sqdoublefrownneq</code> |
| \sim | <code>\frown</code> | $\not\sim$ | <code>\nsqdoublesmile</code> | \asymp | <code>\sqdoublesmile</code> |
| \asymp | <code>\frownneq</code> | $\not\asymp$ | <code>\nsqdoublesmileeq</code> | \asymp | <code>\sqdoublesmileeq</code> |
| \asymp | <code>\frownneqsmile</code> | $\not\asymp$ | <code>\nsqeqlfrown</code> | \asymp | <code>\squeqlfrown</code> |
| \circ | <code>\frownsmile</code> | $\not\circ$ | <code>\nsqeqlsmile</code> | \asymp | <code>\squeqlsmile</code> |
| \asymp | <code>\frownsmileeq</code> | $\not\asymp$ | <code>\nsqfrown</code> | \sim | <code>\sqfrown</code> |
| $\not\asymp$ | <code>\ndoublefrown</code> | $\not\asymp$ | <code>\nsqfrownneq</code> | \asymp | <code>\sqfrownneq</code> |
| $\not\asymp$ | <code>\ndoublefrownneq</code> | $\not\asymp$ | <code>\nsqfrownqsmile</code> | \asymp | <code>\sqfrownqsmile</code> |
| $\not\asymp$ | <code>\ndoublesmile</code> | $\not\asymp$ | <code>\nsqfrownsmile</code> | \asymp | <code>\sqfrownsmile</code> |
| $\not\asymp$ | <code>\ndoublesmileeq</code> | $\not\asymp$ | <code>\nsqsmile</code> | \sim | <code>\sqsmile</code> |
| $\not\asymp$ | <code>\neqfrown</code> | $\not\asymp$ | <code>\nsqsmileeq</code> | \asymp | <code>\sqsmileeq</code> |
| $\not\asymp$ | <code>\neqsmile</code> | $\not\asymp$ | <code>\nsqsmileeqfrown</code> | \asymp | <code>\sqsmileeqfrown</code> |
| $\not\asymp$ | <code>\nfrown</code> | $\not\asymp$ | <code>\nsqsmilefrown</code> | \asymp | <code>\sqsmilefrown</code> |
| $\not\asymp$ | <code>\nfrownneq</code> | $\not\asymp$ | <code>\nsqtriplefrown</code> | \asymp | <code>\sqtriplefrown</code> |
| $\not\asymp$ | <code>\nfrownneqsmile</code> | $\not\asymp$ | <code>\nsqtriplesmile</code> | \asymp | <code>\sqtriplesmile</code> |
| $\not\asymp$ | <code>\nfrownsmile</code> | $\not\asymp$ | <code>\ntriplefrown</code> | \asymp | <code>\triplefrown</code> |
| $\not\asymp$ | <code>\nfrownsmileeq</code> | $\not\asymp$ | <code>\ntriplesmile</code> | \asymp | <code>\triplesmile</code> |
| $\not\asymp$ | <code>\nsmile</code> | \sim | <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 168: fdsymbol Spoons

| | | | | | |
|----------------|-----------------------------------|----------------|-----------------------------------|----------------|-------------------------------|
| $\bullet\circ$ | <code>\blackwhitespoon</code> | $\not\bullet$ | <code>\ndownblackspoon</code> | $\not\bullet$ | <code>\nupblackspoon</code> |
| \bullet | <code>\downblackspoon</code> | $\not\bullet$ | <code>\downspoon</code> | $\not\bullet$ | <code>\nupspoon</code> |
| \circ | <code>\downspoon</code> | $\bullet\circ$ | <code>\leftblackspoon</code> | $\bullet\circ$ | <code>\whiteblackspoon</code> |
| $\bullet-$ | <code>\leftblackspoon</code> | $\bullet\circ$ | <code>\leftrightblackspoon</code> | $\bullet-$ | <code>\rightblackspoon</code> |
| $\bullet-$ | <code>\leftrightblackspoon</code> | $\circ\bullet$ | <code>\leftrightspoon</code> | $\circ-$ | <code>\rightspoon</code> |
| $\circ\circ$ | <code>\leftrightspoon</code> | \circ | <code>\leftspoon</code> | \bullet | <code>\upblackspoon</code> |
| $\circ-$ | <code>\leftspoon</code> | $\circ\bullet$ | <code>\rightblackspoon</code> | \circ | <code>\upspoon</code> |
| $\bullet\circ$ | <code>\nblackwhitespoon</code> | $\circ\bullet$ | <code>\rightspoon</code> | $\circ\bullet$ | <code>\whiteblackspoon</code> |

fdsymbol defines synonyms for many of the preceding symbols:

| | | | | | |
|----------------|------------------------|----------------|---------------------------|----------------|----------------------------|
| $\circ\circ$ | <code>\cirmid</code> | $\circ-$ | <code>\multimapinv</code> | $\circ\bullet$ | <code>\nmultimap</code> |
| $\circ\circ$ | <code>\dualmap</code> | $\circ\circ$ | <code>\ncirmid</code> | $\circ\bullet$ | <code>\nmultimapinv</code> |
| $\bullet\circ$ | <code>\imageof</code> | $\circ\bullet$ | <code>\ndualmap</code> | $\circ\bullet$ | <code>\norigof</code> |
| $\circ\circ$ | <code>\midcir</code> | $\bullet\circ$ | <code>\nimageof</code> | $\bullet\circ$ | <code>\origof</code> |
| $\circ-$ | <code>\multimap</code> | $\circ\bullet$ | <code>\nmidcir</code> | | |

TABLE 169: *fdsymbol* Pitchforks

| | | | | | |
|--------------|------------------------------|--------------|-------------------------------|--------------|-------------------------------|
| Ψ | <code>\downpitchfork</code> | $\not\equiv$ | <code>\leftfpitchfork</code> | \ni | <code>\rightfpitchfork</code> |
| \Leftarrow | <code>\leftfpitchfork</code> | $\not\equiv$ | <code>\rightfpitchfork</code> | \pitchfork | <code>\upppitchfork</code> |
| \nexists | <code>\ndownpitchfork</code> | $\not\vdash$ | <code>\nupppitchfork</code> | | |

fdsymbol defines `\npitchfork` as a synonym for `\nupppitchfork` and `\pitchfork` as a synonym for `\upppitchfork`.

TABLE 170: *fdsymbol* Smiles and Frowns

| | | | | | |
|-----------|--------------------------|--------------|---------------------------|-------------|---------------------------|
| \frown | <code>\frown</code> | $\not\equiv$ | <code>\nfrownneq</code> | $\not\cong$ | <code>\nsmilefrown</code> |
| \equiv | <code>\frownneq</code> | $\not\equiv$ | <code>\nfrownsmile</code> | \sim | <code>\smile</code> |
| \simeq | <code>\frownsmile</code> | $\not\cong$ | <code>\nsmile</code> | \cong | <code>\smileeq</code> |
| \dagger | <code>\nfrown</code> | $\not\equiv$ | <code>\nsmileeq</code> | \asymp | <code>\smilefrown</code> |

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

TABLE 171: *ulsy* Contradiction Symbols

| | | | | | | | | | |
|-------------------|----------------------|-------------------|----------------------|-------------------|----------------------|-------------------|----------------------|-------------------|----------------------|
| \ntriangleright | <code>\blitza</code> | \ntriangleright | <code>\blitzb</code> | \ntriangleright | <code>\blitzc</code> | \ntriangleright | <code>\blitzd</code> | \ntriangleright | <code>\blitze</code> |
|-------------------|----------------------|-------------------|----------------------|-------------------|----------------------|-------------------|----------------------|-------------------|----------------------|

TABLE 172: Extension Characters

| | | | |
|-----|----------------------|-----|----------------------|
| $=$ | <code>\relbar</code> | $=$ | <code>\Relbar</code> |
|-----|----------------------|-----|----------------------|

TABLE 173: *stmaryrd* Extension Characters

| | | | | | |
|-----|------------------------|-----|----------------------------|-----|--------------------------|
| $/$ | <code>\Arrownot</code> | $:$ | <code>\Mapsfromchar</code> | $:$ | <code>\Mapstochar</code> |
| $/$ | <code>\arrownot</code> | $:$ | <code>\mapsfromchar</code> | | |

TABLE 174: *txfonts/pxfonts* Extension Characters

| | | | | | |
|-----|------------------------------|------|-------------------------------|------|----------------------------|
| $:$ | <code>\Mappedfromchar</code> | $\#$ | <code>\Mmappedfromchar</code> | $\#$ | <code>\Mmapstochar</code> |
| $:$ | <code>\mappedfromchar</code> | $\#$ | <code>\mmappedfromchar</code> | $\#$ | <code>\ mmapstochar</code> |

TABLE 175: *mathabx* Extension Characters

| | | | |
|-----|----------------------------|-----|--------------------------|
| $:$ | <code>\mapsfromchar</code> | $:$ | <code>\mapstochar</code> |
| $:$ | <code>\Mapsfromchar</code> | $:$ | <code>\Mapstochar</code> |

TABLE 176: stix Extension Characters

| | | |
|-----------------|-----------|------------|
| \lhook | \relbar | \RRelbar |
| \mapsfromchar | \Relbar | \Rrelbar |
| \mapstochar | ρok | |

TABLE 177: Log-like Symbols

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

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

TABLE 178: *AMS* Log-like Symbols

| | | | |
|------------|------------|--------------|---------------|
| \injlim | \injlim | \varinjlim | \varlimsup |
| \projlim | \projlim | \varliminf | \varprojlim |

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

TABLE 179: Q_NA2e Number Sets

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

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

TABLE 180: Greek Letters

| | | | | | | | |
|---------------|--------------------------|-------------|------------------------|-------------|------------------------|------------|-----------------------|
| α | <code>\alpha</code> | θ | <code>\theta</code> | \circ | <code>\circ</code> | τ | <code>\tau</code> |
| β | <code>\beta</code> | ϑ | <code>\vartheta</code> | π | <code>\pi</code> | υ | <code>\upsilon</code> |
| γ | <code>\gamma</code> | ι | <code>\iota</code> | ϖ | <code>\varpi</code> | ϕ | <code>\phi</code> |
| δ | <code>\delta</code> | κ | <code>\kappa</code> | ρ | <code>\rho</code> | φ | <code>\varphi</code> |
| ϵ | <code>\epsilon</code> | λ | <code>\lambda</code> | ϱ | <code>\varrho</code> | χ | <code>\chi</code> |
| ε | <code>\varepsilon</code> | μ | <code>\mu</code> | σ | <code>\sigma</code> | ψ | <code>\psi</code> |
| ζ | <code>\zeta</code> | ν | <code>\nu</code> | ς | <code>\varsigma</code> | ω | <code>\omega</code> |
| η | <code>\eta</code> | ξ | <code>\xi</code> | | | | |
| Γ | <code>\Gamma</code> | Λ | <code>\Lambda</code> | Σ | <code>\Sigma</code> | Ψ | <code>\Psi</code> |
| Δ | <code>\Delta</code> | Ξ | <code>\Xi</code> | Υ | <code>\Upsilon</code> | Ω | <code>\Omega</code> |
| Θ | <code>\Theta</code> | Π | <code>\Pi</code> | Φ | <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 “μ”. To make available commands for *all* of the Greek majuscules, either use the `mathspec` package, which requires X_ET_EX, or copy `mathspec.sty`'s Greek-letter definitions to your document's preamble:

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

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

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

TABLE 181: *AMS* Greek Letters

F `\digamma` \varkappa `\varkappa`

TABLE 182: `txfonts/pxfonts` Upright Greek Letters

| | | | | | | | |
|---------------|----------------------------|-------------|--------------------------|-------------|--------------------------|-----------|------------------------|
| α | <code>\alphaup</code> | θ | <code>\thetaau</code> | π | <code>\piup</code> | ϕ | <code>\phiiu</code> |
| β | <code>\betaau</code> | ϑ | <code>\varthetaau</code> | ϖ | <code>\varpiup</code> | φ | <code>\varphiiu</code> |
| γ | <code>\gammaau</code> | ι | <code>\iotaau</code> | ρ | <code>\rhoau</code> | χ | <code>\chiiu</code> |
| δ | <code>\deltaau</code> | κ | <code>\kappaau</code> | ϱ | <code>\varrhoau</code> | ψ | <code>\psiiu</code> |
| ϵ | <code>\epsilonau</code> | λ | <code>\lambdaau</code> | σ | <code>\sigmaau</code> | ω | <code>\omegaau</code> |
| ε | <code>\varepsilonau</code> | μ | <code>\muau</code> | ς | <code>\varsigmaau</code> | | |
| ζ | <code>\zetaau</code> | ν | <code>\nuau</code> | τ | <code>\tauau</code> | | |
| η | <code>\etaau</code> | ξ | <code>\xiau</code> | υ | <code>\upsilonau</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 183: `upgreek` Upright Greek Letters

| | | | | | | | |
|---------------|----------------------------|-------------|--------------------------|-------------|---------------------------|-----------|------------------------|
| α | <code>\upalpha</code> | θ | <code>\uptheta</code> | π | <code>\uppi</code> | ϕ | <code>\upphi</code> |
| β | <code>\upbeta</code> | ϑ | <code>\upvartheta</code> | ϖ | <code>\upvarpi</code> | φ | <code>\upvarphi</code> |
| γ | <code>\upgamma</code> | ι | <code>\upiota</code> | ρ | <code>\uprho</code> | χ | <code>\upchi</code> |
| δ | <code>\updelta</code> | κ | <code>\upkappa</code> | ϱ | <code>\upvarrho</code> | ψ | <code>\uppsi</code> |
| ϵ | <code>\upepsilon</code> | λ | <code>\uplambda</code> | σ | <code>\upsigma</code> | ω | <code>\upomega</code> |
| ε | <code>\upvarepsilon</code> | μ | <code>\upmu</code> | ς | <code>\upvarsigma</code> | | |
| ζ | <code>\upzeta</code> | ν | <code>\upnu</code> | τ | <code>\uptau</code> | | |
| η | <code>\upeta</code> | ξ | <code>\upxi</code> | υ | <code>\upupsilon</code> | | |
| Γ | <code>\Upsilon</code> | Λ | <code>\Uplambda</code> | Σ | <code>\Upsilonigma</code> | Ψ | <code>\Uppsi</code> |
| Δ | <code>\Updelta</code> | Ξ | <code>\Upxi</code> | Υ | <code>\Upupsilon</code> | Ω | <code>\Upomega</code> |
| Θ | <code>\Uptheta</code> | Π | <code>\Uppi</code> | Φ | <code>\Upphi</code> | | |

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

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

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

TABLE 184: `fourier` Variant Greek Letters

| | | | |
|----------|------------------------|-----------|-------------------------|
| π | <code>\pi</code> | ρ | <code>\rho</code> |
| ϖ | <code>\varpi</code> | ϱ | <code>\varrho</code> |
| ϖ | <code>\varvarpi</code> | ϱ | <code>\varvarrho</code> |

TABLE 185: `txfonts/pxfonts` Variant Latin Letters

| | | | |
|----------|--------------------|----------|--------------------|
| <i>g</i> | <code>\varg</code> | <i>v</i> | <code>\varv</code> |
|----------|--------------------|----------|--------------------|

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

TABLE 186: `boisik` Variant Greek Letters

| | | | |
|----------|-----------------------|----------|------------------------|
| <i>β</i> | <code>\varbeta</code> | <i>κ</i> | <code>\varkappa</code> |
|----------|-----------------------|----------|------------------------|

TABLE 187: `boisik` Variant Latin Letters

| | |
|----------|--------------------|
| <i>g</i> | <code>\varg</code> |
|----------|--------------------|

TABLE 188: `stix` Variant Greek Letters

| | | | |
|----------|--------------------------|----------|----------------------|
| <i>ε</i> | <code>\varepsilon</code> | <i>φ</i> | <code>\varphi</code> |
|----------|--------------------------|----------|----------------------|

TABLE 189: `stix` Transformed Greek Letters

| | |
|----------|---------------------------|
| <i>϶</i> | <code>\backepsilon</code> |
|----------|---------------------------|

TABLE 190: `AMS` Hebrew Letters

| | | | |
|----------|--------------------|----------|---------------------|
| <i>ב</i> | <code>\beth</code> | <i>ג</i> | <code>\gimel</code> |
|----------|--------------------|----------|---------------------|

`\aleph` (\aleph_0) appears in Table 286 on page 112.

TABLE 191: `MnSymbol` Hebrew Letters

| | | | |
|----------|---------------------|----------|--------------------|
| <i>א</i> | <code>\aleph</code> | <i>ב</i> | <code>\beth</code> |
|----------|---------------------|----------|--------------------|

TABLE 192: `fdsymbol` Hebrew Letters

| | | | |
|----------|---------------------|----------|--------------------|
| <i>ג</i> | <code>\aleph</code> | <i>ד</i> | <code>\beth</code> |
|----------|---------------------|----------|--------------------|

TABLE 193: `boisik` Hebrew Letters

| | | | |
|----------|--------------------|----------|---------------------|
| <i>ב</i> | <code>\beth</code> | <i>ג</i> | <code>\gimel</code> |
|----------|--------------------|----------|---------------------|

TABLE 194: *stix* Hebrew Letters

| | | | | | | | |
|---|--------|---|-------|---|--------|---|---------|
| א | \aleph | ב | \beth | ג | \gimel | ד | \daleth |
|---|--------|---|-------|---|--------|---|---------|

TABLE 195: Letter-like Symbols

| | | | | | | | | | |
|---|---------|---|------------|---|--------|---|----------|---|------|
| ⊥ | \bot | ∀ | \forallall | ∃ | \imath | ⊸ | \ni | ⊤ | \top |
| ℓ | \ell | ℏ | \hbar | ∈ | \in | ∂ | \partial | ∅ | \wp |
| Ǝ | \exists | Ⅎ | \Im | 𝕁 | \jmath | ℝ | \Re | | |

TABLE 196: *AMStex* Letter-like Symbols

| | | | | | |
|---|-----------|---|-------------|---|----------|
| 𝕜 | \Bbbk | ℂ | \complement | ℏ | \hbar |
| ® | \circledR | ℳ | \Finv | ℏ | \hslash |
| Ⓢ | \circledS | ℴ | \Game | # | \nexists |

TABLE 197: *txfonts/pxfonts* Letter-like Symbols

| | | | | | | | |
|---|-----------|---|----------------|---|--------|---|--------|
| ¢ | \mathcent | £ | \mathsterling* | ₪ | \notin | ฿ | \notni |
|---|-----------|---|----------------|---|--------|---|--------|

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

TABLE 198: *mathabx* Letter-like Symbols

| | | | | | | | |
|---|-------------|---|-----------|---|---------------|---|--------------|
| ∈ | \barin | ε | \in | ⊐ | \nottop | € | \varnotin |
| ℂ | \complement | # | \nexists | ϶ | \owns | ฿ | \varnotowner |
| Ǝ | \exists | ⊓ | \notbot | ϶ | \ownsbar | | |
| ℳ | \Finv | ₪ | \notin | ∂ | \partial | | |
| ℴ | \Game | # | \notowner | ฿ | \partialslash | | |

TABLE 199: *MnSymbol* Letter-like Symbols

| | | | | | | | |
|---|------------|---|----------|---|-----------|---|------|
| ⊥ | \bot | ϶ | \in | ฿ | \nowns* | ⊤ | \top |
| Ǝ | \exists | # | \nexists | ϶ | \owns | ฿ | \wp |
| ∀ | \forallall | € | \nin* | ฿ | \powerset | | |

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

TABLE 200: `fdsymbol` Letter-like Symbols

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

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

TABLE 201: `boisik` Letter-like Symbols

| | | | | | | | |
|---------------|--------------------------|---------|--------------------|-----|------------------------|------------|-----------------------|
| k | <code>\Bbbk</code> | \odot | <code>\Game</code> | i | <code>\imath</code> | \nexists | <code>\nexists</code> |
| \complement | <code>\complement</code> | h | <code>\hbar</code> | T | <code>\intercal</code> | \wp | <code>\wp</code> |
| \exists | <code>\exists</code> | \Finv | <code>\Finv</code> | h | <code>\hslash</code> | j | <code>\jmath</code> |

TABLE 202: `stix` Letter-like Symbols

| | | | | | | | |
|---------------|--------------------------|----------------|--------------------------|----------------|--------------------------|---------------|--------------------------|
| \AA | <code>\Angstrom</code> | \mathcal{E} | <code>\Eulerconst</code> | i | <code>\imath</code> | T | <code>\top</code> |
| \mathbb{k} | <code>\Bbbk</code> | \exists | <code>\exists</code> | \intercal | <code>\intercal</code> | \topbot | <code>\topbot</code> |
| \perp | <code>\bot</code> | \exists | <code>\Finv</code> | j | <code>\jmath</code> | \wp | <code>\wp</code> |
| \circledR | <code>\circledR</code> | \forall | <code>\forallall</code> | \mathcal{S} | <code>\mathcal{S}</code> | \mathcal{Y} | <code>\mathcal{Y}</code> |
| \circledS | <code>\circledS</code> | \mathcal{O} | <code>\Game</code> | \mathcal{P} | <code>\mathcal{P}</code> | \mathcal{Z} | <code>\mathcal{Z}</code> |
| \complement | <code>\complement</code> | \hbar | <code>\hbar</code> | \mathcal{F} | <code>\mathcal{F}</code> | \mathcal{S} | <code>\mathcal{S}</code> |
| F | <code>\digamma</code> | \hbar | <code>\hslash</code> | \nexists | <code>\nexists</code> | \mathcal{R} | <code>\mathcal{R}</code> |
| ℓ | <code>\ell</code> | \mathfrak{I} | <code>\Im</code> | \mathfrak{R} | <code>\Re</code> | | |

TABLE 203: `trfsigns` Letter-like Symbols

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

TABLE 204: `mathdesign` Letter-like Symbols

| | | | |
|------------|-----------------------|-------|-----------------------------|
| \in | <code>\in</code> | \ni | <code>\owns</code> |
| \notin | <code>\notin</code> | \in | <code>\smallin</code> |
| $\not\in$ | <code>\not\in</code> | \ni | <code>\smallowns</code> |
| \nexists | <code>\nexists</code> | \in | <code>\not\smallowns</code> |

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

TABLE 205: `fge` Letter-like Symbols

| | | | | | | | |
|----------------|--------------------|----------------|-------------------------|----------------|-------------------------|----------------|--------------------|
| \mathbb{A} | <code>\fgeA</code> | \mathfrak{g} | <code>\fgeeszett</code> | \mathfrak{B} | <code>\fgeleftB</code> | \mathfrak{F} | <code>\fgeU</code> |
| \mathfrak{z} | <code>\fgec</code> | \mathcal{H} | <code>\fgeF</code> | \mathcal{O} | <code>\fgeleftC</code> | | |
| \mathfrak{p} | <code>\fged</code> | \mathcal{J} | <code>\fgef</code> | \mathcal{W} | <code>\fgerightB</code> | | |
| \mathfrak{z} | <code>\fgee</code> | \mathcal{Y} | <code>\fgelb^*</code> | f | <code>\fges</code> | | |

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

TABLE 206: fourier Letter-like Symbols

 $\partial \ \backslash\partial \ \partial \ \backslash\varpartial$

TABLE 207: cmll Letter-like Symbols

 $\bot \ \backslash\Bot \ \curlywedge \ \backslash\simbot$
TABLE 208: *AMS* Delimiters

| | | | |
|-----------|----------------------|-----------|----------------------|
| \lceil | \backslashulcorner | \rceil | \backslashurcorner |
| \lfloor | \backslashllcorner | \rfloor | \backslashlrcorner |

TABLE 209: stmaryrd Delimiters

| | | | | | | | |
|----------|--------------------------|----------|--------------------------|-----------|--------------------|-----------|--------------------|
| $\{$ | \backslashLbag | $\}$ | \backslashRbag | $\{$ | \backslashlbag | $\}$ | \backslashrbag |
| \lceil | \backslashlceil | \rceil | \backslashrceil | \lfloor | \backslashlfloor | \rfloor | \backslashrfloor |
| $($ | \backslashlparenthesis | $)$ | \backslashrparenthesis | | | | |

TABLE 210: mathabx Delimiters

| | | | |
|-----------|----------------------|-----------|----------------------|
| $[$ | \backslashlcorners | $]$ | \backslashrcorners |
| \lceil | \backslashulcorner | \rceil | \backslashurcorner |
| \lfloor | \backslashllcorner | \rfloor | \backslashlrcorner |

TABLE 211: boisik Delimiters

| | | | |
|-----------|----------------------|-----------|----------------------|
| \lceil | \backslashulcorner | \rceil | \backslashurcorner |
| \lfloor | \backslashllcorner | \rfloor | \backslashlrcorner |

TABLE 212: stix Delimiters

| | | | | | | | |
|---------------|-------------------------|-----------|-------------------------|---------------|--------------------------|-----------|--------------------------|
| \langle | \backslashangledot | \rangle | \backslashangledot | \langle | \backslashllangle | \rangle | \backslashrrangle |
| $\{$ | \backslashlbag | $\}$ | \backslashrbag | \lfloor | \backslashllcorner | \rfloor | \backslashlrcorner |
| $($ | \backslashblkbrbrak | $)$ | \backslashblkbrbrak | \langle | \backslashlparenthesis | \rangle | \backslashrparenthesis |
| $[$ | \backslashbracklltick | $]$ | \backslashbrackurtick | $\langle\!\!$ | \backslashparengtr | $\!\!>$ | \backslashRparenless |
| \lceil | \backslashbrackubar | \rceil | \backslashbrackubar | $\langle\!\!$ | \backslashparenless | $\!\!>$ | \backslashparengtr |
| \lfloor | \backslashbrackultick | \rfloor | \backslashbracklrtick | $\langle\!\!$ | \backslashvzigzag | $\!\!>$ | \backslashrvzigzag |
| $\langle\!\!$ | \backslashbrbrak | $\!\!>$ | \backslashbrbrak | $\langle\!\!$ | \backslashLvzigzag | $\!\!>$ | \backslashRvzigzag |
| \langle | \backslashcurvyangle | \rangle | \backslashcurvyangle | \lceil | \backslashulcorner | \rceil | \backslashurcorner |

TABLE 213: nath Delimiters

 $\lfloor \ \backslashniv \ \rfloor \ \backslashvin$

TABLE 214: Variable-sized Delimiters

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

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

TABLE 215: Large, Variable-sized Delimiters

| | | | | | | | | | |
|--------|--------|--------------------------|-------------|--------------------------|----------|-----------|-------------------------|----------|----------------------|
| \int | \int | <code>\lmoustache</code> | $\Bigg\}$ | <code>\rmoustache</code> | $\Bigg($ | $\Bigg\{$ | <code>\lgroup</code> | $\Bigg)$ | <code>\rgroup</code> |
| $ $ | $ $ | <code>\arrowvert</code> | \parallel | <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 216: \mathcal{AM} S Variable-sized Delimiters

| | | | | | |
|-------------|-------------|---------------------|-------------|-------------|---------------------|
| $ $ | $ $ | <code>\lvert</code> | $ $ | $ $ | <code>\rvert</code> |
| \parallel | \parallel | <code>\lVert</code> | \parallel | \parallel | <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 214) are intended to be used as operators (e.g., as in “ $p|q$ ”).

 TABLE 217: `stmaryrd` Variable-sized Delimiters

| | | | |
|--------------|--------------|-------------------------|--------------|
| \llbracket | \rrbracket | <code>\llbracket</code> | \rrbracket |
|--------------|--------------|-------------------------|--------------|

TABLE 218: `mathabx` Variable-sized Delimiters

| | | | | | |
|--------------|------------|------------------------|------------|--------------|----------------------|
| \llbracket | \lceil | $\backslash\ldbrack$ | \rceil | \rrbracket | $\backslash\rdbrack$ |
| \lfloor | $\{\!\!\{$ | $\backslash\lfloor$ | $\}\!\!\}$ | \rfloor | $\backslash\rfloor$ |
| \mid | \mid | $\backslash\thickvert$ | \mid | \mid | $\backslash\vvvert$ |

TABLE 219: `MnSymbol` Variable-sized Delimiters

| | | | | | |
|--------------|--------------|-------------------------|-----------|-------------------------------------|-------------------------------------|
| \parallel | \parallel | $\backslash\Arrowvert$ | $\{$ | $\left\{ \backslash lbrace$ | $\right\} \backslash rceil$ |
| \mid | \mid | $\backslash arrowvert$ | \lceil | $\left[\backslash lceil$ | $\right] \backslash rfloor$ |
| \backslash | \backslash | $\backslash backslash$ | \lfloor | $\left[\backslash lfloor$ | $\right) \backslash rgrou$ |
| \mid | \mid | $\backslash bracevert$ | $\{$ | $\left(\backslash lgroup$ | $\} \backslash rmoustache$ |
| $[$ | $]$ | $\backslash llangle$ | \langle | $\langle\langle \backslash llangle$ | $\rangle\rangle \backslash rrangle$ |
| $]$ | $]$ | $\backslash llcorner$ | \langle | $\langle \backslash llcorner$ | $\rangle \backslash rsem$ |
| $($ | $)$ | $\backslash lmoustache$ | \rangle | $\rangle \backslash rmoustache$ | $\rangle \backslash rWavy$ |
| $)$ | $)$ | $\backslash lrcorner$ | \rangle | $\rangle \backslash lrcorner$ | $\rangle \backslash rwavy$ |
| $/$ | $/$ | $\backslash lssem$ | \lceil | $\lceil \backslash lssem$ | $\rceil \backslash ulcorner$ |
| \langle | \langle | $\backslash lwavy$ | \rangle | $\rangle \backslash lwavy$ | $\rangle \backslash ullcorner$ |
| \rangle | \rangle | $\backslash lWavy$ | \rangle | $\rangle \backslash lWavy$ | $\rangle \backslash ulrcorner$ |
| $ $ | $ $ | $\backslash rangle$ | \rangle | $\rangle \backslash rangle$ | $\rangle \backslash urcorner$ |

(continued on next page)

(continued from previous page)

```
( { \langle } \ranglebar || || \|\n( { \langlebar } \rangle } \rbrace
```

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

TABLE 220: *fdsymbol* Variable-sized Delimiters

(continued on next page)

(continued from previous page)

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

TABLE 221: stix Variable-sized Delimiters

(continued on next page)

(continued from previous page)

| | | | | | | | | |
|--------------|--------------|------------------------------|-----------|-----------|-------------------------------|------------------|------------------|--------------------------------|
| \downarrow | \downarrow | $\backslash\text{downarrow}$ | \lceil | \lceil | $\backslash\text{lceil}$ | \uparrow | \uparrow | $\backslash\text{uparrow}$ |
| \Downarrow | \Downarrow | $\backslash\text{Downarrow}$ | \lfloor | \lfloor | $\backslash\text{lffloor}$ | \Uparrow | \Uparrow | $\backslash\text{Uparrow}$ |
| $[$ | $[$ | $[$ | $($ | $)$ | $\backslash\text{lgroup}$ | \Downarrow | \Downarrow | $\backslash\text{Updownarrow}$ |
| $]$ | $]$ | $]$ | \langle | \rangle | $\backslash\text{lmoustache}$ | \Updownarrow | \Updownarrow | $\backslash\text{updownarrow}$ |
| $($ | $($ | $($ | $($ | $($ | $\backslash\text{lParen}$ | \UpUpdownarrow | \UpUpdownarrow | $\backslash\text{Uuparrow}$ |
| $)$ | $)$ | $)$ | \rangle | \rangle | $\backslash\text{rAngle}$ | \UpUpdownarrow | \UpUpdownarrow | $\backslash\text{UUparrow}$ |
| $/$ | $/$ | $/$ | $)$ | $)$ | $\backslash\text{rangle}$ | \parallel | \parallel | $\backslash\text{Vert}$ |
| $<$ | $<$ | $<$ | $}$ | $}$ | $\backslash\text{rbrace}$ | $ $ | $ $ | $\backslash\text{vert}$ |
| $>$ | $>$ | $>$ | $\}$ | $\}$ | $\backslash\text{rBrace}$ | $\ \ $ | $\ \ $ | $\backslash\text{Vvert}$ |
| $ $ | $ $ | $ $ | $\ $ | $\ $ | $\backslash\text{rBrack}$ | | | |
| \langle | \langle | \langle | \rangle | \rangle | $\backslash\text{rbrbrak}$ | | | |

TABLE 222: `mathdesign` Variable-sized Delimiters

| | | | | | |
|-----|--------------------|-----------------------------|-----|--------------------|------------------------------|
| $,$ | $\left\{ \right\}$ | $\backslash\text{leftwave}$ | $,$ | $\left\{ \right\}$ | $\backslash\text{rightwave}$ |
| $,$ | $\left\{ \right\}$ | $\backslash\text{leftevaw}$ | $,$ | $\left\{ \right\}$ | $\backslash\text{rightevaw}$ |

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

TABLE 223: **nat** Variable-sized Delimiters (Double)

| | |
|---|--|
| $\langle \langle \backslash lAngle \rangle \rangle$ | $\backslash rAngle$ |
| $\llbracket \llbracket \backslash lBrack \rrbracket \rrbracket$ | $\backslash rBrack$ |
| $\lceil \lceil \backslash lCeil \rceil \rceil$ | $\backslash rCeil$ |
| $\lfloor \lfloor \backslash lFloor \rfloor \rfloor$ | $\backslash rFloor$ |
| $\parallel \parallel \backslash lVert^*$ | $\parallel \parallel \backslash rVert^*$ |

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

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

TABLE 224: **nat** Variable-sized Delimiters (Triple)

| | |
|--|---|
| $\langle\langle\langle \backslash triple< \rangle \rangle \rangle$ | $\backslash triple>$ |
| $\llbracket \llbracket \llbracket \backslash triple[\rrbracket \rrbracket \rrbracket$ | $\backslash triple]$ |
| $\parallel \parallel \parallel \backslash ltriple ^*$ | $\parallel \parallel \parallel \backslash rtriple ^*$ |

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

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

TABLE 225: **fourier** Variable-sized Delimiters

| | |
|--|------------------------|
| $\llbracket \llbracket \backslash llbracket \rrbracket \rrbracket$ | $\backslash rrbracket$ |
| $\parallel \parallel \parallel \backslash VERT$ | |

TABLE 226: **textcomp** Text-mode Delimiters

| | |
|--|----------------------------|
| $\langle \backslash textlangle \rangle$ | $\backslash textrangle$ |
| $\llbracket \backslash textlbrackdbl \rrbracket$ | $\backslash textrbrackdbl$ |
| $\{ \backslash textlquill \}$ | $\backslash textrquill$ |

TABLE 227: metre Text-mode Delimiters

| | | | | | | | |
|-----------|---------------------|-----------|---------------------|-----------|-----------------------|-----------|-----------------------|
| $\}$ | <code>\alad</code> | $\}$ | <code>\Alad</code> | \dagger | <code>\crux</code> | \dagger | <code>\Crux</code> |
| $\{$ | <code>\alas</code> | $\{$ | <code>\Alas</code> | $\ $ | <code>\quadrad</code> | $\ $ | <code>\Quadrad</code> |
| \rangle | <code>\angud</code> | \rangle | <code>\Angud</code> | $\ $ | <code>\quadras</code> | $\ $ | <code>\Quadras</code> |
| \langle | <code>\angus</code> | \langle | <code>\Angus</code> | | | | |

TABLE 228: Math-mode Accents

| | | | | | | | |
|-------------|------------------------|-------------|------------------------|----------------|---------------------------|-------------|------------------------|
| \acute{a} | <code>\acute{a}</code> | \check{a} | <code>\check{a}</code> | \grave{a} | <code>\grave{a}</code> | \tilde{a} | <code>\tilde{a}</code> |
| \bar{a} | <code>\bar{a}</code> * | \ddot{a} | <code>\ddot{a}</code> | \hat{a} | <code>\hat{a}</code> | \vec{a} | <code>\vec{a}</code> |
| \breve{a} | <code>\breve{a}</code> | \dot{a} | <code>\dot{a}</code> | \mathring{a} | <code>\mathring{a}</code> | | |

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

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

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

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

TABLE 229: *AMS* Math-mode Accents

| | | | |
|------------|-----------------------|-------------------|------------------------------|
| \ddot{a} | <code>\ddot{a}</code> | $\ddot{\ddot{a}}$ | <code>\ddot{\ddot{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 *AMS* ones tighten the space between the dots (from \ddot{a} to $\ddot{\ddot{a}}$). The `mathabx` and `mathdots` versions also function properly within subscripts and superscripts ($x^{\ddot{a}}$ instead of $x^{\dot{\ddot{a}}}$).

TABLE 230: MnSymbol Math-mode Accents

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

TABLE 231: `fdsymbol` Math-mode Accents

| | | | |
|----------------|------------------------------|----------------|--------------------------------|
| \mathfrak{a} | <code>\middlebar{a}</code> | \mathfrak{a} | <code>\strokethrough{a}</code> |
| \mathfrak{a} | <code>\middleslash{a}</code> | \mathfrak{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 232: `boisik` Math-mode Accents

| | |
|----------------|----------------------|
| \mathfrak{a} | <code>\vec{a}</code> |
|----------------|----------------------|

TABLE 233: `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> |
| \ddot{a} | <code>\asteraccent{a}</code> | $\overleftarrow{\overleftarrow{a}}$ | <code>\leftharpoonaccent{a}</code> |
| \bar{a} | <code>\bar{a}</code> | $\overleftarrow{\overrightarrow{a}}$ | <code>\leftrightarrowaccent{a}</code> |
| \check{a} | <code>\breve{a}</code> | \dot{a} | <code>\mathring{a}</code> |
| \grave{a} | <code>\candra{a}</code> | \grave{a} | <code>\ocommatopright{a}</code> |
| $\check{\grave{a}}$ | <code>\check{\grave{a}}</code> | $\grave{\acute{a}}$ | <code>\oturnedcomma{a}</code> |
| $\ddot{\grave{a}}$ | <code>\dddot{a}</code> | $\grave{\dot{a}}$ | <code>\ovhook{a}</code> |
| $\ddot{\acute{a}}$ | <code>\dddot{a}</code> | $\grave{\acute{\dot{a}}}$ | <code>\rightharpoonaccent{a}</code> |
| $\ddot{\check{a}}$ | <code>\ddot{a}</code> | \tilde{a} | <code>\tilde{a}</code> |
| $\acute{\grave{a}}$ | <code>\dot{\grave{a}}</code> | \vec{a} | <code>\vec{a}</code> |
| $\acute{\check{a}}$ | <code>\droang{a}</code> | \widehat{a} | <code>\widebridgeabove{a}</code> |
| $\grave{\check{a}}$ | <code>\grave{\check{a}}</code> | | |

TABLE 234: `fge` Math-mode Accents

| | |
|-------------------|---|
| $\dot{\acute{a}}$ | <code>\spirituslenis{A}\spirituslenis{a}</code> * |
|-------------------|---|

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

TABLE 235: `yhmath` Math-mode Accents

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

This symbol is largely obsolete, as standard L^AT_EX 2_ε has supported `\mathring` (Table 228 on the previous page) since June 1998 [L^AT98].

TABLE 236: 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 242 for a sample of this symbol. See also the `polynom` package, which automatically solves and typesets polynomial-division problems in a similar manner.

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

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

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

TABLE 237: `\overrightarrow` Extensible Accents

$$\overrightarrow{abc} \quad \text{\code{\overrightarrow{abc}}}$$

TABLE 238: `yhmath` Extensible Accents

| | | | |
|-------------------|------------------------------|-----------------------|----------------------------------|
| \widehat{abc} | <code>\widehat{abc}</code> | \widetilde{abc} | <code>\widetilde{abc}</code> |
| \wideparen{abc} | <code>\wideparen{abc}</code> | $\widehat{\triangle}$ | <code>\widehat{\triangle}</code> |
| \widering{abc} | <code>\widering{abc}</code> | | |

TABLE 239: `AMS` Extensible Accents

| | | | |
|----------------------------|---------------------------------------|------------------------|-----------------------------------|
| \overleftrightarrow{abc} | <code>\overleftrightarrow{abc}</code> | \overleftarrow{abc} | <code>\overleftarrow{abc}</code> |
| \overleftarrow{abc} | <code>\overleftarrow{abc}</code> | \overrightarrow{abc} | <code>\overrightarrow{abc}</code> |

TABLE 240: MnSymbol Extensible Accents

| | | | |
|--------------------|-------------------------------------|--------------------|-------------------------------------|
| \overbrace{abc} | <code>\overbrace{abc}</code> | \underbrace{abc} | <code>\underbrace{abc}</code> |
| \overbrace{abc} | <code>\overgroup{abc}</code> | \underbrace{abc} | <code>\underlinesegment{abc}</code> |
| \overbrace{abc} | <code>\overleftharpoon{abc}</code> | \widehat{abc} | <code>\widehat{abc}</code> |
| \overbrace{abc} | <code>\overlinesegment{abc}</code> | \wideparen{abc} | <code>\wideparen{abc}</code> |
| \overbrace{abc} | <code>\overrightharpoon{abc}</code> | \widetilde{abc} | <code>\widetilde{abc}</code> |
| \underbrace{abc} | | | |

TABLE 241: fdsymbol Extensible Accents

| | | | |
|--------------------|-------------------------------------|--------------------|-------------------------------------|
| \overbrace{abc} | <code>\overbrace{abc}</code> | \underbrace{abc} | <code>\underbrace{abc}</code> |
| \overbrace{abc} | <code>\overgroup{abc}</code> | \underbrace{abc} | <code>\underlinesegment{abc}</code> |
| \overbrace{abc} | <code>\overleftharpoon{abc}</code> | \widehat{abc} | <code>\widehat{abc}</code> |
| \overbrace{abc} | <code>\overlinesegment{abc}</code> | \wideparen{abc} | <code>\wideparen{abc}</code> |
| \overbrace{abc} | <code>\overrightharpoon{abc}</code> | \widetilde{abc} | <code>\widetilde{abc}</code> |
| \underbrace{abc} | <code>\underbrace{abc}</code> | | |

TABLE 242: stix Extensible Accents

| | | | |
|--------------------|---------------------------------------|--------------------|--|
| \overbrace{abc} | <code>\longdivision{abc}</code> | \underbrace{abc} | <code>\underbrace{abc}</code> |
| \overbrace{abc} | <code>\overbrace{abc}</code> | \underbrace{abc} | <code>\underleftarrow{abc}</code> |
| \overbrace{abc} | <code>\overbracket{abc}</code> | \underbrace{abc} | <code>\underleftharpoon{abc}</code> |
| \overbrace{abc} | <code>\overleftarrow{abc}</code> | \underbrace{abc} | <code>\underleftrightarrow{abc}</code> |
| \overbrace{abc} | <code>\overleftharpoon{abc}</code> | \underbrace{abc} | <code>\underparen{abc}</code> |
| \overbrace{abc} | <code>\overleftrightarrow{abc}</code> | \underbrace{abc} | <code>\underrightarrow{abc}</code> |
| \overbrace{abc} | <code>\overparen{abc}</code> | \underbrace{abc} | <code>\underrightharpoon{abc}</code> |
| \overbrace{abc} | <code>\overrightarrow{abc}</code> | \underbrace{abc} | <code>\widecheck{abc}</code> |
| \overbrace{abc} | <code>\overrightharpoon{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 243: `mathtools` Extensible Accents

| | | | |
|---------------------|----------------------------------|----------------------|-----------------------------------|
| \overbrace{abc} | <code>\overbrace{abc}</code> | \underbrace{abc} | <code>\underbrace{abc}</code> |
| \overbracket{abc} | <code>\overbracket{abc}</code> * | \underbracket{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 244: `mathabx` Extensible Accents

| | | | |
|--------------------|-------------------------------|-------------------|------------------------------|
| \overbrace{abc} | <code>\overbrace{abc}</code> | \widebar{abc} | <code>\widebar{abc}</code> |
| \overgroup{abc} | <code>\overgroup{abc}</code> | \widecheck{abc} | <code>\widecheck{abc}</code> |
| \underbrace{abc} | <code>\underbrace{abc}</code> | \wideparen{abc} | <code>\wideparen{abc}</code> |
| \undergroup{abc} | <code>\undergroup{abc}</code> | \widering{abc} | <code>\widering{abc}</code> |
| \widearrow{abc} | <code>\widearrow{abc}</code> | | |

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

TABLE 245: `fourier` Extensible Accents

| | | | |
|------------------|-----------------------------|-------------------|------------------------------|
| \widearc{abc} | <code>\widearc{abc}</code> | \wideparen{abc} | <code>\wideparen{abc}</code> |
| \wideOarc{abc} | <code>\wideOarc{abc}</code> | \widering{abc} | <code>\widering{abc}</code> |

TABLE 246: `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 247: `abracses` Extensible Accents

| | | | |
|-------------------|-------------------------------|--------------------|--------------------------------|
| \overbrace{abc} | <code>\aoverbrace{abc}</code> | \underbrace{abc} | <code>\aunderbrace{abc}</code> |
|-------------------|-------------------------------|--------------------|--------------------------------|

`\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 `abracses` documentation for more information.

TABLE 248: `undertilde` Extensible Accents

| | |
|-------------------|---------------------------|
| \underline{abc} | <code>\utilde{abc}</code> |
|-------------------|---------------------------|

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

TABLE 249: `ushort` Extensible Accents

| | | | |
|-------------------------------|-----------------------------|-------------------|----------------------------|
| $\underline{\underline{abc}}$ | <code>\ushortdw{abc}</code> | \underline{abc} | <code>\ushortw{abc}</code> |
|-------------------------------|-----------------------------|-------------------|----------------------------|

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

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

TABLE 250: `mdwmath` Extensible Accents

| | |
|--------------|--------------------------|
| \sqrt{abc} | <code>\sqrt*[abc]</code> |
|--------------|--------------------------|

TABLE 251: `actuarialangle` Extensible Accents

| | |
|------------------|-----------------------------------|
| \overline{abc} | <code>\actuarialangle{abc}</code> |
|------------------|-----------------------------------|

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

TABLE 252: `AM` Extensible Arrows

| | | | |
|--------------------|-------------------------------|---------------------|--------------------------------|
| \xleftarrow{abc} | <code>\xleftarrow{abc}</code> | \xrightarrow{abc} | <code>\xrightarrow{abc}</code> |
|--------------------|-------------------------------|---------------------|--------------------------------|

TABLE 253: mathtools Extensible Arrows

| | | | |
|--------------------|--|---------------------|---------------------------------------|
| $\xleftarrow[abc]$ | <code>\xhookleftarrow{abc}</code> | $\xrightarrow[abc]$ | <code>\xleftrightharpoons{abc}</code> |
| $\xleftarrow[abc]$ | <code>\xhookrightarrow{abc}</code> | $\xrightarrow[abc]$ | <code>\xmapsto{abc}</code> |
| $\xleftarrow[abc]$ | <code>\xLeftarrow{abc}</code> | $\xrightarrow[abc]$ | <code>\xRightarrow{abc}</code> |
| $\xleftarrow[abc]$ | <code>\xleftharpoondown{abc}</code> | $\xrightarrow[abc]$ | <code>\xrightharpoondown{abc}</code> |
| $\xleftarrow[abc]$ | <code>\xleftharpoonup{abc}</code> | $\xrightarrow[abc]$ | <code>\xrightharpoonup{abc}</code> |
| $\xleftarrow[abc]$ | <code>\xleftrightharpoonup{abc}</code> | $\xrightarrow[abc]$ | <code>\xrightleftharpoons{abc}</code> |
| $\xleftarrow[abc]$ | <code>\xLeftrightarrow{abc}</code> | | |

TABLE 254: chemarr Extensible Arrows

$$\xrightleftharpoons[abc]{} \quad \text{\texttt{\xrightleftharpoons{abc}}}$$

TABLE 255: chemarrow Extensible Arrows

| | | | |
|---------------------------------|---|---------------------------------|---|
| $\xleftarrow[def]{abc}$ | <code>\autoleftarrow{abc}{def}</code> | $\xrightarrow[def]{abc}$ | <code>\autorightarrow{abc}{def}</code> |
| $\xrightleftharpoons[def]{abc}$ | <code>\autoleftrightharpoons{abc}{def}</code> | $\xrightleftharpoons[def]{abc}$ | <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 256: extarrows Extensible Arrows

| | | | |
|----------------------------|------------------------------------|----------------------------|--|
| $\xrightleftharpoons[abc]$ | <code>\xLeftrightarrow{abc}</code> | $\xrightleftharpoons[abc]$ | <code>\xLongleftrightarrow{abc}</code> |
| $\xrightleftharpoons[abc]$ | <code>\xleftrightarrow{abc}</code> | $\xrightleftharpoons[abc]$ | <code>\xlongleftrightarrow{abc}</code> |
| $\xrightleftharpoons[abc]$ | <code>\xlongequal{abc}</code> | $\xrightleftharpoons[abc]$ | <code>\xLongrightarrow{abc}</code> |
| $\xrightleftharpoons[abc]$ | <code>\xLongleftarrow{abc}</code> | $\xrightleftharpoons[abc]$ | <code>\xlongrightarrow{abc}</code> |
| $\xrightleftharpoons[abc]$ | <code>\xlongleftarrow{abc}</code> | | |

TABLE 257: `extpfeil` Extensible Arrows

| | | | |
|-------------------------|------------------------------------|---------------------|---------------------------------------|
| \xlongequal{abc} | <code>\xlongequal{abc}</code> | $\xleftarrow[abc]$ | <code>\xtwoheadleftarrow{abc}</code> |
| \xmapsto{abc} | <code>\xmapsto{abc}</code> | $\xrightarrow[abc]$ | <code>\xtwoheadrightarrow{abc}</code> |
| \xleftrightarrow{abc} | <code>\xleftrightarrow{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 258: `DotArrow` Extensible Arrows

$$\overset{a}{\dashrightarrow} \quad \text{\dotarrow{a}}$$

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

TABLE 259: `trfsigns` Extensible Transform Symbols

$$\overleftarrow{a} \quad \text{\dft{a}} \quad \overrightarrow{a} \quad \text{\DFT{a}}$$

TABLE 260: `holtpolt` Non-commutative Division Symbols

$$\frac{abc}{def} \quad \text{\holter{abc}{def}} \quad \frac{abc}{def} \quad \text{\polter{abc}{def}}$$

TABLE 261: Dots

| | | | | | | | |
|-----|---------------------|----|-----------------------|-----|---------------------|---|---------------------|
| . | <code>\cdotp</code> | : | <code>\colon^*</code> | . | <code>\ldotp</code> | : | <code>\vdots</code> |
| ... | <code>\cdots</code> | .. | <code>\ddots</code> | ... | <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^AT_EX [Dow00] for more information on math-mode spacing.

[†] The `mathdots` package redefines `\ddots` and `\vdots` (Table 267) to make them scale properly with font size. (They normally scale horizontally but not vertically.) `\fixedddots` and `\fixedvdots` provide the original, fixed-height functionality of L^AT_EX 2 _{ε} ’s `\ddots` and `\vdots` macros.

TABLE 262: *AMS* Dots

| | | | | | |
|------------|------------------------|---------|----------------------|--------------|--------------------------|
| \because | <code>\because*</code> | \dots | <code>\dotsti</code> | \therefore | <code>\therefore*</code> |
| \dots | <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 88 on page 47.

The *AMS* `\dots` symbols are named according to their intended usage: `\dotsb` between pairs of binary operators/relations, `\dotsc` between pairs of commas, `\dotsti` between pairs of integrals, `\dotsm` between pairs of multiplication signs, and `\dotso` between other symbol pairs.

TABLE 263: *wasysym* Dots

\therefore `\wasytherefore`

TABLE 264: *MnSymbol* Dots

| | | | | | |
|--|------------------------------|--|-------------------------------|--|---------------------------|
| \cdot | <code>\cdot</code> | \cdots | <code>\hcdotdot</code> | \therefore | <code>\udots</code> |
| $\cdot\cdot$ | <code>\ddotdotdot</code> | $\cdots\cdots$ | <code>\hdots</code> | $\therefore\therefore$ | <code>\uptherefore</code> |
| $\cdot\cdot\cdot$ | <code>\ddots</code> | $\cdots\cdots\cdots$ | <code>\leftttherefore</code> | $\therefore\therefore\therefore$ | <code>\vdotdot</code> |
| $\therefore\therefore$ | <code>\diamondddots</code> | $\cdots\cdots\cdots\cdots$ | <code>\rightttherefore</code> | $\therefore\therefore\therefore\therefore$ | <code>\vdots</code> |
| $\therefore\therefore\therefore$ | <code>\downttherefore</code> | $\cdots\cdots\cdots\cdots\cdots$ | <code>\squaredots</code> | $\therefore\therefore\therefore\therefore\therefore$ | <code>\vdots</code> |
| $\therefore\therefore\therefore\therefore$ | <code>\fivedots</code> | $\cdots\cdots\cdots\cdots\cdots\cdots$ | <code>\udotdot</code> | | |

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

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

TABLE 265: *fdsymbol* Dots

| | | | | | |
|----------------------------------|------------------------------|----------------------------------|-------------------------------|--|---------------------------|
| \cdot | <code>\cdot</code> | \cdots | <code>\hdots</code> | \therefore | <code>\udots</code> |
| $\cdot\cdot$ | <code>\ddotdotdot</code> | $\cdots\cdots$ | <code>\leftttherefore</code> | $\therefore\therefore$ | <code>\uptherefore</code> |
| $\cdot\cdot\cdot$ | <code>\ddots</code> | $\cdots\cdots\cdots$ | <code>\rightttherefore</code> | $\therefore\therefore\therefore$ | <code>\vdotdot</code> |
| $\therefore\therefore$ | <code>\downttherefore</code> | $\cdots\cdots\cdots\cdots$ | <code>\squaredots</code> | $\therefore\therefore\therefore\therefore$ | |
| $\therefore\therefore\therefore$ | <code>\hcdotdot</code> | $\cdots\cdots\cdots\cdots\cdots$ | <code>\udotdot</code> | | |

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

TABLE 266: stix Dots

| | | | | | |
|--------------|-----------------------|------------|-------------------------------|--------------|----------------------------|
| \therefore | <code>\adots</code> | \cdots | <code>\cdots</code> | \vdots | <code>\fourvdots</code> |
| \because | <code>\because</code> | \because | <code>\because</code> | $.$ | <code>\ldotp</code> |
| \cdot | <code>\cdotp</code> | \cdot | <code>\ddots</code> | \dots | <code>\mathellipsis</code> |
| \cdot | <code>\cdotp</code> | \cdot | <code>\enleadertwodots</code> | \therefore | <code>\therefore</code> |

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

TABLE 267: mathdots Dots

\cdots `\ddots` $\cdot\cdot\cdot$ `\idots` $:$ `\vdots`

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

TABLE 268: yhmath Dots

\cdots `\adots`

TABLE 269: teubner Dots

$:$ `\colon` \vdash `\vdash` \vdash `\vdash` \vdash `\antilabe`

TABLE 270: begriff Begriffsschrift Symbols

\vdash `\BGassert` $-$ `\BGcontent` \top `\BGnot`
 \vdash_a^b `\BGconditional{a}{b}` \circledast_a `\BGquant{a}`

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

TABLE 271: frege Begriffsschrift Symbols

| | | | | | |
|--|------------------------------|------------------------------------|------------------------------|--|----------------------------|
| $\vdash \underline{a}$ | <code>\Facontent</code> | $\vdash \underline{\underline{a}}$ | <code>\Fanncontent</code> | $\dashv \underline{\underline{a}}$ | <code>\Fncontent</code> |
| $\vdash \underline{\underline{a}}$ | <code>\Fancontent</code> | $\dashv \underline{\underline{a}}$ | <code>\Fcontent</code> | $\dashv \underline{\underline{\underline{a}}}$ | <code>\Fncontent</code> |
| $\vdash \underline{\underline{\underline{a}}}$ | <code>\Fannquant{a}</code> | $\vdash \underline{\underline{a}}$ | <code>\Faquant{a}</code> | $\dashv \underline{\underline{a}}$ | <code>\Fnquant{a}</code> |
| $\vdash \underline{\underline{\underline{a}}}$ | <code>\Fannquantsn{a}</code> | $\vdash \underline{\underline{a}}$ | <code>\Faquantnsn{a}</code> | $\dashv \underline{\underline{a}}$ | <code>\Fnquantsn{a}</code> |
| $\vdash \underline{\underline{\underline{a}}}$ | <code>\Fannquantnn{a}</code> | $\vdash \underline{\underline{a}}$ | <code>\Faquantnn{a}</code> | $\dashv \underline{\underline{a}}$ | <code>\Fnquantnn{a}</code> |
| $\vdash \underline{\underline{a}}$ | <code>\Fanquant{a}</code> | $\vdash \underline{\underline{a}}$ | <code>\Fnnquant{a}</code> | $\dashv \underline{\underline{a}}$ | <code>\Fquant{a}</code> |
| $\vdash \underline{\underline{a}}$ | <code>\Fanquantnsn{a}</code> | $\vdash \underline{\underline{a}}$ | <code>\Fnnquantnsn{a}</code> | $\dashv \underline{\underline{a}}$ | <code>\Fquantnsn{a}</code> |
| $\vdash \underline{\underline{\underline{a}}}$ | <code>\Fanquantnn{a}</code> | $\vdash \underline{\underline{a}}$ | <code>\Fnnquantnn{a}</code> | $\dashv \underline{\underline{\underline{a}}}$ | <code>\Fquantnn{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 272: mathcomp Math Symbols

| | | | | | |
|--------------------|----------------------------|----------|---------------------|--------------------------------|----------------------------|
| $^{\circ}\text{C}$ | <code>\tccentigrade</code> | Ω | <code>\tcohm</code> | $\%$ | <code>\tcpertousand</code> |
| μ | <code>\tcmu</code> | | $\%$ | <code>\tcpertenthousand</code> | |

TABLE 273: marvosym Math Symbols

| | | | | | |
|-------------------|---------------------------|---------|---------------------------------|---------------|--------------------------------|
| \triangleleft | <code>\AngleSign</code> | \geq | <code>\LargerOrEqual</code> | \times | <code>\MVMultiplication</code> |
| \Rightarrow | <code>\Conclusion</code> | \leq | <code>\LessOrEqual</code> | $.$ | <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> |
| $\not\mid$ | <code>\DividesNot</code> | $($ | <code>\MVLeftBracket</code> | \neq | <code>\NotCongruent</code> |
| \Leftrightarrow | <code>\Equivalence</code> | $-$ | <code>\MVMinus</code> | | |

TABLE 274: 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 275: fge Digits

| | | | |
|-------------|-----------------------------|--------------|----------------------------|
| \emptyset | <code>\fgestruckzero</code> | $\mathbb{1}$ | <code>\fgestruckone</code> |
|-------------|-----------------------------|--------------|----------------------------|

TABLE 276: dozenal Base-12 Digits

| | | | |
|--------------|-----------------|--------------|-----------------|
| $\mathbb{2}$ | <code>\x</code> | $\mathbb{8}$ | <code>\e</code> |
|--------------|-----------------|--------------|-----------------|

TABLE 277: mathabx Mayan Digits

| | | | | | |
|------------------|-----------------------|---|-----------------------|---|-----------------------|
| $\bullet\bullet$ | <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 278: stix Infinites

| | | | | | |
|-----------------|------------------------|----------|-----------------------|----------|------------------------|
| \circledinfty | <code>\acidfree</code> | ∞ | <code>\infny</code> | ∞ | <code>\tieinfty</code> |
| \approx | <code>\iinfin</code> | ϕ | <code>\nvinfty</code> | | |

TABLE 279: stix Primes

| | | | |
|--------|-----------------------|-------|---------------------------|
| $'$ | <code>\prime</code> | $'$ | <code>\backprime</code> |
| $''$ | <code>\dprime</code> | $''$ | <code>\backdprime</code> |
| $'''$ | <code>\trprime</code> | $'''$ | <code>\backtrprime</code> |
| $''''$ | <code>\qprime</code> | | |

TABLE 280: stix Empty Sets

| | | | | | |
|-------------------|-----------------------------|-------------------|-----------------------------|-------------|--------------------------|
| \emptyset | <code>\emptyset</code> | $\bar{\emptyset}$ | <code>\emptysetobar</code> | \emptyset | <code>\varnothing</code> |
| $\emptyset\!\!\!$ | <code>\emptysetoarr</code> | $\emptyset\!\!\!$ | <code>\emptysetocirc</code> | | |
| $\emptyset\!\!\!$ | <code>\emptysetoarrl</code> | $\emptyset\!\!\!$ | <code>\revemptyset</code> | | |

TABLE 281: *AMS* Angles

| | | | | | |
|----------|---------------------|------------------|-----------------------------|-------------------|------------------------------|
| \angle | <code>\angle</code> | \measuredangle | <code>\measuredangle</code> | \sphericalangle | <code>\sphericalangle</code> |
|----------|---------------------|------------------|-----------------------------|-------------------|------------------------------|

TABLE 282: MnSymbol Angles

| | | | | | |
|----------|---------------------|------------------|-----------------------------|-------------------|------------------------------|
| \angle | <code>\angle</code> | \measuredangle | <code>\measuredangle</code> | \sphericalangle | <code>\sphericalangle</code> |
|----------|---------------------|------------------|-----------------------------|-------------------|------------------------------|

TABLE 283: fdsymbol Angles

| | | | | | |
|------------------|-----------------------------|------------------|--------------------------------|-----------------|----------------------------------|
| \angle | <code>\angle</code> | \triangleright | <code>\revangle</code> | \triangleleft | <code>\sphericalangle</code> |
| \measuredangle | <code>\measuredangle</code> | \triangleright | <code>\revmeasuredangle</code> | \triangleleft | <code>\sphericalangledown</code> |
| \rightangle | <code>\rightangle</code> | \sqsubset | <code>\rightangle</code> | \sqsupset | <code>\sphericalangleleft</code> |
| \rightangledot | <code>\rightangledot</code> | \sqsubset | <code>\rightangle</code> | \sqsupset | <code>\sphericalangleup</code> |

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

TABLE 284: boisik Angles

| | | | | | |
|------------------|-----------------------------|------------------|------------------------------|-------------------|------------------------------|
| \angle | <code>\angle</code> | \rightangle | <code>\rightangle</code> | \sphericalangle | <code>\sphericalangle</code> |
| \measuredangle | <code>\measuredangle</code> | \rightangledot | <code>\rightanglemdot</code> | | |
| \rightangle | <code>\rightangle</code> | \rightangle | <code>\rightangle</code> | \sphericalangle | <code>\sphericalangle</code> |

TABLE 285: stix Angles

| | | | | | |
|------------------|-------------------------------|------------------|-------------------------------------|------------------|--------------------------------|
| \angle | <code>\angdnr</code> | \triangleleft | <code>\measanglerutone</code> | \triangleleft | <code>\rightanglelmdot</code> |
| \angle | <code>\angle</code> | \triangleright | <code>\measangleltonw</code> | \triangleright | <code>\rightanglesqr</code> |
| \triangleleft | <code>\angles</code> | \triangleright | <code>\measangleurtone</code> | \triangleleft | <code>\sphericalangle</code> |
| \leq | <code>\angleubar</code> | \triangleleft | <code>\measuredangle</code> | \triangleright | <code>\sphericalangleup</code> |
| \triangleright | <code>\gtlpar</code> | \triangleleft | <code>\measuredangleleft</code> | \triangleleft | <code>\threedangle</code> |
| \triangleleft | <code>\measangledltosw</code> | \triangleleft | <code>\measuredrightangle</code> | \triangleright | <code>\turnangle</code> |
| \triangleleft | <code>\measangledrtose</code> | \triangleleft | <code>\rangledownzigzagarrow</code> | \triangleleft | <code>\wideangledown</code> |
| \triangleright | <code>\measangleldtosw</code> | \triangleright | <code>\revangle</code> | \triangleright | <code>\wideangleup</code> |
| \triangleleft | <code>\measangleltonw</code> | \triangleleft | <code>\revangleubar</code> | | |
| \triangleright | <code>\measanglerdtose</code> | \triangleleft | <code>\rightangle</code> | | |

TABLE 286: Miscellaneous L^AT_EX 2_ε Math Symbols

| | | | | | | | |
|--------------|-------------------------|--------------|---------------------------|------------|-----------------------|-------------|------------------------|
| \aleph | <code>\aleph</code> | \Box | <code>\Box^{*,†}</code> | ∇ | <code>\nabla</code> | \triangle | <code>\triangle</code> |
| \emptyset | <code>\emptyset</code> | \diamond | <code>\Diamond^{*}</code> | \neg | <code>\neg</code> | | |
| \angle | <code>\angle</code> | ∞ | <code>\infty</code> | \prime | <code>\prime</code> | | |
| \backslash | <code>\backslash</code> | \backslash | <code>\backslash</code> | \mho^{*} | <code>\mho^{*}</code> | \surd | <code>\surd</code> |

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

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

‡ Many people prefer the look of *AMS*’s `\varnothing` (“∅”, Table 287) to that of L^AT_EX’s `\emptyset`.

TABLE 287: Miscellaneous *AMS* Math Symbols

| | | | | | |
|------------------|-----------------------------|----------------------|---------------------------------|-----------------|----------------------------|
| \backslash | <code>\backprime</code> | \blacktriangledown | <code>\blacktriangledown</code> | \mho | <code>\mho</code> |
| \star | <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 288: Miscellaneous *wasysym* Math Symbols

| | | | | | | | |
|--------|-------------------|------------|-----------------------|------------|-----------------------|-------------|------------------------|
| \Box | <code>\Box</code> | \Diamond | <code>\Diamond</code> | \mho^{*} | <code>\mho^{*}</code> | \varangle | <code>\varangle</code> |
|--------|-------------------|------------|-----------------------|------------|-----------------------|-------------|------------------------|

* `wasysym` also defines an `\agem0` symbol, which is the same glyph as `\mho` but is intended for use in text mode.

TABLE 289: Miscellaneous *txfonts/pxfonts* Math Symbols

| | | | | | |
|-----------------|----------------------------|-----------|----------------------|-----------|----------------------|
| \blacklozenge | <code>\Diamondblack</code> | λ | <code>\lambda</code> | λ | <code>\lambda</code> |
| \diamond | <code>\Diamonddot</code> | λ | <code>\lambda</code> | λ | <code>\lambda</code> |

TABLE 290: Miscellaneous `mathabx` Math Symbols

| | | | | | | | |
|---|------------------------|-----|------------------------------|---|-------------------------------|---|------------------------------|
| ○ | <code>\degree</code> | /// | <code>\fourth</code> | ✗ | <code>\measuredangle</code> | 〃 | <code>\second</code> |
| ＼ | <code>\diagdown</code> | # | <code>\hash</code> | ㄣ | <code>\pitchfork</code> | ✗ | <code>\sphericalangle</code> |
| ／ | <code>\diagup</code> | ∞ | <code>\infty</code> | ∞ | <code>\proto</code> | 〃 | <code>\third</code> |
| ∅ | <code>\diameter</code> | × | <code>\leftthreetimes</code> | × | <code>\rightthreetimes</code> | # | <code>\varhash</code> |

TABLE 291: 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> | ∫ | <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 292: 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>\partialvardlcirclerightint</code> | ○ | <code>\partialvartlcirclerightint</code> |
| ○ | <code>\partialvardoint</code> | ○ | <code>\partialvartooint</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> |
| Σ | <code>\partialvardsumint</code> | Σ | <code>\partialvartsumint</code> |

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

TABLE 293: Miscellaneous `fdsymbol` Math Symbols

| | | | | | |
|---|-------------------------|---|-----------------------|---|---------------------------|
| ¬ | <code>\backneg</code> | ∞ | <code>\infty</code> | / | <code>\prime</code> |
| ＼ | <code>\backprime</code> | ¬ | <code>\invneg</code> | ∅ | <code>\revemptyset</code> |
| ✓ | <code>\checkmark</code> | ✖ | <code>\maltese</code> | ▽ | <code>\sector</code> |
| ∅ | <code>\emptyset</code> | ¬ | <code>\neg</code> | ∫ | <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 294: Miscellaneous boisik Math Symbols

| | | | | | |
|--------------|---------------------------|------------|----------------------------|--------------|--------------------------|
| ∂ | <code>\backepsilon</code> | \dagger | <code>\hermitmatrix</code> | $\not\wedge$ | <code>\notbot</code> |
| \backslash | <code>\backprime</code> | ∞ | <code>\infin</code> | $\not\top$ | <code>\nottop</code> |
| \checkmark | <code>\checkmark</code> | \neg | <code>\invnot</code> | ι | <code>\riota</code> |
| \square | <code>\dalambert</code> | λ | <code>\lambdabar</code> | \sim | <code>\sinewave</code> |
| \diagdown | <code>\diagdown</code> | λ | <code>\lambdaslash</code> | \emptyset | <code>\varnothing</code> |
| \diagup | <code>\diagup</code> | \maltese | | | |

TABLE 295: Miscellaneous stix Math Symbols

| | | | | | |
|------------------|-----------------------------|----------------|-----------------------------|----------------------------|------------------------------|
| \approx | <code>\accurrent</code> | \dagger | <code>\hermitmatrix</code> | \ddag | <code>\PropertyLine</code> |
| \backslash | <code>\backslash</code> | \cdot | <code>\hyphenbullet</code> | \blacksquare | <code>\QED</code> |
| \equiv | <code>\bbbrktbrk</code> | $\sim\sim$ | <code>\hzigzag</code> | $??$ | <code>\Question</code> |
| \perp | <code>\bigbot</code> | Δ | <code>\increment</code> | $\times\!\times$ | <code>\rdiagovfdiag</code> |
| \parallel | <code>\biginterleave</code> | \blacksquare | <code>\inversebullet</code> | \bowtie | <code>\rightouterjoin</code> |
| \vdash | <code>\bigtop</code> | \neg | <code>\invnot</code> | $\downarrow\downarrow$ | <code>\sansLmirrored</code> |
| \odot | <code>\blacksmiley</code> | \Join | | $\uparrow\uparrow$ | <code>\sansLturned</code> |
| $ $ | <code>\bracevert</code> | \square | <code>\laplac</code> | \sim | <code>\sinewave</code> |
| \wedge | <code>\caretinsert</code> | \Join | <code>\leftouterjoin</code> | $\overline{}$ | <code>\strns</code> |
| \checkmark | <code>\checkmark</code> | \llcorner | <code>\llarc</code> | \mp | <code>\thermod</code> |
| \triangleright | <code>\conictaper</code> | \lrcorner | <code>\lrarc</code> | $\circ\circ$ | <code>\topcir</code> |
| \geq | <code>\danger</code> | \maltese | | \sqsubset | <code>\turnednot</code> |
| \diagdown | <code>\diagdown</code> | \S | <code>\mathsection</code> | $\swarrow\swarrow$ | <code>\ubrbrak</code> |
| \diagup | <code>\diagup</code> | $_$ | <code>\mathvisible</code> | \curvearrowleft | <code>\ularc</code> |
| \emptyset | <code>\diameter</code> | ∇ | <code>\nabla</code> | \curvearrowright | <code>\urarc</code> |
| $*$ | <code>\dingasterisk</code> | \neg | <code>\neg*</code> | $\#\#\#$ | <code>\viewdata</code> |
| \times | <code>\elinters</code> | $_$ | <code>\obrbrak</code> | $\wedge\wedge\wedge$ | <code>\vzigzag</code> |
| \eth | <code>\eth</code> | \llcorner | <code>\perps</code> | $\circ\circ\circ$ | <code>\yen</code> |
| $!!$ | <code>\Exclam</code> | $\bar{_}$ | <code>\postalmark</code> | $\circ\circ\circ$ | <code>\zcmp</code> |
| \times | <code>\fdiagovrdiag</code> | \cap | <code>\profline</code> | $\gg\gg\gg$ | <code>\zpipe</code> |
| \bowtie | <code>\fullouterjoin</code> | \diamond | <code>\profsurf</code> | $\uparrow\uparrow\uparrow$ | <code>\zproject</code> |

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

TABLE 296: Miscellaneous textcomp Text-mode Math Symbols

| | | | | | |
|---------|-----------------------------------|---------------|--------------------------------|---------------|-----------------------------------|
| \circ | <code>\textdegree</code> * | $\frac{1}{2}$ | <code>\textonehalf</code> † | $\frac{3}{4}$ | <code>\textthreequarters</code> † |
| \div | <code>\textdiv</code> | $\frac{1}{4}$ | <code>\textonequarter</code> † | $\frac{3}{8}$ | <code>\textthreesuperior</code> |
| $/$ | <code>\textfractionsolidus</code> | $\frac{1}{}$ | <code>\textonesuperior</code> | \times | <code>\texttimes</code> |
| \neg | <code>\textlnot</code> | \pm | <code>\textpm</code> | $\frac{2}{}$ | <code>\texttwosuperior</code> |
| $-$ | <code>\textminus</code> | $\sqrt{}$ | <code>\textsurd</code> | | |

* If you prefer a larger degree symbol you might consider defining one as “`\ensuremath{\text{\textcircled{}}}`” (“ $^{\circ}$ ”).

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

TABLE 297: Miscellaneous `fge` Math Symbols

| | | | |
|----------------------------|-------------------------|---------------------------|----------------------------|
| <code>\fgebackslash</code> | <code>\fgecap</code> | <code>\fgecupacute</code> | <code>\fgeangle</code> |
| <code>\fgebaracute</code> | <code>\fgecapbar</code> | <code>\fgecupbar</code> | <code>\fgeupbracket</code> |
| <code>\fgebarcap</code> | <code>\fgecup</code> | <code>\fgeinfty</code> | |

TABLE 298: Miscellaneous `mathdesign` Math Symbols

`\rightangle`

TABLE 299: 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>A<small>B</small>C</i> | <code>\mathcal{ABC}</code> | <i>none</i> |
| <i>A<small>B</small>C<small>C</small></i> | <code>\mathscr{ABC}</code> <i>or</i> <code>\mathcal{ABC}</code> | <code>mathrsfs</code> <code>calrsfs</code> |
| <i>A<small>B</small>C</i> | <code>\mathcal{ABC}</code> <i>or</i> <code>\mathscr{ABC}</code> | <code>euscript</code> with the <code>mathcal</code> option <code>euscript</code> with the <code>mathscr</code> option |
| <i>A<small>B</small>C<small>C</small></i> | <code>\mathcal{ABC}</code> <i>or</i> <code>\mathscr{ABC}</code> | <code>rsfso</code> <code>rsfso</code> with the <code>scr</code> option |
| <i>A<small>B</small>C</i> | <code>\mathcal{ABC}</code> <i>or</i> <code>\mathscr{ABC}</code> | <code>urwchancal</code> [*] <code>urwchancal</code> [*] with the <code>mathscr</code> option |
| ABC | <code>\mathbb{ABC}</code> | <code>amsfonts</code> , [§] <code>amssymb</code> , <code>txfonts</code> , or <code>pxfonts</code> |
| ABC | <code>\varmathbb{ABC}</code> | <code>txfonts</code> or <code>pxfonts</code> |
| ABCdef123 | <code>\mathbb{ABCdef123}</code> | <code>bbold</code> or <code>mathbbol</code> [†] |
| ABCdef123 | <code>\mathbb{ABCdef123}</code> | <code>mbboard</code> [†] |
| ABCdef12 | <code>\mathbb{ABCdef12}</code> | <code>bbm</code> |
| ABCdef12 | <code>\mathbb{ABCdef12}</code> | <code>bbm</code> |
| ABCdef12 | <code>\mathbb{ABCdef12}</code> | <code>bbm</code> |
| ABC1 | <code>\mathds{ABC1}</code> | <code>dsfont</code> |
| ABC1 | <code>\mathds{ABC1}</code> | <code>dsfont</code> with the <code>sans</code> option |
| ABC | <code>\symA\symB\symC</code> | <code>china2e</code> [‡] |
| ABCdef123 | <code>\mathfrak{ABCdef123}</code> | <code>eufrak</code> |
| ABCdef123 | <code>\textfrak{ABCdef123}</code> | <code>yfonts</code> [¶] |
| ABCdef123 | <code>\textswab{ABCdef123}</code> | <code>yfonts</code> [¶] |
| ABCdef123 | <code>\textgoth{ABCdef123}</code> | <code>yfonts</code> [¶] |

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

As a similar trick, you can typeset the Calligra font’s script “*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 “`\mathbbf{\langle}\Langle\Lbrack\Lparen\bbalpha\bbbeta\bbgamma\Rparen\Rbrack\Rangle}`”.

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

[‡] The `\sym...` commands provided by the `GnA2e` package are actually text-mode commands. They are included in Table 299 because they resemble the blackboard-bold symbols that appear in the rest of the table. In addition to the 26 letters of the English alphabet, `GnA2e` provides three umlauted blackboard-bold letters: `\symAE` (“ \ddot{A} ”), `\symOE` (“ \ddot{O} ”), and `\symUE` (“ \ddot{U} ”). Note that `GnA2e` does provide math-mode commands for the most common number-set symbols. These are presented in Table 179 on page 87.

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

[§] An older (i.e., prior to 1991) version of the `AMS`’s fonts rendered \mathbb{C} , \mathbb{N} , \mathbb{R} , \mathbb{S} , and \mathbb{Z} as C , N , R , S , and 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 2 ϵ` packages for utilizing the now-obsolete glyphs.

4 Science and technology symbols

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

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

| | | | | | |
|--------------------|-----------------------|----------|---------------------|------|---------------------------|
| $^{\circ}\text{C}$ | <code>\celsius</code> | μ | <code>\micro</code> | $\%$ | <code>\perthousand</code> |
| $^{\circ}$ | <code>\degree</code> | Ω | <code>\ohm</code> | | |

TABLE 301: `wasy sym` Electrical and Physical Symbols

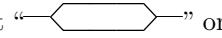
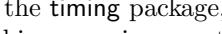
| | | | | | | | | | |
|--------|------------------|-----------|-------------------|-----|----------------------|-----|------------------|--------------------------|---------------------|
| \sim | <code>\AC</code> | \approx | <code>\VHF</code> | f | <code>\photon</code> | F | <code>\HF</code> | $\sim\!\sim\!\sim\!\sim$ | <code>\gluon</code> |
|--------|------------------|-----------|-------------------|-----|----------------------|-----|------------------|--------------------------|---------------------|

TABLE 302: `ifsym` Pulse Diagram Symbols

| | | | | | | | |
|----------|-----------------------------|----------------|----------------------------|----------|---------------------------|----------|------------------------------|
| \sqcup | <code>\FallingEdge</code> | $\sqcup\sqcap$ | <code>\LongPulseLow</code> | \sqcap | <code>\PulseLow</code> | \sqcup | <code>\ShortPulseHigh</code> |
| \sqcap | <code>\LongPulseHigh</code> | $\sqcap\sqcup$ | <code>\PulseHigh</code> | \sqcup | <code>\RaisingEdge</code> | \sqcap | <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><</code> | $>$ | <code>></code> |
| $—$ | <code>L</code> | $—$ | <code>M</code> | $—$ | <code>H</code> | $—$ | <code>D</code> | $<$ | <code><<</code> | $>$ | <code>>></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 “`B`”.

TABLE 303: `ar` Aspect Ratio Symbol

\mathcal{R} `\AR`

TABLE 304: `textcomp` Text-mode Science and Engineering Symbols

| | | | | | | | |
|--------------------|---------------------------|-------------------|-----------------------|-------|----------------------|----------|-----------------------|
| $^{\circ}\text{C}$ | <code>\textcelsius</code> | \textcircled{U} | <code>\textmho</code> | μ | <code>\textmu</code> | Ω | <code>\textohm</code> |
|--------------------|---------------------------|-------------------|-----------------------|-------|----------------------|----------|-----------------------|

TABLE 305: steinmetz Extensible Phasor Symbol

 \underline{abc} \phase{abc}

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

TABLE 306: wasysym Astronomical Symbols

| | | | | | | | | | |
|---|-----------|---|-----------|---|--------------|---|--------------|---|------------|
| ☿ | \mercury | ♂ | \earth | ♃ | \jupiter | ♄ | \uranus | ♅ | \pluto |
| ♀ | \venus | ♂ | \mars | ♄ | \saturn | ♃ | \neptune | | |
| ⊙ | \astrosun | ○ | \fullmoon | ☽ | \leftmoon | ● | \newmoon | ☽ | \rightmoon |
| ♈ | \aries | ♉ | \cancer | ♊ | \libra | ♒ | \aquarius | | |
| ♉ | \taurus | ♊ | \leo | ♋ | \scorpio | ♑ | \capricornus | | |
| ♊ | \gemini | ♋ | \virgo | ♌ | \sagittarius | ♓ | \pisces | | |
| ☊ | \ascnode | ☋ | \descnode | ☌ | \conjunction | ☍ | \opposition | ♈ | \vernal |

TABLE 307: marvosym Astronomical Symbols

| | | | | | | | | | |
|---|----------|---|---------|---|--------------|---|------------|---|--------|
| ☿ | \Mercury | ♂ | \Earth | ♃ | \Jupiter | ♄ | \Uranus | ♀ | \Pluto |
| ♀ | \Venus | ♂ | \Mars | ♄ | \Saturn | ♃ | \Neptune | | |
| ☽ | \Moon | ○ | \Sun | | | | | | |
| ♈ | \Aries | ♉ | \Cancer | ♊ | \Libra | ♑ | \Capricorn | | |
| ♉ | \Taurus | ♊ | \Leo | ♋ | \Scorpio | ♒ | \Aquarius | | |
| ♊ | \Gemini | ♋ | \Virgo | ♌ | \Sagittarius | ♓ | \Pisces | | |

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

TABLE 308: fontawesome Astronomical Symbols

| | | | | | |
|---|------------|---|----------|---|----------|
| ♂ | \faMars | ☽ | \faMoon0 | ♀ | \faVenus |
| ☿ | \faMercury | ○ | \faSun0 | | |

TABLE 309: mathabx Astronomical Symbols

| | | | | | | | | | |
|--------------------------|------------------------|--------------------------|------------------------|--------------------------|-----------------------|--------------------------|-------------------------|--------------------------|------------------------|
| $\text{\textcircled{M}}$ | <code>\Mercury</code> | \oplus | <code>\Earth</code> | $\text{\textcircled{J}}$ | <code>\Jupiter</code> | $\dot{\oplus}$ | <code>\Uranus</code> | $\text{\textcircled{P}}$ | <code>\Pluto</code> |
| $\text{\textcircled{V}}$ | <code>\Venus</code> | $\dot{\oplus}$ | <code>\Mars</code> | $\text{\textcircled{S}}$ | <code>\Saturn</code> | Ψ | <code>\Neptune</code> | $\dot{\oplus}$ | <code>\varEarth</code> |
| $\text{\textcircled{f}}$ | <code>\fullmoon</code> | $\text{\textcircled{L}}$ | <code>\leftmoon</code> | \bullet | <code>\newmoon</code> | $\text{\textcircled{R}}$ | <code>\rightmoon</code> | \odot | <code>\Sun</code> |
| $\text{\textcircled{A}}$ | <code>\Aries</code> | $\text{\textcircled{T}}$ | <code>\Taurus</code> | $\text{\textcircled{G}}$ | <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 310: stix Astronomical Symbols

| | | | | | | | |
|---------|------------------------|--------------------------|------------------------|--------------------------|-------------------------|--------------------------|-------------------|
| \odot | <code>\astrosun</code> | $\text{\textcircled{L}}$ | <code>\leftmoon</code> | $\text{\textcircled{R}}$ | <code>\rightmoon</code> | $\text{\textcircled{S}}$ | <code>\sun</code> |
|---------|------------------------|--------------------------|------------------------|--------------------------|-------------------------|--------------------------|-------------------|

TABLE 311: starfont Astronomical Symbols

| | | | | | | | |
|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|------------------------------|--------------------------|----------------------------|
| $\text{\textcircled{M}}$ | <code>\Mercury</code> | $\text{\textcircled{m}}$ | <code>\Mars</code> | $\text{\textcircled{U}}$ | <code>\Uranus</code> | $\text{\textcircled{d}}$ | <code>\varTerra</code> |
| $\text{\textcircled{V}}$ | <code>\Venus</code> | $\text{\textcircled{j}}$ | <code>\Jupiter</code> | $\text{\textcircled{N}}$ | <code>\Neptune</code> | $\text{\textcircled{u}}$ | <code>\varUranus</code> |
| $\text{\textcircled{T}}$ | <code>\Terra</code> | $\text{\textcircled{s}}$ | <code>\Saturn</code> | $\text{\textcircled{p}}$ | <code>\Pluto</code> | $\text{\textcircled{P}}$ | <code>\varPluto</code> |
| \odot | <code>\Sun</code> | $\text{\textcircled{M}}$ | <code>\Moon</code> | $\text{\textcircled{L}}$ | <code>\varMoon</code> | | |
| $\text{\textcircled{C}}$ | <code>\Cupido</code> | $\text{\textcircled{Z}}$ | <code>\Zeus</code> | $\text{\textcircled{A}}$ | <code>\Apollon</code> | $\text{\textcircled{V}}$ | <code>\Vulkanus</code> |
| $\text{\textcircled{H}}$ | <code>\Hades</code> | $\text{\textcircled{K}}$ | <code>\Kronos</code> | $\text{\textcircled{A}}$ | <code>\Admetos</code> | $\text{\textcircled{P}}$ | <code>\Poseidon</code> |
| $\text{\textcircled{L}}$ | <code>\Lilith</code> | $\text{\textcircled{N}}$ | <code>\NorthNode</code> | $\text{\textcircled{S}}$ | <code>\SouthNode</code> | | |
| $\text{\textcircled{A}}$ | <code>\Amor</code> | $\text{\textcircled{E}}$ | <code>\Eros</code> | $\text{\textcircled{J}}$ | <code>\Juno</code> | $\text{\textcircled{S}}$ | <code>\Sappho</code> |
| $\text{\textcircled{C}}$ | <code>\Ceres</code> | $\text{\textcircled{H}}$ | <code>\Hidalgo</code> | $\text{\textcircled{P}}$ | <code>\Pallas</code> | $\text{\textcircled{V}}$ | <code>\Vesta</code> |
| $\text{\textcircled{Ch}}$ | <code>\Chiron</code> | $\text{\textcircled{H}}$ | <code>\Hygiea</code> | $\text{\textcircled{Y}}$ | <code>\Psyche</code> | | |
| $\text{\textcircled{F}}$ | <code>\Fortune</code> | | | | | | |
| $\text{\textcircled{A}}$ | <code>\Aries</code> | $\text{\textcircled{L}}$ | <code>\Leo</code> | $\text{\textcircled{S}}$ | <code>\Sagittarius</code> | $\text{\textcircled{C}}$ | <code>\varCapricorn</code> |
| $\text{\textcircled{T}}$ | <code>\Taurus</code> | $\text{\textcircled{V}}$ | <code>\Virgo</code> | $\text{\textcircled{C}}$ | <code>\Capricorn</code> | | |
| $\text{\textcircled{G}}$ | <code>\Gemini</code> | $\text{\textcircled{L}}$ | <code>\Libra</code> | $\text{\textcircled{A}}$ | <code>\Aquarius</code> | | |
| $\text{\textcircled{C}}$ | <code>\Cancer</code> | $\text{\textcircled{S}}$ | <code>\Scorpio</code> | $\text{\textcircled{P}}$ | <code>\Pisces</code> | | |
| $\text{\textcircled{C}}$ | <code>\Conjunction</code> | \square | <code>\Square</code> | $\text{\textcircled{S}}$ | <code>\Semisextile</code> | | |
| $\text{\textcircled{O}}$ | <code>\Opposition</code> | $\text{\textcircled{X}}$ | <code>\Sextile</code> | $\text{\textcircled{L}}$ | <code>\Semisquare</code> | | |
| Δ | <code>\Trine</code> | $\text{\textcircled{K}}$ | <code>\Quincunx</code> | $\text{\textcircled{Q}}$ | <code>\Sesquiquadrate</code> | | |
| A^{sc} | <code>\ASC</code> | E^{p} | <code>\EastPoint</code> | M^{c} | <code>\MC</code> | | |
| D^{sc} | <code>\DSC</code> | I^{c} | <code>\IC</code> | V^{x} | <code>\Vertex</code> | | |
| D^{t} | <code>\Direct</code> | R_x | <code>\Retrograde</code> | S^{t} | <code>\Station</code> | | |
| Δ | <code>\Air</code> | $\text{\textcircled{E}}$ | <code>\Earth</code> | Δ | <code>\Fire</code> | ∇ | <code>\Water</code> |
| N^{ll} | <code>\Natal</code> | \star | <code>\Pentagram</code> | R^{ed} | <code>\Radix</code> | | |

TABLE 312: *wasy* APL Symbols

| | | | | | |
|-----------|-------------------------------|---------------|--------------------------------|-------------|-----------------------------|
| \square | <code>\APLbox</code> | \square | <code>\APLinv</code> | $*$ | <code>\APLstar</code> |
| α | <code>\APLcomment</code> | \square | <code>\APLleftarrowbox</code> | \triangle | <code>\APLup</code> |
| ∇ | <code>\APLdown</code> | \circledast | <code>\APLlog</code> | \square | <code>\APLuparrowbox</code> |
| \square | <code>\APLdownarrowbox</code> | $-$ | <code>\APLminus</code> | $\not+$ | <code>\notbackslash</code> |
| \square | <code>\APLinput</code> | \square | <code>\APLrightarrowbox</code> | $\not-$ | <code>\notslash</code> |
| a | <code>\APLcirc{a}</code> | $\not\alpha$ | <code>\APLnot{a}</code> | $\not\phi$ | <code>\APLvert{a}</code> |

TABLE 313: *stix* APL Symbols

| | | | |
|-----------|------------------------------|---------|-------------------------------|
| \square | <code>\APLboxquestion</code> | $\not+$ | <code>\APLnotbackslash</code> |
| \square | <code>\APLboxupcaret</code> | $\not+$ | <code>\APLnotslash</code> |

TABLE 314: *apl* APL Symbols

| | | | | | | | | | | | | | | | |
|--------------|------------------|------------------|------------------|---------------|------------------|-----------|------------------|-----------|------------------|------------|------------------|-----|------------------|-----|------------------|
| $ $ | <code>\AB</code> | $..$ | <code>\DD</code> | ∇ | <code>\GD</code> | \vdash | <code>\LK</code> | ∇ | <code>\PD</code> | \uparrow | <code>\UA</code> | G | <code>\ZG</code> | Q | <code>\ZQ</code> |
| α | <code>\AM</code> | \perp | <code>\DE</code> | \geq | <code>\GE</code> | \circ | <code>\LO</code> | \square | <code>\QQ</code> | $-$ | <code>\US</code> | H | <code>\ZH</code> | R | <code>\ZR</code> |
| \setminus | <code>\BL</code> | ∇ | <code>\DL</code> | \rightarrow | <code>\GO</code> | \supset | <code>\LU</code> | $\}$ | <code>\RB</code> | \cup | <code>\UU</code> | I | <code>\ZI</code> | S | <code>\ZS</code> |
| \square | <code>\BX</code> | \diamond | <code>\DM</code> | Δ | <code>\GU</code> | \neq | <code>\NE</code> | \dashv | <code>\RK</code> | \ast | <code>\XQ</code> | J | <code>\ZJ</code> | T | <code>\ZT</code> |
| λ | <code>\CB</code> | \boxdot | <code>\DQ</code> | \boxtimes | <code>\IB</code> | $-$ | <code>\NG</code> | \wp | <code>\RO</code> | \AA | <code>\ZA</code> | K | <code>\ZK</code> | U | <code>\ZU</code> |
| Γ | <code>\CE</code> | \cap | <code>\DU</code> | \sim | <code>\IO</code> | \wedge | <code>\NN</code> | \subset | <code>\RU</code> | B | <code>\ZB</code> | L | <code>\ZL</code> | V | <code>\ZV</code> |
| \beth | <code>\CO</code> | τ | <code>\EN</code> | $\{$ | <code>\LB</code> | \bowtie | <code>\NR</code> | ϕ | <code>\RV</code> | C | <code>\ZC</code> | M | <code>\ZM</code> | W | <code>\ZW</code> |
| \circ | <code>\CR</code> | \in | <code>\EP</code> | Δ | <code>\LD</code> | \sim | <code>\NT</code> | \circ | <code>\SO</code> | D | <code>\ZD</code> | N | <code>\ZN</code> | X | <code>\ZX</code> |
| $/$ | <code>\CS</code> | \lfloor | <code>\FL</code> | \leq | <code>\LE</code> | ω | <code>\OM</code> | SS | <code>\SS</code> | E | <code>\ZE</code> | Q | <code>\ZO</code> | Y | <code>\ZY</code> |
| \downarrow | <code>\DA</code> | \triangleright | <code>\FM</code> | \otimes | <code>\LG</code> | \vee | <code>\OR</code> | \wp | <code>\TR</code> | F | <code>\ZF</code> | P | <code>\ZP</code> | Z | <code>\ZZ</code> |

TABLE 315: *marvosym* Computer Hardware Symbols

| | | | | | |
|-----------|-----------------------------|-----------|----------------------------|-----------|-------------------------------|
| \square | <code>\ComputerMouse</code> | \square | <code>\ParallelPort</code> | \square | <code>\SerialInterface</code> |
| \square | <code>\Keyboard</code> | \square | <code>\Printer</code> | \square | <code>\SerialPort</code> |

TABLE 316: keystroke Computer Keys

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

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

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

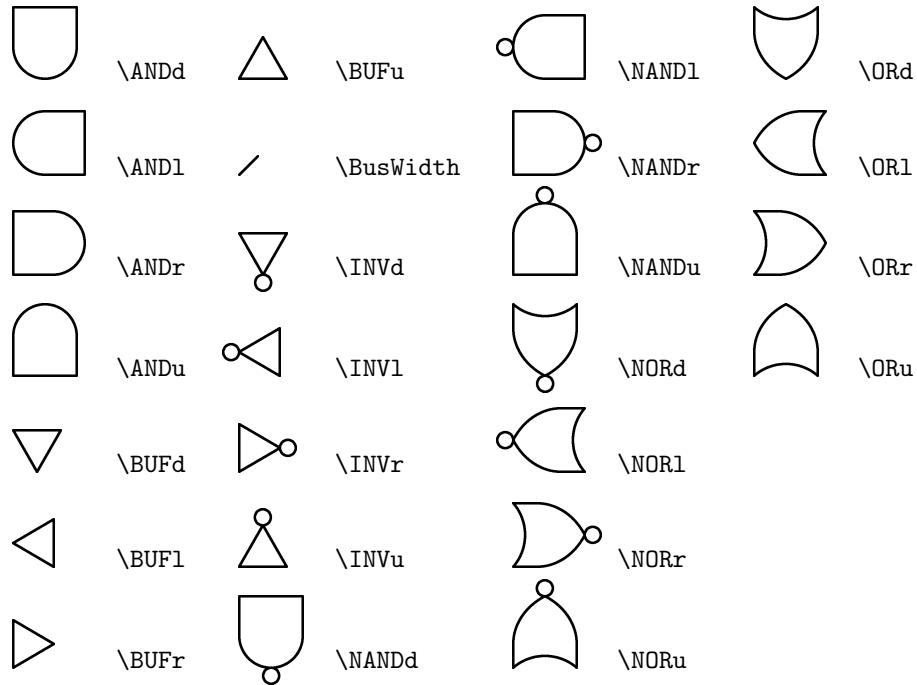
The `\keystroke` command draws a key with an arbitrary label. For example, “`\keystroke{F7}`” produces “”.

TABLE 317: ascii Control Characters (CP437)

| | | | | | | | | | |
|---|------|---|-------|----|------|---|------------|---|-----|
| ⌚ | \SOH | ▣ | \BS | ✿ | \SI | - | \SYN | ↔ | \GS |
| ⌚ | \STX | ○ | \HT | ▶ | \DLE | ‡ | \ETB | ▲ | \RS |
| ♥ | \ETX | ▣ | \LF | ◀ | \DCa | ↑ | \CAN | _ | \US |
| ♦ | \EOT | ♂ | \VT | ↕ | \DCb | ↓ | \EM | | |
| ♣ | \ENQ | ♀ | \FF | !! | \DCc | → | \SUB | | |
| ♠ | \ACK | ○ | \CR | ¶ | \DCd | ← | \ESC | | |
| • | \BEL | ○ | \SO | § | \NAK | ↳ | \FS | | |
| ▢ | \DEL | „ | \NBSP | „ | \NUL | : | \splitvert | | |

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

TABLE 318: logic Logic Gates



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

TABLE 319: marvosym Communication Symbols

| | | | | | | | | | |
|--|-----------------------|--|-------------------|--|--------------------------|--|--------------------------|--|-----------------------|
| | <code>\Email</code> | | <code>\fax</code> | | <code>\Faxmachine</code> | | <code>\Lightning</code> | | <code>\Pickup</code> |
| | <code>\EmailCT</code> | | <code>\FAX</code> | | <code>\Letter</code> | | <code>\Mobilefone</code> | | <code>\Telefon</code> |

TABLE 320: 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>\Lineload</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 321: wasysym Biological Symbols

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

TABLE 322: stix Biological Symbols

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

TABLE 323: marvosym Biological Symbols

| | | | |
|-----------------|------------------|-------------|------------|
| ⚲ \FEMALE | ⚲ \FemaleMale | ♂ \Male | ○ \Neutral |
| ♀ \Female | ♀ \Hermaphrodite | ● \MALE | |
| ⚥ \FemaleFemale | ⚥ \HERMAPHRODITE | ⚥ \MaleMale | |

TABLE 324: fontawesome Biological Symbols

| | | |
|-----------------|------------------|---------------------|
| ○ \faGenderless | ○\faMarsStrokeH | ⚧ \faTransgenderAlt |
| ♂ \faMars | ♂ \faMarsStrokeV | ♀ \faVenus |
| ⚥ \faMarsDouble | ♀ \faNeuter | ⚥ \faVenusDouble |
| ⚥ \faMarsStroke | ⚥ \faTransgender | ⚥ \faVenusMars |

fontawesome defines \faIntersex as a synonym for \faTransgender

TABLE 325: marvosym Safety-related Symbols

| | | | |
|--------------|----------------|------------------|------------------|
| ☣ \Biohazard | ☣ \CEsign | ☣ \Explosionsafe | ☢ \Radioactivity |
| ⓧ \BSEfree | ▲ \Estatically | ☀ \Laserbeam | ⓧ \Stopsign |

TABLE 326: feyn Feynman Diagram Symbols

| | | | | | |
|------------|----------------|----|------------------|-------------|------------------|
| | \bigbosonloop | - | \hfermion | | \smallbosonloopV |
| | \bigbosonloopA | | \shfermion | | \wfermion |
| | \bigbosonloopV | | \smallbosonloop | | \whfermion |
| | \gvcropped | | \smallbosonloopA | | |
| > | \feyn{a} | / | \feyn{fu} | | \feyn{glS} |
| ○ | \feyn{c} | | \feyn{fv} | | \feyn{glu} |
| — | \feyn{f} | ~~ | \feyn{g} | | \feyn{gu} |
| \backslash | \feyn{fd} | | \feyn{g1} | {\textless} | \feyn{gv} |
| | \feyn{fl} | | \feyn{gd} | {\textless} | \feyn{gvs} |
| | \feyn{flS} | | \feyn{g1} | --- | \feyn{h} |
| - | \feyn{fs} | | \feyn{g1B} | \backslash | \feyn{hd} |
| | | | | x | \feyn{x} |

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

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

TABLE 327: svrsymbols Physics Ideograms

| | | | | | |
|--------------|---------------|-------------------|------------------|----------------|------------|
| μ^+ | \antimuon | \mathbb{X} | \experimentalsym | p^+ | \proton |
| $\bar{\nu}$ | \antineutrino | \mathcal{F} | \fermion | q | \quark |
| \bar{n} | \antineutron | \square | \graphene | b | \quarkb |
| p^- | \antiproton | h^+ | \hole | c | \quarkc |
| \bar{q} | \antiquark | \circledcirc | \ion | d | \quarkd |
| \bar{b} | \antiquarkb | \mathbb{M} | \method | s | \quarks |
| \bar{c} | \antiquarkc | μ^- | \muon | t | \quarkt |
| \bar{d} | \antiquarkd | ν | \neutrino | u | \quarku |
| \bar{s} | \antiquarks | n^0 | \neutron | R | \reference |
| \bar{t} | \antiquarkt | | \nucleus | | \solid |
| \bar{u} | \antiquarku | \curvearrowleft | \orbit | \ddagger | \spin |
| \star | \assumption | \mathcal{F} | \phonon | \ddagger | \spindown |
| \diamond | \atom | f | \photon | \wp | \surface |
| e^- | \electron | e_\sim | \plasmon | \mathfrak{f} | \varphoton |
| \mathbb{E} | \errorsym | $\neg\mathcal{F}$ | \polaron | | \water |
| $\neg h^+$ | \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 L^AT_EX interface to the Zapf Dingbats font (one of the standard 35 PostScript fonts). However, rather than name each of the dingbats individually, `pifont` merely provides a single `\ding` command, which outputs the character that lies at a given position in the font. The consequence is that the `pifont` symbols can't be listed by name in this document's index, so be mindful of that fact when searching for a particular symbol.

TABLE 328: `bding` Arrows

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

TABLE 329: `pifont` Arrows

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

TABLE 330: `adfsymbols` Arrows

| | | | | | | | | | | | |
|--|-----------------------------|--|-----------------------------|--|-----------------------------|----------------------------|-----------------------------|--|-----------------------------|--|-----------------------------|
| | <code>\adfarrowsw1</code> | | <code>\adfarrowsw2</code> | | <code>\adfarrowsw3</code> | | <code>\adfarrowsw4</code> | | <code>\adfarrowsw5</code> | | <code>\adfarrowsw6</code> |
| | <code>\adfarrowsw7</code> | | <code>\adfarrowsw8</code> | | <code>\adfarrowsw9</code> | | <code>\adfarrowsw10</code> | | <code>\adfarrowsw11</code> | | <code>\adfarrowsw12</code> |
| | <code>\adfarrowsw13</code> | | <code>\adfarrowsw14</code> | | <code>\adfarrowsw15</code> | | <code>\adfarrowsw16</code> | | <code>\adfarrowsw17</code> | | <code>\adfarrowsw18</code> |
| | <code>\adfarrowsw19</code> | | <code>\adfarrowsw20</code> | | <code>\adfarrowsw21</code> | | <code>\adfarrowsw22</code> | | <code>\adfarrowsw23</code> | | <code>\adfarrowsw24</code> |
| | <code>\adfarrowsw25</code> | | <code>\adfarrowsw26</code> | | <code>\adfarrowsw27</code> | | <code>\adfarrowsw28</code> | | <code>\adfarrowsw29</code> | | <code>\adfarrowsw30</code> |
| | <code>\adfarrowsw31</code> | | <code>\adfarrowsw32</code> | | <code>\adfarrowsw33</code> | | <code>\adfarrowsw34</code> | | <code>\adfarrowsw35</code> | | <code>\adfarrowsw36</code> |
| | <code>\adfarrowsw37</code> | | <code>\adfarrowsw38</code> | | <code>\adfarrowsw39</code> | | <code>\adfarrowsw40</code> | | <code>\adfarrowsw41</code> | | <code>\adfarrowsw42</code> |
| | <code>\adfarrowsw43</code> | | <code>\adfarrowsw44</code> | | <code>\adfarrowsw45</code> | | <code>\adfarrowsw46</code> | | <code>\adfarrowsw47</code> | | <code>\adfarrowsw48</code> |
| | <code>\adfarrowsw49</code> | | <code>\adfarrowsw50</code> | | <code>\adfarrowsw51</code> | | <code>\adfarrowsw52</code> | | <code>\adfarrowsw53</code> | | <code>\adfarrowsw54</code> |
| | <code>\adfarrowsw55</code> | | <code>\adfarrowsw56</code> | | <code>\adfarrowsw57</code> | | <code>\adfarrowsw58</code> | | <code>\adfarrowsw59</code> | | <code>\adfarrowsw60</code> |
| | <code>\adfarrowsw61</code> | | <code>\adfarrowsw62</code> | | <code>\adfarrowsw63</code> | | <code>\adfarrowsw64</code> | | <code>\adfarrowsw65</code> | | <code>\adfarrowsw66</code> |
| | <code>\adfarrowsw67</code> | | <code>\adfarrowsw68</code> | | <code>\adfarrowsw69</code> | | <code>\adfarrowsw70</code> | | <code>\adfarrowsw71</code> | | <code>\adfarrowsw72</code> |
| | <code>\adfarrowsw73</code> | | <code>\adfarrowsw74</code> | | <code>\adfarrowsw75</code> | | <code>\adfarrowsw76</code> | | <code>\adfarrowsw77</code> | | <code>\adfarrowsw78</code> |
| | <code>\adfarrowsw79</code> | | <code>\adfarrowsw80</code> | | <code>\adfarrowsw81</code> | | <code>\adfarrowsw82</code> | | <code>\adfarrowsw83</code> | | <code>\adfarrowsw84</code> |
| | <code>\adfarrowsw85</code> | | <code>\adfarrowsw86</code> | | <code>\adfarrowsw87</code> | | <code>\adfarrowsw88</code> | | <code>\adfarrowsw89</code> | | <code>\adfarrowsw90</code> |
| | <code>\adfarrowsw91</code> | | <code>\adfarrowsw92</code> | | <code>\adfarrowsw93</code> | | <code>\adfarrowsw94</code> | | <code>\adfarrowsw95</code> | | <code>\adfarrowsw96</code> |
| | <code>\adfarrowsw97</code> | | <code>\adfarrowsw98</code> | | <code>\adfarrowsw99</code> | | <code>\adfarrowsw100</code> | | <code>\adfarrowsw101</code> | | <code>\adfarrowsw102</code> |
| | <code>\adfarrowsw103</code> | | <code>\adfarrowsw104</code> | | <code>\adfarrowsw105</code> | | <code>\adfarrowsw106</code> | | <code>\adfarrowsw107</code> | | <code>\adfarrowsw108</code> |
| | <code>\adfarrowsw109</code> | | <code>\adfarrowsw110</code> | | <code>\adfarrowsw111</code> | | <code>\adfarrowsw112</code> | | <code>\adfarrowsw113</code> | | <code>\adfarrowsw114</code> |
| | <code>\adfarrowsw115</code> | | <code>\adfarrowsw116</code> | | <code>\adfarrowsw117</code> | | <code>\adfarrowsw118</code> | | <code>\adfarrowsw119</code> | | <code>\adfarrowsw120</code> |
| | <code>\adfarrowsw121</code> | | <code>\adfarrowsw122</code> | | <code>\adfarrowsw123</code> | | <code>\adfarrowsw124</code> | | <code>\adfarrowsw125</code> | | <code>\adfarrowsw126</code> |
| | <code>\adfarrowsw127</code> | | <code>\adfarrowsw128</code> | | <code>\adfarrowsw129</code> | | <code>\adfarrowsw130</code> | | <code>\adfarrowsw131</code> | | <code>\adfarrowsw132</code> |
| | <code>\adfarrowsw133</code> | | <code>\adfarrowsw134</code> | | <code>\adfarrowsw135</code> | | <code>\adfarrowsw136</code> | | <code>\adfarrowsw137</code> | | <code>\adfarrowsw138</code> |
| | <code>\adfarrowsw139</code> | | <code>\adfarrowsw140</code> | | <code>\adfarrowsw141</code> | | <code>\adfarrowsw142</code> | | <code>\adfarrowsw143</code> | | <code>\adfarrowsw144</code> |
| | <code>\adfarrowsw145</code> | | <code>\adfarrowsw146</code> | | <code>\adfarrowsw147</code> | | <code>\adfarrowsw148</code> | | <code>\adfarrowsw149</code> | | <code>\adfarrowsw150</code> |
| | <code>\adfarrowsw151</code> | | <code>\adfarrowsw152</code> | | <code>\adfarrowsw153</code> | | <code>\adfarrowsw154</code> | | <code>\adfarrowsw155</code> | | <code>\adfarrowsw156</code> |
| | <code>\adfarrowsw157</code> | | <code>\adfarrowsw158</code> | | <code>\adfarrowsw159</code> | | <code>\adfarrowsw160</code> | | <code>\adfarrowsw161</code> | | <code>\adfarrowsw162</code> |
| | <code>\adfarrowsw163</code> | | <code>\adfarrowsw164</code> | | <code>\adfarrowsw165</code> | | <code>\adfarrowsw166</code> | | <code>\adfarrowsw167</code> | | <code>\adfarrowsw168</code> |
| | <code>\adfarrowsw169</code> | | <code>\adfarrowsw170</code> | | <code>\adfarrowsw171</code> | | <code>\adfarrowsw172</code> | | <code>\adfarrowsw173</code> | | <code>\adfarrowsw174</code> |
| | <code>\adfarrowsw175</code> | | <code>\adfarrowsw176</code> | | <code>\adfarrowsw177</code> | | <code>\adfarrowsw178</code> | | <code>\adfarrowsw179</code> | | <code>\adfarrowsw180</code> |
| | <code>\adfarrowsw181</code> | | <code>\adfarrowsw182</code> | | <code>\adfarrowsw183</code> | | <code>\adfarrowsw184</code> | | <code>\adfarrowsw185</code> | | <code>\adfarrowsw186</code> |
| | <code>\adfarrowsw187</code> | | <code>\adfarrowsw188</code> | | <code>\adfarrowsw189</code> | | <code>\adfarrowsw190</code> | | <code>\adfarrowsw191</code> | | <code>\adfarrowsw192</code> |
| | <code>\adfarrowsw193</code> | | <code>\adfarrowsw194</code> | | <code>\adfarrowsw195</code> | | <code>\adfarrowsw196</code> | | <code>\adfarrowsw197</code> | | <code>\adfarrowsw198</code> |
| | <code>\adfarrowsw199</code> | | <code>\adfarrowsw200</code> | | <code>\adfarrowsw201</code> | | <code>\adfarrowsw202</code> | | <code>\adfarrowsw203</code> | | <code>\adfarrowsw204</code> |
| | <code>\adfarrowsw205</code> | | <code>\adfarrowsw206</code> | | <code>\adfarrowsw207</code> | | <code>\adfarrowsw208</code> | | <code>\adfarrowsw209</code> | | <code>\adfarrowsw210</code> |
| | <code>\adfarrowsw211</code> | | <code>\adfarrowsw212</code> | | <code>\adfarrowsw213</code> | | <code>\adfarrowsw214</code> | | <code>\adfarrowsw215</code> | | <code>\adfarrowsw216</code> |
| | <code>\adfarrowsw217</code> | | <code>\adfarrowsw218</code> | | <code>\adfarrowsw219</code> | | <code>\adfarrowsw220</code> | | <code>\adfarrowsw221</code> | | <code>\adfarrowsw222</code> |
| | <code>\adfarrowsw223</code> | | <code>\adfarrowsw224</code> | | <code>\adfarrowsw225</code> | | <code>\adfarrowsw226</code> | | <code>\adfarrowsw227</code> | | <code>\adfarrowsw228</code> |
| | <code>\adfarrowsw229</code> | | <code>\adfarrowsw230</code> | | <code>\adfarrowsw231</code> | | <code>\adfarrowsw232</code> | | <code>\adfarrowsw233</code> | | <code>\adfarrowsw234</code> |
| | <code>\adfarrowsw235</code> | | <code>\adfarrowsw236</code> | | <code>\adfarrowsw237</code> | | <code>\adfarrowsw238</code> | | <code>\adfarrowsw239</code> | | <code>\adfarrowsw240</code> |
| | <code>\adfarrowsw241</code> | | <code>\adfarrowsw242</code> | | <code>\adfarrowsw243</code> | | <code>\adfarrowsw244</code> | | <code>\adfarrowsw245</code> | | <code>\adfarrowsw246</code> |
| | <code>\adfarrowsw247</code> | | <code>\adfarrowsw248</code> | | <code>\adfarrowsw249</code> | | <code>\adfarrowsw250</code> | | <code>\adfarrowsw251</code> | | <code>\adfarrowsw252</code> |
| | <code>\adfarrowsw253</code> | | <code>\adfarrowsw254</code> | | <code>\adfarrowsw255</code> | | <code>\adfarrowsw256</code> | | <code>\adfarrowsw257</code> | | <code>\adfarrowsw258</code> |
| | <code>\adfarrowsw259</code> | | <code>\adfarrowsw260</code> | | <code>\adfarrowsw261</code> | | <code>\adfarrowsw262</code> | | <code>\adfarrowsw263</code> | | <code>\adfarrowsw264</code> |
| | <code>\adfarrowsw265</code> | | <code>\adfarrowsw266</code> | | <code>\adfarrowsw267</code> | <img alt="adfsymbols arrow | | | | | |

TABLE 331: adforn Arrows

| | | | |
|----------------------|------------------------------------|-----------------------|-------------------------------------|
| \leftarrow | <code>\adfhalfleftarrow</code> | \rightarrow | <code>\adfhalfrightarrowhead</code> |
| \blacktriangleleft | <code>\adfhalfleftarrowhead</code> | \blacktriangleright | <code>\adflightarrowhead</code> |
| \rightarrow | <code>\adfhalfrightarrow</code> | \leftarrow | <code>\adflightarrowhead</code> |

TABLE 332: arev Arrows

| | |
|---------------|---------------------------|
| \rightarrow | <code>\arrowbullet</code> |
|---------------|---------------------------|

TABLE 333: fontawesome Arrows

| | | | | | |
|--------------|-----------------------------------|-------------------|----------------------------|---------------------------------|--------------------------------|
| \downarrow | <code>\faArrowCircleDown</code> | \downarrow | <code>\faArrowDown</code> | \downarrow | <code>\faLongArrowDown</code> |
| \leftarrow | <code>\faArrowCircleLeft</code> | \leftarrow | <code>\faArrowLeft</code> | \leftarrow | <code>\faLongArrowLeft</code> |
| \oplus | <code>\faArrowCircleODown</code> | \rightarrow | <code>\faArrowRight</code> | \rightarrow | <code>\faLongArrowRight</code> |
| \oplus | <code>\faArrowCircleOLeft</code> | \nexists | <code>\faArrows</code> | \uparrow | <code>\faLongArrowUp</code> |
| \oplus | <code>\faArrowCircleORight</code> | \times | <code>\faArrowsAlt</code> | \textcircled{C} | <code>\faRepeat</code> |
| \oplus | <code>\faArrowCircleOUp</code> | \leftrightarrow | <code>\faArrowsH</code> | $\textcircled{\textcircled{C}}$ | <code>\faUndo</code> |
| \oplus | <code>\faArrowCircleRight</code> | \updownarrow | <code>\faArrowsV</code> | | |
| \oplus | <code>\faArrowCircleUp</code> | \uparrow | <code>\faArrowUp</code> | | |

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

TABLE 334: fontawesome Chevrons

| | | | | | |
|--------------|------------------------------------|--------------|---------------------------------|--------------|------------------------------|
| \checkmark | <code>\faChevronCircleDown</code> | \checkmark | <code>\faChevronCircleUp</code> | \checkmark | <code>\faChevronRight</code> |
| \leftarrow | <code>\faChevronCircleLeft</code> | \checkmark | <code>\faChevronDown</code> | \checkmark | <code>\faChevronUp</code> |
| \checkmark | <code>\faChevronCircleRight</code> | \leftarrow | <code>\faChevronLeft</code> | | |

TABLE 335: marvosym Scissors

| | | | | | |
|----------|------------------------|----------|----------------------------|----------|-----------------------------|
| \times | <code>\CutLeft</code> | \cdots | <code>\CuttingLine</code> | \times | <code>\RightScissors</code> |
| \times | <code>\CutRight</code> | \times | <code>\LeftScissors</code> | | |

TABLE 336: bbdng Scissors

| | | | |
|--------------|---------------------------------------|--------------|--|
| \cancel{x} | <code>\ScissorHollowLeft</code> | \cancel{x} | <code>\ScissorLeftBrokenTop</code> |
| \cancel{x} | <code>\ScissorHollowRight</code> | \cancel{x} | <code>\ScissorRight</code> |
| \cancel{x} | <code>\ScissorLeft</code> | \cancel{x} | <code>\ScissorRightBrokenBottom</code> |
| \cancel{x} | <code>\ScissorLeftBrokenBottom</code> | \cancel{x} | <code>\ScissorRightBrokenTop</code> |

TABLE 337: pifont Scissors

| | | | | | | | |
|--------------|------------------------|--------------|------------------------|--------------|------------------------|--------------|------------------------|
| \cancel{x} | <code>\ding{33}</code> | \cancel{x} | <code>\ding{34}</code> | \cancel{x} | <code>\ding{35}</code> | \cancel{x} | <code>\ding{36}</code> |
|--------------|------------------------|--------------|------------------------|--------------|------------------------|--------------|------------------------|

TABLE 338: dingbat Pencils



TABLE 339: arev Pencils

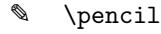


TABLE 340: fontawesome Pencils

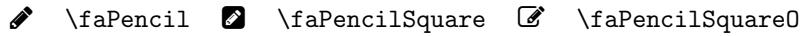


TABLE 341: bbding Pencils and Nibs

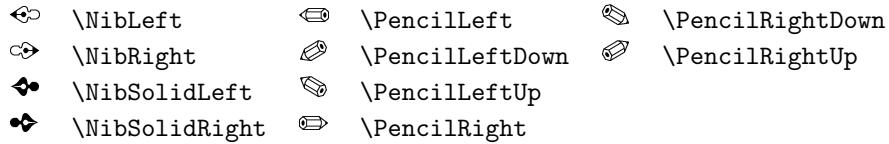


TABLE 342: pifont Pencils and Nibs

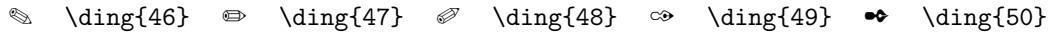


TABLE 343: dingbat Fists

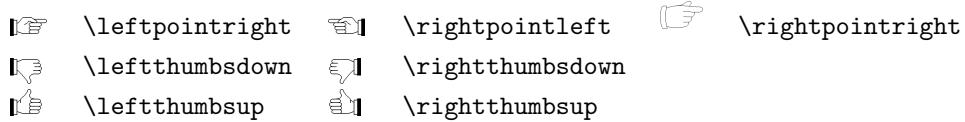


TABLE 344: bbding Fists

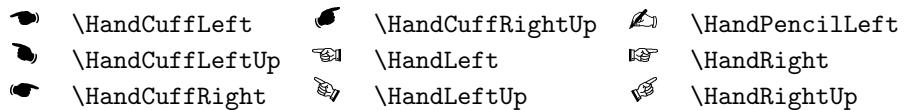


TABLE 345: pifont Fists

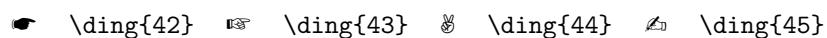


TABLE 346: fourier Fists

| | | | |
|--|-----------|--|------------|
| | \lefthand | | \righthand |
|--|-----------|--|------------|

TABLE 347: arev Fists

| | |
|--|-------------|
| | \pointright |
|--|-------------|

TABLE 348: fontawesome Fists

| | | | | | |
|--|----------------|--|------------------|--|----------------|
| | \faHandLizard0 | | \faHandPaper0 | | \faHandSpock0 |
| | \faHandDown | | \faHandPeace0 | | \faThumbsDown |
| | \faHandLeft | | \faHandPointer0 | | \faThumbsODown |
| | \faHandRight | | \faHandRock0 | | \faThumbsOUp |
| | \faHandUp | | \faHandScissors0 | | \faThumbsUp |

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

TABLE 349: bbding Crosses and Plusss

| | | | | | |
|--|-------------------|--|------------------|--|---------------------|
| | \Cross | | \CrossOpenShadow | | \PlusOutline |
| | \CrossBoldOutline | | \CrossOutline | | \PlusThinCenterOpen |
| | \CrossClowerTips | | \Plus | | |
| | \CrossMaltese | | \PlusCenterOpen | | |

TABLE 350: pifont Crosses and Plusss

| | | | | | | | |
|--|-----------|--|-----------|--|-----------|--|-----------|
| | \ding{57} | | \ding{59} | | \ding{61} | | \ding{63} |
| | \ding{58} | | \ding{60} | | \ding{62} | | \ding{64} |

TABLE 351: adfsymbols Crosses and Plusss

| | | | | | | | |
|--|---------------|--|---------------|--|---------------|--|----------------|
| | \adfbullet{4} | | \adfbullet{6} | | \adfbullet{8} | | \adfbullet{10} |
| | \adfbullet{5} | | \adfbullet{7} | | \adfbullet{9} | | |

TABLE 352: arev Crosses

| | | | |
|--|------------|--|------------|
| | \eastcross | | \westcross |
|--|------------|--|------------|

TABLE 353: bbding Xs and Check Marks

| | | | | | |
|--|----------------|--|-------------|--|--------------|
| | \Checkmark | | \XSolid | | \XSolidBrush |
| | \CheckmarkBold | | \XSolidBold | | |

TABLE 354: pifont Xs and Check Marks

- ✓ \ding{51} ✗ \ding{53} ✗ \ding{55}
- ✓ \ding{52} ✗ \ding{54} ✗ \ding{56}

TABLE 355: wasysym Xs and Check Marks

- ✗ \CheckedBox ☐ \Square ☒ \XBox

TABLE 356: marvosym Xs and Check Marks

- ✗ \Checkedbox ✗ \CrossedBox* ☐ \HollowBox

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

TABLE 357: arev Xs and Check Marks

- ✓ \ballotcheck ✗ \ballotx

TABLE 358: fontawesome Xs and Check Marks

- ✓ \faCheck ✓ \faCheckSquare ✗ \faTimesCircle
- ✓ \faCheckCircle ✓ \faCheckSquare0 ☺ \faTimesCircle0
- ☺ \faCheckCircle0 ✗ \faTimes*

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

TABLE 359: pifont Circled Numerals

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

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

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

TABLE 360: wasysym Stars

$\diamond \backslash d a v i d s s t a r$ * $\backslash h e x s t a r$ * $\backslash v a r h e x s t a r$

TABLE 361: bbdng Stars, Flowers, and Similar Shapes

| | | | | | |
|----------------|--|------------------------------------|--|------------------------------------|--|
| \ast | $\backslash A s t e r i s k$ | $\bullet\bullet$ | $\backslash F i v e F l o w e r P e t a l$ | $\oplus\oplus$ | $\backslash J a c k S t a r$ |
| $\ast\ast$ | $\backslash A s t e r i s k B o l d$ | $\star\star$ | $\backslash F i v e S t a r$ | $\clubsuit\clubsuit$ | $\backslash J a c k S t a r B o l d$ |
| $\ast\ast$ | $\backslash A s t e r i s k C e n t e r O p e n$ | $\star\star$ | $\backslash F i v e S t a r C e n t e r O p e n$ | $\ast\ast$ | $\backslash S i x F l o w e r A l t e r n a t e$ |
| $\ast\ast$ | $\backslash A s t e r i s k R o u n d e d E n d s$ | $\star\star$ | $\backslash F i v e S t a r C o n v e x$ | $\ast\ast$ | $\backslash S i x F l o w e r A l t P e t a l$ |
| $\ast\ast$ | $\backslash A s t e r i s k T h i n$ | $\star\star$ | $\backslash F i v e S t a r L i n e s$ | $\ast\ast$ | $\backslash S i x F l o w e r O p e n C e n t e r$ |
| $\ast\ast$ | $\backslash A s t e r i s k T h i n C e n t e r O p e n$ | $\star\star$ | $\backslash F i v e S t a r O p e n$ | $\circlearrowleft\circlearrowleft$ | $\backslash S i x F l o w e r P e t a l D o t t e d$ |
| $\diamond\ast$ | $\backslash D a v i d S t a r$ | $\bullet\bullet$ | $\backslash F i v e S t a r O p e n C i r c l e d$ | $\ast\ast$ | $\backslash S i x F l o w e r P e t a l R e m o v e d$ |
| \blackstar | $\backslash D a v i d S t a r S o l i d$ | $\star\star$ | $\backslash F i v e S t a r O p e n D o t t e d$ | $\ast\ast$ | $\backslash S i x F l o w e r R e m o v e d O p e n P e t a l$ |
| $\ast\ast$ | $\backslash E i g h t A s t e r i s k$ | $\star\star$ | $\backslash F i v e S t a r O u t l i n e$ | $\star\star$ | $\backslash S i x S t a r$ |
| $\ast\ast$ | $\backslash E i g h t F l o w e r P e t a l$ | $\star\star$ | $\backslash F i v e S t a r O u t l i n e H e a v y$ | $\ast\ast$ | $\backslash S i x t e e n S t a r L i g h t$ |
| $\ast\ast$ | $\backslash E i g h t F l o w e r P e t a l R e m o v e d$ | $\star\star$ | $\backslash F i v e S t a r S h a d o w$ | $\ast\ast$ | $\backslash S n o w f l a k e$ |
| $\ast\ast$ | $\backslash E i g h t S t a r$ | $\dagger\dagger$ | $\backslash F o u r A s t e r i s k$ | $\ast\ast$ | $\backslash S n o w f l a k e C h e v r o n$ |
| \blackstar | $\backslash E i g h t S t a r B o l d$ | $\circlearrowleft\circlearrowleft$ | $\backslash F o u r C l o w e r O p e n$ | $\ast\ast$ | $\backslash S n o w f l a k e C h e v r o n B o l d$ |
| $\ast\ast$ | $\backslash E i g h t S t a r C o n v e x$ | $\clubsuit\clubsuit$ | $\backslash F o u r C l o w e r S o l i d$ | $\ast\ast$ | $\backslash S p a r k l e$ |
| $\ast\ast$ | $\backslash E i g h t S t a r T a p e r$ | $\blacklozenge\blacklozenge$ | $\backslash F o u r S t a r$ | $\ast\ast$ | $\backslash S p a r k l e B o l d$ |
| $\ast\ast$ | $\backslash F i v e F l o w e r O p e n$ | $\diamond\diamond$ | $\backslash F o u r S t a r O p e n$ | $\ast\ast$ | $\backslash T w e l v e S t a r$ |

TABLE 362: pifont Stars, Flowers, and Similar Shapes

| | | | | | | | | | |
|-----------------|-------------------------------|-----------|-------------------------------|---|-------------------------------|------------------------------------|--------------------------------|---|--------------------------------|
| \diamond | $\backslash d i n g \{ 65 \}$ | \bullet | $\backslash d i n g \{ 74 \}$ | * | $\backslash d i n g \{ 83 \}$ | * | $\backslash d i n g \{ 92 \}$ | * | $\backslash d i n g \{ 101 \}$ |
| \dagger | $\backslash d i n g \{ 66 \}$ | \star | $\backslash d i n g \{ 75 \}$ | * | $\backslash d i n g \{ 84 \}$ | * | $\backslash d i n g \{ 93 \}$ | * | $\backslash d i n g \{ 102 \}$ |
| \ddagger | $\backslash d i n g \{ 67 \}$ | \star | $\backslash d i n g \{ 76 \}$ | * | $\backslash d i n g \{ 85 \}$ | * | $\backslash d i n g \{ 94 \}$ | * | $\backslash d i n g \{ 103 \}$ |
| \clubsuit | $\backslash d i n g \{ 68 \}$ | \star | $\backslash d i n g \{ 77 \}$ | * | $\backslash d i n g \{ 86 \}$ | $\clubsuit\clubsuit$ | $\backslash d i n g \{ 95 \}$ | * | $\backslash d i n g \{ 104 \}$ |
| \clubsuit | $\backslash d i n g \{ 69 \}$ | \star | $\backslash d i n g \{ 78 \}$ | * | $\backslash d i n g \{ 87 \}$ | $\circlearrowleft\circlearrowleft$ | $\backslash d i n g \{ 96 \}$ | * | $\backslash d i n g \{ 105 \}$ |
| \blacklozenge | $\backslash d i n g \{ 70 \}$ | \star | $\backslash d i n g \{ 79 \}$ | * | $\backslash d i n g \{ 88 \}$ | $\circlearrowleft\circlearrowleft$ | $\backslash d i n g \{ 97 \}$ | * | $\backslash d i n g \{ 106 \}$ |
| $\diamond\ast$ | $\backslash d i n g \{ 71 \}$ | \star | $\backslash d i n g \{ 80 \}$ | * | $\backslash d i n g \{ 89 \}$ | $\circlearrowleft\circlearrowleft$ | $\backslash d i n g \{ 98 \}$ | * | $\backslash d i n g \{ 107 \}$ |
| $\star\star$ | $\backslash d i n g \{ 72 \}$ | \ast | $\backslash d i n g \{ 81 \}$ | * | $\backslash d i n g \{ 90 \}$ | * | $\backslash d i n g \{ 99 \}$ | | |
| $\star\star$ | $\backslash d i n g \{ 73 \}$ | \ast | $\backslash d i n g \{ 82 \}$ | * | $\backslash d i n g \{ 91 \}$ | * | $\backslash d i n g \{ 100 \}$ | | |

TABLE 363: adfsymbols Stars, Flowers, and Similar Shapes

| | | | | | | | |
|------------|---|------------------------------------|---|------------------------------------|---|------------------------------------|---|
| \diamond | $\backslash a d f b u l l e t \{ 1 \}$ | * | $\backslash a d f b u l l e t \{ 13 \}$ | \diamond | $\backslash a d f b u l l e t \{ 18 \}$ | \diamond | $\backslash a d f b u l l e t \{ 23 \}$ |
| \diamond | $\backslash a d f b u l l e t \{ 2 \}$ | \diamond | $\backslash a d f b u l l e t \{ 14 \}$ | $\circlearrowleft\circlearrowleft$ | $\backslash a d f b u l l e t \{ 19 \}$ | $\circlearrowleft\circlearrowleft$ | $\backslash a d f b u l l e t \{ 24 \}$ |
| * | $\backslash a d f b u l l e t \{ 3 \}$ | \diamond | $\backslash a d f b u l l e t \{ 15 \}$ | $\circlearrowleft\circlearrowleft$ | $\backslash a d f b u l l e t \{ 20 \}$ | * | $\backslash a d f b u l l e t \{ 25 \}$ |
| * | $\backslash a d f b u l l e t \{ 11 \}$ | $\circlearrowleft\circlearrowleft$ | $\backslash a d f b u l l e t \{ 16 \}$ | $\circlearrowleft\circlearrowleft$ | $\backslash a d f b u l l e t \{ 21 \}$ | $\circlearrowleft\circlearrowleft$ | $\backslash a d f b u l l e t \{ 26 \}$ |
| * | $\backslash a d f b u l l e t \{ 12 \}$ | $\circlearrowleft\circlearrowleft$ | $\backslash a d f b u l l e t \{ 17 \}$ | $\circlearrowleft\circlearrowleft$ | $\backslash a d f b u l l e t \{ 22 \}$ | | |

TABLE 364: adforn Stars

| | | | | | | | | | |
|---|----------------------------------|---|----------------------------------|---|----------------------------------|---|----------------------------------|---|-----------------------------------|
| * | $\backslash a d f a s t \{ 1 \}$ | * | $\backslash a d f a s t \{ 3 \}$ | * | $\backslash a d f a s t \{ 5 \}$ | * | $\backslash a d f a s t \{ 7 \}$ | * | $\backslash a d f a s t \{ 9 \}$ |
| * | $\backslash a d f a s t \{ 2 \}$ | * | $\backslash a d f a s t \{ 4 \}$ | * | $\backslash a d f a s t \{ 6 \}$ | * | $\backslash a d f a s t \{ 8 \}$ | * | $\backslash a d f a s t \{ 10 \}$ |

TABLE 365: fontawesome Stars

★ \faStar □ \faStarHalf ▪ \faStarHalf0 △ \faStar0

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

TABLE 366: fourier Fleurons and Flowers

| | | |
|-----------------|------------------|-------------------|
| ❖ \aldine | ❖ \decoone | ❖ \floweroneright |
| ❖ \aldineleft | ❖ \decosix | ❖ \leafleft |
| ❖ \aldineright | ❖ \decothreeleft | ❖ \leafNE |
| ❖ \aldinesmall | ❖ \decothreeleft | ❖ \leafright |
| ❖ \decfourleft | ❖ \decotwo | ❖ \starredbullet |
| ❖ \decfourright | ❖ \floweroneleft | |

TABLE 367: adforn Fleurons and Flowers

| | |
|-------------------------------|--------------------------------|
| ❖ \adfdownhalfleafleft | ❖ \adfdownhalfleafright |
| ❖ \adfdownleafleft | ❖ \adfdownleafright |
| ❖ \adfflatdownhalfleafleft | ❖ \adfflatdownhalfleafright |
| ❖ \adfflatdownoutlineleafleft | ❖ \adfflatdownoutlineleafright |
| ❖ \adfflatleafleft | ❖ \adfflatleafright |
| ❖ \adfflatleafoutlineleft | ❖ \adfflatleafoutlineright |
| ❖ \adfflatleafsolidleft | ❖ \adfflatleafsolidright |
| ❖ \adfflowerleft | ❖ \adfflowerright |
| ❖ \adffhalfleafleft | ❖ \adffhalfleafright |
| ❖ \adfhangingflatleafleft | ❖ \adfhangingflatleafright |
| ❖ \adfhangingingleafleft | ❖ \adfhangingingleafright |
| ❖ \adfleafleft | ❖ \adfleafright |
| ❖ \adfoutlineleafleft | ❖ \adfoutlineleafright |
| ❖ \adfsmallhangingleafleft | ❖ \adfsmallhangingleafright |
| ❖ \adfsmallleafleft | ❖ \adfsmallleafright |
| ❖ \adfsolidleafleft | ❖ \adfsolidleafright |

TABLE 368: wasysym Geometric Shapes

| | | | |
|------------|---------------|----------------|----------------|
| ○ \Circle | ○ \LEFTcircle | ○ \octagon | ○ \RIGHTcircle |
| ● \CIRCLE | ● \LEFTCIRCLE | ○ \pentagon | ● \RIGHTCIRCLE |
| ○ \hexagon | ○ \Leftcircle | ○ \Rightcircle | ○ \varhexagon |

TABLE 369: MnSymbol Geometric Shapes

| | | |
|---------------------|---------------------|-------------------|
| ★ \filledlargestar | ◇ \largeiamond | ◇ \medlozenge |
| ◆ \filledlozenge | ☆ \largepentagram | ☆ \medstarofdavid |
| ◆ \filledmedlozenge | □ \largesquare | ◊ \smalllozenge |
| ○ \largecircle | ☆ \largestar | |
| ◇ \argediamond | ☆ \largestarofdavid | |

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

TABLE 370: *fdsymbol* Geometric Shapes

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

fdsymbol defines synonyms for almost all of the preceding symbols:

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

TABLE 371: *boisik* Geometric Shapes

| | | | | | |
|---|--------------------|---|-------------|---|-----------------|
| ★ | \bigstar | ◊ | \diamond | ▽ | \triangledown |
| ◆ | \blacklozenge | ◊ | \lozenge | ▫ | \triangleleft |
| ■ | \blacksquare | ◊ | \lozengedot | ▷ | \triangleright |
| ▲ | \blacktriangle | □ | \square | ▫ | \varlrttriangle |
| ▼ | \blacktriangledown | * | \star | | |

TABLE 372: *stix* Geometric Shapes

| | | | | | |
|---|-------------------------|---|--------------------------|---|---------------------|
| ○ | \acwopencirclearrow | ▽ | \downtriangleleftblack | ◀ | \smalltriangleleft |
| ↖ | \barovernorthwestarrow | ▽ | \downtrianglerightblack | ▷ | \smalltriangleright |
| ◎ | \benznr | ○ | \enclosecircle | ◆ | \smbldiamond |
| ▼ | \bigblacktriangledown | ◇ | \enclosediamond | ◆ | \smblklozenge |
| ▲ | \bigblacktriangleup | □ | \enclosesquare | ■ | \smbblksquare |
| ★ | \bigstar | △ | \enclosetriangle | ☆ | \smwhitestar |
| ▽ | \bigtriangledown | ● | \errbarblackcircle | ○ | \smwhtcircle |
| ◀ | \bigtriangleleft | ◆ | \errbarblackdiamond | ◊ | \smwhtdiamond |
| △ | \bigtriangleup | ■ | \errbarblacksquare | ◊ | \smwhtlozenge |
| ☆ | \bigwhitestar | ○ | \errbarcircle | □ | \smwhtsquare |
| ● | \blackcircledownarrow | ◊ | \errbardiamond | □ | \sqlozenge |
| ● | \blackcircledrightdot | □ | \errbarsquare | ■ | \squarebotblack |
| ● | \blackcircledtwodots | ○ | \fishey | ■ | \squarecrossfill |
| ● | \blackcircleulquadwhite | □ | \fltns | ■ | \squarehfill |
| ◆ | \blackdiamondddownarrow | ○ | \hexagon | ■ | \squarehvfill |
| ❖ | \blackinwhitediamond | ● | \hexagonblack | □ | \squareleftblack |
| □ | \blackinwhite square | △ | \house | ■ | \squarellblack |
| ◐ | \blacklefthalfcircle | □ | \rectangle | □ | \squarellquad |
| ◆ | \blacklozenge | ■ | \rectangleblack | ■ | \squarelrblack |
| ◀ | \blackpointerleft | ○ | \inversewhitecircle | □ | \squarelrquad |
| ▶ | \blackpointerright | ◊ | \invwhitehalfcircle | ■ | \squareneswfill |
| ◑ | \blackrighthalfcircle | □ | \invwhiteupperhalfcircle | ■ | \squarenwsefill |

(continued on next page)

(continued from previous page)

| | | |
|--------------------------|----------------------------|-------------------------|
| ▲ \blacktriangle | ● \lgblkcircle | ■ \squarerightblack |
| ▼ \blacktriangledown | ■ \lgblksquare | □ \squaretopblack |
| ◀ \blacktriangleleft | ○ \lgwhtcircle | ■ \squareulblack |
| ▶ \blacktriangleright | □ \lgwhtsquare | □ \squareulquad |
| ● \blkhorzoval | ◀ \llblacktriangle | ■ \squareurblack |
| ● \blkvertoval | ▽ \lltriangle | □ \squareurquad |
| ○ \botsemicircle | ◀ \lrblacktriangle | ■ \squarevfill |
| □ \boxonbox | △ \lrtriangle | ○ \squaoval |
| ◎ \bullseye | ● \mdblkcircle |) \topsemicircle |
| ○ \circ | ◆ \mdblkdiamond | □ \trapezium |
| ● \circlebottomhalfblack | ◆ \mdblklozenge | △ \trianglecdot |
| ● \circledbullet | ■ \mdblkksquare | ▽ \triangledown |
| ♀ \circleddownarrow | ● \mdlgbkcircle | ▲ \triangleleftblack |
| ○ \circledrightdot | ◆ \mdlgbkdiamond | △ \triangleodot |
| ● \circledstar | ■ \mdlgbkksquare | ▲ \trianglerightblack |
| ○ \circledtwodots | ◇ \mdlgwhtdiamond | △ \triangles |
| ○ \circledwhitebullet | ◇ \mdlgwhtlozenge | △ \triangleubar |
| ● \circlelefthalfblack | □ \mdlgwhtsquare | ◀ \ulblacktriangle |
| ⊕ \circlellquad | ● \mdsmblkcircle | ▽ \urtriangle |
| ⊖ \circlelrquad | ■ \mdsmblkksquare | ○ \varhexagon |
| ● \circlerighthalfblack | ○ \mdsmwhtcircle | ● \varhexagonblack |
| ● \circletophalfblack | □ \mdsmwhtsquare | ○ \varhexagonlrbonds |
| ⊕ \circleulquad | ○ \mdwhtcircle | △ \varlrtriangle |
| ⊖ \circleurquad | ◇ \mdwhtdiamond | ★ \varstar |
| ● \circleurquadblack | ◊ \mdwhtlozenge | □ \vrectangle |
| ● \circlevertfill | □ \mdwhtsquare | ■ \vrectangleblack |
| ○ \cirE | ★ \medblackstar | · \vysmblksquare |
| ○ \cirsir | ☆ \medwhitestar | · \vysmwhtsquare |
| ○ \cwopencirclearrow | □ \parallelogram | ▲ \whiteinwhitetriangle |
| ◆ \diamondbotblack | ■ \parallelogramblack | △ \whitepointerleft |
| ◆ \diamondcdot | ○ \pentagon | ▷ \whitepointerright |
| ◆ \diamondleftblack | ◆ \pentagonblack | ○ \whthorzoval |
| ◆ \diamondrightblack | ○ \rightpentagon | ○ \whtvertoval |
| ◆ \diamondtopblack | ◆ \rightpentagonblack | |
| ○ \dottedcircle | ◀ \smallblacktriangleleft | |
| □ \dottedsquare | ▶ \smallblacktriangleright | |

stix defines \diamond as a synonym for \smwhtdiamond, \blacksquare as a synonym for \mdlgbkksquare, \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 \mdlgbklozenge as a synonym for \blacklozenge.

TABLE 373: ifsym Geometric Shapes

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

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

TABLE 374: bbdng Geometric Shapes

| | | | | | |
|---|------------------|---|------------------------------|---|-----------------------|
| ○ | \CircleShadow | | \Rectangle | □ | \SquareShadowTopLeft |
| ● | \CircleSolid | █ | \RectangleBold | □ | \SquareShadowTopRight |
| ◆ | \DiamondSolid | | \RectangleThin | █ | \SquareSolid |
| ○ | \Ellipse | □ | \Square | ▼ | \TriangleDown |
| ○ | \EllipseShadow | □ | \SquareCastShadowBottomRight | ▲ | \TriangleUp |
| ● | \EllipseSolid | □ | \SquareCastShadowTopLeft | | |
| ◀ | \HalfCircleLeft | □ | \SquareCastShadowTopRight | | |
| ▶ | \HalfCircleRight | □ | \SquareShadowBottomRight | | |

TABLE 375: pifont Geometric Shapes

- \ding{108} □ \ding{111} □ \ding{114} ♦ \ding{117} | \ding{121}
- \ding{109} □ \ding{112} ▲ \ding{115} ▷ \ding{119} ■ \ding{122}
- \ding{110} □ \ding{113} ▼ \ding{116} | \ding{120}

TABLE 376: universa Geometric Shapes

- \baucircle ■ \bausquare ▲ \bautriangle

TABLE 377: adfsymbols Geometric Shapes

- \adfbullet{27} ▶ \adfbullet{32} • \adfbullet{43} • \adfbullet{48}
- \adfbullet{28} ▲ \adfbullet{33} • \adfbullet{44} • \adfbullet{49}
- \adfbullet{29} ▾ \adfbullet{34} • \adfbullet{45} ♦ \adfbullet{50}
- ♦ \adfbullet{30} • \adfbullet{41} ▷ \adfbullet{46} ♦ \adfbullet{51}
- ◀ \adfbullet{31} • \adfbullet{42} ▷ \adfbullet{47} • \adfbullet{52}

TABLE 378: fontawesome Geometric Shapes

- \faCircle ○ \faCircleNotch ○ \faDotCircle○ \faSquare○
- \faCircle○ ○ \faCircleThin ■ \faSquare

TABLE 379: L^AT_EX 2 _{ε} Playing-Card Suits

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

TABLE 380: txfonts/pxfonts Playing-Card Suits

- ♣ \varclubsuit ♦ \vardiamondsuit ♥ \varheartsuit ♠ \varsuit

TABLE 381: MnSymbol Playing-Card Suits

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

TABLE 382: fdsymbol Playing-Card Suits

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

TABLE 383: boisik Playing-Card Suits

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

TABLE 384: stix Playing-Card Suits

| | | | | | | | |
|---|--------------|---|------------|---|-----------------|---|---------------|
| ♣ | \clubsuit | ♥ | \heartsuit | & | \varclubsuit | ♥ | \varheartsuit |
| ♦ | \diamondsuit | ♠ | \spadesuit | ♦ | \vardiamondsuit | ♦ | \varsadesuit |

TABLE 385: arev Playing-Card Suits

| | | | | | | | |
|---|----------|---|-------------|---|-----------|---|-----------|
| ♣ | \varclub | ♦ | \vardiamond | ♥ | \varheart | ♦ | \varspade |
|---|----------|---|-------------|---|-----------|---|-----------|

TABLE 386: adforn Flourishes

| | | | |
|-----|-----------------------------|-----|------------------------------|
| ~ | \adfclosedflourishleft | ~ | \adfclosedflourishright |
| ~~ | \adfdoubleflourishleft | ~~ | \adfdoubleflourishright |
| ~~~ | \adfdoublesharpflourishleft | ~~~ | \adfdoublesharpflourishright |
| ~~~ | \adfflourishleft | ~~~ | \adfflourishright |
| ~~~ | \adfflourishleftdouble | ~~~ | \adfflourishrightdouble |
| ~~~ | \adfflourishleft | ~~~ | \adfflourishright |
| ~~~ | \adfflourishleft | ~~~ | \adfflourishright |
| ~~~ | \adfsickleflourishleft | ~~~ | \adfsickleflourishright |
| ~~~ | \adfsingleflourishleft | ~~~ | \adfsingleflourishright |
| ~~~ | \adftripleflourishleft | ~~~ | \adftripleflourishright |
| ~~~ | \adfwavesleft | ~~~ | \adfwavesright |

TABLE 387: Miscellaneous dingbat Dingbats

| | | | | | |
|---|-----------------|---|-----------------------|---|-----------------|
| Ĵ | \anchor | Ѡ | \eye | Ѐ | \Sborder |
| Ѽ | \carriagereturn | Ѽ | \filledsquarewithdots | Ѽ | \squarewithdots |
| ✓ | \checkmark | Ѡ | \satellitedish | Ѐ | \Zborder |

TABLE 388: Miscellaneous bbdng Dingbats

| | | | | | | | |
|---|-----------------------|---|--------|---|---------------|---|----------------------|
| ✉ | \Envelope | Ѡ | \Peace | Ѡ | \PhoneHandset | Ѡ | \SunshineOpenCircled |
| ❖ | \OrnamentDiamondSolid | Ѡ | \Phone | Ѡ | \Plane | Ѡ | \Tape |

TABLE 389: Miscellaneous pifont Dingbats

| | | | | | | | | | |
|---|-----------|---|------------|---|------------|---|------------|---|------------|
| ¤ | \ding{37} | ¤ | \ding{40} | ♥ | \ding{164} | ¤ | \ding{167} | ♠ | \ding{171} |
| Ѡ | \ding{38} | ¤ | \ding{41} | ♦ | \ding{165} | ♣ | \ding{168} | ♦ | \ding{169} |
| Ѡ | \ding{39} | ❖ | \ding{118} | Ѡ | \ding{166} | ♥ | \ding{170} | | |

TABLE 390: Miscellaneous adforn Dingbats

- \adfbullet
- ◊ \adfdiamond
- Ѡ \adfggee
- § \adfS
- \adfsquare

6 Ancient languages

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

TABLE 391: *phaistos* Symbols from the Phaistos Disk

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

TABLE 392: *protosem* Proto-Semitic Characters

| | | | | | | | | | | | | | | | |
|--|---------|--|----------|--|---------|--|-----------|--|---------|--|-----------|--|------------|--|----------|
| | \Aaleph | | \AAaleph | | \Abeth | | \AAbeth | | \Agimel | | \Adaleth | | \AAadaleth | | \Ahe |
| | \AAhe | | \Azayin | | \Akaph | | \AAkaph | | \Alamed | | \AAAlamed | | \Amem | | \Anun |
| | \AAayin | | \Ateth | | \Asmekh | | \AApe | | \Ape | | \AAape | | \Asade | | \AAasade |
| | \AAayod | | \Ayod | | \Aayin | | \Aqoph | | \Aqoph | | \Aresh | | \AAresh | | \Ashin |
| | \Ahesh | | \AAahesh | | \Alamed | | \AAalamed | | \Amem | | \Anun | | \Aqoph | | \Atav |

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

TABLE 393: hierogl^f Hieroglyphics

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

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

TABLE 394: linearA Linear A Script

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

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

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

TABLE 395: linearb Linear B Basic and Optional Letters

| | | | | | | | | | | | |
|---|--------|---|------|---|---------|---|---------|---|--------|---|-------|
| 卜 | \Ba | 曰 | \Bja | 𢁊 | \Bmu | 𢁃 | \Bpte | 𢁄 | \Broii | 𢁅 | \Bto |
| 𠂔 | \Baii | 𠂔 | \Bje | 𢁎 | \Bna | 𢁆 | \Bpu | 𢁇 | \Bru | 𢁈 | \Btu |
| 𢁉 | \Baiii | 𢁉 | \Bjo | 𢁊 | \Bne | 𢁊 | \Bpuii | 𢁉 | \Bsa | 𢁉 | \Btwo |
| 𢁌 | \Bau | 𢁌 | \Bju | 𢁎 | \Bni | 𢁊 | \Bqa | 𢁌 | \Bse | 𢁌 | \Bu |
| ト | \Bda | ⊕ | \Bka | 𢁉 | \Bno | 𢁊 | \Bqe | 𢁉 | \Bsi | 𢁉 | \Bwa |
| 𢁉 | \Bde | 𢁉 | \Bke | 𢁊 | \Bnu | 𢁊 | \Bqi | 𢁉 | \Bso | 𢁉 | \Bwe |
| 𢁉 | \Bdi | 𢁉 | \Bki | 𢁉 | \Bnwa | 𢁊 | \Bqo | 𢁉 | \Bsu | 𢁉 | \Bwi |
| 𢁊 | \Bdo | 𢁊 | \Bko | 𢁉 | \Bo | 𢁉 | \Bra | 𢁊 | \Bswa | 𢁊 | \Bwo |
| 𢁉 | \Bdu | 𢁉 | \Bku | 𢁊 | \Bpa | 𢁉 | \Braii | 𢁉 | \Bswi | 𢁉 | \Bza |
| 𢁉 | \Bdwe | 𢁉 | \Bma | 𢁉 | \Bpaiii | 𢁉 | \Braiii | 𢁉 | \Bta | 𢁉 | \Bze |
| 𢁉 | \Bdwo | 𢁉 | \Bme | 𢁉 | \Bpe | 𢁉 | \Bre | 𢁉 | \Btaii | 𢁉 | \Bzo |
| 𢁌 | \Be | 𢁉 | \Bmi | 𢁉 | \Bpi | 𢁊 | \Bri | 𢁉 | \Bte | | |
| ヰ | \Bi | ヰ | \Bmo | ヰ | \Bpo | + | \Bro | ヰ | \Bti | | |

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

TABLE 396: linearb Linear B Numerals

| | | | | | | | | | |
|-----|--------|---|---------|----|---------|-----|--------|------|---------|
| I | \BNi | | \BNvii | == | \BNxl | ○ | \BNc | oooo | \BNdcc |
| II | \BNii | | \BNviii | == | \BNl | ○ | \BNcc | oooo | \BNdccc |
| III | \BNiii | | \BNix | == | \BNlx | ○ | \BNccc | oooo | \BNcm |
| II | \BNiv | - | \BNx | == | \BNlxx | ○○ | \BNcd | ○○ | \BNm |
| II | \BNv | = | \BNxx | == | \BNlxxx | ○○○ | \BNd | | |
| III | \BNvi | = | \BNxxx | == | \BNxc | ○○○ | \BNd | | |

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

TABLE 397: linearb Linear B Weights and Measures

| | | | | | | | | | |
|---|-----------|---|----------|---|----------|---|--------|---|--------|
| 𢁉 | \BPTalent | 𢁉 | \BPvolb | 𢁉 | \BPvolcf | 𢁉 | \BPwtb | 𢁉 | \BPwtd |
| 𢁉 | \BPvola | 𢁉 | \BPvolcd | 𢁉 | \BPwta | 𢁉 | \BPwtc | | |

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

TABLE 398: linearb Linear B Ideograms

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

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

TABLE 399: linearb Unidentified Linear B Symbols

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

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

TABLE 400: cypriot Cypriot Letters

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

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

TABLE 401: sarabian South Arabian Letters

| | | | | | | | | | |
|---|------|---|-------|---|-------|---|-------|---|-------|
| ◦ | \SAa | ሂ | \SAz | ሃ | \SAM | ህ | \SAsd | ሇ | \SAdb |
| ሮ | \SAb | ለ | \SAhd | ሪ | \SAN | ሩ | \SAq | ሪ | \SATb |
| ሮ | \SAg | ሱ | \SATd | ሲ | \SAs | ሳ | \SAr | ሮ | \SAGa |
| ሮ | \SAd | ር | \SAY | ሮ | \SAf | ሮ | \SAsv | ር | \SAzd |
| ሮ | \SAh | ሮ | \SAk | ሮ | \SAlq | ሮ | \SAT | ሮ | \SAsa |
| ሮ | \SAw | ሮ | \SAI | ሮ | \SAo | ሮ | \SAhu | ሮ | \SAdd |

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

TABLE 402: teubner Archaic Greek Letters and Greek Numerals

| | | | | | | | |
|---|---------------------|---|-----------|----|----------|---|------------|
| Ϙ | \Coppa [†] | F | \Digamma* | ϙ | \sampi* | ϙ | \varstigma |
| ϙ | \coppa [†] | ϙ | \kappa | \ϙ | \Stigma | | |
| F | \digamma*,‡ | ϙ | \Sampi | ϙ | \stigma* | | |

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

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

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

TABLE 403: boisik Archaic Greek Letters and Greek Numerals

| | | | | | | | |
|---|----------|---|--------|---|-------------|---|-----------|
| F | \Digamma | ϙ | \qoppa | ϙ | \stigma | ϙ | \varsampi |
| F | \digamma | Ϙ | \Qoppa | Ϙ | \Stigma | | |
| ϙ | \heta | ϙ | \Sampi | ϙ | \vardigamma | | |
| F | \Heta | ϙ | \sampi | ϙ | \Varsampi | | |

TABLE 404: epiolmec Epi-Olmec Script

| | | | | | |
|---|--------------|---|-------------|---|----------------|
|  | \EOafter |  | \EOMiddle |  | \EOStarWarrior |
|  | \EOandThen |  | \EOmonster |  | \EOstep |
|  | \EOAppear |  | \EOMountain |  | \EOSu |
|  | \EOBeardMask |  | \EOmuu |  | \EOsu |
|  | \EOBedeck |  | \EOna |  | \EOSun |

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| | | | | | |
|--|-----------------|--|---------------|--|-----------------|
| | \EOBlood | | \EOOne | | \EOsuu |
| | \EObrace | | \EOoni | | \EOSuu |
| | \EObuilding | | \EOnow | | \Eota |
| | \EObundle | | \EOonu | | \EOote |
| | \EOChop | | \EOonuu | | \EOthrone |
| | \EOChronI | | \EOofficerI | | \EOti |
| | \EOCloth | | \EOofficerII | | \EOtime |
| | \EODealWith | | \EOofficerIII | | \EOtime |
| | \EODeer | | \EOofficerIV | | \EOtitle |
| | \EOeat | | \EOopa | | \EOtitleII |
| | \EOflint | | \EOpak | | \EOtitleIV |
| | \EOflower | | \EOPatron | | \EOto |
| | \EOFold | | \EOPatronII | | \EOtu |
| | \EOGod | | \Eope | | \EOtuki |
| | \EOGoUp | | \EOpenis | | \EOtukpa |
| | \EOgovernor | | \Eopi | | \EOtturtle |
| | \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 | | \EOvarwuu |
| | \EOLetBlood | | \EOSini | | \EOvarYear |
| | \EoloInCloth | | \EOskin | | \EOwa |
| | \EOlongLipII | | \EOSky | | \EOwe |
| | \EOLord | | \EOSkyAnimal | | \EOwi |
| | \EOlose | | \EOSkyPillar | | \EOwo |
| | \EOma | | \EOSnake | | \EOwuu |
| | \EOmacaw | | \EOSo | | \EOya |
| | \EOmacawi | | \EOSpan | | \EOyaj |
| | \EOme | | \EOSprinkle | | \EOye |
| | \EOMexNew | | \EOstar | | \EOYear |
| | \EOmi | | \EOstarWarrior | | \EOyuu |

TABLE 405: epiolmec Epi-Olmec Numerals

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

7 Musical symbols

The following symbols are used to typeset musical notation. The *lilyglyphs* package provides a large subset of the symbols in this section. Note, however, that *lilyglyphs* depends upon the *fontspec* package, OpenType (.otf) fonts, and some PDF graphics and therefore works only with Lua^LATEX or X_ELA^TE_X.

TABLE 406: L^AT_EX 2_E Musical Symbols

♭ \flat ♯ \natural ♮ \sharp

TABLE 407: *textcomp* Musical Symbols

♪ \textmusicalnote

TABLE 408: *wasysym* Musical Symbols

♪ \eighthnote ♫ \halfnote ♪ \twonotes . \fullnote ♩ \quarternote

TABLE 409: *MnSymbol* Musical Symbols

♭ \flat ♯ \natural ♮ \sharp

TABLE 410: *fdsymbol* Musical Symbols

♭ \flat ♯ \natural ♮ \sharp

TABLE 411: *boisik* Musical Symbols

♭ \flat ♯ \natural ♮ \sharp

TABLE 412: *stix* Musical Symbols

♪ \eighthnote ♫ \natural ♪ \sharp
♭ \flat ♩ \quarternote ♪ \twonotes

TABLE 413: *arev* Musical Symbols

♩ \quarternote ♪ \eighthnote ♪ \sixteenthnote

TABLE 414: MusiX_TE_X Musical Symbols

| | | | | | |
|-------------------|---------------|------------------|-------------------|--------------------------------|------------------|
| | \allabreve | > | \lsf | | \shake |
| | \altoclef | v | \lsfz | | \Shake |
| | \backturn | = | \maxima | | \Shakel |
| | \bassclef | + | \meterplus | | \Shakene |
| / | \caesura | # | \mordent | | \Shakenw |
| Ø | \coda | ## | \Mordent | | \Shakesw |
| | \Coda | - | \PAUSE | | \smallaltoclef |
| * | \Dep | - | \PAuse | | \smallbassclef |
| [| \doublelthumb | - | \pause | | \smalltrebleclef |
| [| \downbow | \textcircled{d}. | \Ped | | \sPed |
| \gamma | \ds | \{\} | \qp | | \trebleclef |
| \% | \duevolte | \:\:\: | \qqs | \sim | \trill |
| \circlearrowleft | \fermatadown | \:\:\: | \qs | \infty | \turn |
| \circlearrowright | \fermataup | \:\:\: | \reverseallabreve | \vee | \upbow |
| \circ | \flageolett | C\circ | \reverseC | > | \usf |
| - | \hpause | * | \sDep | ^ | \usfz |
| \:\:\: | \hs | \S\S\S | \Segno | \textcircled{w} | \wq |
| \:\:\: | \longa | \S\S\S | \segno | \textcircled{w}\textcircled{w} | \wqq |

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

TABLE 415: MusiXTEX Alternative Clefs

| | | | |
|---|-----------------|---|-----------------|
|  | \drumclef |  | \gregorianFclef |
|  | \gregorianCclef |  | \oldGclef |

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

TABLE 416: *harmony* Musical Symbols

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

The MusiXTEX package must be installed to use *harmony*.

TABLE 417: *harmony* Musical Accents

| | | | |
|---|---------------------|---|-------------------|
|  | \Ferli{A}\Ferli{a}* |  | \Ohne{A}\Ohne{a}* |
|  | \Fermi{A}\Fermi{a} |  | \Umd{A}\Umd{a}* |
| (A)a | \Kr{A}\Kr{a} | | |

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

In addition to the accents shown above, \HH is a special accent command that accepts five period-separated characters and typesets them such that “\HH.X.a.b.c.d.” produces “X^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 MusiXTEX package must be installed to use *harmony*.

TABLE 418: *lilyglyphs* Single Notes

| | | | |
|--|------------------------------|--|-----------------------------------|
| | \eighthNote | | \quarterNoteDottedDown |
| | \eighthNoteDotted | | \quarterNoteDown |
| | \eighthNoteDottedDouble | | \sixteenthNote |
| | \eighthNoteDottedDoubleDown | | \sixteenthNoteDotted |
| | \eighthNoteDottedDown | | \sixteenthNoteDottedDouble |
| | \eighthNoteDown | | \sixteenthNoteDottedDoubleDown |
| | \halfNote | | \sixteenthNoteDottedDown |
| | \halfNoteDotted | | \thirtysecondNote |
| | \halfNoteDottedDouble | | \thirtysecondNoteDotted |
| | \halfNoteDottedDoubleDown | | \thirtysecondNoteDottedDouble |
| | \halfNoteDottedDown | | \thirtysecondNoteDottedDoubleDown |
| | \quarterNote | | \thirtysecondNoteDottedDown |
| | \quarterNoteDotted | | \thirtysecondNoteDown |
| | \quarterNoteDottedDouble | | \wholeNote |
| | \quarterNoteDottedDoubleDown | | \wholeNoteDotted |

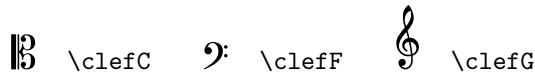
lilyglyphs defines synonyms for all of the preceding symbols:

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

TABLE 419: *lilyglyphs* Beamed Notes

| | | | |
|--|----------------------|--|------------------------|
| | \twoBeamedQuavers | | \threeBeamedQuaversII |
| | \threeBeamedQuavers | | \threeBeamedQuaversIII |
| | \threeBeamedQuaversI | | |

TABLE 420: *lilyglyphs* Clefs



Each of these symbols provides a smaller, “inline” form (`\clefCInline`, `\clefFInline`, and `\clefGInline`, respectively) intended for use within a paragraph. See the *lilyglyphs* documentation for more information.

TABLE 421: *lilyglyphs* Time Signatures

C `\lilyTimeC` **C** `\lilyTimeCHalf`

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

TABLE 422: *lilyglyphs* Accidentals

| | | | |
|-----------|------------------------------|----------|---|
| x | <code>\doublesharp</code> | # | <code>\sharpArrowdown</code> |
| b | <code>\flat</code> | # | <code>\sharpArrowup</code> |
| bb | <code>\flatflat</code> | # | <code>\sharpSlashslashslashstem</code> |
| b | <code>\natural</code> | # | <code>\sharpSlashslashslashslashstem</code> |
| # | <code>\sharp</code> | # | <code>\sharpSlashslashstem</code> |
| # | <code>\sharpArrowboth</code> | # | <code>\sharpSlashslashstemstem</code> |

TABLE 423: *lilyglyphs* 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> |
| γ | <code>\quaverRest</code> | —. | <code>\wholeNoteRestDotted</code> |

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

TABLE 424: *lily \otimes ly \pmb{bs}* Dynamics Letters

| | | | |
|-----------|------------------|------------|------------------|
| f | \lilyDynamics{f} | r | \lilyDynamics{r} |
| p | \lilyDynamics{p} | s | \lilyDynamics{s} |
| m | \lilyDynamics{m} | z | \lilyDynamics{z} |
| rf | \lilyRF | rfz | \lilyRFZ |

These letters and the digits 0–9 are the only alphanumerics defined by *lily \otimes ly \pmb{bs}* 's underlying Emmentaler fonts.

TABLE 425: *lily \otimes ly \pmb{bs}* Dynamics Symbols

| | | | |
|-------------|---------------|-------------|-----------------|
| < | \crescHairpin | > | \decrescHairpin |
|-------------|---------------|-------------|-----------------|

TABLE 426: *lily \otimes ly \pmb{bs}* Articulations

| | | | | | |
|-----------------|-----------------|----------|--------------|----------|----------------|
| > | \lilyAccent | ^ | \marcato | , | \staccatissimo |
| <> | \lilyEspressivo | v | \marcatoDown | - | \tenuto |
| . | \lilyStaccato | = | \portato | | |
| o | \lilyThumb | = | \portatoDown | | |

TABLE 427: *lily \otimes ly \pmb{bs}* Scripts

| | |
|--|----------|
| | \fermata |
|--|----------|

TABLE 428: *lily \otimes ly \pmb{bs}* Accordion Notation

| | | | | | |
|--|---------------------|--|-----------------|--|-------------------|
| | \accordionBayanBass | | \accordionOldEE | | \accordionStdBass |
| | \accordionDiscant | | \accordionPull | | |
| | \accordionFreeBass | | \accordionPush | | |

TABLE 429: *lily\lyphs* Named Time Signatures

| | | | |
|---|-----------------------------------|---|--------------------------------------|
| ¢ | \lilyGlyph{timesig.C22} | ◊ | \lilyGlyph{timesig.mensural98} |
| ¢ | \lilyGlyph{timesig.C44} | ¢ | \lilyGlyph{timesig.neomensural22} |
| ¢ | \lilyGlyph{timesig.mensural22} | ¤ | \lilyGlyph{timesig.neomensural24} |
| ◊ | \lilyGlyph{timesig.mensural24} | ○ | \lilyGlyph{timesig.neomensural32} |
| ○ | \lilyGlyph{timesig.mensural32} | ◊ | \lilyGlyph{timesig.neomensural34} |
| ◊ | \lilyGlyph{timesig.mensural34} | ¢ | \lilyGlyph{timesig.neomensural44} |
| ¢ | \lilyGlyph{timesig.mensural44} | ¤ | \lilyGlyph{timesig.neomensural48} |
| ¤ | \lilyGlyph{timesig.mensural48} | ¢ | \lilyGlyph{timesig.neomensural64} |
| ¢ | \lilyGlyph{timesig.mensural64} | ¢ | \lilyGlyph{timesig.neomensural68} |
| ◊ | \lilyGlyph{timesig.mensural68} | ¤ | \lilyGlyph{timesig.neomensural68alt} |
| ¤ | \lilyGlyph{timesig.mensural68alt} | ○ | \lilyGlyph{timesig.neomensural94} |
| ○ | \lilyGlyph{timesig.mensural94} | ◊ | \lilyGlyph{timesig.neomensural98} |

lily\lyphs defines shorter names for a few of these symbols. See Table 421.

TABLE 430: *lily\lyphs* Named Scripts

| | | | |
|-----|---|-----|-----------------------------------|
| ↗ | \lilyGlyph{scripts.arpeggio} | ↔ | \lilyGlyph{scripts.prallmordent} |
| ↖ | \lilyGlyph{scripts.arpeggio.arrow.1} | ↔↔ | \lilyGlyph{scripts.prallprall} |
| ↙ | \lilyGlyph{scripts.arpeggio.arrow.M1} | ↔↔↔ | \lilyGlyph{scripts.prallup} |
| ↘ | \lilyGlyph{scripts.augmentum} | , | \lilyGlyph{scripts.rcomma} |
| ſ | \lilyGlyph{scripts.barline.kievan} | ∞ | \lilyGlyph{scripts.reverseturn} |
| 〃 | \lilyGlyph{scripts.caesura.curved} | / | \lilyGlyph{scripts.rvarcomma} |
| 〃〃 | \lilyGlyph{scripts.caesura.straight} | % | \lilyGlyph{scripts.segno} |
| . | \lilyGlyph{scripts.circulus} | > | \lilyGlyph{scripts.sforzato} |
| ◊ | \lilyGlyph{scripts.coda} | ◊ | \lilyGlyph{scripts.snappizzicato} |
| . | \lilyGlyph{scripts.daccentus} | . | \lilyGlyph{scripts.staccato} |
| ⌚ | \lilyGlyph{scripts.dfermata} | + | \lilyGlyph{scripts.stopped} |
| ⌚⌚ | \lilyGlyph{scripts.dlongfermata} | - | \lilyGlyph{scripts.tenuto} |
| ▼ | \lilyGlyph{scripts.dmarcato} | ◊ | \lilyGlyph{scripts.thumb} |
| □ | \lilyGlyph{scripts.downbow} | ✓ | \lilyGlyph{scripts.tickmark} |
| ↔↔ | \lilyGlyph{scripts.downmordent} | • | \lilyGlyph{scripts.trilelement} |
| ↔↔↔ | \lilyGlyph{scripts.downprall} | tr | \lilyGlyph{scripts.trill} |
| ▫ | \lilyGlyph{scripts.dpedalheel} | ~ | \lilyGlyph{scripts.trill_element} |
| ^ | \lilyGlyph{scripts.dpedaltoe} | ∞ | \lilyGlyph{scripts.turn} |
| ¬ | \lilyGlyph{scripts.dportato} | . | \lilyGlyph{scripts.uaccentus} |
| . | \lilyGlyph{scripts.dsemicirculus} | ⌚ | \lilyGlyph{scripts.ufermata} |
| V | \lilyGlyph{scripts.dshortfermata} | ▬ | \lilyGlyph{scripts.ulongfermata} |
| S | \lilyGlyph{scripts.dsignumcongruentiae} | ^ | \lilyGlyph{scripts.umarcato} |
| ‐ | \lilyGlyph{scripts.dstaccatissimo} | ∨ | \lilyGlyph{scripts.upbow} |
| ▬▬ | \lilyGlyph{scripts.dverylongfermata} | υ | \lilyGlyph{scripts.upedalheel} |
| <=> | \lilyGlyph{scripts.espr} | v | \lilyGlyph{scripts.upedaltoe} |
| ◦ | \lilyGlyph{scripts.flageolet} | ↔↔ | \lilyGlyph{scripts.upmordent} |
| ø | \lilyGlyph{scripts.halfopen} | - | \lilyGlyph{scripts.uportato} |
| ◊ | \lilyGlyph{scripts.halfopenvertical} | ↔↔ | \lilyGlyph{scripts.uprall} |
| . | \lilyGlyph{scripts.ictus} | . | \lilyGlyph{scripts.usemicirculus} |
| ‘ | \lilyGlyph{scripts.lcomma} | ▲ | \lilyGlyph{scripts.ushortfermata} |

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| | |
|---------------------------------|---|
| \lilyGlyph{scripts.lineprall} | \lilyGlyph{scripts.usignumcongruentiae} |
| / \lilyGlyph{scripts.lvarcomma} | , \lilyGlyph{scripts.ustaccatissimo} |
| \lilyGlyph{scripts.mordent} | \lilyGlyph{scripts.uverylongfermata} |
| o \lilyGlyph{scripts.open} | \lilyGlyph{scripts.varcoda} |
| \lilyGlyph{scripts.prall} | \lilyGlyph{scripts.varsegno} |
| \lilyGlyph{scripts.pralldown} | |

lilyglypbs defines \fermata as a shorter name for “♪” than \lilyGlyph{scripts.ufermata}. See Table 427.

TABLE 431: *lilyglypbs* Named Rests

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

lilyglypbs defines shorter names for a few of these symbols. See Table 423.

TABLE 432: *lilyglypbs* Named Pedals

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

TABLE 433: *lilyglyphs* Named Flags

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

TABLE 434: *lilyglyphs* Named Custodes

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

TABLE 435: *lilyglyp̄s* Named Clefs

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

lilyglyp̄s defines shorter names for a few of these symbols. See Table 420.

TABLE 436: *lilyGlyphs* Named Noteheads

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

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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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```
■      \lilyGlyph{noteheads.srM2ligmensural}
■      \lilyGlyph{noteheads.srM2semiligmensural}
■      \lilyGlyph{noteheads.srM3ligmensural}
■      \lilyGlyph{noteheads.srM3semiligmensural}
·      \lilyGlyph{noteheads.ssolesmes.auct.asc}
·      \lilyGlyph{noteheads.ssolesmes.auct.desc}
·      \lilyGlyph{noteheads.ssolesmes.incl.auctum}
·      \lilyGlyph{noteheads.ssolesmes.incl.parvum}
·      \lilyGlyph{noteheads.ssolesmes.oriscus}
·      \lilyGlyph{noteheads.ssolesmes.stropha}
·      \lilyGlyph{noteheads.ssolesmes.stropha.aucta}
·      \lilyGlyph{noteheads.svaticana.cehalicus}
·      \lilyGlyph{noteheads.svaticana.epiphonus}
·      \lilyGlyph{noteheads.svaticana.inclinatum}
·      \lilyGlyph{noteheads.svaticana.inner.cehalicus}
·      \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.vephonous}
·      \lilyGlyph{noteheads.svaticana.vlpes}
·      \lilyGlyph{noteheads.svaticana.vuples}
·      \lilyGlyph{noteheads.u0doFunk}
·      \lilyGlyph{noteheads.u0fa}
·      \lilyGlyph{noteheads.u0faFunk}
·      \lilyGlyph{noteheads.u0faThin}
·      \lilyGlyph{noteheads.u0miFunk}
·      \lilyGlyph{noteheads.u0reFunk}
·      \lilyGlyph{noteheads.u0tiFunk}
·      \lilyGlyph{noteheads.u1do}
·      \lilyGlyph{noteheads.u1doFunk}
·      \lilyGlyph{noteheads.u1doThin}
·      \lilyGlyph{noteheads.u1doWalker}
·      \lilyGlyph{noteheads.u1fa}
·      \lilyGlyph{noteheads.u1faFunk}
·      \lilyGlyph{noteheads.u1faThin}
·      \lilyGlyph{noteheads.u1faWalker}
·      \lilyGlyph{noteheads.u1miFunk}
·      \lilyGlyph{noteheads.u1re}
·      \lilyGlyph{noteheads.u1reFunk}
·      \lilyGlyph{noteheads.u1reThin}
·      \lilyGlyph{noteheads.u1reWalker}
·      \lilyGlyph{noteheads.u1ti}
·      \lilyGlyph{noteheads.u1tiFunk}
·      \lilyGlyph{noteheads.u1tiThin}
·      \lilyGlyph{noteheads.u1tiWalker}
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▷   \lilyGlyph{noteheads.u1triangle}
▲   \lilyGlyph{noteheads.u2do}
■   \lilyGlyph{noteheads.u2doFunk}
▲   \lilyGlyph{noteheads.u2doThin}
▼   \lilyGlyph{noteheads.u2doWalker}
▲   \lilyGlyph{noteheads.u2fa}
▼   \lilyGlyph{noteheads.u2faFunk}
▲   \lilyGlyph{noteheads.u2faThin}
▼   \lilyGlyph{noteheads.u2faWalker}
▲   \lilyGlyph{noteheads.u2kievan}
■   \lilyGlyph{noteheads.u2re}
▷   \lilyGlyph{noteheads.u2reFunk}
■   \lilyGlyph{noteheads.u2reThin}
▷   \lilyGlyph{noteheads.u2reWalker}
▲   \lilyGlyph{noteheads.u2ti}
■   \lilyGlyph{noteheads.u2tiFunk}
■   \lilyGlyph{noteheads.u2tiThin}
▼   \lilyGlyph{noteheads.u2tiWalker}
▷   \lilyGlyph{noteheads.u2triangle}
■   \lilyGlyph{noteheads.u3kievan}

\lilyGlyph{noteheads.uM2}
\lilyGlyph{noteheads.uM2blackmensural}
\lilyGlyph{noteheads.uM2mensural}
\lilyGlyph{noteheads.uM2neomensural}
\lilyGlyph{noteheads.uM2semimensural}
\lilyGlyph{noteheads.uM3blackmensural}
\lilyGlyph{noteheads.uM3mensural}
\lilyGlyph{noteheads.uM3neomensural}
\lilyGlyph{noteheads.uM3semimensural}
\lilyGlyph{noteheads.urM2mensural}
\lilyGlyph{noteheads.urM2neomensural}
\lilyGlyph{noteheads.urM2semimensural}
\lilyGlyph{noteheads.urM3mensural}
\lilyGlyph{noteheads.urM3neomensural}
\lilyGlyph{noteheads.urM3semimensural}

```

TABLE 437: *lilyglyphs* Named Accordion Symbols

| | | | |
|---|---------------------------------|---|-------------------------------|
| ☰ | \lilyGlyph{accordion.bayanbass} | ◎ | \lilyGlyph{accordion.oldEE} |
| ⊖ | \lilyGlyph{accordion.discant} | ˥ | \lilyGlyph{accordion.pull} |
| . | \lilyGlyph{accordion.dot} | > | \lilyGlyph{accordion.push} |
| ⊖ | \lilyGlyph{accordion.freebass} | ⊕ | \lilyGlyph{accordion.stdbass} |

lilyglyphs defines shorter names for all of these symbols except \lilyGlyph{accordion.dot}. See Table 428.

TABLE 438: *lilyglypbs* Named Accidentals

```

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

```

lilyglypbs defines shorter names for a few of these symbols. See Table 422.

TABLE 439: *lilyglypbs* Named Arrowheads

- | | |
|------------------------------------|-----------------------------------|
| ➢ \lilyGlyph{arrowheads.close.01} | ➢ \lilyGlyph{arrowheads.open.01} |
| ◀ \lilyGlyph{arrowheads.close.0M1} | ◀ \lilyGlyph{arrowheads.open.0M1} |
| ▲ \lilyGlyph{arrowheads.close.11} | ▲ \lilyGlyph{arrowheads.open.11} |
| ▼ \lilyGlyph{arrowheads.close.1M1} | ▼ \lilyGlyph{arrowheads.open.1M1} |

TABLE 440: *lilyglyphs* Named Alphanumerics and Punctuation

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

See Table 424 for an alternative way to typeset dynamics letters. *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 441: Miscellaneous *lilyglyphs* Named Musical Symbols

| | | | |
|---|------------------------------|---|--------------------------------|
| ~ | \lilyGlyph{brackettips.down} | . | \lilyGlyph{dots.dotvaticana} |
| ~ | \lilyGlyph{brackettips.up} | _ | \lilyGlyph{ties.lyric.default} |
| . | \lilyGlyph{dots.dot} | _ | \lilyGlyph{ties.lyric.short} |
| * | \lilyGlyph{dots.dotkievan} | | |

8 Other symbols

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

TABLE 442: `textcomp` Genealogical Symbols

| | | | | | |
|-----------|------------------------|--------------|----------------------------|-----------|---------------------------|
| \star | <code>\textborn</code> | $\circ\circ$ | <code>\textdivorced</code> | \otimes | <code>\textmarried</code> |
| \dagger | <code>\textdied</code> | $\circ\circ$ | <code>\textleaf</code> | | |

TABLE 443: `wasysym` General Symbols

| | | | | | | | |
|------------------|---------------------------|----------------------|---------------------------|----------------------|-------------------------|-----------------------|---------------------------|
| \blacksquare | <code>\ataribox</code> | \odot | <code>\clock</code> | \blacktriangleleft | <code>\LEFTarrow</code> | \blacktriangleright | <code>\RIGHTarrow</code> |
| \blacktriangle | <code>\bell</code> | \oslash | <code>\diameter</code> | \circlearrowleft | <code>\leftturn</code> | \circlearrowright | <code>\rightturn</code> |
| \bullet | <code>\blacksmiley</code> | \blacktriangledown | <code>\DOWNarrow</code> | \leftrightharpoons | <code>\lightning</code> | \odot | <code>\smiley</code> |
| \bowtie | <code>\Bowtie</code> | $\odot\odot$ | <code>\frownie</code> | \tanh | <code>\phone</code> | $\odot\odot$ | <code>\sun</code> |
| \mid | <code>\brokenvert</code> | $\oslash\oslash$ | <code>\invdiameter</code> | $\diamond\!\diamond$ | <code>\pointer</code> | \blacktriangle | <code>\UParrow</code> |
| \checkmark | <code>\checked</code> | \maltese | <code>\kreuz</code> | $\oslash\oslash$ | <code>\recorder</code> | $\square\!\square$ | <code>\wasylozenge</code> |

TABLE 444: `manfnt` Dangerous Bend Symbols

| | | | | | |
|--|---------------------|--|------------------------|--|---------------------------------|
| | <code>\dbend</code> | | <code>\lhd bend</code> | | <code>\reversedvideobend</code> |
|--|---------------------|--|------------------------|--|---------------------------------|

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

TABLE 445: Miscellaneous `manfnt` Symbols

| | | | |
|----------------|--------------------------------------|----------------------|---------------------------------------|
| \circ | <code>\manboldkidney</code> | \circ | <code>\manpenkidney</code> |
| \odot | <code>\manconcentriccircles</code> | \odot | <code>\manquadrifolium</code> |
| \diamondsuit | <code>\manconcentricdiamond</code> | \curvearrowleft | <code>\manquartercircle</code> |
| \diamond | <code>\mancone</code> | \circlearrowleft | <code>\manrotatedquadrifolium</code> |
| \square | <code>\mancube</code> | \curvearrowright | <code>\manrotatedquartercircle</code> |
| \nwarrow | <code>\manerrarrow</code> | \star | <code>\manstar</code> |
| \blacksquare | <code>\manfilledquartercircle</code> | \backslash | <code>\mantiltPennib</code> |
| \dashv | <code>\manhPennib</code> | \blacktriangledown | <code>\mantriangledown</code> |
| \square | <code>\manimpossiblecube</code> | \triangleright | <code>\mantriangleright</code> |
| \circ | <code>\mankidney</code> | \blacktriangleleft | <code>\mantriangleup</code> |
| \circ | <code>\manlhpennibkidney</code> | \mid | <code>\manvpennib</code> |

TABLE 446: `marvosym` Media Control Symbols

| | | | | | | | |
|--|------------------------------|--|------------------------|--|-----------------------------|----------------------|---------------------|
| \blacktriangleright | <code>\Forward</code> | \blacktriangledown | <code>\MoveDown</code> | $\blacktriangleleft\blacktriangleleft$ | <code>\RewindToIndex</code> | \blacktriangleleft | <code>\ToTop</code> |
| $\blacktriangleright\mid$ | <code>\ForwardToEnd</code> | \blacktriangleleft | <code>\MoveUp</code> | \blacktriangleleft | <code>\RewindToStart</code> | | |
| $\blacktriangleright\blacktriangleright$ | <code>\ForwardToIndex</code> | $\blacktriangleleft\blacktriangleleft$ | <code>\Rewind</code> | $\blacktriangledown\blacktriangledown$ | <code>\ToBottom</code> | | |

TABLE 447: marvosym Laundry Symbols

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

TABLE 448: marvosym Information Symbols

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

TABLE 449: Other marvosym Symbols

| | | | | | | | |
|--|----------|--|------------|--|-----------|--|------------|
| | \Ankh | | \Bouquet | | \Heart | | \PeaceDove |
| | \Bat | | \Celtcross | | \ManFace | | \Smiley |
| | \BOLogo | | \CircledA | | \MineSign | | \WomanFace |
| | \BOLogoL | | \Cross | | \Mundus | | \Yinyang |
| | \BOLogoP | | \Frowny | | @ | | |

TABLE 450: Miscellaneous universa Symbols

\bauforms \bauhead

TABLE 451: Miscellaneous fourier Symbols

| | | | | | | | |
|--|---------|--|----------|--|---------------|--|-------------|
| | \bomb | | \grimace | | \textthing* | | \textxswup* |
| | \danger | | \noway | | \textxswdown* | | |

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

TABLE 452: ifsym Weather Symbols

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

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

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

TABLE 453: ifsym Alpine Symbols

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

TABLE 454: ifsym Clocks

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

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

TABLE 455: Other ifsym Symbols

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

TABLE 456: *clock* Clocks

| \ClockStyle | \ClockFramefalse | \ClockFrametrue |
|-------------|------------------|-----------------|
| 0 | ~ | ○~○ |
| 1 | ○~○ | ○~○ |
| 2 | ○~○ | ○~○ |
| 3 | -~- | ○~○ |

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

TABLE 457: *epsdice* Dice

| | | | | | |
|---|-------------|---|-------------|---|-------------|
| □ | \epsdice{1} | □ | \epsdice{3} | □ | \epsdice{5} |
| □ | \epsdice{2} | □ | \epsdice{4} | □ | \epsdice{6} |

TABLE 458: *hhcount* Dice

| | | | | | |
|---|------------|---|------------|---|------------|
| □ | \fcdice{1} | □ | \fcdice{3} | □ | \fcdice{5} |
| □ | \fcdice{2} | □ | \fcdice{4} | □ | \fcdice{6} |

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

TABLE 459: *stix* Dice

| | | | | | |
|---|---------|---|----------|---|---------|
| □ | \dicei | □ | \diceiii | □ | \dicev |
| □ | \diceii | □ | \diceiv | □ | \dicevi |

TABLE 460: `\bullcntr` Tally Markers

| | | | | | |
|-----|-----------------------------------|------|-----------------------------------|-------|-----------------------------------|
| • | <code>\bullcntr{<1>}</code> | •• | <code>\bullcntr{<4>}</code> | ••• | <code>\bullcntr{<7>}</code> |
| •• | <code>\bullcntr{<2>}</code> | ••• | <code>\bullcntr{<5>}</code> | •••• | <code>\bullcntr{<8>}</code> |
| ••• | <code>\bullcntr{<3>}</code> | •••• | <code>\bullcntr{<6>}</code> | ••••• | <code>\bullcntr{<9>}</code> |

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

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

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

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

| | | |
|-----------------------------------|-------|-------|
| small | large | heart |
| <code>\bullcntr{<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 `\bullcntr`’s pips. See the `bullcntr` documentation for more information.

TABLE 461: `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 462: `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 463: skull Symbols

 \skull

TABLE 464: Non-Mathematical mathabx Symbols

 \rip

TABLE 465: skak Chess Informator Symbols

| | | | | | |
|------------------|-----------------|--------------------|---------------|---------------|----------------|
| \mp | \bbetter | \circ | \doublepawns | $\circ\circ$ | \seppawns |
| \dashv | \bdecisive | \perp | \ending | O-O | \shortcastling |
| \triangleright | \betteris | = | \equal | \oplus | \timelimit |
| \boxplus | \bishoppair | \Leftrightarrow | \file | ∞ | \unclear |
| \mp | \bupperhand | \gg | \kside | $\circ\circ$ | \unitedpawns |
| \times | \capturesymbol | O-O-O | \longcastling | R | \various |
| O | \castlingchar | X | \markera | \pm | \wbetter |
| - | \castlinghyphen | O | \markerb | $+-$ | \wdecisive |
| \boxplus | \centre | # | \mate | \times | \weakpt |
| + | \checksymbol | > | \morepawns | \sqsubset | \with |
| RR | \chesscomment | O | \moreroom | \rightarrow | \withattack |
| | \chessetc | N | \novelty | \triangle | \withidea |
| — | \chesssee | \square | \onlymove | \uparrow | \withinit |
| \boxtimes | \compensation | \blacksquare | \opposbishops | \sqcup | \without |
| \Leftarrow | \counterplay | \circlearrowleft | \passedpawn | \pm | \wupperhand |
| C | \devadvantage | \llcorner | \qside | \odot | \zugzwang |
| \Rrightarrow | \diagonal | \blacksquare | \samebishops | | |

TABLE 466: *skak* Chess Pieces and Chessboard Squares

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

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

TABLE 467: *igo* Go Symbols

| | | | |
|---|---------------------------|---|---------------------------|
| ○ | \blackstone[\igocircle] | ○ | \whitestone[\igocircle] |
| ✗ | \blackstone[\igocross] | ✗ | \whitestone[\igocross] |
| ● | \blackstone[\igonone] | ○ | \whitestone[\igonone] |
| □ | \blackstone[\igosquare] | □ | \whitestone[\igosquare] |
| △ | \blackstone[\igotriangle] | △ | \whitestone[\igotriangle] |

In addition to the symbols shown above, *igo*'s \blackstone and \whitestone commands accept numbers from 1 to 99 and display them circled as ①, ②, ③, ..., ⑨ and ①, ②, ③, ..., ⑨, respectively.

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

TABLE 468: go Go Symbols

| | | | | | |
|---|------------|---|---------------|---|--------------|
| + | \botborder | + | \lftbotcorner | - | \rttopcorner |
| + | \empty | + | \lfttopcorner | □ | \square |
| + | \hoshi | + | \rtborder | — | \topborder |
| + | \lftborder | + | \rtbotcorner | △ | \triangle |

In addition to the board fragments and stones shown above, go's \black and \white commands accept numbers from 1 to 253 and display them circled as ❶, ❷, ❸, ..., ❾ and ①, ②, ③, ..., ⑯, 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 469: metre Metrical Symbols

| | | | | | | | | | | | |
|---|------|----|-------|----|------|-----|-------|-----|--------|----|--------|
| × | \a | ≤ | \bBm | | \cc | ≈ | \Mbb | : | \Pppp | ⊗ | \t |
| ⌚ | \B | ≤ | \bbm | | \Ccc | ≈≈ | \mbbx | : | \pppp | — | \tsbm |
| ◦ | \b | ≤≤ | \Bbm | — | \m | ○○ | \oo | ··· | \Ppppp | — | \tsmb |
| ϶ | \Bb | ≤≤ | \bbmb | ‘ | \M | . | \p | ··· | \ppppp | — | \tsmm |
| ϶ | \BB | ≤≤ | \bbmx | × | \ma | — | \pm | — | \ps | · | \vppm |
| ϶ | \bb | ≤ | \bm | ‘‘ | \Mb | : | \pp | : | \pxp | · | \vpppm |
| ϶ | \bB | ≤ | \Bm | ○ | \mb | : | \Pp | : | \Pxp | :: | \x |
| ϶ | \bba | | \c | ≤ | \mBb | — | \ppm | ~ | \R | | |
| ϶ | \bbb | | \C | ≤ | \mbB | ··· | \ppp | ~ | \r | | |
| ϶ | \BBm | | \Cc | ≈ | \mbb | ··· | \Ppp | ⊗ | \T | | |

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

TABLE 470: metre Small and Large Metrical Symbols

| | | | |
|----|-------------|----|-------------|
| ÷ | \anaclasis | ÷ | \Anaclasis |
| < | \antidiple | < | \Antidiple |
| ≲ | \antidiple* | ≲ | \Antidiple* |
| ▷ | \antisigma | ▷ | \Antisigma |
| ※ | \asteriscus | ※ | \Asteriscus |
| ^ | \catalexis | ^ | \Catalexis |
| > | \diple | > | \Diple |
| ≳ | \diple* | ≳ | \Diple* |
| —— | \obelus | —— | \Obelus |
| ÷ | \obelus* | ÷ | \Obelus* |
| ~ | \respondens | ~ | \Respondens |
| ⊗ | \terminus | ⊗ | \Terminus |
| ⊕ | \terminus* | ⊕ | \Terminus* |

TABLE 471: teubner Metrical Symbols

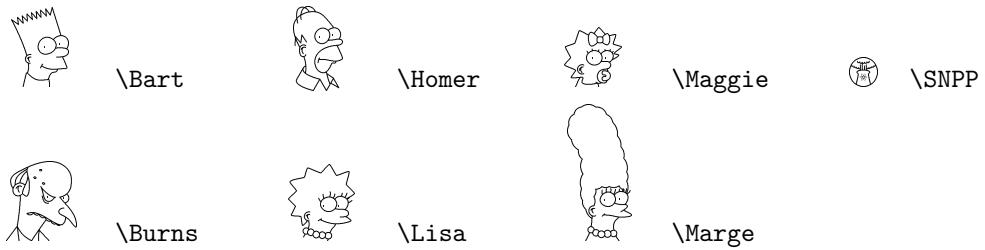
| | | | | | |
|----------|----------------|----------|------------|-------------------|---------------|
| oo | \aeolicbii | o | \barbrevis | + | \ipercatal |
| ooo | \aeolicbiii | o | \bbrevis | - | \longa |
| oooo | \aeolicbiv | o | \brevis | <u>o</u> | \ubarbbrevis |
| x | \anceps | <u>o</u> | \catal | <u>o</u> | \ubarbrevis |
| <u>x</u> | \ancepsdbrevis | <u>o</u> | \corona | <u>o</u> <u>o</u> | \ubarsbrevis |
| <u>x</u> | \banceps | <u>o</u> | \coronainv | o | \ubrevislonga |
| <u>o</u> | \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 “oooo||oooo”. See the *teubner* documentation for more information.

TABLE 472: dictsym Dictionary Symbols

| | | | | | |
|--------------|------------------|--------------|-----------------|--------------|--------------|
| \mathbb{E} | \dsaeronautical | \mathbb{T} | \dscommercial | \mathbb{A} | \dsmedical |
| \mathbb{A} | \dsagricultural | \mathbb{D} | \dsheraldical | \mathbb{X} | \dsmilitary |
| Δ | \dsarchitectural | \mathbb{R} | \dsjuridical | \mathbb{B} | \dsrailways |
| \mathbb{G} | \dsbiological | \mathbb{U} | \dsliterary | \mathbb{O} | \dstechnical |
| \mathbb{C} | \dschemical | \mathbb{K} | \dsmathematical | | |

TABLE 473: simpsons Characters from *The Simpsons*



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:

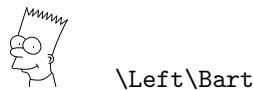


TABLE 474: `pmbboxdraw` Box-Drawing Symbols

| | | | | | | | |
|--|--------------|--|-------------|--|---------------|--|----------------|
| | \textblock | | \textSFli | | \textSFxli | | \textSFxxiii |
| | \textdkshade | | \textSFlii | | \textSFxlii | | \textSFxxiv |
| | \textdnblock | | \textSFliii | | \textSFxliii | | \textSFxxv |
| | \textlfblock | | \textSFliv | | \textSFxliv | | \textSFxxvi |
| | \textltshade | | \textSFv | | \textSFxlix | | \textSFxxvii |
| | \textrtblock | | \textSFvi | | \textSFxlv | | \textSFxxviii |
| | \textSFi | | \textSFvii | | \textSFxlvi | | \textSFxxxix |
| | \textSFii | | \textSFviii | | \textSFxlvii | | \textSFxxxvi |
| | \textSFiii | | \textSFx | | \textSFxlviii | | \textSFxxxvii |
| | \textSFiv | | \textSFxi | | \textSFxx | | \textSFxxxviii |
| | \textSFix | | \textSFxix | | \textSFxxi | | \textshade |
| | \textSFi | | \textSFxl | | \textSFxxii | | \textupblock |

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

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

TABLE 475: `staves` Magical Staves

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

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| | | | | | |
|--|-------------|--|---------------|--|---------------|
| | \staveXII | | \staveXXXV | | \staveL VIII |
| | \staveXIII | | \staveXXXVI | | \staveL IX |
| | \staveXIV | | \staveXXXVII | | \staveL X |
| | \staveXV | | \staveXXXVIII | | \staveL XI |
| | \staveXVI | | \staveXXXIX | | \staveL XII |
| | \staveXVII | | \staveXL | | \staveL XIII |
| | \staveXVIII | | \staveXLI | | \staveL XIV |
| | \staveXIX | | \staveXLII | | \staveL XV |
| | \staveXX | | \staveXLIII | | \staveL XVI |
| | \staveXXI | | \staveXLIV | | \staveL XVII |
| | \staveXXII | | \staveXLV | | \staveL XVIII |
| | \staveXXIII | | \staveXLVI | | |

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

TABLE 476: pigpen Cipher Symbols

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

TABLE 477: GÍA2e Phases of the Moon

∅ \MoonPha{1} ♀ \MoonPha{2} ☽ \MoonPha{3} ☾ \MoonPha{4}

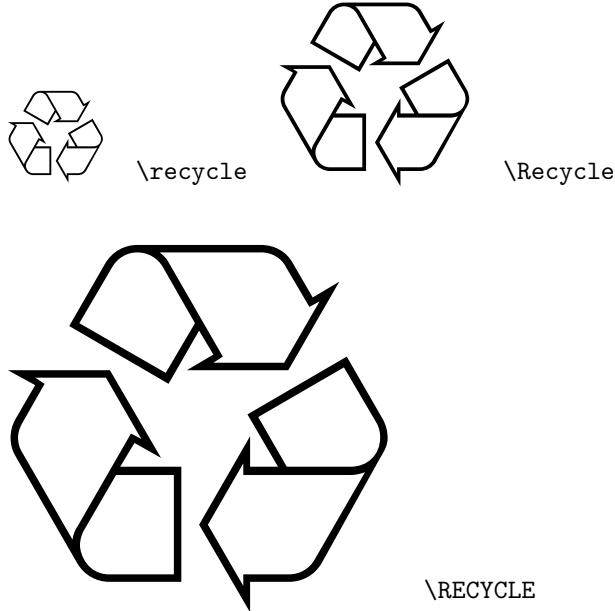
TABLE 478: GÍA2e Recycling Symbols

◎ \Greenpoint

TABLE 479: marvosym Recycling Symbols

 \PackingWaste  \Recycling

TABLE 480: recycle Recycling Symbols



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

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

TABLE 481: Other GfNA2e Symbols

 \Info  \Request
 \Postbox  \Telephone

TABLE 482: soyombo Soyombo Symbols

 \Soyombo  \sA*  \sO*

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

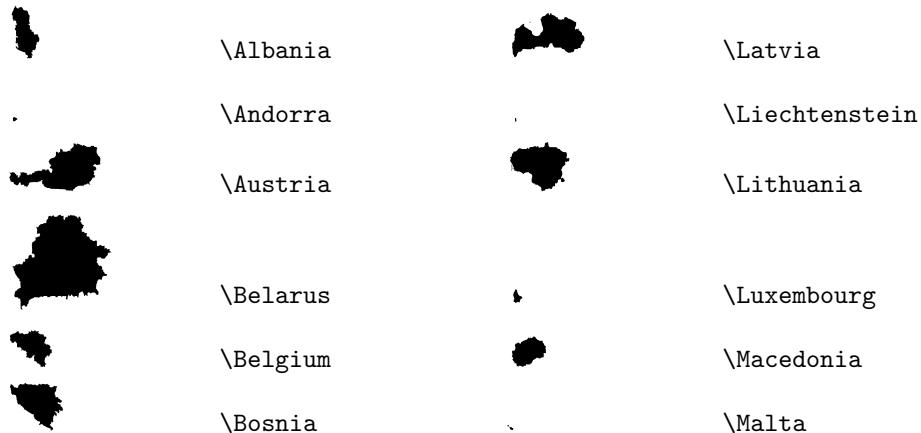
TABLE 483: knitting Knitting Symbols

| | | | | | |
|------------------|------------------------------|-------------------------------------|----------------------------|----------------------------|---------------------------|
| \wedge | <code>\textknit{!}</code> | \rightarrow | <code>\textknit{[]}</code> | \circlearrowleft | <code>\textknit{Q}</code> |
| \Rightarrow | <code>\textknit{"}</code> | \leftrightarrow | <code>\textknit{}{}</code> | \circlearrowright | <code>\textknit{q}</code> |
| \backslash | <code>\textknit{()}</code> | $\wedge\wedge$ | <code>\textknit{A}</code> | $\nearrow\wedge$ | <code>\textknit{R}</code> |
| $/$ | <code>\textknit{()}</code> | $\wedge\backslash$ | <code>\textknit{a}</code> | $\nwarrow\wedge$ | <code>\textknit{r}</code> |
| $*$ | <code>\textknit{*}</code> | $\circlearrowleft\circlearrowright$ | <code>\textknit{B}</code> | $\leftarrow\rightarrow$ | <code>\textknit{S}</code> |
| $-$ | <code>\textknit{-}</code> | $\circlearrowleft\circlearrowright$ | <code>\textknit{b}</code> | $\rightarrow\rightarrow$ | <code>\textknit{s}</code> |
| $\wedge\wedge$ | <code>\textknit{2}</code> | $\Downarrow\Downarrow$ | <code>\textknit{E}</code> | $\square\circlearrowleft$ | <code>\textknit{T}</code> |
| $\wedge\wedge$ | <code>\textknit{3}</code> | $\curvearrowleft\curvearrowright$ | <code>\textknit{F}</code> | $\square\circlearrowright$ | <code>\textknit{t}</code> |
| \times | <code>\textknit{4}</code> | $\curvearrowleft\curvearrowright$ | <code>\textknit{f}</code> | $\square\curvearrowleft$ | <code>\textknit{U}</code> |
| \times | <code>\textknit{5}</code> | $\uparrow\downarrow$ | <code>\textknit{H}</code> | $\times\downarrow$ | <code>\textknit{u}</code> |
| \forall | <code>\textknit{6}</code> | $\downarrow\uparrow$ | <code>\textknit{h}</code> | $\square\vee\vee$ | <code>\textknit{V}</code> |
| \forall | <code>\textknit{7}</code> | $\rightarrow\rightarrow$ | <code>\textknit{I}</code> | $\vee\vee$ | <code>\textknit{v}</code> |
| $\forall\forall$ | <code>\textknit{8}</code> | $\rightarrow\rightarrow$ | <code>\textknit{i}</code> | $\square\vee\vee$ | <code>\textknit{W}</code> |
| $\forall\forall$ | <code>\textknit{9}</code> | $\rightarrow\rightarrow$ | <code>\textknit{j}</code> | $\vee\vee$ | <code>\textknit{w}</code> |
| $\wedge\wedge$ | <code>\textknit{:}</code> | $\rightarrow\rightarrow$ | <code>\textknit{j}</code> | $\square\vee\vee$ | <code>\textknit{X}</code> |
| $\wedge\wedge$ | <code>\textknit{;}</code> | $\nwarrow\nwarrow$ | <code>\textknit{l}</code> | $\vee\vee$ | <code>\textknit{x}</code> |
| $\wedge\wedge$ | <code>\textknit{<}</code> | $\nwarrow\nwarrow$ | <code>\textknit{l}</code> | $\forall\forall$ | <code>\textknit{Y}</code> |
| $-$ | <code>\textknit{=}</code> | $\square\rightarrow$ | <code>\textknit{M}</code> | $\forall\forall$ | <code>\textknit{y}</code> |
| $\wedge\wedge$ | <code>\textknit{>}</code> | $\square\rightarrow$ | <code>\textknit{m}</code> | $\square\square$ | <code>\textknit{Z}</code> |
| \bullet | <code>\textknit{@}</code> | $\circ\circ$ | <code>\textknit{o}</code> | $\square\circlearrowleft$ | <code>\textknit{z}</code> |

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

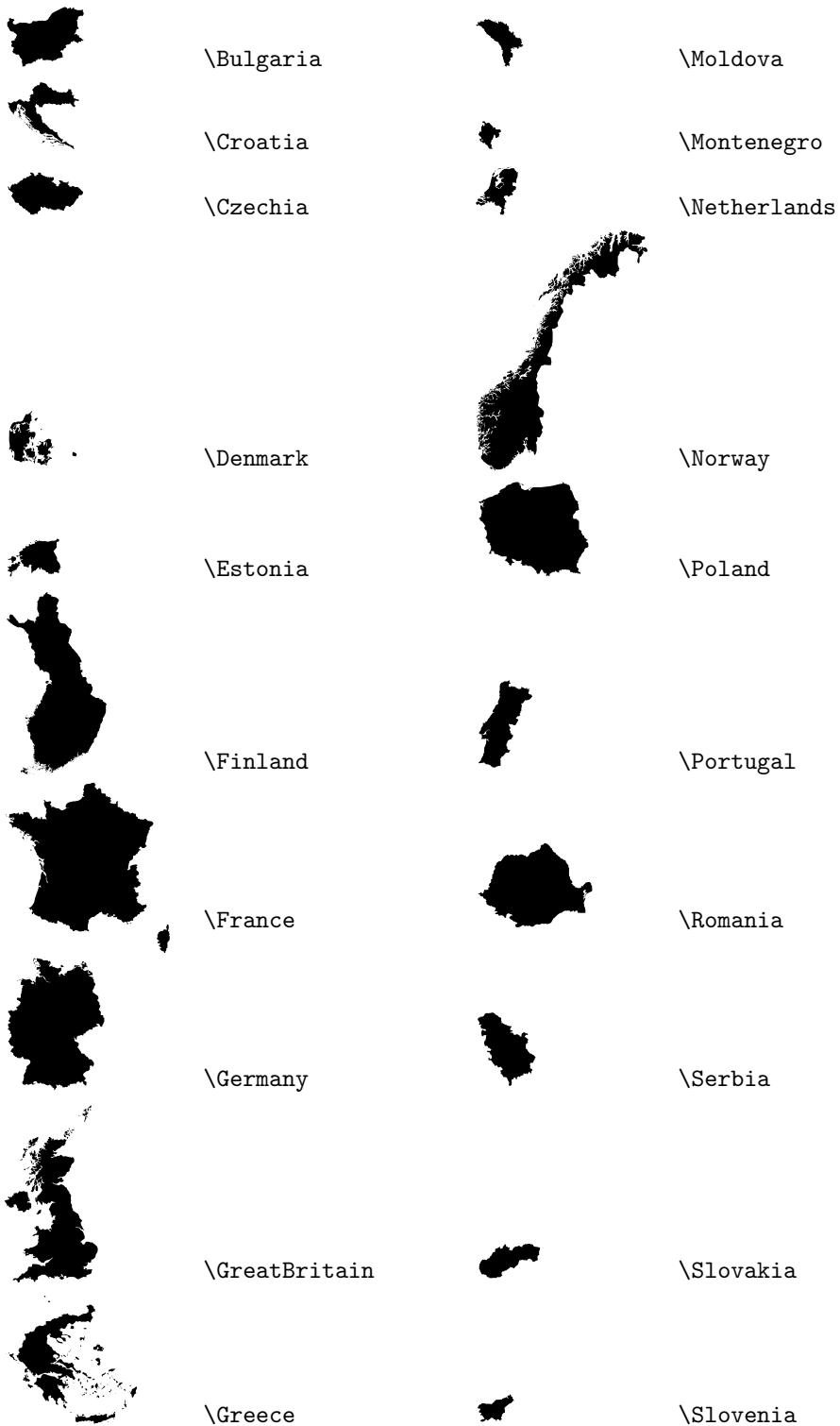
Some symbols behave differently when used as part of a sequence. For example, contrast `\textknit{1}` (“ \wedge ”), `\textknit{11}` (“ $\wedge\wedge$ ”), and `\textknit{111}` (“ $\wedge\wedge\wedge$ ”). Similarly, contrast `\textknit{"}` (“ \Rightarrow ”) and `\textknit{"}"` (“ \circlearrowleft ”). Again,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

TABLE 484: CountriesOfEurope Country Maps



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

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

TABLE 485: Miscellaneous `arev` Symbols

| | | | | | | | |
|--|---------------------------|--|----------------------------|--|-------------------------|--|-----------------------|
| | <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 486: `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 487: `tikzsymbols` Cooking Symbols

| | | | | | | | |
|--|---------------------------|--|-------------------------|--|------------------------|--|-----------------------|
| | <code>\bakingplate</code> | | <code>\eggbeater</code> | | <code>\peeler</code> | | <code>\trident</code> |
| | <code>\blender</code> | | <code>\fryingpan</code> | | <code>\pot</code> | | |
| | <code>\bowl</code> | | <code>\oven</code> | | <code>\sieve</code> | | |
| | <code>\cooker</code> | | <code>\pan</code> | | <code>\squeezer</code> | | |

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

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

TABLE 488: `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>\Laughey</code> | | <code>\oldWinkey</code> | | <code>\Tongey</code> | | <code>\Key</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 489: `tikzsymbols` 3D Emoticons

| | | | | | | | |
|--|------------------------|--|------------------------|--|-----------------------|--|--------------------------|
| | <code>\dAnnoey</code> | | <code>\dNinja</code> | | <code>\dSmiley</code> | | <code>\dKey</code> |
| | <code>\dCooley</code> | | <code>\dNursey</code> | | <code>\dTongey</code> | | <code>\olddWinkey</code> |
| | <code>\dInnocey</code> | | <code>\drWalley</code> | | <code>\dVomey</code> | | |
| | <code>\dLaughey</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 489 accepts one or more color arguments for further customization. See the `tikzsymbols` documentation for more information.

TABLE 490: `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 491: Miscellaneous tikzsymbols Symbols

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

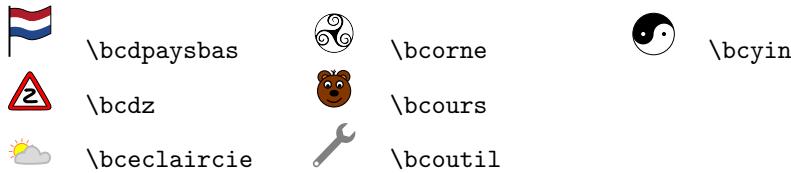
All `tikzsymbols` symbols are implemented with TikZ graphics, not with a font. `\Tribar` supports customization of the fill color for each bar. `\Strichmaxerl` supports customization of the angles at which the stick figure's arms and legs are drawn. See the `tikzsymbols` documentation for more information.

TABLE 492: Miscellaneous bclogo Symbols

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

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

TABLE 493: fontawesome Web-Related Icons

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

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| | | | | | |
|--|----------------------|--|---------------------|--|----------------------|
| | \faBed | | \faFrown0 | | \faSearchPlus |
| | \faBeer | | \faFutbol0 | | \faSellsy |
| | \faBehance | | \faGamepad | | \faServer |
| | \faBehanceSquare | | \faGavel | | \faShare |
| | \faBell | | \faGetPocket | | \faShareAlt |
| | \faBello | | \faGg | | \faShareAltSquare |
| | \faBellSlash | | \faGgCircle | | \faShareSquare |
| | \faBellSlash0 | | \faGift | | \faShareSquare0 |
| | \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 |
| | \faBookmark0 | | \faGraduationCap | | \faSlack |
| | \faBriefcase | | \faGratipay | | \faSliders |
| | \faBug | | \faHackerNews | | \faSlideshare |
| | \faBuilding | | \faHdd0 | | \faSmile0 |
| | \faBuilding0 | | \faHeader | | \faSort |
| | \faBullhorn | | \faHeadphones | | \faSortAlphaAsc |
| | \faBullseye | | \faHeart | | \faSortAlphaDesc |
| | \faBus | | \faHeartbeat | | \faSortAmountAsc |
| | \faBuysellads | | \faHeart0 | | \faSortAmountDesc |
| | \faCalculator | | \faHistory | | \faSortAsc |
| | \faCalendar | | \faHome | | \faSortDesc |
| | \faCalendarCheck0 | | \faHospital0 | | \faSortNumericAsc |
| | \faCalendarMinus0 | | \faHourglass | | \faSortNumericDesc |
| | \faCalendar0 | | \faHourglassEnd | | \faSoundcloud |
| | \faCalendarPlus0 | | \faHourglassHalf | | \faSpaceShuttle |
| | \faCalendarTimes0 | | \faHourglass0 | | \faSpinner |
| | \faCamera | | \faHourglassStart | | \faSpoon |
| | \faCameraRetro | | \faHouzz | | \faSpotify |
| | \faCar | | \faHSquare | | \faStackExchange |
| | \faCaretDown | | \faHtml5 | | \faStackOverflow |
| | \faCaretLeft | | \faICursor | | \faSteam |
| | \faCaretRight | | \faInbox | | \faSteamSquare |
| | \faCaretSquare0Down | | \faIndent | | \faStepBackward |
| | \faCaretSquare0Left | | \faIndustry | | \faStepForward |
| | \faCaretSquare0Right | | \faInfo | | \faStethoscope |
| | \faCaretSquare0Up | | \faInfoCircle | | \faStickyNote |
| | \faCaretUp | | \faInstagram | | \faStickyNote0 |
| | \faCartArrowDown | | \faInternetExplorer | | \faStop |
| | \faCartPlus | | \faIoxhost | | \faStreetView |
| | \faCc | | \faItalic | | \faStrikethrough |
| | \faCcAmex | | \faJoomla | | \faStumbleupon |
| | \faCcDinersClub | | \faJsfiddle | | \faStumbleuponCircle |
| | \faCcDiscover | | \faKey | | \faSubscript |
| | \faCcJcb | | \faKeyboard0 | | \faSubway |

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| | | | | | |
|--|-------------------|--|------------------------|--|------------------|
| | \faCcMastercard | | \faLanguage | | \faSuitcase |
| | \faCcPaypal | | \faLaptop | | \faSuperscript |
| | \faCcStripe | | \faLastfm | | \faTable |
| | \faCcVisa | | \faLastfmSquare | | \faTablet |
| | \faCertificate | | \faLeaf | | \faTachometer |
| | \faChainBroken | | \faLeanpub | | \faTag |
| | \faChild | | \faLemonO | | \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 | | \faListOl | | \faTicket |
| | \faCogs | | \faListUl | | \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 | | \faPencart | | \faVine |
| | \faEmpire | | \faOpenid | | \faVk |

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| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------|----------------|---------------------|-------------|---------------|------------------|------------------------|--------------------------|-------------|-------------------|-------------------|-------------------------|----------|--------------------------|-----------------------|---------------|---------------------------------|-----------------------------|-------------------|------------------|----------|------------|-------------------|--------------|-------------------|--------------------------|-------------------|-----------------|------------------|----------------|----------------|------------|------------------|----------------|----------------------------|---------------------|----------------------|------------------------|-------------------------------|------------------|---------------------|------------------------------|---------------------------|-------------------------|-----------------------|----------------|------------------|----------------------|--------------------------|--------------|-----------------|--------------------|------------------------|------------------|-----------|------------------------|----------------|-----------------------------|--------------|--------------------|-----------------------------|---------------------------------|
| ✉ \faEnvelope | ⓧ \faEnvelopeO | ✉ \faEnvelopeSquare | ⓧ \faEraser | ↑ \faExchange | ! \faExclamation | ● \faExclamationCircle | ▲ \faExclamationTriangle | ↗ \faExpand | 🕒 \faExpeditedssl | ↗ \faExternalLink | ✉ \faExternalLinkSquare | 👁 \faEye | eyedropper \faEyedropper | eye-slash \faEyeSlash | f \faFacebook | fb-official \faFacebookOfficial | fb-square \faFacebookSquare | ◀ \faFastBackward | ▶ \faFastForward | ✉ \faFax | O \faOpera | ⓧ \faOptinMonster | ✉ \faOutdent | leaf \faPagelines | paintbrush \faPaintBrush | clip \faPaperclip | ↗ \faPaperPlane | ↗ \faPaperPlaneO | ¶ \faParagraph | pauze \faPause | paw \faPaw | paypal \faPaypal | phone \faPhone | phonesquare \faPhoneSquare | picture \faPictureO | piechart \faPieChart | piedpiper \faPiedPiper | piedpiper-alt \faPiedPiperAlt | pin \faPinterest | pin-p \faPinterestP | pinsquare \faPinterestSquare | volume-down \faVolumeDown | volume-off \faVolumeOff | volume-up \faVolumeUp | weibo \faWeibo | weixin \faWeixin | whatsapp \faWhatsapp | wheelchair \faWheelchair | wifi \faWifi | W \faWikipediaW | windows \faWindows | wordpress \faWordpress | wrench \faWrench | x \faXing | x-square \faXingSquare | yahoo \faYahoo | y-combinator \faYCombinator | yelp \faYelp | youtube \faYoutube | youtube-play \faYoutubePlay | youtube-square \faYoutubeSquare |
|---------------|----------------|---------------------|-------------|---------------|------------------|------------------------|--------------------------|-------------|-------------------|-------------------|-------------------------|----------|--------------------------|-----------------------|---------------|---------------------------------|-----------------------------|-------------------|------------------|----------|------------|-------------------|--------------|-------------------|--------------------------|-------------------|-----------------|------------------|----------------|----------------|------------|------------------|----------------|----------------------------|---------------------|----------------------|------------------------|-------------------------------|------------------|---------------------|------------------------------|---------------------------|-------------------------|-----------------------|----------------|------------------|----------------------|--------------------------|--------------|-----------------|--------------------|------------------------|------------------|-----------|------------------------|----------------|-----------------------------|--------------|--------------------|-----------------------------|---------------------------------|

fontawesome defines synonyms for many of the preceding symbols:

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------|--------------|------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------|----------------|--------------|------------|------------------------|------------------|--------------|-----------------------|--------------|--------------------------|--------------------------|------------------------------|--------------------------|----------------------|----------------|----------|--------------|----------------|------------------|----------------|----------------|----------------|----------------------------|----------------|-----------------------|-------------------------|-----------------------------|-------------------------|--------------------------------|-----------------------------|-----------------------------|--------------------|----------------|----------------|----------|--------------------|--------------|--------------|----------------|----------------------------|-----------------------|-------------------|--------------------|---------------------------|---------------------------|-----------------------------|-----------------------|----------|------------------|----------------------|--------------------|------------------|----------|---|-----------------------|
| car \faAutomobile | bank \faBank | bar-chart \faBarChartO | battery0 \faBattery0 | battery1 \faBattery1 | battery2 \faBattery2 | battery3 \faBattery3 | battery4 \faBattery4 | cab \faCab | chain \faChain | copy \faCopy | cut \faCut | dashboard \faDashboard | dedent \faDedent | edit \faEdit | facebook \faFacebookF | feed \faFeed | file-movie \faFileMovieO | file-photo \faFilePhotoO | file-picture \faFilePictureO | file-sound \faFileSoundO | file-zip \faFileZipO | flash \faFlash | ge \faGe | gear \faGear | gears \faGears | gittip \faGittip | group \faGroup | hotel \faHotel | image \faImage | institution \faInstitution | legal \faLegal | life-bouy \faLifeBouy | life-saver \faLifeSaver | mail-forward \faMailForward | mail-reply \faMailReply | mail-reply-all \faMailReplyAll | mobile-phone \faMobilePhone | mortar-board \faMortarBoard | navicon \faNavicon | paste \faPaste | photo \faPhoto | ra \faRa | reorder \faReorder | save \faSave | send \faSend | send0 \faSendO | soccer-ball \faSoccerBallO | sort-down \faSortDown | sort-up \faSortUp | support \faSupport | toggle-down \faToggleDown | toggle-left \faToggleLeft | toggle-right \faToggleRight | toggle-up \faToggleUp | tv \faTv | unlink \faUnlink | unsorted \faUnsorted | warning \faWarning | wechat \faWechat | yc \faYc | yc-combinator-square \faYCombinatorSquare | yc-square \faYcSquare |
|-------------------|--------------|------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------|----------------|--------------|------------|------------------------|------------------|--------------|-----------------------|--------------|--------------------------|--------------------------|------------------------------|--------------------------|----------------------|----------------|----------|--------------|----------------|------------------|----------------|----------------|----------------|----------------------------|----------------|-----------------------|-------------------------|-----------------------------|-------------------------|--------------------------------|-----------------------------|-----------------------------|--------------------|----------------|----------------|----------|--------------------|--------------|--------------|----------------|----------------------------|-----------------------|-------------------|--------------------|---------------------------|---------------------------|-----------------------------|-----------------------|----------|------------------|----------------------|--------------------|------------------|----------|---|-----------------------|

TABLE 494: rubikcube Rubik's Cube Rotations

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

All `rubikcube` symbols are implemented with 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** 
 185

9 Fonts with minimal L^AT_EX support

The symbol fonts shown in this section are provided without a corresponding L^AT_EX 2 _{ε} 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^AT_EX font family. Alas, most of the fonts in this section do not even define a L^AT_EX 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 495: hands Fists

| | | | |
|---|----------------------|---|----------------------|
| ⌚ | \Pisymbol{hands}{65} | ⌚ | \Pisymbol{hands}{67} |
| ⌚ | \Pisymbol{hands}{66} | ⌚ | \Pisymbol{hands}{68} |

TABLE 496: greenpoint Recycling Symbols

⌚ \Pisymbol{greenpoint}{71}

TABLE 497: nkarta Map Symbols

| | | | | | |
|----|-----------------------|---|------------------------|-----|------------------------|
| ○ | \Pisymbol{nkarta}{33} | × | \Pisymbol{nkarta}{96} | ● | \Pisymbol{nkarta}{193} |
| △ | \Pisymbol{nkarta}{34} | ➤ | \Pisymbol{nkarta}{97} | □ | \Pisymbol{nkarta}{194} |
| △ | \Pisymbol{nkarta}{35} | ⬆ | \Pisymbol{nkarta}{98} | ■ | \Pisymbol{nkarta}{195} |
| ◇ | \Pisymbol{nkarta}{36} | 🌐 | \Pisymbol{nkarta}{99} | ଓ | \Pisymbol{nkarta}{196} |
| ○ | \Pisymbol{nkarta}{37} | ▲ | \Pisymbol{nkarta}{100} | ↳ | \Pisymbol{nkarta}{197} |
| ★ | \Pisymbol{nkarta}{38} | ★ | \Pisymbol{nkarta}{101} | ✈ | \Pisymbol{nkarta}{198} |
| ○ | \Pisymbol{nkarta}{39} | ✉ | \Pisymbol{nkarta}{102} | ↙ | \Pisymbol{nkarta}{199} |
| ↓ | \Pisymbol{nkarta}{40} | ↑ | \Pisymbol{nkarta}{103} | → | \Pisymbol{nkarta}{200} |
| ↓ | \Pisymbol{nkarta}{41} | ↳ | \Pisymbol{nkarta}{104} | ▲ | \Pisymbol{nkarta}{201} |
| ★ | \Pisymbol{nkarta}{42} | ▷ | \Pisymbol{nkarta}{105} | ◆ | \Pisymbol{nkarta}{202} |
| .. | \Pisymbol{nkarta}{43} | ✈ | \Pisymbol{nkarta}{106} | ■ | \Pisymbol{nkarta}{203} |
| ↗ | \Pisymbol{nkarta}{44} | ➤ | \Pisymbol{nkarta}{107} | ■■ | \Pisymbol{nkarta}{204} |
| ✚ | \Pisymbol{nkarta}{45} | □ | \Pisymbol{nkarta}{108} | ● | \Pisymbol{nkarta}{205} |
| ⊗ | \Pisymbol{nkarta}{46} | ☰ | \Pisymbol{nkarta}{109} | ■■■ | \Pisymbol{nkarta}{206} |
| • | \Pisymbol{nkarta}{47} | ✿ | \Pisymbol{nkarta}{110} | ❖ | \Pisymbol{nkarta}{207} |
| ◦ | \Pisymbol{nkarta}{48} | ○ | \Pisymbol{nkarta}{111} | ※ | \Pisymbol{nkarta}{208} |
| ↓ | \Pisymbol{nkarta}{49} | ◇ | \Pisymbol{nkarta}{112} | ▬ | \Pisymbol{nkarta}{209} |

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TABLE 498: moonphase Astronomical Symbols

| | | | |
|---|-------------------------|---|-------------------------|
| ⌚ | \Pisymbol{moonphase}{0} | ⌚ | \Pisymbol{moonphase}{2} |
| ⌚ | \Pisymbol{moonphase}{1} | ⌚ | \Pisymbol{moonphase}{3} |

TABLE 499: astrosym Astronomical Symbols

| | | | |
|----|-------------------------|----|--------------------------|
| ○ | \Pisymbol{astrosym}{0} | □ | \Pisymbol{astrosym}{132} |
| ✖ | \Pisymbol{astrosym}{1} | * | \Pisymbol{astrosym}{133} |
| ♀ | \Pisymbol{astrosym}{2} | ❖ | \Pisymbol{astrosym}{134} |
| ♂ | \Pisymbol{astrosym}{3} | ↖ | \Pisymbol{astrosym}{135} |
| ♂ | \Pisymbol{astrosym}{4} | ↙ | \Pisymbol{astrosym}{136} |
| ☿ | \Pisymbol{astrosym}{5} | ♂♂ | \Pisymbol{astrosym}{137} |
| ☿ | \Pisymbol{astrosym}{6} | □ | \Pisymbol{astrosym}{138} |
| ↑ | \Pisymbol{astrosym}{7} | ○ | \Pisymbol{astrosym}{139} |
| ↑↑ | \Pisymbol{astrosym}{8} | ● | \Pisymbol{astrosym}{140} |
| ◑ | \Pisymbol{astrosym}{9} | ◎ | \Pisymbol{astrosym}{141} |
| ◑ | \Pisymbol{astrosym}{10} | ● | \Pisymbol{astrosym}{142} |
| ▽ | \Pisymbol{astrosym}{11} | ● | \Pisymbol{astrosym}{143} |
| ◑ | \Pisymbol{astrosym}{12} | ◑ | \Pisymbol{astrosym}{144} |
| ◑ | \Pisymbol{astrosym}{13} | ◑ | \Pisymbol{astrosym}{145} |
| ◑ | \Pisymbol{astrosym}{14} | ● | \Pisymbol{astrosym}{146} |
| ◑ | \Pisymbol{astrosym}{15} | ● | \Pisymbol{astrosym}{147} |
| ◑ | \Pisymbol{astrosym}{16} | ○ | \Pisymbol{astrosym}{148} |
| ◑ | \Pisymbol{astrosym}{17} | + | \Pisymbol{astrosym}{149} |
| ♏ | \Pisymbol{astrosym}{18} | * | \Pisymbol{astrosym}{150} |
| ↗ | \Pisymbol{astrosym}{19} | * | \Pisymbol{astrosym}{151} |
| ♐ | \Pisymbol{astrosym}{20} | △ | \Pisymbol{astrosym}{152} |
| ♓ | \Pisymbol{astrosym}{21} | □ | \Pisymbol{astrosym}{153} |
| ♓ | \Pisymbol{astrosym}{22} | △ | \Pisymbol{astrosym}{154} |
| ♑ | \Pisymbol{astrosym}{23} | ○ | \Pisymbol{astrosym}{155} |
| ♒ | \Pisymbol{astrosym}{24} | ▼ | \Pisymbol{astrosym}{156} |
| ♑ | \Pisymbol{astrosym}{25} | ○ | \Pisymbol{astrosym}{157} |
| ♒ | \Pisymbol{astrosym}{26} | ▽ | \Pisymbol{astrosym}{158} |
| ♒ | \Pisymbol{astrosym}{27} | ◀ | \Pisymbol{astrosym}{159} |
| ♒ | \Pisymbol{astrosym}{28} | * | \Pisymbol{astrosym}{160} |
| ⊕ | \Pisymbol{astrosym}{29} | △ | \Pisymbol{astrosym}{161} |
| ♂ | \Pisymbol{astrosym}{30} | □ | \Pisymbol{astrosym}{162} |
| ♃ | \Pisymbol{astrosym}{31} | ◀ | \Pisymbol{astrosym}{163} |
| ♃ | \Pisymbol{astrosym}{32} | ○ | \Pisymbol{astrosym}{164} |

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| | | | |
|----|-------------------------|----|--------------------------|
| * | \Pisymbol{astrosym}{33} | ♂ | \Pisymbol{astrosym}{165} |
| ♀ | \Pisymbol{astrosym}{34} | ♀♀ | \Pisymbol{astrosym}{166} |
| ↖ | \Pisymbol{astrosym}{35} | Ⓛ | \Pisymbol{astrosym}{167} |
| ⚲ | \Pisymbol{astrosym}{36} | ♀ | \Pisymbol{astrosym}{168} |
| ⚲ | \Pisymbol{astrosym}{37} | * | \Pisymbol{astrosym}{169} |
| □ | \Pisymbol{astrosym}{38} | ☿ | \Pisymbol{astrosym}{178} |
| ○ | \Pisymbol{astrosym}{39} | ▽ | \Pisymbol{astrosym}{179} |
| ● | \Pisymbol{astrosym}{40} | ▽ | \Pisymbol{astrosym}{180} |
| ☽ | \Pisymbol{astrosym}{41} | Ⓛ | \Pisymbol{astrosym}{181} |
| ☾ | \Pisymbol{astrosym}{42} | * | \Pisymbol{astrosym}{182} |
| ☽ | \Pisymbol{astrosym}{43} | △ | \Pisymbol{astrosym}{183} |
| ☽ | \Pisymbol{astrosym}{44} | □ | \Pisymbol{astrosym}{184} |
| ☽ | \Pisymbol{astrosym}{45} | ✖ | \Pisymbol{astrosym}{185} |
| ☽ | \Pisymbol{astrosym}{46} | ❀ | \Pisymbol{astrosym}{186} |
| ☽ | \Pisymbol{astrosym}{47} | ♂ | \Pisymbol{astrosym}{187} |
| ☽ | \Pisymbol{astrosym}{48} | ○ | \Pisymbol{astrosym}{188} |
| ☽ | \Pisymbol{astrosym}{49} | Ⓛ | \Pisymbol{astrosym}{189} |
| *+ | \Pisymbol{astrosym}{50} | ♀ | \Pisymbol{astrosym}{190} |
| *+ | \Pisymbol{astrosym}{51} | * | \Pisymbol{astrosym}{191} |
| △+ | \Pisymbol{astrosym}{52} | ○ | \Pisymbol{astrosym}{200} |
| □+ | \Pisymbol{astrosym}{53} | ○○ | \Pisymbol{astrosym}{201} |
| ✖+ | \Pisymbol{astrosym}{54} | ○○ | \Pisymbol{astrosym}{202} |
| ○○ | \Pisymbol{astrosym}{55} | ○ | \Pisymbol{astrosym}{203} |
| ☿ | \Pisymbol{astrosym}{56} | ♂ | \Pisymbol{astrosym}{204} |
| ○○ | \Pisymbol{astrosym}{57} | ♀ | \Pisymbol{astrosym}{205} |
| ▽ | \Pisymbol{astrosym}{58} | † | \Pisymbol{astrosym}{206} |
| Ⓛ | \Pisymbol{astrosym}{59} | ○↑ | \Pisymbol{astrosym}{207} |
| * | \Pisymbol{astrosym}{60} | ▷ | \Pisymbol{astrosym}{208} |
| △ | \Pisymbol{astrosym}{61} | ○ | \Pisymbol{astrosym}{209} |
| □ | \Pisymbol{astrosym}{62} | ○○ | \Pisymbol{astrosym}{210} |
| ✖ | \Pisymbol{astrosym}{63} | ▽ | \Pisymbol{astrosym}{211} |
| ❀ | \Pisymbol{astrosym}{64} | ○○ | \Pisymbol{astrosym}{212} |
| ♂ | \Pisymbol{astrosym}{65} | ○○ | \Pisymbol{astrosym}{213} |
| ♀♀ | \Pisymbol{astrosym}{66} | ○○ | \Pisymbol{astrosym}{214} |
| Ⓛ | \Pisymbol{astrosym}{67} | ❀ | \Pisymbol{astrosym}{215} |
| ♀ | \Pisymbol{astrosym}{68} | ○○ | \Pisymbol{astrosym}{216} |
| * | \Pisymbol{astrosym}{69} | ○○ | \Pisymbol{astrosym}{217} |
| ⊕ | \Pisymbol{astrosym}{90} | ○○ | \Pisymbol{astrosym}{218} |
| ⊖ | \Pisymbol{astrosym}{91} | ↗ | \Pisymbol{astrosym}{219} |
| ☽ | \Pisymbol{astrosym}{92} | ○○ | \Pisymbol{astrosym}{220} |
| ☽ | \Pisymbol{astrosym}{93} | ❀ | \Pisymbol{astrosym}{221} |

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| | | | |
|---|--------------------------|---|--------------------------|
| ⌚ | \Pisymbol{astrosym}{94} | ⌚ | \Pisymbol{astrosym}{222} |
| ⌚ | \Pisymbol{astrosym}{95} | ⌚ | \Pisymbol{astrosym}{223} |
| ⌚ | \Pisymbol{astrosym}{100} | ⌚ | \Pisymbol{astrosym}{224} |
| ⌚ | \Pisymbol{astrosym}{101} | ⌚ | \Pisymbol{astrosym}{225} |
| ⌚ | \Pisymbol{astrosym}{102} | ⌚ | \Pisymbol{astrosym}{226} |
| ⌚ | \Pisymbol{astrosym}{103} | ⌚ | \Pisymbol{astrosym}{227} |
| ⌚ | \Pisymbol{astrosym}{104} | ⌚ | \Pisymbol{astrosym}{228} |
| ⌚ | \Pisymbol{astrosym}{105} | ⌚ | \Pisymbol{astrosym}{229} |
| ⌚ | \Pisymbol{astrosym}{106} | ⌚ | \Pisymbol{astrosym}{230} |
| ⌚ | \Pisymbol{astrosym}{107} | ⌚ | \Pisymbol{astrosym}{231} |
| ⌚ | \Pisymbol{astrosym}{108} | ⌚ | \Pisymbol{astrosym}{232} |
| ⌚ | \Pisymbol{astrosym}{109} | ⌚ | \Pisymbol{astrosym}{233} |
| ⌚ | \Pisymbol{astrosym}{110} | ⌚ | \Pisymbol{astrosym}{234} |
| ⌚ | \Pisymbol{astrosym}{111} | ⌚ | \Pisymbol{astrosym}{235} |
| ⌚ | \Pisymbol{astrosym}{112} | ⌚ | \Pisymbol{astrosym}{236} |
| ⌚ | \Pisymbol{astrosym}{113} | ⌚ | \Pisymbol{astrosym}{237} |
| ⌚ | \Pisymbol{astrosym}{114} | ⌚ | \Pisymbol{astrosym}{238} |
| ⌚ | \Pisymbol{astrosym}{115} | ⌚ | \Pisymbol{astrosym}{239} |
| ⌚ | \Pisymbol{astrosym}{116} | ⌚ | \Pisymbol{astrosym}{240} |
| ⌚ | \Pisymbol{astrosym}{117} | ⌚ | \Pisymbol{astrosym}{241} |
| ⌚ | \Pisymbol{astrosym}{118} | ⌚ | \Pisymbol{astrosym}{242} |
| ⌚ | \Pisymbol{astrosym}{119} | ⌚ | \Pisymbol{astrosym}{243} |
| ⌚ | \Pisymbol{astrosym}{120} | ⌚ | \Pisymbol{astrosym}{244} |
| ⌚ | \Pisymbol{astrosym}{121} | ⌚ | \Pisymbol{astrosym}{245} |
| ⌚ | \Pisymbol{astrosym}{122} | ⌚ | \Pisymbol{astrosym}{246} |
| ⌚ | \Pisymbol{astrosym}{123} | ⌚ | \Pisymbol{astrosym}{247} |
| ⌚ | \Pisymbol{astrosym}{124} | ⌚ | \Pisymbol{astrosym}{248} |
| ⌚ | \Pisymbol{astrosym}{125} | ⌚ | \Pisymbol{astrosym}{249} |
| ⌚ | \Pisymbol{astrosym}{126} | ⌚ | \Pisymbol{astrosym}{250} |
| ⌚ | \Pisymbol{astrosym}{127} | ⌚ | \Pisymbol{astrosym}{251} |
| ⌚ | \Pisymbol{astrosym}{128} | ⌚ | \Pisymbol{astrosym}{252} |
| ⌚ | \Pisymbol{astrosym}{129} | ⌚ | \Pisymbol{astrosym}{253} |
| ⌚ | \Pisymbol{astrosym}{130} | ⌚ | \Pisymbol{astrosym}{254} |
| ⌚ | \Pisymbol{astrosym}{131} | ⌚ | \Pisymbol{astrosym}{255} |

TABLE 500: webomints Decorative Borders

| | | | |
|--|----------------------------|--|-----------------------------|
| | \Pisymbol{WebOMintsGD}{47} | | \Pisymbol{WebOMintsGD}{87} |
| | \Pisymbol{WebOMintsGD}{48} | | \Pisymbol{WebOMintsGD}{88} |
| | \Pisymbol{WebOMintsGD}{49} | | \Pisymbol{WebOMintsGD}{89} |
| | \Pisymbol{WebOMintsGD}{50} | | \Pisymbol{WebOMintsGD}{90} |
| | \Pisymbol{WebOMintsGD}{51} | | \Pisymbol{WebOMintsGD}{91} |
| | \Pisymbol{WebOMintsGD}{52} | | \Pisymbol{WebOMintsGD}{93} |
| | \Pisymbol{WebOMintsGD}{53} | | \Pisymbol{WebOMintsGD}{97} |
| | \Pisymbol{WebOMintsGD}{54} | | \Pisymbol{WebOMintsGD}{98} |
| | \Pisymbol{WebOMintsGD}{55} | | \Pisymbol{WebOMintsGD}{99} |
| | \Pisymbol{WebOMintsGD}{56} | | \Pisymbol{WebOMintsGD}{100} |
| | \Pisymbol{WebOMintsGD}{57} | | \Pisymbol{WebOMintsGD}{101} |
| | \Pisymbol{WebOMintsGD}{65} | | \Pisymbol{WebOMintsGD}{102} |
| | \Pisymbol{WebOMintsGD}{66} | | \Pisymbol{WebOMintsGD}{103} |
| | \Pisymbol{WebOMintsGD}{67} | | \Pisymbol{WebOMintsGD}{104} |
| | \Pisymbol{WebOMintsGD}{68} | | \Pisymbol{WebOMintsGD}{105} |
| | \Pisymbol{WebOMintsGD}{69} | | \Pisymbol{WebOMintsGD}{106} |
| | \Pisymbol{WebOMintsGD}{70} | | \Pisymbol{WebOMintsGD}{107} |
| | \Pisymbol{WebOMintsGD}{71} | | \Pisymbol{WebOMintsGD}{108} |
| | \Pisymbol{WebOMintsGD}{72} | | \Pisymbol{WebOMintsGD}{109} |
| | \Pisymbol{WebOMintsGD}{73} | | \Pisymbol{WebOMintsGD}{110} |
| | \Pisymbol{WebOMintsGD}{74} | | \Pisymbol{WebOMintsGD}{111} |
| | \Pisymbol{WebOMintsGD}{75} | | \Pisymbol{WebOMintsGD}{112} |
| | \Pisymbol{WebOMintsGD}{76} | | \Pisymbol{WebOMintsGD}{113} |
| | \Pisymbol{WebOMintsGD}{77} | | \Pisymbol{WebOMintsGD}{114} |
| | \Pisymbol{WebOMintsGD}{78} | | \Pisymbol{WebOMintsGD}{115} |
| | \Pisymbol{WebOMintsGD}{79} | | \Pisymbol{WebOMintsGD}{116} |
| | \Pisymbol{WebOMintsGD}{80} | | \Pisymbol{WebOMintsGD}{117} |
| | \Pisymbol{WebOMintsGD}{81} | | \Pisymbol{WebOMintsGD}{118} |
| | \Pisymbol{WebOMintsGD}{82} | | \Pisymbol{WebOMintsGD}{119} |
| | \Pisymbol{WebOMintsGD}{83} | | \Pisymbol{WebOMintsGD}{120} |
| | \Pisymbol{WebOMintsGD}{84} | | \Pisymbol{WebOMintsGD}{121} |
| | \Pisymbol{WebOMintsGD}{85} | | \Pisymbol{WebOMintsGD}{122} |
| | \Pisymbol{WebOMintsGD}{86} | | |

webomints provides a `uwebo.fd` font-definition file. Instead of using `pifont` and `\Pisymbol` to typeset a glyph, a document can select the webomints font directly. For example, `\usefont{U}{webo}{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 501: umranda Decorative Borders

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

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

TABLE 502: umrandb Decorative Borders

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

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

TABLE 503: dingbat Decorative Borders

| | | | |
|--|------------------------|--|-------------------------|
| | \Pisymbol{dingbat}{69} | | \Pisymbol{dingbat}{97} |
| | \Pisymbol{dingbat}{70} | | \Pisymbol{dingbat}{98} |
| | \Pisymbol{dingbat}{71} | | \Pisymbol{dingbat}{99} |
| | \Pisymbol{dingbat}{72} | | \Pisymbol{dingbat}{100} |
| | \Pisymbol{dingbat}{74} | | \Pisymbol{dingbat}{101} |
| | \Pisymbol{dingbat}{75} | | \Pisymbol{dingbat}{102} |
| | \Pisymbol{dingbat}{76} | | \Pisymbol{dingbat}{103} |
| | \Pisymbol{dingbat}{77} | | \Pisymbol{dingbat}{104} |

The preceding table is incomplete in that it includes only unnamed `dingbat` symbols. Named symbols are included in Table 343 and Table 387 (both intermixed with symbols from the `ark10` font).

The `dingbat` package includes a `udingbat.fd` file so a document does not need to specify the `\DeclareFontFamily` and `\DeclareFontShape` commands list at the beginning of Section 9.

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

TABLE 504: knot Celtic Knots

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

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| | | | | | |
|---|----------------------|--|----------------------|--|-----------------------|
| | \Pisymbol{knot1}{62} | | \Pisymbol{knot1}{78} | | \Pisymbol{knot1}{101} |
| | \Pisymbol{knot1}{63} | | \Pisymbol{knot1}{79} | | \Pisymbol{knot1}{102} |
| | \Pisymbol{knot1}{64} | | \Pisymbol{knot1}{80} | | \Pisymbol{knot1}{103} |
| | \Pisymbol{knot1}{65} | | \Pisymbol{knot1}{81} | | \Pisymbol{knot1}{104} |
| | \Pisymbol{knot1}{66} | | \Pisymbol{knot1}{82} | | \Pisymbol{knot1}{105} |
| | \Pisymbol{knot1}{67} | | \Pisymbol{knot1}{83} | | |
| | \Pisymbol{knot2}{48} | | \Pisymbol{knot2}{68} | | \Pisymbol{knot2}{84} |
| | \Pisymbol{knot2}{49} | | \Pisymbol{knot2}{69} | | \Pisymbol{knot2}{85} |
| | \Pisymbol{knot2}{50} | | \Pisymbol{knot2}{70} | | \Pisymbol{knot2}{86} |
| ◆ | \Pisymbol{knot2}{51} | | \Pisymbol{knot2}{71} | | \Pisymbol{knot2}{87} |
| ● | \Pisymbol{knot2}{52} | | \Pisymbol{knot2}{72} | | \Pisymbol{knot2}{88} |
| | \Pisymbol{knot2}{53} | | \Pisymbol{knot2}{73} | | \Pisymbol{knot2}{96} |
| | \Pisymbol{knot2}{58} | | \Pisymbol{knot2}{74} | | \Pisymbol{knot2}{97} |
| | \Pisymbol{knot2}{59} | | \Pisymbol{knot2}{75} | | \Pisymbol{knot2}{98} |
| | \Pisymbol{knot2}{60} | | \Pisymbol{knot2}{76} | | \Pisymbol{knot2}{99} |
| | \Pisymbol{knot2}{61} | | \Pisymbol{knot2}{77} | | \Pisymbol{knot2}{100} |
| | \Pisymbol{knot2}{62} | | \Pisymbol{knot2}{78} | | \Pisymbol{knot2}{101} |
| | \Pisymbol{knot2}{63} | | \Pisymbol{knot2}{79} | | \Pisymbol{knot2}{102} |
| | \Pisymbol{knot2}{64} | | \Pisymbol{knot2}{80} | | \Pisymbol{knot2}{103} |
| | \Pisymbol{knot2}{65} | | \Pisymbol{knot2}{81} | | \Pisymbol{knot2}{104} |
| | \Pisymbol{knot2}{66} | | \Pisymbol{knot2}{82} | | \Pisymbol{knot2}{105} |
| | \Pisymbol{knot2}{67} | | \Pisymbol{knot2}{83} | | |
| | \Pisymbol{knot3}{48} | | \Pisymbol{knot3}{68} | | \Pisymbol{knot3}{84} |
| | \Pisymbol{knot3}{49} | | \Pisymbol{knot3}{69} | | \Pisymbol{knot3}{85} |
| | \Pisymbol{knot3}{50} | | \Pisymbol{knot3}{70} | | \Pisymbol{knot3}{86} |
| ◆ | \Pisymbol{knot3}{51} | | \Pisymbol{knot3}{71} | | \Pisymbol{knot3}{87} |
| ● | \Pisymbol{knot3}{52} | | \Pisymbol{knot3}{72} | | \Pisymbol{knot3}{88} |
| | \Pisymbol{knot3}{53} | | \Pisymbol{knot3}{73} | | \Pisymbol{knot3}{96} |
| | \Pisymbol{knot3}{58} | | \Pisymbol{knot3}{74} | | \Pisymbol{knot3}{97} |
| | \Pisymbol{knot3}{59} | | \Pisymbol{knot3}{75} | | \Pisymbol{knot3}{98} |
| | \Pisymbol{knot3}{60} | | \Pisymbol{knot3}{76} | | \Pisymbol{knot3}{99} |
| | \Pisymbol{knot3}{61} | | \Pisymbol{knot3}{77} | | \Pisymbol{knot3}{100} |
| | \Pisymbol{knot3}{62} | | \Pisymbol{knot3}{78} | | \Pisymbol{knot3}{101} |
| | \Pisymbol{knot3}{63} | | \Pisymbol{knot3}{79} | | \Pisymbol{knot3}{102} |
| | \Pisymbol{knot3}{64} | | \Pisymbol{knot3}{80} | | \Pisymbol{knot3}{103} |
| | \Pisymbol{knot3}{65} | | \Pisymbol{knot3}{81} | | \Pisymbol{knot3}{104} |
| | \Pisymbol{knot3}{66} | | \Pisymbol{knot3}{82} | | \Pisymbol{knot3}{105} |

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| | | | | |
|---|----------------------|---|----------------------|-----------------------|
|  | \Pisymbol{knot3}{67} |  | \Pisymbol{knot3}{83} | |
|  | \Pisymbol{knot4}{48} |  | \Pisymbol{knot4}{68} | \Pisymbol{knot4}{84} |
|  | \Pisymbol{knot4}{49} |  | \Pisymbol{knot4}{69} | \Pisymbol{knot4}{85} |
|  | \Pisymbol{knot4}{50} |  | \Pisymbol{knot4}{70} | \Pisymbol{knot4}{86} |
| ◆ | \Pisymbol{knot4}{51} |  | \Pisymbol{knot4}{71} | \Pisymbol{knot4}{87} |
| ● | \Pisymbol{knot4}{52} |  | \Pisymbol{knot4}{72} | \Pisymbol{knot4}{88} |
|  | \Pisymbol{knot4}{53} |  | \Pisymbol{knot4}{73} | \Pisymbol{knot4}{96} |
|  | \Pisymbol{knot4}{58} |  | \Pisymbol{knot4}{74} | \Pisymbol{knot4}{97} |
|  | \Pisymbol{knot4}{59} |  | \Pisymbol{knot4}{75} | \Pisymbol{knot4}{98} |
|  | \Pisymbol{knot4}{60} |  | \Pisymbol{knot4}{76} | \Pisymbol{knot4}{99} |
|  | \Pisymbol{knot4}{61} |  | \Pisymbol{knot4}{77} | \Pisymbol{knot4}{100} |
|  | \Pisymbol{knot4}{62} |  | \Pisymbol{knot4}{78} | \Pisymbol{knot4}{101} |
|  | \Pisymbol{knot4}{63} |  | \Pisymbol{knot4}{79} | \Pisymbol{knot4}{102} |
|  | \Pisymbol{knot4}{64} |  | \Pisymbol{knot4}{80} | \Pisymbol{knot4}{103} |
|  | \Pisymbol{knot4}{65} |  | \Pisymbol{knot4}{81} | \Pisymbol{knot4}{104} |
|  | \Pisymbol{knot4}{66} |  | \Pisymbol{knot4}{82} | \Pisymbol{knot4}{105} |
|  | \Pisymbol{knot4}{67} |  | \Pisymbol{knot4}{83} | |
|  | \Pisymbol{knot5}{48} |  | \Pisymbol{knot5}{68} | \Pisymbol{knot5}{84} |
|  | \Pisymbol{knot5}{49} |  | \Pisymbol{knot5}{69} | \Pisymbol{knot5}{85} |
|  | \Pisymbol{knot5}{50} |  | \Pisymbol{knot5}{70} | \Pisymbol{knot5}{86} |
| ◆ | \Pisymbol{knot5}{51} |  | \Pisymbol{knot5}{71} | \Pisymbol{knot5}{87} |
| ● | \Pisymbol{knot5}{52} |  | \Pisymbol{knot5}{72} | \Pisymbol{knot5}{88} |
|  | \Pisymbol{knot5}{53} |  | \Pisymbol{knot5}{73} | \Pisymbol{knot5}{96} |
|  | \Pisymbol{knot5}{58} |  | \Pisymbol{knot5}{74} | \Pisymbol{knot5}{97} |
|  | \Pisymbol{knot5}{59} |  | \Pisymbol{knot5}{75} | \Pisymbol{knot5}{98} |
|  | \Pisymbol{knot5}{60} |  | \Pisymbol{knot5}{76} | \Pisymbol{knot5}{99} |
|  | \Pisymbol{knot5}{61} |  | \Pisymbol{knot5}{77} | \Pisymbol{knot5}{100} |
|  | \Pisymbol{knot5}{62} |  | \Pisymbol{knot5}{78} | \Pisymbol{knot5}{101} |
|  | \Pisymbol{knot5}{63} |  | \Pisymbol{knot5}{79} | \Pisymbol{knot5}{102} |
|  | \Pisymbol{knot5}{64} |  | \Pisymbol{knot5}{80} | \Pisymbol{knot5}{103} |
|  | \Pisymbol{knot5}{65} |  | \Pisymbol{knot5}{81} | \Pisymbol{knot5}{104} |
|  | \Pisymbol{knot5}{66} |  | \Pisymbol{knot5}{82} | \Pisymbol{knot5}{105} |
|  | \Pisymbol{knot5}{67} |  | \Pisymbol{knot5}{83} | |
|  | \Pisymbol{knot6}{48} |  | \Pisymbol{knot6}{68} | \Pisymbol{knot6}{84} |
|  | \Pisymbol{knot6}{49} |  | \Pisymbol{knot6}{69} | \Pisymbol{knot6}{85} |
|  | \Pisymbol{knot6}{50} |  | \Pisymbol{knot6}{70} | \Pisymbol{knot6}{86} |
| ◆ | \Pisymbol{knot6}{51} |  | \Pisymbol{knot6}{71} | \Pisymbol{knot6}{87} |

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| | | | | | | |
|---|----------------------|--|----------------------|--|---|-----------------------|
| ● | \Pisymbol{knot6}{52} | | \Pisymbol{knot6}{72} | | ⋮ | \Pisymbol{knot6}{88} |
| □ | \Pisymbol{knot6}{53} | | \Pisymbol{knot6}{73} | | ⋮ | \Pisymbol{knot6}{96} |
| □ | \Pisymbol{knot6}{58} | | \Pisymbol{knot6}{74} | | ⋮ | \Pisymbol{knot6}{97} |
| □ | \Pisymbol{knot6}{59} | | \Pisymbol{knot6}{75} | | ⋮ | \Pisymbol{knot6}{98} |
| □ | \Pisymbol{knot6}{60} | | \Pisymbol{knot6}{76} | | ⋮ | \Pisymbol{knot6}{99} |
| □ | \Pisymbol{knot6}{61} | | \Pisymbol{knot6}{77} | | ⋮ | \Pisymbol{knot6}{100} |
| □ | \Pisymbol{knot6}{62} | | \Pisymbol{knot6}{78} | | ⋮ | \Pisymbol{knot6}{101} |
| □ | \Pisymbol{knot6}{63} | | \Pisymbol{knot6}{79} | | ⋮ | \Pisymbol{knot6}{102} |
| □ | \Pisymbol{knot6}{64} | | \Pisymbol{knot6}{80} | | ⋮ | \Pisymbol{knot6}{103} |
| □ | \Pisymbol{knot6}{65} | | \Pisymbol{knot6}{81} | | ⋮ | \Pisymbol{knot6}{104} |
| □ | \Pisymbol{knot6}{66} | | \Pisymbol{knot6}{82} | | ⋮ | \Pisymbol{knot6}{105} |
| □ | \Pisymbol{knot6}{67} | | \Pisymbol{knot6}{83} | | | |
| □ | \Pisymbol{knot7}{48} | | \Pisymbol{knot7}{68} | | ⋮ | \Pisymbol{knot7}{84} |
| □ | \Pisymbol{knot7}{49} | | \Pisymbol{knot7}{69} | | ⋮ | \Pisymbol{knot7}{85} |
| □ | \Pisymbol{knot7}{50} | | \Pisymbol{knot7}{70} | | ⋮ | \Pisymbol{knot7}{86} |
| ◆ | \Pisymbol{knot7}{51} | | \Pisymbol{knot7}{71} | | ⋮ | \Pisymbol{knot7}{87} |
| ● | \Pisymbol{knot7}{52} | | \Pisymbol{knot7}{72} | | ⋮ | \Pisymbol{knot7}{88} |
| □ | \Pisymbol{knot7}{53} | | \Pisymbol{knot7}{73} | | ⋮ | \Pisymbol{knot7}{96} |
| □ | \Pisymbol{knot7}{58} | | \Pisymbol{knot7}{74} | | ⋮ | \Pisymbol{knot7}{97} |
| □ | \Pisymbol{knot7}{59} | | \Pisymbol{knot7}{75} | | ⋮ | \Pisymbol{knot7}{98} |
| □ | \Pisymbol{knot7}{60} | | \Pisymbol{knot7}{76} | | ⋮ | \Pisymbol{knot7}{99} |
| □ | \Pisymbol{knot7}{61} | | \Pisymbol{knot7}{77} | | ⋮ | \Pisymbol{knot7}{100} |
| □ | \Pisymbol{knot7}{62} | | \Pisymbol{knot7}{78} | | ⋮ | \Pisymbol{knot7}{101} |
| □ | \Pisymbol{knot7}{63} | | \Pisymbol{knot7}{79} | | ⋮ | \Pisymbol{knot7}{102} |
| □ | \Pisymbol{knot7}{64} | | \Pisymbol{knot7}{80} | | ⋮ | \Pisymbol{knot7}{103} |
| □ | \Pisymbol{knot7}{65} | | \Pisymbol{knot7}{81} | | ⋮ | \Pisymbol{knot7}{104} |
| □ | \Pisymbol{knot7}{66} | | \Pisymbol{knot7}{82} | | ⋮ | \Pisymbol{knot7}{105} |
| □ | \Pisymbol{knot7}{67} | | \Pisymbol{knot7}{83} | | | |

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 | | | | | | | |
| CEA | | | | | | | |

The `niceframe` package can be used to typeset decorative frames using fonts such as knot, especially using characters 48–63 of each font variant.

TABLE 505: *dancers* Dancing Men

\Pisymbol{dancers}\{0\} \Pisymbol{dancers}\{86\} \Pisymbol{dancers}\{172\}
\Pisymbol{dancers}\{1\} \Pisymbol{dancers}\{87\} \Pisymbol{dancers}\{173\}
\Pisymbol{dancers}\{2\} \Pisymbol{dancers}\{88\} \Pisymbol{dancers}\{174\}
\Pisymbol{dancers}\{3\} \Pisymbol{dancers}\{89\} \Pisymbol{dancers}\{175\}
\Pisymbol{dancers}\{4\} \Pisymbol{dancers}\{90\} \Pisymbol{dancers}\{176\}
\Pisymbol{dancers}\{5\} \Pisymbol{dancers}\{91\} \Pisymbol{dancers}\{177\}
\Pisymbol{dancers}\{6\} \Pisymbol{dancers}\{92\} \Pisymbol{dancers}\{178\}
\Pisymbol{dancers}\{7\} \Pisymbol{dancers}\{93\} \Pisymbol{dancers}\{179\}
\Pisymbol{dancers}\{8\} \Pisymbol{dancers}\{94\} \Pisymbol{dancers}\{180\}
\Pisymbol{dancers}\{9\} \Pisymbol{dancers}\{95\} \Pisymbol{dancers}\{181\}
\Pisymbol{dancers}\{10\} \Pisymbol{dancers}\{96\} \Pisymbol{dancers}\{182\}
\Pisymbol{dancers}\{11\} \Pisymbol{dancers}\{97\} \Pisymbol{dancers}\{183\}
\Pisymbol{dancers}\{12\} \Pisymbol{dancers}\{98\} \Pisymbol{dancers}\{184\}
\Pisymbol{dancers}\{13\} \Pisymbol{dancers}\{99\} \Pisymbol{dancers}\{185\}
\Pisymbol{dancers}\{14\} \Pisymbol{dancers}\{100\} \Pisymbol{dancers}\{186\}
\Pisymbol{dancers}\{15\} \Pisymbol{dancers}\{101\} \Pisymbol{dancers}\{187\}
\Pisymbol{dancers}\{16\} \Pisymbol{dancers}\{102\} \Pisymbol{dancers}\{188\}
\Pisymbol{dancers}\{17\} \Pisymbol{dancers}\{103\} \Pisymbol{dancers}\{189\}
\Pisymbol{dancers}\{18\} \Pisymbol{dancers}\{104\} \Pisymbol{dancers}\{190\}
\Pisymbol{dancers}\{19\} \Pisymbol{dancers}\{105\} \Pisymbol{dancers}\{191\}
\Pisymbol{dancers}\{20\} \Pisymbol{dancers}\{106\} \Pisymbol{dancers}\{192\}
\Pisymbol{dancers}\{21\} \Pisymbol{dancers}\{107\} \Pisymbol{dancers}\{193\}
\Pisymbol{dancers}\{22\} \Pisymbol{dancers}\{108\} \Pisymbol{dancers}\{194\}
\Pisymbol{dancers}\{23\} \Pisymbol{dancers}\{109\} \Pisymbol{dancers}\{195\}
\Pisymbol{dancers}\{24\} \Pisymbol{dancers}\{110\} \Pisymbol{dancers}\{196\}
\Pisymbol{dancers}\{25\} \Pisymbol{dancers}\{111\} \Pisymbol{dancers}\{197\}
\Pisymbol{dancers}\{26\} \Pisymbol{dancers}\{112\} \Pisymbol{dancers}\{198\}
\Pisymbol{dancers}\{27\} \Pisymbol{dancers}\{113\} \Pisymbol{dancers}\{199\}
\Pisymbol{dancers}\{28\} \Pisymbol{dancers}\{114\} \Pisymbol{dancers}\{200\}
\Pisymbol{dancers}\{29\} \Pisymbol{dancers}\{115\} \Pisymbol{dancers}\{201\}
\Pisymbol{dancers}\{30\} \Pisymbol{dancers}\{116\} \Pisymbol{dancers}\{202\}
\Pisymbol{dancers}\{31\} \Pisymbol{dancers}\{117\} \Pisymbol{dancers}\{203\}
\Pisymbol{dancers}\{32\} \Pisymbol{dancers}\{118\} \Pisymbol{dancers}\{204\}
\Pisymbol{dancers}\{33\} \Pisymbol{dancers}\{119\} \Pisymbol{dancers}\{205\}

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| | | |
|------------------------|-------------------------|-------------------------|
| \Pisymbol{dancers}{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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| | | |
|--------------------------|---------------------------|---------------------------|
| λ \Pisymbol{dancers}{69} | λ \Pisymbol{dancers}{155} | λ \Pisymbol{dancers}{241} |
| β \Pisymbol{dancers}{70} | β \Pisymbol{dancers}{156} | β \Pisymbol{dancers}{242} |
| χ \Pisymbol{dancers}{71} | χ \Pisymbol{dancers}{157} | χ \Pisymbol{dancers}{243} |
| γ \Pisymbol{dancers}{72} | γ \Pisymbol{dancers}{158} | γ \Pisymbol{dancers}{244} |
| α \Pisymbol{dancers}{73} | α \Pisymbol{dancers}{159} | α \Pisymbol{dancers}{245} |
| δ \Pisymbol{dancers}{74} | δ \Pisymbol{dancers}{160} | δ \Pisymbol{dancers}{246} |
| η \Pisymbol{dancers}{75} | η \Pisymbol{dancers}{161} | η \Pisymbol{dancers}{247} |
| ζ \Pisymbol{dancers}{76} | ζ \Pisymbol{dancers}{162} | ζ \Pisymbol{dancers}{248} |
| ι \Pisymbol{dancers}{77} | ι \Pisymbol{dancers}{163} | ι \Pisymbol{dancers}{249} |
| ρ \Pisymbol{dancers}{78} | ρ \Pisymbol{dancers}{164} | ρ \Pisymbol{dancers}{250} |
| σ \Pisymbol{dancers}{79} | σ \Pisymbol{dancers}{165} | σ \Pisymbol{dancers}{251} |
| τ \Pisymbol{dancers}{80} | τ \Pisymbol{dancers}{166} | τ \Pisymbol{dancers}{252} |
| φ \Pisymbol{dancers}{81} | φ \Pisymbol{dancers}{167} | φ \Pisymbol{dancers}{253} |
| ψ \Pisymbol{dancers}{82} | ψ \Pisymbol{dancers}{168} | ψ \Pisymbol{dancers}{254} |
| χ \Pisymbol{dancers}{83} | χ \Pisymbol{dancers}{169} | χ \Pisymbol{dancers}{255} |
| χ \Pisymbol{dancers}{84} | χ \Pisymbol{dancers}{170} | |
| χ \Pisymbol{dancers}{85} | χ \Pisymbol{dancers}{171} | |

Fans of Sherlock Holmes mysteries will recognize these glyphs as forming the substitution cipher featured in Sir Arthur Conan Doyle's *The Adventure of the Dancing Men* (1903).

TABLE 506: semaphor Semaphore Alphabet

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

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| | | |
|-------------------------|-------------------------|-------------------------|
| \Pisymbol{smfpr10}{65} | \Pisymbol{smfpr10}{135} | \Pisymbol{smfpr10}{204} |
| \Pisymbol{smfpr10}{66} | \Pisymbol{smfpr10}{136} | \Pisymbol{smfpr10}{205} |
| \Pisymbol{smfpr10}{67} | \Pisymbol{smfpr10}{137} | \Pisymbol{smfpr10}{206} |
| \Pisymbol{smfpr10}{68} | \Pisymbol{smfpr10}{138} | \Pisymbol{smfpr10}{207} |
| \Pisymbol{smfpr10}{69} | \Pisymbol{smfpr10}{139} | \Pisymbol{smfpr10}{209} |
| \Pisymbol{smfpr10}{70} | \Pisymbol{smfpr10}{140} | \Pisymbol{smfpr10}{210} |
| \Pisymbol{smfpr10}{71} | \Pisymbol{smfpr10}{142} | \Pisymbol{smfpr10}{211} |
| \Pisymbol{smfpr10}{72} | \Pisymbol{smfpr10}{143} | \Pisymbol{smfpr10}{212} |
| \Pisymbol{smfpr10}{73} | \Pisymbol{smfpr10}{144} | \Pisymbol{smfpr10}{213} |
| \Pisymbol{smfpr10}{74} | \Pisymbol{smfpr10}{145} | \Pisymbol{smfpr10}{214} |
| \Pisymbol{smfpr10}{75} | \Pisymbol{smfpr10}{146} | \Pisymbol{smfpr10}{216} |
| \Pisymbol{smfpr10}{76} | \Pisymbol{smfpr10}{147} | \Pisymbol{smfpr10}{217} |
| \Pisymbol{smfpr10}{77} | \Pisymbol{smfpr10}{148} | \Pisymbol{smfpr10}{218} |
| \Pisymbol{smfpr10}{78} | \Pisymbol{smfpr10}{149} | \Pisymbol{smfpr10}{219} |
| \Pisymbol{smfpr10}{79} | \Pisymbol{smfpr10}{150} | \Pisymbol{smfpr10}{220} |
| \Pisymbol{smfpr10}{80} | \Pisymbol{smfpr10}{151} | \Pisymbol{smfpr10}{221} |
| \Pisymbol{smfpr10}{81} | \Pisymbol{smfpr10}{152} | \Pisymbol{smfpr10}{224} |
| \Pisymbol{smfpr10}{82} | \Pisymbol{smfpr10}{153} | \Pisymbol{smfpr10}{225} |
| \Pisymbol{smfpr10}{83} | \Pisymbol{smfpr10}{154} | \Pisymbol{smfpr10}{226} |
| \Pisymbol{smfpr10}{84} | \Pisymbol{smfpr10}{155} | \Pisymbol{smfpr10}{227} |
| \Pisymbol{smfpr10}{85} | \Pisymbol{smfpr10}{157} | \Pisymbol{smfpr10}{228} |
| \Pisymbol{smfpr10}{86} | \Pisymbol{smfpr10}{158} | \Pisymbol{smfpr10}{229} |
| \Pisymbol{smfpr10}{87} | \Pisymbol{smfpr10}{160} | \Pisymbol{smfpr10}{231} |
| \Pisymbol{smfpr10}{88} | \Pisymbol{smfpr10}{161} | \Pisymbol{smfpr10}{232} |
| \Pisymbol{smfpr10}{89} | \Pisymbol{smfpr10}{162} | \Pisymbol{smfpr10}{233} |
| \Pisymbol{smfpr10}{90} | \Pisymbol{smfpr10}{163} | \Pisymbol{smfpr10}{234} |
| \Pisymbol{smfpr10}{97} | \Pisymbol{smfpr10}{164} | \Pisymbol{smfpr10}{235} |
| \Pisymbol{smfpr10}{98} | \Pisymbol{smfpr10}{165} | \Pisymbol{smfpr10}{236} |
| \Pisymbol{smfpr10}{99} | \Pisymbol{smfpr10}{166} | \Pisymbol{smfpr10}{237} |
| \Pisymbol{smfpr10}{100} | \Pisymbol{smfpr10}{167} | \Pisymbol{smfpr10}{238} |
| \Pisymbol{smfpr10}{101} | \Pisymbol{smfpr10}{168} | \Pisymbol{smfpr10}{239} |
| \Pisymbol{smfpr10}{102} | \Pisymbol{smfpr10}{169} | \Pisymbol{smfpr10}{241} |
| \Pisymbol{smfpr10}{103} | \Pisymbol{smfpr10}{170} | \Pisymbol{smfpr10}{242} |
| \Pisymbol{smfpr10}{104} | \Pisymbol{smfpr10}{171} | \Pisymbol{smfpr10}{243} |
| \Pisymbol{smfpr10}{105} | \Pisymbol{smfpr10}{172} | \Pisymbol{smfpr10}{244} |
| \Pisymbol{smfpr10}{106} | \Pisymbol{smfpr10}{174} | \Pisymbol{smfpr10}{245} |
| \Pisymbol{smfpr10}{107} | \Pisymbol{smfpr10}{175} | \Pisymbol{smfpr10}{246} |
| \Pisymbol{smfpr10}{108} | \Pisymbol{smfpr10}{176} | \Pisymbol{smfpr10}{248} |
| \Pisymbol{smfpr10}{109} | \Pisymbol{smfpr10}{177} | \Pisymbol{smfpr10}{249} |
| \Pisymbol{smfpr10}{110} | \Pisymbol{smfpr10}{178} | \Pisymbol{smfpr10}{250} |
| \Pisymbol{smfpr10}{111} | \Pisymbol{smfpr10}{179} | \Pisymbol{smfpr10}{251} |
| \Pisymbol{smfpr10}{112} | \Pisymbol{smfpr10}{180} | \Pisymbol{smfpr10}{252} |
| \Pisymbol{smfpr10}{113} | \Pisymbol{smfpr10}{181} | \Pisymbol{smfpr10}{253} |
| \Pisymbol{smfpr10}{114} | \Pisymbol{smfpr10}{182} | |
| \Pisymbol{smfpr10}{115} | \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 “`>Hello`”. This can be useful for typesetting complete messages. Roman, bold, monospace, slanted, and bold+slanted styles are all supported.

In addition, `semaphor` provides three variations of each font: a “person” version (`smfpr10`), which is what is illustrated in the preceding table, a “pillar” version (`smfr10`), which shows the flags on a pillar rather than being held by a person, and an “empty” version (`smfer10`), which shows only the flags and no pillar or person. Contrast these variations of the letter “H”:

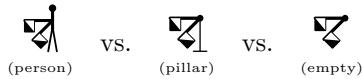


TABLE 507: `cryst` Crystallography Symbols

| | | | | | |
|---|-----------------------------------|---|------------------------------------|---|------------------------------------|
| ◦ | <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> |

(continued on next page)

(continued from previous page)

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| ■ \Pisymbol{cryst}{44} | ☒ \Pisymbol{cryst}{45} | ✓ \Pisymbol{cryst}{47} | ✗ \Pisymbol{cryst}{48} | ↑ \Pisymbol{cryst}{49} | ❖ \Pisymbol{cryst}{50} | ↑ \Pisymbol{cryst}{55} | ↑ \Pisymbol{cryst}{57} | ↑ \Pisymbol{cryst}{58} | ↑ \Pisymbol{cryst}{59} | ● \Pisymbol{cryst}{60} | ☛ \Pisymbol{cryst}{61} | ► \Pisymbol{cryst}{62} | ☒ \Pisymbol{cryst}{123} | ☒ \Pisymbol{cryst}{124} | ✓ \Pisymbol{cryst}{125} | ✗ \Pisymbol{cryst}{127} | ↑ \Pisymbol{cryst}{128} | ❖ \Pisymbol{cryst}{129} | ↑ \Pisymbol{cryst}{130} | ↑ \Pisymbol{cryst}{131} | ↑ \Pisymbol{cryst}{132} | ↑ \Pisymbol{cryst}{133} | ✓ \Pisymbol{cryst}{135} | ☒ \Pisymbol{cryst}{136} | ↑ \Pisymbol{cryst}{137} | ☒ \Pisymbol{cryst}{220} | ☒ \Pisymbol{cryst}{221} | ✓ \Pisymbol{cryst}{223} | ✗ \Pisymbol{cryst}{224} | ↑ \Pisymbol{cryst}{230} | ❖ \Pisymbol{cryst}{231} | ↑ \Pisymbol{cryst}{232} | ↑ \Pisymbol{cryst}{233} | ↑ \Pisymbol{cryst}{236} | ❖ \Pisymbol{cryst}{240} | ✗ \Pisymbol{cryst}{241} | ☒ \Pisymbol{cryst}{242} | ↑ \Pisymbol{cryst}{243} |
|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|

TABLE 508: dice Dice

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| □ \Pisymbol{dice3d}{49} | ⚀ \Pisymbol{dice3d}{50} | ⚁ \Pisymbol{dice3d}{51} | ⚂ \Pisymbol{dice3d}{52} | ⚃ \Pisymbol{dice3d}{53} | ⚄ \Pisymbol{dice3d}{54} | ⚅ \Pisymbol{dice3d}{97} | Ϛ \Pisymbol{dice3d}{98} | Ϛ \Pisymbol{dice3d}{99} | Ϛ \Pisymbol{dice3d}{100} | ⚁ \Pisymbol{dice3d}{101} | ⚁ \Pisymbol{dice3d}{102} | ⚂ \Pisymbol{dice3d}{103} | ⚃ \Pisymbol{dice3d}{104} | ⚄ \Pisymbol{dice3d}{105} | Ϛ \Pisymbol{dice3d}{106} | Ϛ \Pisymbol{dice3d}{107} | Ϛ \Pisymbol{dice3d}{108} | Ϛ \Pisymbol{dice3d}{109} | Ϛ \Pisymbol{dice3d}{110} | ⚁ \Pisymbol{dice3d}{111} | ⚁ \Pisymbol{dice3d}{112} | ⚂ \Pisymbol{dice3d}{113} | ⚃ \Pisymbol{dice3d}{114} | ⚄ \Pisymbol{dice3d}{115} | Ϛ \Pisymbol{dice3d}{116} | Ϛ \Pisymbol{dice3d}{117} | Ϛ \Pisymbol{dice3d}{118} | Ϛ \Pisymbol{dice3d}{119} | Ϛ \Pisymbol{dice3d}{120} |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|

dice defines its symbols at a very small design size. The glyphs shown above were scaled up by a factor of four using `\DeclareFontShape{U}{dice3d}{m}{n}{<- s*[4] dice3d}{}.`

An alternative to using \Pisymbol to select a die rotation is to rely on some cleverness in the kerning tables provided by the dice font. The individual digits “1” through “6” each produce the corresponding (2D) die face: {\usefont{U}{dice3d}{m}{n}2 2 1} produces “⚀ ⚁ ⚂”, for example. When followed by a letter “a” through “d”, those pairs are kerned to produce a 3D die rotation with the digit specifying by the top face and the letter specifying one of the four possible front faces, sorted by increasing value. For example, {\usefont{U}{dice3d}{m}{n}2a 2b 1d} produces “⚁ ⚃ ⚅ ⚁”.

TABLE 509: magic Trading Card Symbols

| | | | | | |
|---|----------------------|---|----------------------|----|----------------------|
| ⓪ | \Pisymbol{magic}{48} | ⑥ | \Pisymbol{magic}{54} | ⌚ | \Pisymbol{magic}{82} |
| ① | \Pisymbol{magic}{49} | ⑦ | \Pisymbol{magic}{55} | ⊗ | \Pisymbol{magic}{84} |
| ② | \Pisymbol{magic}{50} | ⑧ | \Pisymbol{magic}{56} | 💧 | \Pisymbol{magic}{85} |
| ③ | \Pisymbol{magic}{51} | ⑨ | \Pisymbol{magic}{57} | ☀️ | \Pisymbol{magic}{87} |
| ④ | \Pisymbol{magic}{52} | ⓩ | \Pisymbol{magic}{66} | ⊗⊗ | \Pisymbol{magic}{88} |
| ⑤ | \Pisymbol{magic}{53} | ♣ | \Pisymbol{magic}{71} | ⓩⓩ | \Pisymbol{magic}{90} |

The preceding symbols resemble those from Wizards of the Coast's *Magic: The Gathering* trading-card game. An alternative to entering symbols numerically using \Pisymbol is to switch to the `magic` font with `\usefont{U}{magic}{m}{n}` and employ the following mnemonic characters:

| | | |
|---------|-----|--|
| ⓪–ⓩ | 0–9 | Circled numerals 0–9 |
| 💀 | B | Black magic symbol |
| :green: | 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) |
| ⓩⓩ | Z | Circled "10" (for mana cost, e.g., Aladdin's Lamp) |

TABLE 510: bartel-chess-fonts Chess Pieces and Chessboard Squares

| | | | | | |
|---|-----------------------|---|-----------------------|---|------------------------|
| ♙ | \Pisymbol{fselch}{0} | ♘ | \Pisymbol{fselch}{55} | ♗ | \Pisymbol{fselch}{110} |
| ♘ | \Pisymbol{fselch}{1} | ♞ | \Pisymbol{fselch}{56} | ♝ | \Pisymbol{fselch}{111} |
| ♗ | \Pisymbol{fselch}{2} | ♝ | \Pisymbol{fselch}{57} | ♜ | \Pisymbol{fselch}{112} |
| ♜ | \Pisymbol{fselch}{3} | ♜ | \Pisymbol{fselch}{58} | ♝ | \Pisymbol{fselch}{113} |
| ♚ | \Pisymbol{fselch}{4} | ♚ | \Pisymbol{fselch}{59} | ♝ | \Pisymbol{fselch}{114} |
| ♚ | \Pisymbol{fselch}{5} | ♚ | \Pisymbol{fselch}{60} | ♞ | \Pisymbol{fselch}{115} |
| ♝ | \Pisymbol{fselch}{6} | ♝ | \Pisymbol{fselch}{61} | ♝ | \Pisymbol{fselch}{116} |
| ♞ | \Pisymbol{fselch}{7} | ♞ | \Pisymbol{fselch}{62} | ♜ | \Pisymbol{fselch}{117} |
| ♜ | \Pisymbol{fselch}{8} | ♜ | \Pisymbol{fselch}{63} | ♜ | \Pisymbol{fselch}{118} |
| ♝ | \Pisymbol{fselch}{9} | ♝ | \Pisymbol{fselch}{64} | ♝ | \Pisymbol{fselch}{119} |
| ♚ | \Pisymbol{fselch}{10} | ♚ | \Pisymbol{fselch}{65} | ♝ | \Pisymbol{fselch}{120} |
| ♚ | \Pisymbol{fselch}{11} | ♚ | \Pisymbol{fselch}{66} | ♞ | \Pisymbol{fselch}{121} |
| ♝ | \Pisymbol{fselch}{12} | ♝ | \Pisymbol{fselch}{67} | ♝ | \Pisymbol{fselch}{122} |
| ♞ | \Pisymbol{fselch}{13} | ♞ | \Pisymbol{fselch}{68} | ♜ | \Pisymbol{fselch}{123} |
| ♜ | \Pisymbol{fselch}{14} | ♜ | \Pisymbol{fselch}{69} | ♜ | \Pisymbol{fselch}{124} |
| ♝ | \Pisymbol{fselch}{15} | ♝ | \Pisymbol{fselch}{70} | ♣ | \Pisymbol{fselch}{125} |
| ♚ | \Pisymbol{fselch}{16} | ♚ | \Pisymbol{fselch}{71} | ♝ | \Pisymbol{fselch}{126} |
| ♚ | \Pisymbol{fselch}{17} | ♚ | \Pisymbol{fselch}{72} | ♞ | \Pisymbol{fselch}{127} |
| ♝ | \Pisymbol{fselch}{18} | ♝ | \Pisymbol{fselch}{73} | ♝ | \Pisymbol{fselch}{128} |
| ♞ | \Pisymbol{fselch}{19} | ♞ | \Pisymbol{fselch}{74} | ♜ | \Pisymbol{fselch}{129} |

(continued on next page)

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

In addition to the `fselch` font showcased above, `bartel-chess-fonts` also provides a `pkelch` font which includes the same symbol set (minus some of the higher-numbered characters) but drawn in a slightly different style.

`bartel-chess-fonts` provides the `fselch` and `pkelch` fonts in various sizes (optically scaled). See “ $\text{\LaTeX} 2\epsilon$ 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^AT_EX 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^AT_EX. 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^AT_EX will either output an error message or replace an earlier-defined symbol with a later-defined symbol. Table 511 on the next page presents a selection of name clashes that appear in this document.

Using multiple symbols with the same name in the same document—or even merely loading conflicting symbol packages—can be tricky but, as evidenced by the existence of Table 511, not impossible. The general procedure is to load the first package, rename the conflicting symbols, and then load the second package. Examine the L^AT_EX 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^AT_EX 2 _{ϵ} itself. Similarly, `mathabx` redefines a vast number of math symbols in an attempt to improve their look. The `txfonts`, `pxfonts`, and `mathabx` conflicts are not listed in Table 511 because they are designed to be compatible with the symbols they replace. Table 512 on page 208 illustrates what “compatible” means in this context.

To use the new `txfonts/pxfonts` symbols without altering the document’s main font, merely reset the default font families back to their original values after loading one of those packages:

```
\renewcommand\rmdefault{cmr}
\renewcommand\sfdefault{cmss}
\renewcommand\ttdefault{cmtt}
```

10.2 Resizing symbols

Mathematical symbols listed in this document as “variable-sized” are designed to stretch vertically. Each variable-sized symbol comes in one or more basic sizes plus a variation comprising both stretchable and nonstretchable segments. Table 513 on page 208 presents the symbols `\}` and `\uparrow` in their default size, in their `\big`, `\Big`, `\bigg`, and `\Bigg` sizes, in an even larger size achieved using `\left/` `\right`, and—for contrast—in a large size achieved by changing the font size using L^AT_EX 2 _{ϵ} 's `\fontsize` command. Because the symbols shown belong to the Computer Modern family, the `type1cm` package needs to be loaded to support font sizes larger than 24.88 pt.

Note how `\fontsize` makes the symbol wider and thicker. (The `graphicx` package's `\scalebox` or `\resizebox` commands would produce a similar effect.) Also, the `\fontsize`-enlarged symbol is vertically centered relative to correspondingly large text, unlike the symbols enlarged using `\big` et al. or `\left/` `\right`, which all use the same math axis regardless of symbol size. However, `\fontsize` is not limited to mathematical delimiters. Also, `\scalebox` and `\resizebox` are more robust to poorly composed symbols (e.g., two symbols made to overlap by backspacing a fixed distance) but do not work with every TeX backend and will produce jagged symbols when scaling a bitmapped font.

All variable-sized delimiters are defined (by the corresponding `.tfm` file) in terms of up to five segments, as illustrated by Figure 1 on page 208. The top, middle, and bottom segments are of a fixed size. The top-middle and middle-bottom segments (which are constrained to be the same character) are repeated as many times as necessary to achieve the desired height.

10.3 Where can I find the symbol for . . . ?

If you can't find some symbol you're looking for in this document, there are a few possible explanations:

TABLE 511: Symbol Name Clashes

| Symbol | $\text{\LaTeX} 2\epsilon$ | $\mathcal{W}\mathcal{S}$ | stmaryrd | wasy | mathabx | marvosym | bbding | ifsym | dingbat | wsipa |
|-------------------------------|---------------------------|--------------------------|-------------------|--------------------|------------------|----------------------|-----------------|------------------|------------------|----------------|
| <code>\baro</code> | | | | ϕ | | | | | | Θ |
| <code>\bigtriangledown</code> | \bigtriangledown | | | \bigtriangledown | | | | | | |
| <code>\bigtriangleup</code> | \bigtriangleup | | | \bigtriangleup | | | | | | |
| <code>\checkmark</code> | | \checkmark | | | | | | | | |
| <code>\Circle</code> | | | | \circ | | | \bigcirc | | | |
| <code>\Cross</code> | | | | | | \dagger | \dagger | \times | | |
| <code>\ggg</code> | | | \ggg | | | | \bowtie | | | |
| <code>\Letter</code> | | | | \sharp | \sharp | | | | | |
| <code>\lightning</code> | | | | | | ℓ | | | | |
| <code>\Lightning</code> | | | | | \ll | | | | | |
| <code>\lll</code> | | | | | \lll | | | | | |
| <code>\Square</code> | | | | \square | | | \square | | | |
| <code>\Sun</code> | | | | | \odot | \odot | | | | |
| <code>\TriangleDown</code> | | | | | | \blacktriangledown | | \triangleright | | |
| <code>\TriangleUp</code> | | | | | | \blacktriangleup | | \triangleleft | | |

TABLE 512: Example of a Benign Name Clash

| Symbol | Default (Computer Modern) | txfonts (Times Roman) |
|--------------|------------------------------|--------------------------|
| R | R | R |
| \textrecipie | R | R |

TABLE 513: Sample resized delimiters

| Symbol | Default size | \big | \Big | \bigg | \Bigg | \left / \right | \fontsize |
|----------|--------------|------|------|-------|-------|----------------|-----------|
| \} | } | } | } | } | } | { | } |
| \uparrow | ↑ | ↑ | ↑ | ↑ | ↑ | ↑ | ↑ |

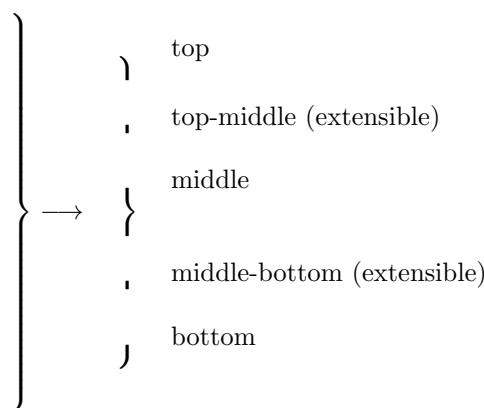


Figure 1: Implementation of variable-sized delimiters

- The symbol isn't intuitively named. As a few examples, the `\ifsym` command to draw dice is “\Cube”; a plus sign with a circle around it (“exclusive or” to computer engineers) is “\oplus”; and lightning bolts in fonts designed by German speakers may have “blitz” in their names as in the `ulsy` package. The moral of the story is to be creative with synonyms when searching the index.
- The symbol is defined by some package that I overlooked (or deemed unimportant). If there's some symbol package that you think should be included in the Comprehensive L^AT_EX 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^AT_EX binding for it. For example, the PostScript Symbol font contains a “J” 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^AT_EX 2_E's low-level font commands [LAT00] and use T_EX'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 “fuccefsl”—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 “J” symbol by typesetting character number 191 in the *psy* (PostScript Symbol) font family.

Reflecting and rotating existing symbols

A common request on `comp.text.tex` is for a reversed or rotated version of an existing symbol. As a last resort, these effects can be achieved with the `graphicx` (or `graphics`) package's `\reflectbox` and `\rotatebox` macros. For example, `\textsuperscript{\reflectbox{?}}` produces an irony mark (“?”), and `\rotatebox[origin=c]{180}{$\backslash iota$}` produces the definite-description operator (“i”). 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}{$\,\smash{\scriptstyle\mathfrak{z}}\,$}}}
\newcommand\wholeof{\mathrel{\reflectbox{$\,\smash{\scriptstyle\mathfrak{z}}\,$}}}
```

The disadvantage of the `graphicx`/`graphics` approach is that not every T_EX backend handles graphical transformations.⁵ Far better is to find a suitable font that contains the desired symbol in the correct orientation. For instance, if the `phonetic` package is available, then `\textit{\riota}` will yield a backend-independent “i”. Similarly, `tipa`'s `\textrevespsilon` (“3”) or `wsipa`'s `\revepsilon` (“3”) may be used to express the mathematical notion of “such that” in a cleaner manner than with `\reflectbox` or `\rotatebox`.⁶

⁵As an example, Xdvi ignores both `\reflectbox` and `\rotatebox`.

⁶More 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^AT_EX 2_ε source file `fontdef.dtx` contains a number of such definitions. For example, `\models` (see Table 87 on page 46) is defined in that file with:

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

where `\mathrel` and `\joinrel` are used to control the horizontal spacing. `\def` is the T_EX primitive upon which L^AT_EX's `\newcommand` is based. See The T_EXbook [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^AT_EX defines `\hbar` (“*h*”) 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 “*b*” and “*d*”, respectively. Note that `\dbar` requires a greater backward math kern than `\bbar`; a -9 mu kern would have produced the less-attractive “*d*” glyph.

The `amsmath` package provides `\overset` and `\underset` commands for placing one symbol respectively above or below another. For example, `\overset{G}{\sim}`⁷ produces “ $\overset{G}{\sim}$ ” (sometimes used for “equidecomposable with respect to *G*”).

Sometimes an ordinary `tabular` environment can be co-opted into juxtaposing existing symbols into a new symbol. Consider the following definition of `\asterism` (“ \ast ”) from a June 2007 post to `comp.text.tex` by Peter Flynn:

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

Note how the space between columns (`\tabcolsep`) and rows (`\vphantom{...}`) is made negative to squeeze the asterisks closer together.

There is a T_EX primitive called `\mathaccent` that centers one mathematical symbol atop another. For example, one can define `\dotcup` (“ \cup ”)—the composition of a `\cup` and a `\cdot`—as follows:

```
\newcommand{\dotcup}{\ensuremath{\mathaccent\cdot\cup}}
```

The catch is that `\mathaccent` requires the accent to be a “math character”. That is, it must be a character in a math font as opposed to a symbol defined in terms of other symbols. See The T_EXbook [Knu86a] for more information.

Another T_EX primitive that is useful for composing symbols is `\vcenter`. `\vcenter` is conceptually similar to “`\begin{tabular}{l}`” in L^AT_EX but takes a list of vertical material instead of `\vphantom{...}`-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:

⁷L^AT_EX'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` (“ \sim ”) symbols with 0.35 x -heights of space between them, is rendered as “ \approx ”. `\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^AT_EX command, borrowed from Plain T_EX, is `\oalign`. `\oalign` 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_EX’s `\ialign` primitive, `\oalign` uses T_EX’s tabular syntax instead of L^AT_EX’s (i.e., with `\cr` as the row terminator instead of `\backslash`). The following example of `\oalign`, a macro that defines a standard-state symbol (`\stst`, “ \ominus ”) as a superscripted Plimsoll line (`\barcirc`, “ \ominus ”),⁸ is due to an October 2007 `comp.text.tex` post by Donald Arseneau:

```
\makeatletter
\providecommand\barcirc{\mathpalette\@barred\circ}
\def\@barred#1#2{\oalign{\hfil#1-$\hfil\cr\hfil#1#2$\hfil\cr}}
\newcommand\stst{^{\protect\barcirc}}
\makeatother
```

In the preceding code, note the `\oalign` call’s use of `\hfil` to horizontally center a minus sign (“ $-$ ”) and a `\circ` (“ \circ ”).

As another example of `\oalign`, consider the following code (due to Enrico Gregorio in a June 2007 post to `comp.text.tex`) that overlaps a `\ni` (“ \ni ”) and two minus signs (“ $-$ ”) to produce “ \ni ”, an obscure variation on the infrequently used “ \exists ” symbol for “such that” discussed on page 209:

```
\newcommand{\suchthat}{%
  \mathrel{\oalign{$\ni$\cr\kern-1pt$-$\kern-6.5pt$-$}}}
```

The `slashed` package, although originally designed for producing Feynman slashed-character notation, in fact facilitates the production of *arbitrary* overlapped symbols. The default behavior is to overwrite a given character with “/”. For example, `\slashed{D}` produces “ $\not D$ ”. However, the `\declarelashed` 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}{%
  \declarelashed{}{\text{-}}{0.04}{0}{I}\slashed{I}}
```

`\declarelashed{}{\cdot}{\cdot}{\cdot}{I}` affects the meaning of all subsequent `\slashed{I}` commands in the same scope. The preceding definition of `\rqm` therefore uses an extra set of curly braces to limit that scope to a single `\slashed{I}`. In addition, `\rqm` uses `amstext`’s `\text` macro (described on page 213) to make `\declarelashed` 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 `\declarelashed` commands.

Somewhat simpler than `slashed` is the `centernot` package. `centernot` provides a single command, `\centernot`, which, like `\not`, puts a slash over the subsequent mathematical symbol. However, instead of putting the slash at a fixed location, `\centernot` centers the slash over its argument. `\centernot` might be used, for example, to create a “does not imply” symbol:

```
⇒ \not\Longrightarrow
vs.
⇒ \centernot\Longrightarrow
```

See the `centernot` documentation for more information.

⁸While `\barcirc` illustrates how to combine symbols using `\oalign`, the `stmaryrd` package’s `\minuso` command (Table 52 on page 28) provides a similar glyph (“ \ominus ”) as a single, indivisible symbol.

Making new symbols work in superscripts and subscripts

To make composite symbols work properly within subscripts and superscripts, you may need to use TeX's `\mathchoice` primitive. `\mathchoice` evaluates one of four expressions, based on whether the current math style is display, text, script, or scriptscript. (See The TeXbook [Knu86a] for a more complete description.) For example, the following L^AT_EX code—posted to `comp.text.tex` by Torsten Bronger—composes a sub/superscriptable “ \topbot ” symbol out of `\top` and `\bot` (“ \top ” and “ \bot ”):

```
\def\topbotatom{\hbox{\hbox to 0pt{$\bot$}\hss$\top$}}
\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}}%
  \!\!#1}
\def\XXint#1#2#3{\setbox0=\hbox{$#1#2#3$}\int\kern-.5\wd0}
\def\ddashint{\Xint=}
\def\dashint{\Xint-}
```

(The preceding code was taken verbatim from the UK TeX Users' Group FAQ at <http://www.tex.ac.uk/faq>.) `\dashint` produces a single-dashed integral sign (“ \int ”), while `\ddashint` produces a double-dashed one (“ $\int\int$ ”). The `\Xint` macro defined above can also be used to generate a wealth of new integrals: “ $\int\circlearrowright$ ” (`\Xint\circlearrowright`), “ $\int\circlearrowleft$ ” (`\Xint\circlearrowleft`), “ $\int\subset$ ” (`\Xint\subset`), “ $\int\infty$ ” (`\Xint\infty`), and so forth.

L^AT_EX 2 _{ε} 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 (“ $\perp\!\!\!\perp$ ”) to `comp.text.tex` in June 2000:

```
\newcommand\independent{\protect\mathpalette{\protect\independenT}{\perp}}
\def\independenT#1#2{\mathrel{\rlap{$#1$}\mkern2mu{#2}}}
```

The `\independent` macro uses `\mathpalette` to pass the `\independenT` helper macro both the current math style and the `\perp` symbol. `\independenT` typesets `\perp` in the current math style, moves two math units to the right, and finally typesets a second—overlapping—copy of `\perp`, again in the current math style. `\rlap`, which enables text overlap, is described on the next page.

Some people like their square-root signs with a trailing “hook” (i.e., “ $\sqrt{-}$ ”) as this helps visually distinguish expressions like “ $\sqrt{3}x$ ” from those like “ $\sqrt[3]{x}$ ”. In March 2002, Dan Luecking posted a `\mathpalette`-based definition of a hooked square-root symbol to `comp.text.tex`. This code was subsequently refined by Max Dohse and Scott Pakin into the version shown below, which accepts a root as an optional argument, for consistency with `\sqrt`.

```
\newcommand{\hksqrt}[2][]{\mathpalette{\DHLhksqrt{#1}{#2}}}
\def\DHLhksqrt#1#2{\setbox0=\hbox{$#1\sqrt{#2}$}\dimen0=\ht0
\advance\dimen0-0.2\ht0
\setbox2=\hbox{\vrule height\ht0 depth -\dimen0}%
{\box0\lower0.4pt\box2}}
```

Notice how `\hksqrt` uses `\mathpalette` to pass the current math style (`\displaystyle`, `\textstyle`, etc.) to `\DHLhksqrt` as argument #1. `\DHLhksqrt` subsequently uses that style within an `\hbox`. The rest of the code is simply using TeX primitives to position a hook of height 0.2 times the `\sqrt` height at the right of the `\sqrt`. See The TeXbook [Knu86a] for more understanding of TeX “boxes” and “dimens”.

Sometimes, however, `amstext`’s `\text` macro is all that is necessary to make composite symbols appear correctly in subscripts and superscripts, as in the following definitions of `\nesarrow` (“↗”) and `\nwsearrow` (“↖”):⁹

```
\newcommand{\nesarrow}{\mathrel{\text{$\nearrow$\llap{$\swarrow$}}}}
\newcommand{\nwsearrow}{\mathrel{\text{$\nwarrow$\llap{$\searrow$}}}}
```

`\text` resembles L^AT_EX’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\crcr}}}
\makeatother
```

The `\makeatletter` and `\makeatother` commands are needed to coerce L^AT_EX into accepting “Q” as part of a macro name. `\moverlay` takes a list of symbols separated by `\cr` (TeX’s equivalent of L^AT_EX’s `\backslash`). For example, the `\topbot` command defined on the previous page could have been expressed as “`\moverlay{\top\cr\bot}`” and the `\nesarrow` 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^AT_EX-generated symbols

Oftentimes, symbols composed in the L^AT_EX 2_E source code can be modified with minimal effort to produce useful variations. For example, `fontdef.dtx` composes the `\ddots` symbol (see Table 261 on page 107) out of three periods, raised 7 pt., 4 pt., and 1 pt., respectively:

```
\def\ddots{\mathinner{\mkern1mu\raise7\p@
  \vbox{\kern7\p@\hbox{.}}\mkern2mu
  \raise4\p@\hbox{.}\mkern2mu\raise\p@\hbox{.}\mkern1mu}}
```

`\p@` is a L^AT_EX 2_E 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.

⁹Note that if your goal is to typeset commutative diagrams or pushout/pullback diagrams, then you should probably be using `Xy-pic`.

Producing complex accents

Accents are a special case of combining existing symbols to make new symbols. While various tables in this document show how to add an accent to an existing symbol, some applications, such as transliterations from non-Latin alphabets, require *multiple* accents per character. For instance, the creator of pdfTEX writes his name as “Hàn Thé Thành”. The dblaccnt package enables L^AT_EX to stack accents, as in “H\`an Th\^e Th\~anh” (albeit not in the OT1 font encoding). In addition, the wsipa package defines \diatop and \diaunder macros for putting one or more diacritics or accents above or below a given character. For example, \diaunder[{\diatop[']|\textsubdot{r}}] produces “ᬁ”. See the wsipa 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 “ᬁ” and \accentset{e}{X} produces “ᜇ”. \underaccent does the same thing, but places the accent beneath the character. This enables constructs like \underaccent{\tilde}{V}, which produces “ᜇ”. 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^AT_EX’s \hrulefill command:

```
\makeatletter
\def\equalsfill{$\m@th\mathord=\mkern-7mu
  \cleaders\hbox{$\!\mathord=\!\$}\hfill
  \mkern-7mu\mathord=$}
\makeatother
```

TEX’s \cleaders and \hfill primitives are the key to understanding \equalsfill’s extensibility. Essentially, \equalsfill repeats a box containing “=” plus some negative space until it fills the maximum available horizontal space. \equalsfill is intended to be used with L^AT_EX’s \stackrel command, which stacks one mathematical expression (slightly reduced in size) atop another. Hence, “\stackrel{a}{\rightarrow}” produces “ \xrightarrow{a} ” and “X \stackrel{\text{definition}}{\hbox{\equalsfill}} Y” produces “ $X \overset{\text{definition}}{=}= Y$ ”.

If all that needs to extend are horizontal and vertical lines—as opposed to repeated symbols such as the “=” in the previous example—L^AT_EX’s array or tabular environments may suffice. Consider the following code (due to a February 1999 comp.text.tex post by Donald Arseneau and subsequent modifications by Billy Yu and Scott Pakin) for typesetting annuity and life-insurance symbols:

```
\DeclareRobustCommand{\actuarial}[2][]{%
  \def\arraystretch{0}%
  \setlength\arraycolsep{0.5pt}%
  \setlength\arrayrulewidth{0.5pt}%
  \setbox0=\hbox{$\scriptstyle#1#2$}%
  \begin{array}[b]{*2{@{}>{\scriptstyle}c|}
    \cline{2-2}%
    \rule[1.25pt]{0pt}{\ht0}%
    #1 & #2%
  \end{array}%
}
```

Using the preceding definition, one can type, e.g., “\$a_{\actuarial{n}}\$” to produce “ $a_{\overline{n}}$ ” and “\$a_{\actuarial[x:]{n}}\$” to produce “ $a_{x:\overline{n}}$ ”. This is similar in concept to how the actuarialangle package defines its \actuarialangle command (Table 251).

A more complex example of composing accents is the following definition of extensible \overbracket, \underbracket, \overparenthesis, and \underparenthesis symbols, taken from a May 2002 comp.text.tex post by Donald Arseneau:

```
\makeatletter
\def\overbracket{\mathop{\vbox{\ialign{##\cr\cr\noalign{\kern3\p@}}}
```

```

\downbracketfill\crcr\noalign{\kern3\p@\nointerlineskip}
$ \hfil\displaystyle{#1}\hfil$\crcr}}}\limits}
\def\underbracket#1{\mathop{\vtop{\ialign{##\crcr
$ \hfil\displaystyle{#1}\hfil$\crcr\noalign{\kern3\p@\nointerlineskip}
\upbracketfill\crcr\noalign{\kern3\p@}}}}}\limits}
\def\overparenthesis#1{\mathop{\vbox{\ialign{##\crcr\noalign{\kern3\p@}
\downparenthfill\crcr\noalign{\kern3\p@\nointerlineskip}
$ \hfil\displaystyle{#1}\hfil$\crcr}}}\limits}
\def\underparenthesis#1{\mathop{\vtop{\ialign{##\crcr
$ \hfil\displaystyle{#1}\hfil$\crcr\noalign{\kern3\p@\nointerlineskip}
\upparenthfill\crcr\noalign{\kern3\p@}}}}}\limits}
\def\downparenthfill{$\m@th\braceleft\leaders\vrule\hfill\braceright$}
\def\upparenthfill{$\m@th\braceleft\leaders\vrule\hfill\braceright$}
\def\upbracketfill{$\m@th\makesm@sh{\llap{\vrule\@height3\p@\@width.7\p@}}\%
\leaders\vrule\@height.7\p@\hfill
\makesm@sh{\rlap{\vrule\@height3\p@\@width.7\p@}}$}
\def\downbracketfill{$\m@th
\makesm@sh{\llap{\vrule\@height.7\p@\@depth2.3\p@\@width.7\p@}}\%
\leaders\vrule\@height.7\p@\hfill
\makesm@sh{\rlap{\vrule\@height.7\p@\@depth2.3\p@\@width.7\p@}}$}
\makeatother

```

Table 514 showcases these accents. The TEXbook [Knu86a] or another book on TEX primitives is 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., `\braceleft` [“ $\smash{\overbrace{}}_{\smash{\overbrace{}}}$ ”] for `\downparenthfill`), a horizontal rule that stretches as wide as possible, and a right symbol (e.g., `\braceright` [“ $\smash{\overbrace{}}^{\smash{\overbrace{}}}$ ”] for `\downbracketfill`). `\overbracket`, `\underbracket`, `\overparenthesis`, and `\underparenthesis` merely create a table whose width is determined by the given text, thereby constraining the width of the horizontal rules.

TABLE 514: Manually Composed Extensible Accents

| | | | |
|-------------------|---------------------------------|-------------------|-------------------------------------|
| \overbrace{abc} | <code>\overbracket{abc}</code> | \overbrace{abc} | <code>\overparenthesis{abc}</code> |
| \underline{abc} | <code>\underbracket{abc}</code> | \underline{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}ABCD`” produces



See the `simplewick` documentation for more information.

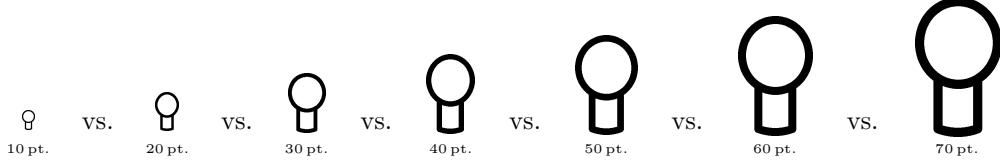
Developing new symbols from scratch

Sometimes it simply not possible to define a new symbol in terms of existing symbols. Fortunately, most, if not all, TEX distributions are shipped with a tool called METAFONT which is designed specifically for creating fonts to be used with TEX. The METAFONTbook [Knu86b] is the authoritative text on METAFONT. If you plan to design your own symbols with METAFONT, The METAFONTbook is essential reading. You may also want to read the freely available METAFONT primer located at <http://metafont.tutorial.free.fr/>. The following is an extremely brief tutorial on how to create a new LATEX symbol using METAFONT. Its primary purpose is to cover the LATEX-specific operations not mentioned in The METAFONTbook and to demonstrate that symbol-font creation is not necessarily a difficult task.

Suppose we need a symbol to represent a light bulb (“ ϑ ”).¹⁰ The first step is to draw this in METAFONT. It is common to separate the font into two files: a size-dependent file, which specifies the design

¹⁰I'm not a very good artist; you'll have to pretend that “ ϑ ” looks like a light bulb.

size and various font-specific parameters that are a function of the design size; and a size-independent file, which draws characters in the given size. Figure 2 shows the METAFONT code for `lightbulb10.mf`. `lightbulb10.mf` specifies various parameters that produce a 10 pt. light bulb then loads `lightbulb.mf`. Ideally, one should produce `lightbulb<size>.mf` files for a variety of `<size>`s. This is called “optical scaling”. It enables, for example, the lines that make up the light bulb to retain the same thickness at different font sizes, which looks much nicer than the alternative—and default—“mechanical scaling”. When a `lightbulb<size>.mf` file does not exist for a given size `<size>`, the computer mechanically produces a wider, taller, thicker symbol:



```
font_identifier := "LightBulb10";                                % Name the font.
font_size 10pt#;                                              % Specify the design size.

em# := 10pt#;                                                 % "M" width is 10 points.
cap# := 7pt#;                                                 % Capital letter height is 7 points above the baseline.
sb# := 1/4pt#;                                               % Leave this much space on the side of each character.
o# := 1/16pt#;                                              % Amount that curves overshoot borders.

input lightbulb                                              % Load the file that draws the actual glyph.
```

Figure 2: Sample METAFONT size-specific file (`lightbulb10.mf`)

`lightbulb.mf`, shown in Figure 3, draws a light bulb using the parameters defined in `lightbulb10.mf`. Note that the the filenames “`lightbulb10.mf`” and “`lightbulb.mf`” do not follow the Berry font-naming scheme [Ber01]; the Berry font-naming scheme is largely irrelevant for symbol fonts, which generally lack bold, italic, small-caps, slanted, and other such variants.

The code in Figures Figure 2 and Figure 3 is heavily commented and should demonstrate some of the basic concepts behind METAFONT usage: declaring variables, defining points, drawing lines and curves, and preparing to debug or fine-tune the output. Again, The METAFONTbook [Knu86b] is the definitive reference on METAFONT programming.

METAFONT can produce “proofs” of fonts—large, labeled versions that showcase the logical structure of each character. In fact, proof mode is METAFONT’s default mode. To produce a proof of `lightbulb10.mf`, issue the following commands at the operating-system prompt:

```
prompt> mf lightbulb10.mf                                     <= Produces lightbulb10.2602gf
prompt> gftodvi lightbulb10.2602gf                           <= Produces lightbulb10.dvi
```

You can then view `lightbulb10.dvi` with any DVI viewer. The result is shown in Figure 4. Observe how the grid defined with `makegrid` at the bottom of Figure 3 draws vertical lines at positions 0, sb , $w/2$, and $w - sb$ and horizontal lines at positions 0, $-1pt$, y_2 , and h . Similarly, observe how the `penlabels` command labels all of the important coordinates: z_1, z_2, \dots, z_8 and z_{67} , which `lightbulb.mf` defines to lie between z_6 and z_7 .

Most, if not all, TeX distributions include a Plain TeX file called `testfont.tex` that is useful for testing new fonts in a variety of ways. One useful routine produces a table of all of the characters in the font:

```
prompt> tex testfont
This is TeX, Version 3.14159 (Web2C 7.3.1)
(/usr/share/texmf/tex/plain/base/testfont.tex
Name of the font to test = lightbulb10
Now type a test command (\help for help):)
*\table
*\bye
```

```

mode_setup;                                     % Target a given printer.

define_pixels(em, cap, sb);                   % Convert to device-specific units.
define_corrected_pixels(o);                  % Same, but add a device-specific fudge factor.

%% Define a light bulb at the character position for "A"
%% with width  $1/2em^{\#}$ , height  $cap^{\#}$ , and depth  $1pt^{\#}$ .
beginchar("A",  $1/2em^{\#}$ ,  $cap^{\#}$ ,  $1pt^{\#}$ ); "A light bulb";
  pickup pencircle scaled  $1/2pt$ ;           % Use a pen with a small, circular tip.

  %% Define the points we need.
  top z1 = ( $w/2, h + o$ );                  %  $z_1$  is at the top of a circle.
  rt z2 = ( $w + sb + o - x_4, y_4$ );        %  $z_2$  is at the same height as  $z_4$  but the opposite side.
  bot z3 = ( $z_1 - (0, w - sb - o)$ );       %  $z_3$  is at the bottom of the circle.
  lft z4 = ( $sb - o, 1/2[y_1, y_3]$ );         %  $z_4$  is on the left of the circle.
  path bulb;                                % Define a path for the bulb itself.
  bulb =  $z_1 \dots z_2 \dots z_3 \dots z_4 \dots$  cycle; % The bulb is a closed path.

   $z_5 = \text{point } 2 - 1/3 \text{ of } bulb$ ;    %  $z_5$  lies on the bulb, a little to the right of  $z_3$ .
   $z_6 = (x_5, 0)$ ;                          %  $z_6$  is at the bottom, directly under  $z_5$ .
   $z_7 = (x_8, 0)$ ;                          %  $z_7$  is at the bottom, directly under  $z_8$ .
   $z_8 = \text{point } 2 + 1/3 \text{ of } bulb$ ;    %  $z_8$  lies on the bulb, a little to the left of  $z_3$ .
  bot z67 = ( $1/2[x_6, x_7], pen\_bot - o - 1/8pt$ ); %  $z_{67}$  lies halfway between  $z_6$  and  $z_7$  but a jot lower.

  %% Draw the bulb and the base.
  draw bulb;                                % Draw the bulb proper.
  draw  $z_5 \dots z_6 \dots z_{67} \dots z_7 \dots z_8$ ; % Draw the base of the bulb.

  %% Display key positions and points to help us debug.
  makegrid(0,  $sb, w/2, w - sb$ ) ( $0, -1pt, y_2, h$ ); % 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`)

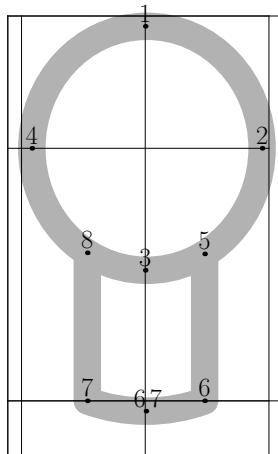


Figure 4: Proof diagram of `lightbulb10.mf`

```
[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).

| Test of lightbulb10 on March 11, 2003 at 1127 | | | | | | | | | |
|---|----|----|----|----|----|----|----|----|-----|
| | '0 | '1 | '2 | '3 | '4 | '5 | '6 | '7 | |
| '10x | | Q | | | | | | | |
| '11x | | | | | | | | | "4x |
| | "8 | "9 | "A | "B | "C | "D | "E | "F | |

Figure 5: Font table produced by `testfont.tex`

The LightBulb10 font is now usable by \TeX . $\text{\LaTeX} 2_{\varepsilon}$, however, needs more information before documents can use the font. First, we create a font-description file that tells $\text{\LaTeX} 2_{\varepsilon}$ how to map fonts in a given font family and encoding to a particular font in a particular font size. For symbol fonts, this mapping is fairly simple. Symbol fonts almost always use the “U” (“Unknown”) font encoding and frequently occur in only one variant: normal weight and non-italicized. The filename for a font-description file important; it must be of the form “`<encoding><family>.fd`”, where `<encoding>` is the lowercase version of the encoding name (typically “u” for symbol fonts) and `<family>` is the name of the font family. For LightBulb10, let’s call this “bulb”. Figure 6 lists the contents of `ubulb.fd`. The document “ $\text{\LaTeX} 2_{\varepsilon}$ Font Selection” [LT00] 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 $\text{\LaTeX} 2_{\varepsilon}$ 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: $\text{\LaTeX} 2_{\varepsilon}$ font-description file (`ubulb.fd`)

The final step is to write a $\text{\LaTeX} 2_{\varepsilon}$ style file that defines a name for each symbol in the font. Because we have only one symbol our style file, `lightbulb.sty` (Figure 7), is rather trivial. Note that instead of typesetting “A” we could have had `\lightbulb` typeset “`\char65`”, “`\char"41`”, or “`\char'101`” (respectively, decimal, hexadecimal, and octal character offsets into the font). For a simple, one-character symbol font such as LightBulb10 it would be reasonable to merge `ubulb.fd` into `lightbulb.sty` instead of maintaining two separate files. In either case, a document need only include “`\usepackage{lightbulb}`” to make the `\lightbulb` symbol available.

```
\newcommand{\lightbulb}{\usefont{U}{bulb}{m}{n}A}
```

Figure 7: $\text{\LaTeX} 2_{\varepsilon}$ style file (`lightbulb.sty`)

METAFONT normally produces bitmapped fonts. However, it is also possible, with the help of some external tools, to produce PostScript Type 1 fonts. These have the advantages of rendering better in Adobe® Acrobat® (at least in versions prior to 6.0) and of being more memory-efficient when handled by a PostScript interpreter. See <http://www.tex.ac.uk/cgi-bin/texfaq2html?label=textrace> for pointers to tools that can produce Type 1 fonts from METAFONT.

10.4 Math-mode spacing

Terms such as “binary operators”, “relations”, and “punctuation” in Section 3 primarily regard the surrounding spacing. (See the Short Math Guide for L^AT_EX [Dow00] for a nice exposition on the subject.) To use a symbol for a different purpose, you can use the T_EX commands `\mathord`, `\mathop`, `\mathbin`, `\mathrel`, `\mathopen`, `\mathclose`, and `\mathpunct`. For example, if you want to use `\downarrow` as a variable (an “ordinary” symbol) instead of a delimiter, you can write `“$3 x + \mathord{\downarrow}$”` to get the properly spaced “ $3x + \downarrow$ ” rather than the awkward-looking “ $3x + \downarrow$ ”. Similarly, to create a dotted-union symbol (“ $\dot{\cup}$ ”) that spaces like the ordinary set-union symbol (`\cup`) it must be defined with `\mathbin`, just as `\cup` is. Contrast `“$A \dot{\cup} B$”` (“ $A \dot{\cup} B$ ”) with `“$A \mathbin{\dot{\cup}} B$”` (“ $A \dot{\cup} B$ ”). See The T_EXbook [Knu86a] for the definitive description of math-mode spacing.

The purpose of the “log-like symbols” in Table 177 and Table 178 is to provide the correct amount of spacing around and within multiletter function names. Table 515 contrasts the output of the log-like symbols with various, naïve alternatives. In addition to spacing, the log-like symbols also handle subscripts properly. For example, “`\max_{p \in P}`” produces “ $\max_{p \in P}$ ” in text, but “ \max ” as part of a displayed formula.

TABLE 515: Spacing Around/Within Log-like Symbols

| L ^A T _E X expression | Output |
|--|------------------------|
| <code>\$r \sin \theta\$</code> | $r \sin \theta$ (best) |
| <code>\$r sin \theta\$</code> | $r sin \theta$ |
| <code>\$r \mbox{sin} \theta\$</code> | $r sin \theta$ |
| <code>\$r \mathrm{sin} \theta\$</code> | $r sin \theta$ |

The `amsmath` package makes it straightforward to define new log-like symbols:

```
\DeclareMathOperator{\atan}{atan}
\DeclareMathOperator*{\lcm}{lcm}
```

The difference between `\DeclareMathOperator` and `\DeclareMathOperator*` involves the handling of subscripts. With `\DeclareMathOperator*`, subscripts are written beneath log-like symbols in display style and to the right in text style. This is useful for limit operators (e.g., `\lim`) and functions that tend to map over a set (e.g., `\min`). In contrast, `\DeclareMathOperator` tells T_EX that subscripts should always be displayed to the right of the operator, as is common for functions that take a single parameter (e.g., `\log` and `\cos`). Table 516 contrasts symbols declared with `\DeclareMathOperator` and `\DeclareMathOperator*` in both text style (`$. . . $`) and display style (`[\dots]`).¹¹

TABLE 516: Defining new log-like symbols

| Declaration function | <code>\$. \newlogsym_{p \in P} \$</code> | <code>[\ \newlogsym_{p \in P} \]</code> |
|------------------------------------|--|--|
| <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 178 utilize this spacing convention.

10.5 Bold mathematical symbols

L^AT_EX 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

¹¹Note that `\displaystyle` can be used to force display style within `$. . . $` 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 517 contrasts the output produced by these various techniques. As the table illustrates, these techniques exhibit variation in their formatting of Latin letters (upright vs. italic), formatting of Greek letters (bold vs. normal), formatting of operators and relations (bold vs. normal), and spacing.

TABLE 517: Producing bold mathematical symbols

| Package | Code | Output | |
|----------------|--|---------------------------------------|--------------|
| <i>none</i> | $\$\\alpha + b = \\Gamma \\div D$$ | $\alpha + b = \Gamma \div D$ | (no bold) |
| <i>none</i> | $\$\\mathbf{\\alpha} + b = \\Gamma \\div D$$ | $\alpha + \mathbf{b} = \Gamma \div D$ | |
| <i>none</i> | $\\boldsymbol{\\alpha} + b = \\Gamma \\div D$$ | $\alpha + \mathbf{b} = \Gamma \div D$ | |
| <i>amsbsy</i> | $\$\\pmb{\\alpha} + b = \\Gamma \\div D$$ | $\alpha + \mathbf{b} = \Gamma \div D$ | (faked bold) |
| <i>amsbsy</i> | $\$\\boldsymbol{\\alpha} + b = \\Gamma \\div D$$ | $\alpha + \mathbf{b} = \Gamma \div D$ | |
| <i>bm</i> | $\$\\bm{\\alpha} + b = \\Gamma \\div D$$ | $\alpha + \mathbf{b} = \Gamma \div D$ | |
| <i>fixmath</i> | $\$\\mathbold{\\alpha} + b = \\Gamma \\div D$$ | $\alpha + \mathbf{b} = \Gamma \div D$ | |

10.6 ASCII and Latin 1 quick reference

Table 518 amalgamates data from various other tables in this document into a convenient reference for L^AT_EX 2_ε 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 L^AT_EX 2_ε command to typeset the character as a text character. And the fourth column lists the L^AT_EX 2_ε command to typeset the character within a `\texttt{...}` command (or, more generally, when `\ttfamily` is in effect).

TABLE 518: L^AT_EX 2_ε 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 | @ | <code>\text{@}</code> | <code>\@</code> |
| 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>\&</code> | <code>\&</code> | 67 | 43 | C | C | C |
| 39 | 27 | , | , | , | 68 | 44 | : | : | : |
| 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>\textasciicircum</code> | <code>\^{}{}</code> |
| 45 | 2D | - | - | - | 95 | 5F | _ | <code>\texttildelow</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 | 100 | 64 | : | : | : |
| 51 | 33 | : | : | : | 101 | 65 | ; | ; | ; |
| 52 | 34 | ; | ; | ; | 102 | 66 | < | <code>\textless</code> | <code>\textless</code> |
| 53 | 35 | < | < | < | 103 | 67 | = | <code>\texttt{=}</code> | <code>=</code> |
| 54 | 36 | = | = | = | 104 | 68 | = | <code>\texttt{=}</code> | <code>=</code> |
| 55 | 37 | > | > | > | 105 | 69 | ~ | <code>\texttt{~}</code> | <code>~</code> |
| 56 | 38 | ^ | ^ | ^ | 106 | 6A | { | <code>\texttt{`}</code> | <code>\`{}</code> |
| 57 | 39 | ^ | ^ | ^ | 107 | 6B | } | <code>\texttt{`}</code> | <code>\`{}</code> |
| 58 | 3A | ~ | ~ | ~ | 108 | 6C | | <code>\texttt{ }</code> | <code> </code> |
| 59 | 3B | ~ | ~ | ~ | 109 | 6D | ~ | <code>\texttt{~}</code> | <code>\~{}{}</code> |
| 60 | 3C | > | > | > | 110 | 6E | ~ | <code>\texttt{~}</code> | <code>\~{}{}</code> |
| 61 | 3D | = | = | = | 111 | 6F | ~ | <code>\texttt{~}</code> | <code>\~{}{}</code> |

The following are some additional notes about the contents of Table 518:

- “” is not available in the OT1 font encoding.
- Table 518 shows a close quote for character 39 for consistency with the open quote shown for character 96. A straight quote can be typeset using `\textquotesingle` (cf. Table 46).
- The characters “<”, “>”, and “|” do work as expected in math mode, although they produce, respectively, “ſ”, “ȝ”, and “—” in text mode when using the OT1 font encoding.¹² The following are some alternatives for typesetting “<”, “>”, and “|”:
 - Specify a document font encoding other than OT1 (as described on page 11).
 - Use the appropriate symbol commands from Table 2 on page 13, viz. `\textless`, `\textgreater`, and `\textbar`.
 - Enter the symbols in math mode instead of text mode, i.e., `$<$`, `$>$`, and `$|$`.

Note that for typesetting metavariables many people prefer `\textlangle` and `\textrangle` to `\textless` and `\textgreater`; i.e., “`\langle filename \rangle`” instead of “`<filename>`”.

- Although “/” does not require any special treatment, L^AT_EX additionally defines a `\slash` command which outputs the same glyph but permits a line break afterwards. That is, “increase/decrease” is always typeset as a single entity while “increase`\slash`decrease” may be typeset with “increase/” on one line and “decrease” on the next.
- `\textasciicircum` can be used instead of `\^{}{}`, and `\textasciitilde` can be used instead of `\~{}{}`. Note that `\textasciitilde` and `\~{}{}` produce raised, diacritic tildes. “Text” (i.e., vertically centered) tildes can be generated with either the math-mode `\sim` command (shown in Table 87 on page 46), which produces a somewhat wide “~”, or the `textcomp` package’s `\texttildelow` (shown in Table 46 on page 26), which produces a vertically centered “~” in most fonts but a baseline-oriented “~” in Computer Modern, `txfonts`, `pxfonts`, and various other fonts originating from the T_EX world. If your goal is to typeset tildes in URLs or Unix filenames, your best bet is to use the `url` package, which has a number of nice features such as proper line-breaking of such names.
- The various `\char` commands within `\texttt` are necessary only in the OT1 font encoding. In other encodings (e.g., T1), commands such as `\{`, `\}`, `_`, and `\textbackslash` all work properly.
- The code page 437 (IBM PC) version of ASCII characters 1 to 31 can be typeset using the `ascii` package. See Table 317 on page 122.
- To replace “‘” and “’” with the more computer-like (and more visibly distinct) “`” and “’” within a `verbatim` environment, use the `upquote` package. Outside of `verbatim`, you can use `\char18` and `\char13` to get the modified quote characters. (The former is actually a grave accent.)

Similar to Table 518, Table 519 on the following page is an amalgamation of data from other tables in this document. While Table 518 shows how to typeset the 7-bit ASCII character set, Table 519 shows the Latin 1 (Western European) character set, also known as ISO-8859-1.

The following are some additional notes about the contents of Table 519:

- A “(tc)” after a symbol name means that the `textcomp` package must be loaded to access that symbol. A “(T1)” means that the symbol requires the T1 font encoding. The `fontenc` package can change the font encoding document-wide.
- Many of the `\text...` accents can also be produced using the accent commands shown in Table 18 on page 19 plus an empty argument. For instance, `\={}` is essentially the same as `\textasciimacron`.
- The commands in the “L^AT_EX 2_ε” columns work both in body text and within a `\textttt{...}` command (or, more generally, when `\ttfamily` is in effect).

¹²Donald Knuth didn’t think such symbols were important outside of mathematics so he omitted them from his text fonts.

TABLE 519: LATEX 2_E Latin 1 Table

| Dec | Hex | Char | LATEX 2 _E | | Dec | Hex | Char | LATEX 2 _E | |
|-----|-----|------|----------------------|------|-----|-----|------|----------------------|------|
| 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 | — | \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 | ‘ | \textasciacute | (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{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 | CO | 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 | Ҫ | \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 “£” and “\$” glyphs occupy the same slot (36) of the OT1 font encoding, with “£” appearing in italic fonts and “\$” appearing in roman fonts. A problem with L^AT_EX’s default handling of this double-mapping is that “{\sffamily\slshape\pounds}” produces “\$”, not “£”. Other font encodings use separate slots for the two characters and are therefore robust to the problem of “£”/“\$” conflicts. Authors who use \pounds should select a font encoding other than OT1 (as explained on page 11) or use the `textcomp` package, which redefines \pounds to use the TS1 font encoding.
- Character 173, \-, is shown as “-” but is actually a discretionary hyphen; it appears only at the end of a line.

Microsoft® Windows® normally uses a superset of Latin 1 called “Code Page 1252” or “CP1252” for short. CP1252 introduces symbols in the Latin 1 “invalid” range (characters 128–159). Table 520 presents the characters with which CP1252 augments the standard Latin 1 table.

TABLE 520: L^AT_EX 2_ε Code Page 1252 Table

| Dec | Hex | Char | L ^A T _E X 2 _ε | | Dec | Hex | Char | L ^A T _E X 2 _ε |
|-----|-----|------|--|------|-----|-----|------|--|
| 128 | 80 | € | \texteuro | (tc) | 145 | 91 | ‘ | ‘ |
| 130 | 82 | , | \quotesinglbase | (T1) | 146 | 92 | , | , |
| 131 | 83 | f | \textit{f} | | 147 | 93 | “ | “ |
| 132 | 84 | „ | \quotedblbase | (T1) | 148 | 94 | ” | ” |
| 133 | 85 | … | \dots | | 149 | 95 | • | \textbullet |
| 134 | 86 | † | \dag | | 150 | 96 | — | -- |
| 135 | 87 | ‡ | \ddag | | 151 | 97 | — | --- |
| 136 | 88 | ^ | \textasciicircum | | 152 | 98 | ~ | \textasciitilde |
| 137 | 89 | % | \textperthousand | (tc) | 153 | 99 | ™ | \texttrademark |
| 138 | 8A | Š | \v{S} | | 154 | 9A | š | \v{s} |
| 139 | 8B | ⟨ | \guilsinglleft | (T1) | 155 | 9B | ⟩ | \guilsinglright (T1) |
| 140 | 8C | Œ | \OE | | 156 | 9C | œ | \oe |
| 142 | 8E | Ž | \v{Z} | | 158 | 9E | ž | \v{z} |
| | | | | | 159 | 9F | Ŷ | \"{Y} |

The following are some additional notes about the contents of Table 520:

- As in Table 519, a “(tc)” after a symbol name means that the `textcomp` package must be loaded to access that symbol. A “(T1)” means that the symbol requires the T1 font encoding. The `fontenc` package can change the font encoding document-wide.
- Not all characters in the 128–159 range are defined.
- Look up “euro signs” in the index for alternatives to \texteuro.

While too large to incorporate into this document, a listing of ISO 8879:1986 SGML/XML character entities and their L^AT_EX equivalents is available from <http://www.bitjungle.com/isoent/>. Some of the characters presented there make use of `isoent`, a L^AT_EX 2_ε package (available from the same URL) that fakes some of the missing ISO glyphs using the L^AT_EX `picture` environment.¹³

10.7 Unicode characters

Unicode is a “universal character set”—a standard for encoding (i.e., assigning unique numbers to) the symbols appearing in many of the world’s languages. While ASCII can represent 128 symbols and Latin 1 can represent 256 symbols, Unicode can represent an astonishing 1,114,112 symbols.

Because T_EX and L^AT_EX predate the Unicode standard and Unicode fonts by almost a decade, support for Unicode has had to be added to the base T_EX and L^AT_EX systems. Note first that L^AT_EX distinguishes between *input* encoding—the characters used in the `.tex` file—and *output* encoding—the characters that appear in the generated `.dvi`, `.pdf`, etc. file.

¹³`isoent` is not featured in this document, because it is not available from CTAN and because the faked symbols are not “true” characters; they exist in only one size, regardless of the body text’s font size.

Inputting Unicode characters

To include Unicode characters in a `.tex` file, load the `ucs` package and load the `inputenc` package with the `utf8x` (“UTF-8 extended”) option.¹⁴ These packages enable \LaTeX to translate UTF-8 sequences to \LaTeX commands, which are subsequently processed as normal. For example, the UTF-8 text “Copyright © 2015”—“©” is not an ASCII character and therefore cannot be input directly without packages such as `ucs`/`inputenc`—is converted internally by `inputenc` to “Copyright \textcopyright{} 2015” and therefore typeset as “Copyright © 2015”.

The `ucs`/`inputenc` combination supports only a tiny subset of Unicode’s million-plus symbols. Additional symbols can be added manually using the `\DeclareUnicodeCharacter` command. `\DeclareUnicodeCharacter` takes two arguments: a Unicode number and a \LaTeX command to execute when the corresponding Unicode character is encountered in the input. For example, the Unicode character “degree celsius” (“°C”) appears at character position U+2103.¹⁵ However, “°C” is not one of the characters that `ucs` and `inputenc` recognize. The following document shows how to use `\DeclareUnicodeCharacter` to tell \LaTeX 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 \LaTeX input file is the ability to include a given Unicode character in the corresponding output file. By far the easiest approach is to use \XeLaTeX instead of \pdfLaTeX or ordinary \LaTeX . \XeLaTeX handles Unicode input and output natively and can utilize system fonts directly without having to expose them via `.tfm`, `.fd`, and other such files. To output a Unicode character, a \XeLaTeX document can either include that character directly as UTF-8 text or use \TeX ’s `\char` primitive, which \XeLaTeX extends to accept numbers larger than 255.

Suppose we want to output the symbols for versicle (“﴿”) and response (“﴿”) in a document. The Unicode charts list “versicle” at position U+2123 and “response” at position U+211F. We therefore need to install a font that contains those characters at their proper positions. One such font that is freely available from CTAN is Junicode (`Junicode.ttf`) from the `junicode` package. The `fontspec` package makes it easy for a \XeLaTeX document to utilize a system font. The following example defines a `\textjuni` command that uses `fontspec` to typeset its argument in Junicode:

```
\documentclass{article}
\usepackage{fontspec}

\newcommand{\textjuni}[1]{{\fontspec{Junicode}\#1} }

\begin{document}
We use '\textjuni{\char"2123}' for a versicle
and '\textjuni{\char"211F}' for a response.
\end{document}
```

¹⁴UTF-8 is the 8-bit Unicode Transformation Format, a popular mechanism for representing Unicode symbol numbers as sequences of one to four bytes.

¹⁵The Unicode convention is to express character positions as “U+*hexadecimal number*”.

which produces

We use “ V ” for a versicle and “ 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 L^AT_EX symbols (Table 50, Table 71, Table 87, Table 137, Table 177, Table 180, Table 214, Table 215, Table 228, Table 236, Table 286, and a few tables that have since been reorganized) and was designed to be nearly identical to the tables in Chapter 3 of Leslie Lamport’s book [Lam86]. Even the table captions and the order of the symbols within each table matched! The *AMS* symbols (Table 51, Table 88, Table 89, Table 140, Table 141, Table 181, Table 190, Table 208, and Table 287) and an initial Math Alphabets table (Table 299) were added thereafter. Later, Alexander Holt provided the `stmaryrd` tables (Table 52, Table 73, Table 90, Table 143, Table 173, and Table 209).

In January, 2001, Scott Pakin took responsibility for maintaining the symbol list and has since implemented a complete overhaul of the document. The result, now called, “The Comprehensive L^AT_EX 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 L^AT_EX
- tables showing how to typeset all of the characters in the ASCII and Latin 1 font encodings

Furthermore, the internal structure of the document has been completely altered from David Carlisle’s original version. Most of the changes are geared towards making the document easier to extend, modify, and reformat.

Build characteristics Table 521 on the next page lists some of this document’s build characteristics. Most important is the list of packages that L^AT_EX couldn’t find, but that `symbols.tex` otherwise would have been able to take advantage of. Complete, prebuilt versions of this document are available from CTAN (<http://www.ctan.org/> or one of its many mirror sites) in the directory `tex-archive/info/symbols/comprehensive`. Table 522 shows the package date (specified in the `.sty` file with `\ProvidesPackage`) for each package that was used to build this document and that specifies a package date. Packages are not listed in any particular order in either Table 521 or Table 522.

TABLE 521: Document Characteristics

| Characteristic | Value |
|---------------------|---|
| Source file: | <code>symbols.tex</code> |
| Build date: | November 30, 2015 |
| Symbols documented: | 14032 |
| Packages included: | textcomp latexsym amssymb stmaryrd euscript wasysym pifont manfnt bbdng undertilde ifsym tipa tipx extraipa wsuipa phonetic uly ar metre txfonts mathabx fclfont skak ascii dingbat skull eurosym esvect yfonts yhmath esint mathdots trsym universa upgreek overrightarrow chemarr chemarrow nath trfsigns mathtools phaistos arcs vietnam t4phonet holtpolt semtrans dictsym extarrows protosem harmony hieroglf cclicenses mathdesign arev MnSymbol fdsymbol boisik cml1 extpfeil keystroke fge turnstile simpsons epsdice feyn staves igo colonequals shuffle fourier dozenal pmboxdraw pigpen clock teubner linearA linearb cyprriot sarabian china2e harpoon steinmetz milstd recycle DotArrow ushort hhcount ogonek combelow musixtex ccicons adfsymbols adforn bigints soyombo tfruee knitting textgreek begriff frege abraces CountriesOfEurope cookingsymbols prodint epiolmec mdwmath rsfso fontawesome stix hands greenpoint nkarta astrosym webomints moonphase dancers semaphor umranda umrandb cryst starfont tikzsymbols dice apl go magic bartel-chess-fants actuarialangle lilyglyphs knot bclogo bullcntr rubikcube svrsymbols accents nicefrac bm junicode mathrsfs chancery urwchancal calligra bbold mbboard dsfont bbm |
| Packages omitted: | <i>none</i> |

TABLE 522: Package versions used in the preparation of this document

| Name | Date | Name | Date | Name | Date |
|------------|------------|-------------|------------|-----------|------------|
| textcomp | 2005/09/27 | latexsym | 1998/08/17 | amssymb | 2013/01/14 |
| stmaryrd | 1994/03/03 | euscript | 2009/06/22 | wasymp | 2003/10/30 |
| pifont | 2005/04/12 | manfnt | 1999/07/01 | bbding | 1999/04/15 |
| undertilde | 2000/08/08 | ifsym | 2000/04/18 | tipa | 2002/08/08 |
| tipx | 2003/01/01 | wsuipa | 1994/07/16 | ar | 2012/01/23 |
| metre | 2001/12/05 | txfonts | 2008/01/22 | mathabx | 2003/07/29 |
| skak | 2013/07/18 | ascii | 2006/05/30 | dingbat | 2001/04/27 |
| skull | 2002/01/23 | eurosym | 1998/08/06 | yfonts | 2003/01/08 |
| mathdots | 2014/06/11 | trsym | 2000/06/25 | universa | 98/08/01 |
| upgreek | 2003/02/12 | chemarr | 2006/02/20 | mathtools | 2015/11/12 |
| phaistos | 2004/04/23 | arcs | 2004/05/09 | t4phonet | 2004/06/01 |
| semtrans | 1998/02/10 | dictsym | 2004/07/26 | extarrows | 2008/05/15 |
| protosem | 2005/03/18 | harmony | 2007/05/04 | hieroglf | 2015/06/02 |
| cclicenses | 2005/05/20 | MnSymbol | 2007/01/21 | fdsymbol | 2011/11/01 |
| boisik | 2009/08/21 | extpfeil | 2009/10/31 | keystroke | 2010/04/23 |
| fge | 2015/05/19 | turnstile | 2007/06/23 | epsdice | 2007/02/15 |
| feyn | 2009/10/08 | colonequals | 2006/08/01 | shuffle | 2008/10/27 |
| dozenal | 2015/01/29 | pmboxdraw | 2011/03/24 | pigpen | 2008/12/07 |
| clock | 2001/04/10 | teubner | 2015/10/25 | linearA | 2006/03/13 |

(continued on next page)

(continued from previous page)

| Name | Date | Name | Date | Name | Date |
|------------|------------|-------------------|------------|----------------|------------|
| linearb | 2005/06/22 | cypriot | 2009/05/22 | sarabian | 2005/11/12 |
| china2e | 1997/06/01 | harpoon | 1994/11/02 | steinmetz | 2009/06/14 |
| milstd | 2009/06/25 | DotArrow | 2007/02/12 | ushort | 2001/06/13 |
| hhcount | 1995/03/31 | ogonek | 95/07/17 | combelow | 2010/05/02 |
| musixtex | 2001/07/08 | ccicons | 2013/04/16 | adforn | 2010/07/25 |
| bigints | 2010/02/15 | soyombo | 1996/09/01 | tfrupee | 2010/12/15 |
| knitting | 2010/08/29 | textgreek | 2011/10/09 | frege | 2012/08/04 |
| abraces | 2012/08/24 | CountriesOfEurope | 2012/04/18 | cookingsymbols | 2014/12/28 |
| epiolmec | 2003/11/05 | mdwmath | 1996/04/11 | fontawesome | 2015/07/30 |
| stix | 2015/04/17 | starfont | 2010/09/29 | tikzsymbols | 2015/10/13 |
| bclogo | 2011/07/06 | bullcntr | 2007/04/02 | rubikcube | 2015/09/25 |
| svrsymbols | 2015/09/01 | accents | 2006/05/12 | nicefrac | 1998/08/04 |
| bm | 2014/10/28 | calligra | 2012/04/10 | | |

10.9 Copyright and license

The Comprehensive L^AT_EX Symbol List

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This work may be distributed and/or modified under the conditions of the L^AT_EX 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^AT_EX 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] L^AT_EX3 Project Team. L^AT_EX 2 _{ε} font selection, January 30, 2000. Available from <http://www.ctan.org/tex-archive/macros/latex/doc/fntguide.pdf> (also included in many T_EX distributions).

Index

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., “ \hat{v} ” for “ \check{v} ”).

Some symbol entries appear to be listed repeatedly. This happens when multiple packages define identical (or nearly identical) glyphs with the same symbol name.¹⁶

| Symbols | |
|---|-----------------------------------|
| $\\"{} (\text{`})$ | 19 |
| $\#\# (\#)$ | 13, 220 |
| $\$ (\$)$ | 13, 14, 220 |
| $\$ (\$)$ | 14 |
| $\% (\%)$ | 13, 220 |
| $\& (\&)$ | 13, 33, 220 |
| $\backslash' (\text{'}')$ | 19 |
| $\langle \rangle (\langle \rangle)$ | 94 |
| $\langle \langle \rangle \rangle (\langle \langle \rangle \rangle)$ | 95 |
| $\langle \langle \langle \rangle \rangle \rangle (\langle \langle \langle \rangle \rangle \rangle)$ | 98 |
| $\rangle \langle \rangle (\rangle \langle \rangle)$ | 94 |
| $\rangle \langle \langle \rangle \rangle (\rangle \langle \langle \rangle \rangle)$ | 95 |
| $\rangle \langle \langle \langle \rangle \rangle \rangle (\rangle \langle \langle \langle \rangle \rangle \rangle)$ | 98 |
| $* (*)$ | 29 |
| $\backslash,$ | 219 |
| $\backslash- (-)$ | 222, 223 |
| $\backslash. (\text{.})$ | 19 |
| $\backslash / (/)$ | 94 |
| $\backslash / (/ \backslash /)$ | 95 |
| $\backslash / (/ \backslash / \backslash /)$ | 98 |
| $\backslash : (:) \dots$ | 109 |
| $\backslash ; (:) \dots$ | 109 |
| $\backslash < (\langle \rangle) \dots$ | 95 |
| $\backslash < (\langle \langle \rangle \rangle) \dots$ | 98 |
| $\backslash ? (:) \dots$ | 109 |
| $\backslash [(]) \dots$ | 94 |
| $\backslash [(] [) \dots$ | 95 |
| $\backslash [(] [) [) \dots$ | 98 |
| $\backslash \backslash \dots$ | 211 |
| $\backslash] (]) \dots$ | 94 |
| $\backslash] (] [) \dots$ | 95 |
| $\backslash] (] [) [) \dots$ | 98 |
| $\backslash ^ (\hat{\ }) \dots$ | 19 |
| $\backslash ^ \{ \} (\text{`}) \dots$ | 13, 221 |
| $\backslash \backslash \langle \rangle (\langle \rangle)$ | 94 |
| $\backslash \backslash \langle \rangle \langle \rangle (\langle \rangle \langle \rangle)$ | 94, 96 |
| $\backslash \backslash \langle \rangle \langle \rangle \langle \rangle (\langle \rangle \langle \rangle \langle \rangle)$ | 19 |
| $\backslash = (\text{=} \text{`}) \dots$ | 19 |
| $\backslash = \{ \} (-) \dots$ | 221 |
| $\backslash () \dots$ | 97 |
| $\backslash (\backslash) \dots$ | 95 |
| $\backslash (\backslash \backslash) \dots$ | 98 |
| $\backslash (\backslash \backslash \backslash) \dots$ | 46, 94, 96, 99 |
| $\backslash (((\dots$ | 97 |
| $\backslash) () \dots$ | 97 |
| $\backslash / (/) \dots$ | 97 |
| $\backslash [([) \dots$ | 97 |
| $\backslash _ \dots$ | 14 |
| $\backslash _ (_) \dots$ | 13, 221 |
| $\backslash \{ \{ \} \dots$ | 13, 14, 94 |
| $\backslash \{ \{ \} \dots$ | 221 |
| $\backslash \} \{ \} \dots$ | 13, 14, 94 |
| $\backslash \} \{ \} \dots$ | 221 |
| $\backslash \} (]) \dots$ | 97 |
| $\backslash ` (\text{`}) \dots$ | 19 |
| $\backslash ^ (\text{`}) \dots$ | 19 |
| $\backslash ^ \{ \} (\text{`}) \dots$ | 13, 221 |
| A | |
| $\backslash a (\text{`})$ | 104 |
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¹⁶This occurs frequently between `amssymb` and `mathabx`, for example.

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| \Pisymbol{dice3d}{101} (🎲) | | 203 | \Pisymbol{dingbat}{98} | | | \Pisymbol{fselch}{15} (👑) | | 204 |
| \Pisymbol{dice3d}{102} (🎲) | | 203 | | | | \Pisymbol{fselch}{16} (👑) | | 204 |
| \Pisymbol{dice3d}{103} (🎲) | | 203 | | | | \Pisymbol{fselch}{17} (👑) | | 204 |
| \Pisymbol{dice3d}{104} (🎲) | | 203 | | | | \Pisymbol{fselch}{18} (👑) | | 204 |
| \Pisymbol{dice3d}{105} (🎲) | | 203 | | | | \Pisymbol{fselch}{19} (👑) | | 204 |
| \Pisymbol{dice3d}{106} (🎲) | | 203 | | | | | | |
| \Pisymbol{dice3d}{107} (🎲) | | 203 | | | | | | |
| \Pisymbol{dice3d}{108} (🎲) | | 203 | | | | | | |

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|----------------------------|-----------|----------------------------|-----------|-------------------------------|-----------|
| \Pisymbol{fselch}{104} (▣) | 205 | \Pisymbol{fselch}{132} (▣) | 205 | \Pisymbol{fselch}{234} (▣) | 205 |
| \Pisymbol{fselch}{105} (▣) | 205 | \Pisymbol{fselch}{133} (▣) | 205 | \Pisymbol{fselch}{240} (▣) | 205 |
| \Pisymbol{fselch}{106} (▣) | 205 | \Pisymbol{fselch}{134} (▣) | 205 | \Pisymbol{fselch}{246} (▣) | 205 |
| \Pisymbol{fselch}{107} (▣) | 205 | \Pisymbol{fselch}{135} (▣) | 205 | \Pisymbol{greenpoint}{71} (◐) | 186 |
| \Pisymbol{fselch}{108} (▽) | 205 | \Pisymbol{fselch}{136} (▣) | 205 | \Pisymbol{hands}{65} (◑) | 186 |
| \Pisymbol{fselch}{109} (▽) | 205 | \Pisymbol{fselch}{137} (▣) | 205 | \Pisymbol{hands}{66} (◑) | 186 |
| \Pisymbol{fselch}{110} (▽) | 204 | \Pisymbol{fselch}{138} (▣) | 205 | \Pisymbol{hands}{67} (◑) | 186 |
| \Pisymbol{fselch}{111} (▬) | 204 | \Pisymbol{fselch}{139} (▣) | 205 | \Pisymbol{hands}{68} (◑) | 186 |
| \Pisymbol{fselch}{112} (▬) | 204 | \Pisymbol{fselch}{140} (▣) | 205 | \Pisymbol{knot1}{48} (□) | 194 |
| \Pisymbol{fselch}{113} (▬) | 204 | \Pisymbol{fselch}{141} (▣) | 205 | \Pisymbol{knot1}{49} (▣) | 194 |
| \Pisymbol{fselch}{114} (▼) | 204 | \Pisymbol{fselch}{142} (▣) | 205 | \Pisymbol{knot1}{50} (▣) | 194 |
| \Pisymbol{fselch}{115} (▼) | 204 | \Pisymbol{fselch}{143} (▣) | 205 | \Pisymbol{knot1}{51} (◆) | 194 |
| \Pisymbol{fselch}{116} (▼) | 204 | \Pisymbol{fselch}{144} (▣) | 205 | \Pisymbol{knot1}{52} (●) | 194 |
| \Pisymbol{fselch}{117} (▬) | 204 | \Pisymbol{fselch}{145} (○) | 205 | \Pisymbol{knot1}{53} (▣) | 194 |
| \Pisymbol{fselch}{118} (▬) | 204 | \Pisymbol{fselch}{151} (○) | 205 | \Pisymbol{knot1}{58} (□) | 194 |
| \Pisymbol{fselch}{119} (◐) | 204 | \Pisymbol{fselch}{157} (●) | 205 | \Pisymbol{knot1}{59} (□) | 194 |
| \Pisymbol{fselch}{120} (▼) | 204 | \Pisymbol{fselch}{163} (○) | 205 | \Pisymbol{knot1}{60} (□) | 194 |
| \Pisymbol{fselch}{121} (▼) | 204 | \Pisymbol{fselch}{169} (○) | 205 | \Pisymbol{knot1}{61} (□) | 194 |
| \Pisymbol{fselch}{122} (▼) | 204 | \Pisymbol{fselch}{175} (●) | 205 | \Pisymbol{knot1}{62} () | 195 |
| \Pisymbol{fselch}{123} (▬) | 204 | \Pisymbol{fselch}{180} (☒) | 205 | \Pisymbol{knot1}{63} (▬) | 195 |
| \Pisymbol{fselch}{124} (▬) | 204 | \Pisymbol{fselch}{186} (☒) | 205 | \Pisymbol{knot1}{64} (◐) | 195 |
| \Pisymbol{fselch}{125} (◐) | 204 | \Pisymbol{fselch}{192} (☒) | 205 | \Pisymbol{knot1}{65} (◑) | 195 |
| \Pisymbol{fselch}{126} (▣) | 204 | \Pisymbol{fselch}{198} (☒) | 205 | \Pisymbol{knot1}{66} (◑) | 195 |
| \Pisymbol{fselch}{127} (◑) | 204 | \Pisymbol{fselch}{204} (☒) | 205 | \Pisymbol{knot1}{67} (◑) | 195 |
| \Pisymbol{fselch}{128} (▣) | 204 | \Pisymbol{fselch}{210} (☒) | 205 | \Pisymbol{knot1}{68} (◑) | 194 |
| \Pisymbol{fselch}{129} (▣) | 204 | \Pisymbol{fselch}{216} (☒) | 205 | \Pisymbol{knot1}{69} (◐) | 194 |
| \Pisymbol{fselch}{130} (▣) | 205 | \Pisymbol{fselch}{222} (☒) | 205 | | |
| \Pisymbol{fselch}{131} (▣) | 205 | \Pisymbol{fselch}{228} (☒) | 205 | | |

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|-------------------------|-----------|-------------------------|-----------|------------------------|-----------|
| \Pisymbol{knot2}{105} (| 195 | \Pisymbol{knot3}{76} (| 195 | \Pisymbol{knot4}{50} (| 196 |
| \Pisymbol{knot3}{48} (| 195 | \Pisymbol{knot3}{77} (| 195 | \Pisymbol{knot4}{51} (| 196 |
| \Pisymbol{knot3}{49} (| 195 | \Pisymbol{knot3}{78} (| 195 | \Pisymbol{knot4}{52} (| 196 |
| \Pisymbol{knot3}{50} (| 195 | \Pisymbol{knot3}{79} (| 195 | \Pisymbol{knot4}{53} (| 196 |
| \Pisymbol{knot3}{51} (| 195 | \Pisymbol{knot3}{80} (| 195 | \Pisymbol{knot4}{58} (| 196 |
| \Pisymbol{knot3}{52} (| 195 | \Pisymbol{knot3}{81} (| 195 | \Pisymbol{knot4}{59} (| 196 |
| \Pisymbol{knot3}{53} (| 195 | \Pisymbol{knot3}{82} (| 195 | \Pisymbol{knot4}{60} (| 196 |
| \Pisymbol{knot3}{58} (| 195 | \Pisymbol{knot3}{83} (| 196 | \Pisymbol{knot4}{61} (| 196 |
| \Pisymbol{knot3}{59} (| 195 | \Pisymbol{knot3}{84} (| 195 | \Pisymbol{knot4}{62} (| 196 |
| \Pisymbol{knot3}{60} (| 195 | \Pisymbol{knot3}{85} (| 195 | \Pisymbol{knot4}{63} (| 196 |
| \Pisymbol{knot3}{61} (| 195 | \Pisymbol{knot3}{86} (| 195 | \Pisymbol{knot4}{64} (| 196 |
| \Pisymbol{knot3}{62} (| 195 | \Pisymbol{knot3}{87} (| 195 | \Pisymbol{knot4}{65} (| 196 |
| \Pisymbol{knot3}{63} (| 195 | \Pisymbol{knot3}{88} (| 195 | \Pisymbol{knot4}{66} (| 196 |
| \Pisymbol{knot3}{64} (| 195 | \Pisymbol{knot3}{96} (| 195 | \Pisymbol{knot4}{67} (| 196 |
| \Pisymbol{knot3}{65} (| 195 | \Pisymbol{knot3}{97} (| 195 | \Pisymbol{knot4}{68} (| 196 |
| \Pisymbol{knot3}{66} (| 195 | \Pisymbol{knot3}{98} (| 195 | \Pisymbol{knot4}{69} (| 196 |
| \Pisymbol{knot3}{67} (| 196 | \Pisymbol{knot3}{99} (| 195 | \Pisymbol{knot4}{70} (| 196 |
| \Pisymbol{knot3}{68} (| 195 | \Pisymbol{knot3}{100} (| 195 | \Pisymbol{knot4}{71} (| 196 |
| \Pisymbol{knot3}{69} (| 195 | \Pisymbol{knot3}{101} (| 195 | \Pisymbol{knot4}{72} (| 196 |
| \Pisymbol{knot3}{70} (| 195 | \Pisymbol{knot3}{102} (| 195 | \Pisymbol{knot4}{73} (| 196 |
| \Pisymbol{knot3}{71} (| 195 | \Pisymbol{knot3}{103} (| 195 | \Pisymbol{knot4}{74} (| 196 |
| \Pisymbol{knot3}{72} (| 195 | \Pisymbol{knot3}{104} (| 195 | \Pisymbol{knot4}{75} (| 196 |
| \Pisymbol{knot3}{73} (| 195 | \Pisymbol{knot3}{105} (| 195 | \Pisymbol{knot4}{76} (| 196 |
| \Pisymbol{knot3}{74} (| 195 | \Pisymbol{knot4}{48} (| 196 | \Pisymbol{knot4}{77} (| 196 |
| \Pisymbol{knot3}{75} (| 195 | \Pisymbol{knot4}{49} (| 196 | \Pisymbol{knot4}{78} (| 196 |

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|---------------------------|---------------------------|------------------------|
| \Pisymbol{knot6}{60} (| \Pisymbol{knot6}{85} (| \Pisymbol{knot7}{63} (|
| 197 | 196 | 197 |
| \Pisymbol{knot6}{61} (| \Pisymbol{knot6}{86} (| \Pisymbol{knot7}{64} (|
| 197 | 196 | 197 |
| \Pisymbol{knot6}{62} () | \Pisymbol{knot6}{87} () | \Pisymbol{knot7}{65} (|
| 197 | 196 | 197 |
| \Pisymbol{knot6}{63} (==) | \Pisymbol{knot6}{88} (| \Pisymbol{knot7}{66} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{64} (| \Pisymbol{knot6}{96} (| \Pisymbol{knot7}{67} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{65} (| \Pisymbol{knot6}{97} (| \Pisymbol{knot7}{68} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{66} (| \Pisymbol{knot6}{98} (| \Pisymbol{knot7}{69} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{67} (| \Pisymbol{knot6}{99} (| \Pisymbol{knot7}{70} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{68} (| \Pisymbol{knot6}{100} (| \Pisymbol{knot7}{71} (|
| 196 | 197 | 197 |
| \Pisymbol{knot6}{69} (| \Pisymbol{knot6}{101} (| \Pisymbol{knot7}{72} (|
| 196 | 197 | 197 |
| \Pisymbol{knot6}{70} (| \Pisymbol{knot6}{102} (| \Pisymbol{knot7}{73} (|
| 196 | 197 | 197 |
| \Pisymbol{knot6}{71} (| \Pisymbol{knot6}{103} (| \Pisymbol{knot7}{74} (|
| 196 | 197 | 197 |
| \Pisymbol{knot6}{72} (| \Pisymbol{knot6}{104} (| \Pisymbol{knot7}{75} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{73} (| \Pisymbol{knot6}{105} (| \Pisymbol{knot7}{76} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{74} (| \Pisymbol{knot7}{48} (| \Pisymbol{knot7}{77} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{75} (| \Pisymbol{knot7}{49} (| \Pisymbol{knot7}{78} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{76} (| \Pisymbol{knot7}{50} (| \Pisymbol{knot7}{79} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{77} (| \Pisymbol{knot7}{51} (◆) | \Pisymbol{knot7}{80} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{78} (| \Pisymbol{knot7}{52} (●) | \Pisymbol{knot7}{81} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{79} (| \Pisymbol{knot7}{53} (| \Pisymbol{knot7}{82} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{80} (| \Pisymbol{knot7}{58} (| \Pisymbol{knot7}{83} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{81} (| \Pisymbol{knot7}{59} (| \Pisymbol{knot7}{84} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{82} (| \Pisymbol{knot7}{60} (| \Pisymbol{knot7}{85} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{83} (| \Pisymbol{knot7}{61} (| \Pisymbol{knot7}{86} (|
| 197 | 197 | 197 |
| \Pisymbol{knot6}{84} (| \Pisymbol{knot7}{62} () | \Pisymbol{knot7}{87} (|
| 196 | 197 | 197 |

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|---------------------------|----|-----------------------------|-----|---------------------------|-----|
| \Pisymbol{knot7}{88} (✉) | . | \Pisymbol{magic}{88} (⊗) | .. | \Pisymbol{nkarta}{64} (□) | .. |
| 197 | | 204 | | 187 | |
| \Pisymbol{knot7}{96} (✉) | . | \Pisymbol{magic}{90} (⊗) | .. | \Pisymbol{nkarta}{65} (*) | .. |
| 197 | | 204 | | 187 | |
| \Pisymbol{knot7}{97} (✉) | . | \Pisymbol{moonphase}{0} (⌚) | .. | \Pisymbol{nkarta}{66} (⌚) | .. |
| 197 | | 188 | | 187 | |
| \Pisymbol{knot7}{98} (✉) | . | \Pisymbol{moonphase}{1} (⌚) | .. | \Pisymbol{nkarta}{67} (⌚) | .. |
| 197 | | 188 | | 187 | |
| \Pisymbol{knot7}{99} (✉) | . | \Pisymbol{moonphase}{2} (⌚) | .. | \Pisymbol{nkarta}{68} (▲) | .. |
| 197 | | 188 | | 187 | |
| \Pisymbol{knot7}{100} (✉) | . | \Pisymbol{moonphase}{3} (⌚) | .. | \Pisymbol{nkarta}{69} (※) | .. |
| 197 | | 188 | | 187 | |
| \Pisymbol{knot7}{101} (✉) | . | \Pisymbol{nkarta}{33} (○) | .. | \Pisymbol{nkarta}{70} (※) | .. |
| 197 | | 186 | | 187 | |
| \Pisymbol{knot7}{102} (✉) | . | \Pisymbol{nkarta}{34} (◎) | .. | \Pisymbol{nkarta}{71} (★) | .. |
| 197 | | 186 | | 187 | |
| \Pisymbol{knot7}{103} (✉) | . | \Pisymbol{nkarta}{35} (△) | .. | \Pisymbol{nkarta}{72} (▬) | .. |
| 197 | | 186 | | 187 | |
| \Pisymbol{knot7}{104} (▬) | . | \Pisymbol{nkarta}{36} (◇) | .. | \Pisymbol{nkarta}{73} (□) | .. |
| 197 | | 186 | | 187 | |
| \Pisymbol{knot7}{105} (▬) | . | \Pisymbol{nkarta}{37} (○) | .. | \Pisymbol{nkarta}{74} (±) | .. |
| 197 | | 186 | | 187 | |
| \Pisymbol{magic}{48} (◎) | .. | \Pisymbol{nkarta}{38} (★) | .. | \Pisymbol{nkarta}{75} (●) | 187 |
| 204 | | 186 | | \Pisymbol{nkarta}{76} (□) | .. |
| \Pisymbol{magic}{49} (①) | .. | \Pisymbol{nkarta}{39} (○) | .. | 187 | |
| 204 | | 186 | | \Pisymbol{nkarta}{77} (▲) | .. |
| \Pisymbol{magic}{50} (②) | .. | \Pisymbol{nkarta}{40} (●) | 186 | 187 | |
| 204 | | \Pisymbol{nkarta}{41} (●) | 186 | \Pisymbol{nkarta}{78} (■) | .. |
| \Pisymbol{magic}{51} (③) | .. | \Pisymbol{nkarta}{42} (★) | .. | 187 | |
| 204 | | 186 | | \Pisymbol{nkarta}{79} (○) | .. |
| \Pisymbol{magic}{52} (④) | .. | \Pisymbol{nkarta}{43} (◊) | .. | 187 | |
| 204 | | 186 | | \Pisymbol{nkarta}{80} (▽) | .. |
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| 204 | | 186 | | \Pisymbol{nkarta}{81} (▬) | .. |
| \Pisymbol{magic}{54} (⑥) | .. | \Pisymbol{nkarta}{45} (✖) | .. | 187 | |
| 204 | | 186 | | \Pisymbol{nkarta}{82} (⊗) | .. |
| \Pisymbol{magic}{55} (⑦) | .. | \Pisymbol{nkarta}{46} (⊗) | .. | 187 | |
| 204 | | 186 | | \Pisymbol{nkarta}{83} (▶) | .. |
| \Pisymbol{magic}{56} (⑧) | .. | \Pisymbol{nkarta}{47} (⊕) | .. | 187 | |
| 204 | | 186 | | \Pisymbol{nkarta}{84} (○) | .. |
| \Pisymbol{magic}{57} (⑨) | .. | \Pisymbol{nkarta}{48} (⊖) | 186 | 187 | |
| 204 | | \Pisymbol{nkarta}{49} (●) | 186 | \Pisymbol{nkarta}{85} (▬) | .. |
| \Pisymbol{magic}{66} (⊗) | .. | \Pisymbol{nkarta}{50} (●) | 187 | 187 | |
| 204 | | \Pisymbol{nkarta}{51} (●) | 187 | \Pisymbol{nkarta}{86} (⌚) | .. |
| \Pisymbol{magic}{71} (⌚) | .. | \Pisymbol{nkarta}{52} (●) | 187 | 187 | |
| 204 | | \Pisymbol{nkarta}{53} (●) | 187 | \Pisymbol{nkarta}{87} (✿) | .. |
| \Pisymbol{magic}{82} (⌚) | .. | \Pisymbol{nkarta}{54} (●) | 187 | 187 | |
| 204 | | \Pisymbol{nkarta}{55} (●) | 187 | \Pisymbol{nkarta}{88} (⌚) | .. |
| \Pisymbol{magic}{84} (⊗) | .. | \Pisymbol{nkarta}{56} (●) | 187 | 187 | |
| 204 | | \Pisymbol{nkarta}{57} (●) | 187 | \Pisymbol{nkarta}{89} (⌚) | .. |
| \Pisymbol{magic}{85} (●) | .. | \Pisymbol{nkarta}{58} (□) | .. | 187 | |
| 204 | | 187 | | \Pisymbol{nkarta}{90} (⌚) | 187 |
| \Pisymbol{magic}{87} (⊗) | .. | \Pisymbol{nkarta}{59} (○) | .. | \Pisymbol{nkarta}{91} (⌚) | .. |
| 204 | | 187 | | 187 | |
| | | \Pisymbol{nkarta}{60} (○) | .. | \Pisymbol{nkarta}{92} (⌚) | .. |
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| | | \Pisymbol{nkarta}{61} (■) | .. | \Pisymbol{nkarta}{93} (⌚) | 187 |
| | | 187 | | \Pisymbol{nkarta}{94} (⌚) | .. |
| | | \Pisymbol{nkarta}{62} (⊗) | .. | 187 | |
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| \Pisymbol{nkarta}{97} (⌚) | | 186 |
| \Pisymbol{nkarta}{98} (⌚) | | 186 |
| \Pisymbol{nkarta}{99} (⌚) | | 186 |
| \Pisymbol{nkarta}{100} (⌚) | | 186 |
| \Pisymbol{nkarta}{101} (⌚) | | 186 |
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| \Pisymbol{nkarta}{103} (⌚) | | 186 |
| \Pisymbol{nkarta}{104} (⌚) | | 186 |
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| \Pisymbol{nkarta}{109} (⌚) | | 186 |
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| \Pisymbol{nkarta}{114} (⌚) | | 187 |
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| \Pisymbol{nkarta}{118} (⌚) | | 187 |
| \Pisymbol{nkarta}{119} (⌚) | | 187 |
| \Pisymbol{nkarta}{120} (⌚) | | 187 |
| \Pisymbol{nkarta}{121} (⌚) | | 187 |
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| \Pisymbol{nkarta}{123} | (⌚) | |
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| \Pisymbol{nkarta}{125} (⌚) | | 187 |
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| \Pisymbol{nkarta}{165} (♣) | | 187 |
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| \Pisymbol{nkarta}{179} (⊗) | | 187 |
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