

The Comprehensive L^AT_EX Symbol List

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12 November 2015

Abstract

This document lists 14030 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/>).

Contents

Contents	1
1	Introduction
1.1	Document Usage
1.2	Frequently Requested Symbols
2	Body-text symbols
Table 1:	I ^A T _E X 2 _{ε} Escapable “Special” Characters
Table 2:	Predefined I ^A T _E X 2 _{ε} Text-mode Commands
Table 3:	I ^A T _E X 2 _{ε} Commands Defined to Work in Both Math and Text Mode
Table 4:	<i>AMS</i> Commands Defined to Work in Both Math and Text Mode
Table 5:	Non-ASCII Letters (Excluding Accented Letters)
Table 6:	textgreek Upright Greek Letters
Table 7:	Letters Used to Typeset African Languages
Table 8:	Letters Used to Typeset Vietnamese
Table 9:	Punctuation Marks Not Found in OT1
Table 10:	pifont Decorative Punctuation Marks
Table 11:	tipa Phonetic Symbols
Table 12:	tipx Phonetic Symbols
Table 13:	wsuipa Phonetic Symbols
Table 14:	wasysym Phonetic Symbols
Table 15:	phonetic Phonetic Symbols
Table 16:	t4phonet Phonetic Symbols
Table 17:	semtrans Transliteration Symbols
Table 18:	Text-mode Accents
Table 19:	tipa Text-mode Accents
Table 20:	extraipa Text-mode Accents
Table 21:	wsuipa Text-mode Accents
Table 22:	phonetic Text-mode Accents
Table 23:	metre Text-mode Accents
Table 24:	t4phonet Text-mode Accents
Table 25:	arcs Text-mode Accents
Table 26:	semtrans Accents
Table 27:	ogonek Accents

^{*}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.

Table 28:	combelow Accents	23
Table 29:	wsipa Diacritics	23
Table 30:	textcomp Diacritics	23
Table 31:	marvosym Diacritics	24
Table 32:	textcomp Currency Symbols	24
Table 33:	marvosym Currency Symbols	24
Table 34:	fontawesome Currency Symbols	24
Table 35:	wasysym Currency Symbols	24
Table 36:	Q̄N̄A2e Currency Symbols	25
Table 37:	teubner Currency Symbols	25
Table 38:	tfrupee Currency Symbols	25
Table 39:	eurosym Euro Signs	25
Table 40:	fourier Euro Signs	25
Table 41:	textcomp Legal Symbols	25
Table 42:	fontawesome Legal Symbols	25
Table 43:	ccllicenses Creative Commons License Icons	26
Table 44:	ccicons Creative Commons License Icons	26
Table 45:	textcomp Old-style Numerals	26
Table 46:	Miscellaneous textcomp Symbols	26
Table 47:	Miscellaneous wasysym Text-mode Symbols	26

3 Mathematical symbols 27

Table 48:	Math-Mode Versions of Text Symbols	27
Table 49:	cml1 Unary Operators	27
Table 50:	Binary Operators	28
Table 51:	\mathcal{AM} S Binary Operators	28
Table 52:	stmaryrd Binary Operators	28
Table 53:	wasysym Binary Operators	29
Table 54:	txfonts/pxfonts Binary Operators	29
Table 55:	mathabx Binary Operators	29
Table 56:	MnSymbol Binary Operators	29
Table 57:	fdsymbol Binary Operators	30
Table 58:	boisik Binary Operators	31
Table 59:	stix Binary Operators	32
Table 60:	mathdesign Binary Operators	32
Table 61:	cml1 Binary Operators	33
Table 62:	shuffle Binary Operators	33
Table 63:	ulsy Geometric Binary Operators	33
Table 64:	mathabx Geometric Binary Operators	33
Table 65:	MnSymbol Geometric Binary Operators	34
Table 66:	fdsymbol Geometric Binary Operators	34
Table 67:	boisik Geometric Binary Operators	35
Table 68:	stix Geometric Binary Operators	36
Table 69:	stix Small Integrals	36
Table 70:	stix Small Integrals with Explicit Slant	37
Table 71:	Variable-sized Math Operators	37
Table 72:	\mathcal{AM} S Variable-sized Math Operators	38
Table 73:	stmaryrd Variable-sized Math Operators	38
Table 74:	wasysym Variable-sized Math Operators	38
Table 75:	mathabx Variable-sized Math Operators	38
Table 76:	txfonts/pxfonts Variable-sized Math Operators	39
Table 77:	esint Variable-sized Math Operators	40
Table 78:	bigints Variable-sized Math Operators	41
Table 79:	MnSymbol Variable-sized Math Operators	41
Table 80:	fdsymbol Variable-sized Math Operators	42
Table 81:	boisik Variable-sized Math Operators	43
Table 82:	stix Variable-sized Math Operators	43
Table 83:	stix Integrals with Explicit Slant	44

Table 84:	mathdesign Variable-sized Math Operators	46
Table 85:	prodint Variable-sized Math Operators	46
Table 86:	cml Large Math Operators	46
Table 87:	Binary Relations	46
Table 88:	<i>AMS</i> Binary Relations	47
Table 89:	<i>AMS</i> Negated Binary Relations	47
Table 90:	stmaryrd Binary Relations	47
Table 91:	wasysym Binary Relations	47
Table 92:	txfonts/pfxfonts Binary Relations	48
Table 93:	txfonts/pfxfonts Negated Binary Relations	48
Table 94:	mathabx Binary Relations	48
Table 95:	mathabx Negated Binary Relations	49
Table 96:	MnSymbol Binary Relations	49
Table 97:	MnSymbol Negated Binary Relations	50
Table 98:	fdsymbol Binary Relations	51
Table 99:	fdsymbol Negated Binary Relations	53
Table 100:	boisik Binary Relations	54
Table 101:	boisik Negated Binary Relations	54
Table 102:	stix Binary Relations	55
Table 103:	stix Negated Binary Relations	56
Table 104:	mathtools Binary Relations	56
Table 105:	turnstile Binary Relations	57
Table 106:	trsym Binary Relations	58
Table 107:	trfsigns Binary Relations	58
Table 108:	cml Binary Relations	58
Table 109:	colonequals Binary Relations	58
Table 110:	fourier Binary Relations	58
Table 111:	Subset and Superset Relations	58
Table 112:	<i>AMS</i> Subset and Superset Relations	59
Table 113:	stmaryrd Subset and Superset Relations	59
Table 114:	wasysym Subset and Superset Relations	59
Table 115:	txfonts/pfxfonts Subset and Superset Relations	59
Table 116:	mathabx Subset and Superset Relations	59
Table 117:	MnSymbol Subset and Superset Relations	60
Table 118:	fdsymbol Subset and Superset Relations	60
Table 119:	boisik Subset and Superset Relations	60
Table 120:	stix Subset and Superset Relations	61
Table 121:	Inequalities	61
Table 122:	<i>AMS</i> Inequalities	61
Table 123:	wasysym Inequalities	62
Table 124:	txfonts/pfxfonts Inequalities	62
Table 125:	mathabx Inequalities	62
Table 126:	MnSymbol Inequalities	63
Table 127:	fdsymbol Inequalities	64
Table 128:	boisik Inequalities	65
Table 129:	stix Inequalities	65
Table 130:	<i>AMS</i> Triangle Relations	66
Table 131:	stmaryrd Triangle Relations	66
Table 132:	mathabx Triangle Relations	66
Table 133:	MnSymbol Triangle Relations	67
Table 134:	fdsymbol Triangle Relations	68
Table 135:	boisik Triangle Relations	68
Table 136:	stix Triangle Relations	68
Table 137:	Arrows	69
Table 138:	Harpoons	69
Table 139:	textcomp Text-mode Arrows	69
Table 140:	<i>AMS</i> Arrows	69
Table 141:	<i>AMS</i> Negated Arrows	69

Table 142: <i>AMS</i> Harpoons	69
Table 143: stmaryrd Arrows	70
Table 144: txfonts/pxfonts Arrows	70
Table 145: mathabx Arrows	70
Table 146: mathabx Negated Arrows	70
Table 147: mathabx Harpoons	71
Table 148: MnSymbol Arrows	71
Table 149: MnSymbol Negated Arrows	72
Table 150: MnSymbol Harpoons	74
Table 151: MnSymbol Negated Harpoons	74
Table 152: fdsymbol Arrows	75
Table 153: fdsymbol Negated Arrows	76
Table 154: fdsymbol Harpoons	78
Table 155: fdsymbol Negated Harpoons	79
Table 156: boisik Arrows	79
Table 157: boisik Negated Arrows	80
Table 158: boisik Harpoons	80
Table 159: stix Arrows	81
Table 160: stix Negated Arrows	83
Table 161: stix Harpoons	83
Table 162: harpoon Extensible Harpoons	84
Table 163: chemarrow Arrows	84
Table 164: fge Arrows	84
Table 165: MnSymbol Spoons	84
Table 166: MnSymbol Pitchforks	84
Table 167: MnSymbol Smiles and Frowns	85
Table 168: fdsymbol Spoons	85
Table 169: fdsymbol Pitchforks	86
Table 170: fdsymbol Smiles and Frowns	86
Table 171: ulsy Contradiction Symbols	86
Table 172: Extension Characters	86
Table 173: stmaryrd Extension Characters	86
Table 174: txfonts/pxfonts Extension Characters	86
Table 175: mathabx Extension Characters	86
Table 176: stix Extension Characters	87
Table 177: Log-like Symbols	87
Table 178: <i>AMS</i> Log-like Symbols	87
Table 179: QPA2e Number Sets	87
Table 180: Greek Letters	88
Table 181: <i>AMS</i> Greek Letters	88
Table 182: txfonts/pxfonts Upright Greek Letters	89
Table 183: upgreek Upright Greek Letters	89
Table 184: fourier Variant Greek Letters	89
Table 185: txfonts/pxfonts Variant Latin Letters	90
Table 186: boisik Variant Greek Letters	90
Table 187: boisik Variant Latin Letters	90
Table 188: stix Variant Greek Letters	90
Table 189: stix Transformed Greek Letters	90
Table 190: <i>AMS</i> Hebrew Letters	90
Table 191: MnSymbol Hebrew Letters	90
Table 192: fdsymbol Hebrew Letters	90
Table 193: boisik Hebrew Letters	90
Table 194: stix Hebrew Letters	91
Table 195: Letter-like Symbols	91
Table 196: <i>AMS</i> Letter-like Symbols	91
Table 197: txfonts/pxfonts Letter-like Symbols	91
Table 198: mathabx Letter-like Symbols	91
Table 199: MnSymbol Letter-like Symbols	91

Table 200:	<i>fdsymbol</i> Letter-like Symbols	92
Table 201:	<i>boisik</i> Letter-like Symbols	92
Table 202:	<i>stix</i> Letter-like Symbols	92
Table 203:	<i>trfsigns</i> Letter-like Symbols	92
Table 204:	<i>mathdesign</i> Letter-like Symbols	92
Table 205:	<i>fge</i> Letter-like Symbols	92
Table 206:	<i>fourier</i> Letter-like Symbols	93
Table 207:	<i>cml1</i> Letter-like Symbols	93
Table 208:	<i>\mathcal{MS}</i> Delimiters	93
Table 209:	<i>stmaryrd</i> Delimiters	93
Table 210:	<i>mathabx</i> Delimiters	93
Table 211:	<i>boisik</i> Delimiters	93
Table 212:	<i>stix</i> Delimiters	93
Table 213:	<i>nath</i> Delimiters	93
Table 214:	Variable-sized Delimiters	94
Table 215:	Large, Variable-sized Delimiters	94
Table 216:	<i>\mathcal{MS}</i> Variable-sized Delimiters	94
Table 217:	<i>stmaryrd</i> Variable-sized Delimiters	94
Table 218:	<i>mathabx</i> Variable-sized Delimiters	95
Table 219:	<i>MnSymbol</i> Variable-sized Delimiters	95
Table 220:	<i>fdsymbol</i> Variable-sized Delimiters	96
Table 221:	<i>stix</i> Variable-sized Delimiters	97
Table 222:	<i>mathdesign</i> Variable-sized Delimiters	98
Table 223:	<i>nath</i> Variable-sized Delimiters (Double)	99
Table 224:	<i>nath</i> Variable-sized Delimiters (Triple)	99
Table 225:	<i>fourier</i> Variable-sized Delimiters	99
Table 226:	<i>textcomp</i> Text-mode Delimiters	99
Table 227:	<i>metre</i> Text-mode Delimiters	100
Table 228:	Math-mode Accents	100
Table 229:	<i>\mathcal{MS}</i> Math-mode Accents	100
Table 230:	<i>MnSymbol</i> Math-mode Accents	100
Table 231:	<i>fdsymbol</i> Math-mode Accents	101
Table 232:	<i>boisik</i> Math-mode Accents	101
Table 233:	<i>stix</i> Math-mode Accents	101
Table 234:	<i>fge</i> Math-mode Accents	101
Table 235:	<i>yhmath</i> Math-mode Accents	101
Table 236:	Extensible Accents	102
Table 237:	<i>overrightarrow</i> Extensible Accents	102
Table 238:	<i>yhmath</i> Extensible Accents	102
Table 239:	<i>\mathcal{MS}</i> Extensible Accents	102
Table 240:	<i>MnSymbol</i> Extensible Accents	103
Table 241:	<i>fdsymbol</i> Extensible Accents	103
Table 242:	<i>stix</i> Extensible Accents	103
Table 243:	<i>mathtools</i> Extensible Accents	104
Table 244:	<i>mathabx</i> Extensible Accents	104
Table 245:	<i>fourier</i> Extensible Accents	104
Table 246:	<i>esvect</i> Extensible Accents	104
Table 247:	<i>abraces</i> Extensible Accents	105
Table 248:	<i>undertilde</i> Extensible Accents	105
Table 249:	<i>ushort</i> Extensible Accents	105
Table 250:	<i>mdwmath</i> Extensible Accents	105
Table 251:	<i>actuarialangle</i> Extensible Accents	105
Table 252:	<i>\mathcal{MS}</i> Extensible Arrows	105
Table 253:	<i>mathtools</i> Extensible Arrows	106
Table 254:	<i>chemarr</i> Extensible Arrows	106
Table 255:	<i>chemarrow</i> Extensible Arrows	106
Table 256:	<i>extarrows</i> Extensible Arrows	106
Table 257:	<i>extpfeil</i> Extensible Arrows	107

Table 258: DotArrow Extensible Arrows	107
Table 259: trfsigns Extensible Transform Symbols	107
Table 260: holtpolt Non-commutative Division Symbols	107
Table 261: Dots	107
Table 262: <i>AMS</i> Dots	108
Table 263: wasysym Dots	108
Table 264: MnSymbol Dots	108
Table 265: fdsymbol Dots	108
Table 266: stix Dots	109
Table 267: mathdots Dots	109
Table 268: yhmath Dots	109
Table 269: teubner Dots	109
Table 270: begriff Begriffsschrift Symbols	109
Table 271: frege Begriffsschrift Symbols	110
Table 272: mathcomp Math Symbols	110
Table 273: marvosym Math Symbols	110
Table 274: marvosym Digits	110
Table 275: fge Digits	110
Table 276: dozenal Base-12 Digits	110
Table 277: mathabx Mayan Digits	110
Table 278: stix Infinities	111
Table 279: stix Primes	111
Table 280: stix Empty Sets	111
Table 281: <i>AMS</i> Angles	111
Table 282: MnSymbol Angles	111
Table 283: fdsymbol Angles	111
Table 284: boisik Angles	111
Table 285: stix Angles	112
Table 286: Miscellaneous L ^A T _E X 2 _ε Math Symbols	112
Table 287: Miscellaneous <i>AMS</i> Math Symbols	112
Table 288: Miscellaneous wasysym Math Symbols	112
Table 289: Miscellaneous txfonts/pfxfonts Math Symbols	112
Table 290: Miscellaneous mathabx Math Symbols	113
Table 291: Miscellaneous MnSymbol Math Symbols	113
Table 292: Miscellaneous Internal MnSymbol Math Symbols	113
Table 293: Miscellaneous fdsymbol Math Symbols	113
Table 294: Miscellaneous boisik Math Symbols	114
Table 295: Miscellaneous stix Math Symbols	114
Table 296: Miscellaneous textcomp Text-mode Math Symbols	114
Table 297: Miscellaneous fge Math Symbols	115
Table 298: Miscellaneous mathdesign Math Symbols	115
Table 299: Math Alphabets	116
4 Science and technology symbols	118
Table 300: gensymb Symbols Defined to Work in Both Math and Text Mode	118
Table 301: wasysym Electrical and Physical Symbols	118
Table 302: ifsym Pulse Diagram Symbols	118
Table 303: ar Aspect Ratio Symbol	118
Table 304: textcomp Text-mode Science and Engineering Symbols	118
Table 305: steinmetz Extensible Phasor Symbol	119
Table 306: wasysym Astronomical Symbols	119
Table 307: marvosym Astronomical Symbols	119
Table 308: fontawesome Astronomical Symbols	119
Table 309: mathabx Astronomical Symbols	120
Table 310: stix Astronomical Symbols	120
Table 311: starfont Astronomical Symbols	120
Table 312: wasysym APL Symbols	121
Table 313: stix APL Symbols	121

Table 314: <code>apl</code> APL Symbols	121
Table 315: <code>marvosym</code> Computer Hardware Symbols	121
Table 316: <code>keystroke</code> Computer Keys	122
Table 317: <code>ascii</code> Control Characters (CP437)	122
Table 318: <code>logic</code> Logic Gates	123
Table 319: <code>marvosym</code> Communication Symbols	123
Table 320: <code>marvosym</code> Engineering Symbols	123
Table 321: <code>wasysym</code> Biological Symbols	123
Table 322: <code>stix</code> Biological Symbols	124
Table 323: <code>marvosym</code> Biological Symbols	124
Table 324: <code>fontawesome</code> Biological Symbols	124
Table 325: <code>marvosym</code> Safety-related Symbols	124
Table 326: <code>feyn</code> Feynman Diagram Symbols	125
Table 327: <code>svrsymbols</code> Physics Ideograms	125
5 Dingbats	126
Table 328: <code>bbdng</code> Arrows	126
Table 329: <code>pifont</code> Arrows	126
Table 330: <code>adfsymbols</code> Arrows	126
Table 331: <code>adforn</code> Arrows	127
Table 332: <code>arev</code> Arrows	127
Table 333: <code>fontawesome</code> Arrows	127
Table 334: <code>fontawesome</code> Chevrons	127
Table 335: <code>marvosym</code> Scissors	127
Table 336: <code>bbdng</code> Scissors	127
Table 337: <code>pifont</code> Scissors	127
Table 338: <code>dingbat</code> Pencils	128
Table 339: <code>arev</code> Pencils	128
Table 340: <code>fontawesome</code> Pencils	128
Table 341: <code>bbdng</code> Pencils and Nibs	128
Table 342: <code>pifont</code> Pencils and Nibs	128
Table 343: <code>dingbat</code> Fists	128
Table 344: <code>bbdng</code> Fists	128
Table 345: <code>pifont</code> Fists	128
Table 346: <code>fourier</code> Fists	129
Table 347: <code>arev</code> Fists	129
Table 348: <code>fontawesome</code> Fists	129
Table 349: <code>bbdng</code> Crosses and Plususes	129
Table 350: <code>pifont</code> Crosses and Plususes	129
Table 351: <code>adfsymbols</code> Crosses and Plususes	129
Table 352: <code>arev</code> Crosses	129
Table 353: <code>bbdng</code> Xs and Check Marks	129
Table 354: <code>pifont</code> Xs and Check Marks	130
Table 355: <code>wasysym</code> Xs and Check Marks	130
Table 356: <code>marvosym</code> Xs and Check Marks	130
Table 357: <code>arev</code> Xs and Check Marks	130
Table 358: <code>fontawesome</code> Xs and Check Marks	130
Table 359: <code>pifont</code> Circled Numerals	130
Table 360: <code>wasysym</code> Stars	130
Table 361: <code>bbdng</code> Stars, Flowers, and Similar Shapes	131
Table 362: <code>pifont</code> Stars, Flowers, and Similar Shapes	131
Table 363: <code>adfsymbols</code> Stars, Flowers, and Similar Shapes	131
Table 364: <code>adforn</code> Stars	131
Table 365: <code>fontawesome</code> Stars	132
Table 366: <code>fourier</code> Fleurons and Flowers	132
Table 367: <code>adforn</code> Fleurons and Flowers	132
Table 368: <code>wasysym</code> Geometric Shapes	132
Table 369: <code>MnSymbol</code> Geometric Shapes	132

Table 370: <i>fdsymbol</i> Geometric Shapes	133
Table 371: <i>boisik</i> Geometric Shapes	133
Table 372: <i>stix</i> Geometric Shapes	133
Table 373: <i>ifsym</i> Geometric Shapes	135
Table 374: <i>bbdng</i> Geometric Shapes	135
Table 375: <i>pifont</i> Geometric Shapes	136
Table 376: <i>universa</i> Geometric Shapes	136
Table 377: <i>adfsymbols</i> Geometric Shapes	136
Table 378: <i>fontawesome</i> Geometric Shapes	136
Table 379: L ^A T _E X 2 _ε Playing-Card Suits	136
Table 380: txfonts/pfxfonts Playing-Card Suits	136
Table 381: MnSymbol Playing-Card Suits	136
Table 382: <i>fdsymbol</i> Playing-Card Suits	136
Table 383: <i>boisik</i> Playing-Card Suits	136
Table 384: <i>stix</i> Playing-Card Suits	137
Table 385: <i>arev</i> Playing-Card Suits	137
Table 386: <i>adforn</i> Flourishes	137
Table 387: Miscellaneous dingbat Dingbats	137
Table 388: Miscellaneous bbdng Dingbats	137
Table 389: Miscellaneous pifont Dingbats	137
Table 390: Miscellaneous adforn Dingbats	137
6 Ancient languages	138
Table 391: <i>phaistos</i> Symbols from the Phaistos Disk	138
Table 392: <i>protosem</i> Proto-Semitic Characters	138
Table 393: <i>hieroglf</i> Hieroglyphics	139
Table 394: <i>linearA</i> Linear A Script	139
Table 395: <i>linearb</i> Linear B Basic and Optional Letters	142
Table 396: <i>linearb</i> Linear B Numerals	142
Table 397: <i>linearb</i> Linear B Weights and Measures	142
Table 398: <i>linearb</i> Linear B Ideograms	143
Table 399: <i>linearb</i> Unidentified Linear B Symbols	143
Table 400: <i>cypriot</i> Cypriot Letters	143
Table 401: <i>sarabian</i> South Arabian Letters	144
Table 402: <i>teubner</i> Archaic Greek Letters and Greek Numerals	144
Table 403: <i>boisik</i> Archaic Greek Letters and Greek Numerals	144
Table 404: <i>epiolmec</i> Epi-Olmec Script	144
Table 405: <i>epiolmec</i> Epi-Olmec Numerals	146
7 Musical symbols	147
Table 406: L ^A T _E X 2 _ε Musical Symbols	147
Table 407: <i>textcomp</i> Musical Symbols	147
Table 408: <i>wasysym</i> Musical Symbols	147
Table 409: MnSymbol Musical Symbols	147
Table 410: <i>fdsymbol</i> Musical Symbols	147
Table 411: <i>boisik</i> Musical Symbols	147
Table 412: <i>stix</i> Musical Symbols	147
Table 413: <i>arev</i> Musical Symbols	147
Table 414: MusiXT _E X Musical Symbols	148
Table 415: MusiXT _E X Alternative Clefs	149
Table 416: <i>harmony</i> Musical Symbols	149
Table 417: <i>harmony</i> Musical Accents	149
Table 418: <i>lilyglyphs</i> Single Notes	150
Table 419: <i>lilyglyphs</i> Beamed Notes	150
Table 420: <i>lilyglyphs</i> Clefs	151
Table 421: <i>lilyglyphs</i> Time Signatures	151
Table 422: <i>lilyglyphs</i> Accidentals	151

Table 423: <i>lilyglyphs</i> Rests	151
Table 424: <i>lilyglyphs</i> Dynamics Letters	152
Table 425: <i>lilyglyphs</i> Dynamics Symbols	152
Table 426: <i>lilyglyphs</i> Articulations	152
Table 427: <i>lilyglyphs</i> Scripts	152
Table 428: <i>lilyglyphs</i> Accordion Notation	152
Table 429: <i>lilyglyphs</i> Named Time Signatures	153
Table 430: <i>lilyglyphs</i> Named Scripts	153
Table 431: <i>lilyglyphs</i> Named Rests	154
Table 432: <i>lilyglyphs</i> Named Pedals	154
Table 433: <i>lilyglyphs</i> Named Flags	155
Table 434: <i>lilyglyphs</i> Named Custodes	155
Table 435: <i>lilyglyphs</i> Named Clefs	156
Table 436: <i>lilyglyphs</i> Named Noteheads	157
Table 437: <i>lilyglyphs</i> Named Accordion Symbols	161
Table 438: <i>lilyglyphs</i> Named Accidentals	162
Table 439: <i>lilyglyphs</i> Named Arrowheads	162
Table 440: <i>lilyglyphs</i> Named Alphanumerics and Punctuation	163
Table 441: Miscellaneous <i>lilyglyphs</i> Named Musical Symbols	163
8 Other symbols	164
Table 442: <i>textcomp</i> Genealogical Symbols	164
Table 443: <i>wasysym</i> General Symbols	164
Table 444: <i>manfnt</i> Dangerous Bend Symbols	164
Table 445: Miscellaneous <i>manfnt</i> Symbols	164
Table 446: <i>marvosym</i> Media Control Symbols	164
Table 447: <i>marvosym</i> Laundry Symbols	165
Table 448: <i>marvosym</i> Information Symbols	165
Table 449: Other <i>marvosym</i> Symbols	165
Table 450: Miscellaneous <i>universa</i> Symbols	165
Table 451: Miscellaneous <i>fourier</i> Symbols	165
Table 452: <i>ifsym</i> Weather Symbols	166
Table 453: <i>ifsym</i> Alpine Symbols	166
Table 454: <i>ifsym</i> Clocks	166
Table 455: Other <i>ifsym</i> Symbols	166
Table 456: <i>clock</i> Clocks	167
Table 457: <i>epsdice</i> Dice	167
Table 458: <i>hhcount</i> Dice	167
Table 459: <i>stix</i> Dice	167
Table 460: <i>bullcntr</i> Tally Markers	168
Table 461: <i>hhcount</i> Tally Markers	168
Table 462: <i>dozenal</i> Tally Markers	168
Table 463: <i>skull</i> Symbols	169
Table 464: Non-Mathematical <i>mathabx</i> Symbols	169
Table 465: <i>skak</i> Chess Informator Symbols	169
Table 466: <i>skak</i> Chess Pieces and Chessboard Squares	170
Table 467: <i>igo</i> Go Symbols	170
Table 468: <i>go</i> Go Symbols	171
Table 469: <i>metre</i> Metrical Symbols	171
Table 470: <i>metre</i> Small and Large Metrical Symbols	171
Table 471: <i>teubner</i> Metrical Symbols	172
Table 472: <i>dictsym</i> Dictionary Symbols	172

Table 473: simpsons Characters from <i>The Simpsons</i>	172
Table 474: pmboxdraw Box-Drawing Symbols	173
Table 475: staves Magical Staves	173
Table 476: pigpen Cipher Symbols	174
Table 477: GrN2e Phases of the Moon	174
Table 478: GrN2e Recycling Symbols	174
Table 479: marvosym Recycling Symbols	175
Table 480: recycle Recycling Symbols	175
Table 481: Other GrN2e Symbols	175
Table 482: soyombo Soyombo Symbols	175
Table 483: knitting Knitting Symbols	176
Table 484: CountriesOfEurope Country Maps	176
Table 485: Miscellaneous arev Symbols	178
Table 486: cookingsymbols Cooking Symbols	178
Table 487: tikzsymbols Cooking Symbols	179
Table 488: tikzsymbols Emoticons	179
Table 489: tikzsymbols 3D Emoticons	179
Table 490: tikzsymbols Trees	179
Table 491: Miscellaneous tikzsymbols Symbols	180
Table 492: Miscellaneous bclogo Symbols	180
Table 493: fontawesome Web-Related Icons	181
Table 494: rubikcube Rubik's Cube Rotations	185
9 Fonts with minimal L^AT_EX support	186
Table 495: hands Fists	186
Table 496: greenpoint Recycling Symbols	186
Table 497: nkarta Map Symbols	186
Table 498: moonphase Astronomical Symbols	188
Table 499: astrosym Astronomical Symbols	188
Table 500: webomints Decorative Borders	191
Table 501: umranda Decorative Borders	192
Table 502: umrandb Decorative Borders	193
Table 503: dingbat Decorative Borders	194
Table 504: knot Celtic Knots	194
Table 505: dancers Dancing Men	198
Table 506: semaphor Semaphore Alphabet	200
Table 507: cryst Crystallography Symbols	202
Table 508: dice Dice	203
Table 509: magic Trading Card Symbols	204
Table 510: bartel-chess-fonts Chess Pieces and Chessboard Squares	204
10 Additional Information	206
10.1 Symbol Name Clashes	206
10.2 Resizing symbols	206
10.3 Where can I find the symbol for ...?	206
10.4 Math-mode spacing	219
10.5 Bold mathematical symbols	219
10.6 ASCII and Latin 1 quick reference	220
10.7 Unicode characters	223
10.8 About this document	225
10.9 Copyright and license	227
References	228
Index	229

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 14030 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
í, ï, ī, ī, etc. (versus í, ï, ī, and ī)	19	⋮	47
¢	24	:= and ::=	48
€	24	≤ and ≥	61
©, ®, and ™	25	⋮⋮	109
%	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	\textlrcorner	\textvisible
>	\textgreater		\textspace

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	ð	\DH*	ł	\L	ø	\o	ß	\ss
Å	\AA	ð	\dh*	ł	\l	ø	\o	SS	\SS
Æ	\AE	ð	\DJ*	-	\NG*	Œ	\OE	Þ	\TH*
æ	\ae	ð	\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{V}
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{z}
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	ڳ	\texthtb	ڙ	\textrtailz
ڳ	\textbarg	ڳ	\texthtbardotlessj	ڻ	\textrhook
߱	\textbarglotstop	߱	\texthtc	߳	\textsca
߲	\textbari	߲	\texthtd	߲	\textscb
߳	\textbarl	߳	\texthtg	߳	\textscce
ߴ	\textbaro	ߴ	\texthth	ߴ	\textscg
ߵ	\textbarrevglotstop	ߵ	\texttheng	ߵ	\textsch
߶	\textbaru	߶	\texthtk	߶	\textschwa
߷	\textbeltl	߷	\texthtp	߷	\textsci
߸	\textbeta	߸	\texthtq	߸	\textscj
߹	\textbullseye	߹	\texthttaild	߹	\textsccl
ߺ	\textcelpal	ߺ	\texthtscg	ߺ	\textscn
߻	\textchi	߻	\texthtt	߻	\textcoelig
߻	\textcloseepsilon	߻	\texthvlig	߻	\textscomega
߻	\textcloseomega	߻	\textinvglotstop	߻	\textscr
߻	\textcloserevepsilon	߻	\textinvscr	߻	\textscripta
߻	\textcommatailz	߻	\textiot	߻	\textscriptg
߻	\textcorner	߻	\textlambda	߻	\textscriptv
߻	\textcrb	߻	\textlengthmark	߻	\textscu
߻	\textcrd	߻	\textlhookt	߻	\textscy
߻	\textcrg	߻	\textlhtlongi	߻	\textsecstress
߻	\textcrh	߻	\textlhtlongy	߻	\textsoftsign
߻	\textcrinvglotstop	߻	\textlonglegr	߻	\textstretchc
߻	\textcrlambda	߻	\textlptr	߻	\texttctclig
߻	\textcrtwo	߻	\textltailm	߻	\textteshlig
߻	\textctc	߻	\textltailn	߻	\texttheta
߻	\textctd	߻	\textltilde	߻	\textthorn
߻	\textcdctzlig	߻	\textlyoghligr	߻	\texttoneletterstem
߻	\textctesh	߻	\textobardotlessj	߻	\texttslig
߻	\textctj	߻	\textolyoghligr	߻	\textturna
߻	\textctn	߻	\textomega	߻	\textturncelig
߻	\textctt	߻	\textopencorner	߻	\textturnh
߻	\textcttctclig	߻	\textopeno	߻	\textturnrnk
߻	\textctyogh	߻	\textpalhook	߻	\textturnlonglegr
߻	\textcttz	߻	\textphi	߻	\textturnnm
߻	\textdctzlig	߻	\textpipe	߻	\textturnmrleg
߻	\textdoublebaresh	߻	\textprimstress	߻	\textturnr
߻	\textdoublebarpipe	߻	\textraiseglotstop	߻	\textturnrrtail
߻	\textdoublebarslash	߻	\textraisevibyi	߻	\textturnscripta
߻	\textdoublepipe	߻	\textramshorns	߻	\textturnrt
߻	\textdoublevertline	߻	\textrevapostrophe	߻	\textturnrv
߻	\textdownstep	߻	\textreve	߻	\textturnw
߻	\textdyoghlig	߻	\textrevesilon	߻	\textturny
߻	\textdzlig	߻	\textrevglotstop	߻	\textupsilon
߻	\textepsilon	߻	\textrevyogh	߻	\textupstep
߻	\textesh	߻	\textrhokrevepsilon	߻	\textvertline
߻	\textfishhookr	߻	\textrhookschwa	߻	\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
n	\textfrbarn	ଲ	\textpipevar	ପ୍ର	\textthornvarii
ڏ	\textfrhookd	କ୍ଷ	\textqlig	ପ୍ର	\textthornvariii
ڏ	\textfrhookdvar	ମ୍ବ	\textrectangle	ପ୍ର	\textthornvariv
t	\textfrhookt	ମ୍ବ	\textretractingvar	ଲ୍ଲ	\textturnglotstop
ڦ	\textfrtailgamma	ଙ୍ଗ	\textrevscl	କ୍ଷ	\textturnsck
ڦ	\textglotstopvari	ଙ୍ଗ	\textrevscr	ନ୍ତ୍ର	\textturnscu
ڦ	\textglotstopvari	ଅ୍ର	\textrhooka	୯	\textturnthree
ڦ	\textglotstopvari	େୟ	\textrhooke	୧୦	\textturntwo
ڦ	\textgrgamma	େୟ	\textrhookepsilon	୭	\textuncrfemale
ڦ	\textheng	ୱେୟ	\textrhookopeno	୧୧	\textupfullarrow
hm	\texthmlig	ଫ୍ଲେୟ	\textrtailhth		

TABLE 13: wsipa Phonetic Symbols

γ	\babygamma	η	\eng	η_j	\labdentalnas	θ	\schwa
\flat	\barb	σ^*	\er	\sharp	\latfric	I	\sci
$\ddot{\text{d}}$	\bard	\int	\esh	\sqcup	\legm	N	\scn
$\dot{\text{i}}$	\bari	\eth		\sqcap	\legr	R	\scr
$\ddot{\text{t}}$	\barl	r	\flapr	\natural	\lz	a	\scripta
e	\baro	?	\glotstop	α	\nialpha	g	\scriptg
p	\barp	b	\hookb	β	\nibeta	v	\scriptv
$\ddot{\text{f}}$	\barsci	d	\hookd	χ	\nichi	U	\scu
w	\barscu	g	\hookg	ε	\niepsilon	Y	\scy
u	\baru	h	\hookh	γ	\nigamma	y	\slashb
\odot	\clickb	h	\hookheng	ι	\niota	z	\slashc
C	\clickc	z	\hookrevepsilon	λ	\nilambda	d	\slashd
t	\clickt	hv		ω	\niomega	y	\slashu
w	\closedniomega	v	\inva	ϕ	\niph	d	\taild
o	\closedrevepsilon	j	\invf	σ	\nisigma	l	\tailinvr
b	\crossb	s	\invglotstop	θ	\nitheta	l	\taill
d	\crossd	q	\invh	υ	\niupsilon	n	\tailn
h	\crossh	x	\invlegr	j	\nj	r	\tailr
x	\crossnilambda	w	\invvm	∞	\oo	s	\tails
c	\curlyc	x	\invr	\circ	\openo	t	\tailt
f	\curlyesh	v	\invscr	e	\reve	z	\tailz
z	\curlyyogh	w	\invscripta	f	\reject	f	\tesh
z	\curlyz	a	\invv	g	\revepsilon	p	\thorn
t	\dlbari	m	\invw	h	\revglotstop	t	\tildel
dʒ	\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	p	\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
nj	\emgma	B	\ausaB	h	\planck	x	\roty	o	\varopeno
ny	\engma	b	\ausab	a	\pwedge	e	\schwa	v	\vod
ju	\enya	d	\ausad	D	\revD	p	\thorn	f	\voicedh
e	\epsi	D	\ausaD	v	\riota	u	\ubar	z	\yogh
f	\esh	k	\ausak	u	\rotm	q	\udesc		
ð	\eth	K	\ausak	o	\rotOmega	a	\vara		
fj	\fj	d	\hookd	a	\rotr	g	\varg		

TABLE 16: `t4phonet` Phonetic Symbols

\ddot{d}	<code>\textcrd</code>	\ddot{f}	<code>\texthtd</code>	\mid	<code>\textpipe</code>
\ddot{h}	<code>\textcrh</code>	\ddot{k}	<code>\texthtk</code>	\ddot{d}	<code>\textrtaild</code>
ε	<code>\textepsilon</code>	$\ddot{\rho}$	<code>\texthtp</code>	\ddot{t}	<code>\textrtailt</code>
\mathfrak{f}	<code>\textesh</code>	\mathfrak{f}	<code>\texthtt</code>	\mathfrak{d}	<code>\textschwa</code>
\mathfrak{fj}	<code>\textfjlig</code>	\mathfrak{i}	<code>\textiota</code>	\mathfrak{f}	<code>\textscriptv</code>
\mathfrak{b}	<code>\texthtb</code>	\mathfrak{n}	<code>\textltailn</code>	\mathfrak{g}	<code>\textteshlig</code>
\mathfrak{c}	<code>\texthtc</code>	\mathfrak{o}	<code>\textopeno</code>	\mathfrak{z}	<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

\rightarrow `\Alif` \leftarrow `\Ayn`

TABLE 18: Text-mode Accents

$\ddot{A}a$	<code>\\"{A}\\"{a}</code>	$\dot{A}a$	<code>\ {A}\ {a}‡</code>	$\hat{A}a$	<code>\f{A}\f{a}¶</code>	$\breve{A}a$	<code>\t{A}\t{a}</code>
$\acute{A}a$	<code>\'{A}\'{a}</code>	$\tilde{A}a$	<code>\~{A}\~{a}</code>	$\ddot{A}a$	<code>\G{A}\G{a}‡</code>	$\check{A}a$	<code>\u{A}\u{a}</code>
$\grave{A}a$	<code>\.{A}\.{a}</code>	$\underline{A}a$	<code>\b{A}\b{a}</code>	$\acute{A}a$	<code>\H{A}\H{a}</code>	$\ddot{A}a$	<code>\U{A}\U{a}‡</code>
$\bar{A}a$	<code>\={A}\={a}</code>	$\dot{\underline{A}}a$	<code>\c{A}\c{a}</code>	$\grave{\underline{A}}a$	<code>\k{A}\k{a}†</code>	$\check{\underline{A}}a$	<code>\U{A}\U{a}¶</code>
$\hat{A}a$	<code>\^{A}\^{a}</code>	$\ddot{\underline{A}}a$	<code>\C{A}\C{a}¶</code>	$\acute{\underline{A}}a$	<code>\r{A}\r{a}</code>	$\breve{\underline{A}}a$	<code>\v{A}\v{a}</code>
$\grave{\underline{A}}a$	<code>\`{A}\`{a}</code>	$\dot{\underline{\dot{A}}}a$	<code>\d{A}\d{a}</code>	$\acute{\underline{\dot{A}}}a$	<code>\h{A}\h{a}§</code>		
$\hat{\underline{A}}a$	<code>\~{A}\~{a}</code>						

$\hat{A}a$ `\newtie{A}\newtie{a}*` \circledcirc{A} `\textcircled{A}\textcircled{a}`

* Requires the `textcomp` package.

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

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

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

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

Also note the existence of `\i` and `\j`, which produce dotless versions of “i” and “j” (viz., “ı” and “ј”). 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 “naï̄ve” 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}	<code>\hill{A}\hill{a}</code>	\dot{a}	<code>\rc{A}\rc{a}</code>	\tilde{a}	<code>\ut{A}\ut{a}</code>
\ddot{a}	<code>\od{A}\od{a}</code>	\ddot{a}	<code>\syl{A}\syl{a}</code>		
$\hat{\dot{a}}$	<code>\ohill{A}\ohill{a}</code>	$\ddot{\dot{a}}$	<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}	<code>\acutus{A}\acutus{a}</code>
\breve{a}	<code>\breve{A}\breve{a}</code>
\tilde{a}	<code>\circumflexus{A}\circumflexus{a}</code>
\ddot{a}	<code>\diaeresis{A}\diaeresis{a}</code>
\grave{a}	<code>\gravis{A}\gravis{a}</code>
\bar{a}	<code>\macron{A}\macron{a}</code>

TABLE 24: t4phonet Text-mode Accents

\ddot{a}	<code>\textdoublegrave{A}\textdoublegrave{a}</code>
\ddot{a}	<code>\textvbaraccent{A}\textvbaraccent{a}</code>
\ddot{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}	<code>\overarc{A}\overarc{a}</code>	\underline{a}	<code>\underarc{A}\underarc{a}</code>
---------------	-------------------------------------	-----------------	---------------------------------------

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

At the time of this writing (2015/11/12), there exists an incompatibility between the `arcs` package and the `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 “ $\mathcal{O}\mathcal{X}$ ” (`\mathcal{O}x` or `\mathcal{O}\mathcal{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	$\backslash sqcup$

(continued on next page)

(continued from previous page)

\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
\diamonddots	\minus	\vee
\div	\minusdot	\veedot
\dotmedvert	\mp	\vertbowtie
\dotminus	\neswbipropto	\vertdiv
\doublecap	\nwsebipropto	\wedge
\doublecup	\plus	\wedgedot
\doublecurlyvee	\pm	\wreath
\doublecurlywedge	\righthalfcap	
\doublesqcap	\righthalfcup	

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

TABLE 57: *fdsymbol* Binary Operators

\amalg	\doublevee	\rtimes
\ast	\doublewedge	\setminus
\barwedge	\downY	\sqcap
\cap	\dtimes	\sqcapdot
\capdot	\hddotdot	\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

(continued on next page)

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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>\smallscpoints</code>	\int	<code>\smallscpointup</code>
\int	<code>\smallsqints</code>	\int	<code>\smallsqintup</code>
\int	<code>\smallsumints</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

\iint	$\iint\iint$	\iiint	\iiiiint	\iiiiiiint	\iiiiiiiiint
\iiiiiiiiiiint	\iiiiiiiiiiiiint	\iiiiiiiiiiiiiiint	$\int \cdots \int$	$\int \cdots \int$	\idotsint

TABLE 73: *stmaryrd* Variable-sized Math Operators

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

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

$\int\int$	$\int\int\int$	$\int\int\int\int$	$\int\int\int\int\int$	$\int\int\int\int\int\int$	$\int\int\int\int\int\int\int$
$\oint\oint$	$\oint\oint\oint$	$\oint\oint\oint\oint$	$\oint\oint\oint\oint\oint$	$\oint\oint\oint\oint\oint\oint$	$\oint\oint\oint\oint\oint\oint\oint$

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	$\oplus\oplus$	\bigright
$\square\square$	\bigsqcap	$\boxtimes\boxtimes$	\bigboxtimes	$\oslash\oslash$	\bigslash
$\curlywedge\curlywedge$	\bigcurlywedge	$\boxdot\boxdot$	\bigboxtop	$\ominus\ominus$	\bigotop

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$\boxtimes \boxtimes$	<code>\bigboxasterisk</code>	$\triangle \triangle$	<code>\bigboxtriangleup</code>	$\circlearrowleft \circlearrowright$	<code>\bigotriangleup</code>
$\boxminus \boxminus$	<code>\bigboxbackslash</code>	$\square \square$	<code>\bigboxvoid</code>	$\circlearrowright \circlearrowright$	<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>	$\circleddash \circleddash$	<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/pfxfonts 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>	\iiij	\iiij	<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

$$\int \quad \int \quad \backslash intup$$

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

TABLE 82: `stix` Variable-sized Math Operators

$\textstyle \int$	$\textstyle \int$	<code>\awint</code>	$\textstyle \coprod$	$\textstyle \coprod$	<code>\coprod</code>	$\textstyle \oint$	$\textstyle \oint$	<code>\oiint</code>
\sum	\sum	<code>\Bbbsum</code>	$\textstyle \bigvee$	$\textstyle \bigvee$	<code>\disjquant</code>	$\textstyle \ointint$	$\textstyle \ointint$	<code>\oiint</code>
\cap	\cap	<code>\bigcap</code>	$\textstyle \int$	$\textstyle \int$	<code>\fint</code>	$\textstyle \oint$	$\textstyle \oint$	<code>\oint</code>
\cup	\cup	<code>\bigcup</code>	$\textstyle \iiint$	$\textstyle \iiint$	<code>\iiiint</code>	$\textstyle \ointcclockwise$	$\textstyle \ointcclockwise$	<code>\ointctrcclockwise</code>
\uplus	\uplus	<code>\bigcupdot</code>	$\textstyle \iiiiint$	$\textstyle \iiiiint$	<code>\iiiiint</code>	$\textstyle \ointint$	$\textstyle \ointint$	<code>\ointint</code>
\odot	\odot	<code>\bigodot</code>	$\textstyle \iint$	$\textstyle \iint$	<code>\iint</code>	$\textstyle \prod$	$\textstyle \prod$	<code>\prod</code>
\oplus	\oplus	<code>\bigoplus</code>	$\textstyle \int$	$\textstyle \int$	<code>\int</code>	$\textstyle \rppointint$	$\textstyle \rppointint$	<code>\rppointint</code>
\otimes	\otimes	<code>\bigotimes</code>	$\textstyle \int$	$\textstyle \int$	<code>\intbar</code>	$\textstyle \scpointint$	$\textstyle \scpointint$	<code>\scpointint</code>
\sqcap	\sqcap	<code>\bigsqcap</code>	$\textstyle \int$	$\textstyle \int$	<code>\intBar</code>	$\textstyle \sqoint$	$\textstyle \sqoint$	<code>\sqoint</code>
\sqcup	\sqcup	<code>\bigsqcup</code>	$\textstyle \oint$	$\textstyle \oint$	<code>\intcap</code>	$\textstyle \sum$	$\textstyle \sum$	<code>\sum</code>
\parallel	\parallel	<code>\bigtalloblong</code>	$\textstyle \int$	$\textstyle \int$	<code>\intclockwise</code>	$\textstyle \oint$	$\textstyle \oint$	<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/pxfonts 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>	$\geq\leq$	<code>\succeqq</code>
$\approx\approx$	<code>\Colonsim</code>	$\bullet\circ$	<code>\multimapdotbothB</code>	$\asymp\asymp$	<code>\succneqq</code>
$\vdash\vdash$	<code>\Eqcolon</code>	$\bullet\circ\circ$	<code>\multimapdotbothBvert</code>	$//$	<code>\varparallel</code>
$\vdash\vdash$	<code>\eqcolon</code>	$\bullet\bullet\circ$	<code>\multimapdotbothvert</code>	$\backslash\backslash$	<code>\varparallelinv</code>
$\vdash\vdash$	<code>\eqqcolon</code>	$\bullet\bullet\bullet$	<code>\multimapdotinv</code>	$\nparallel\nparallel$	<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/pxfonts, a “:=” symbol can be constructed with “`\mathrel{\mathop:}=`”.

TABLE 93: txfonts/pxfonts Negated Binary Relations

$\not\approx$	<code>\napproxeq</code>	$\not\approx$	<code>\npreccurlyeq</code>	$\not\approx$	<code>\nthickapprox</code>
$\not\ast$	<code>\nasmp</code>	$\not\asymp$	<code>\npreceqq</code>	$\not\ll$	<code>\ntwoheadleftarrow</code>
$\not\prec$	<code>\backsim</code>	$\not\prec$	<code>\nprecsim</code>	$\not\gg$	<code>\ntwoheadrightarrow</code>
$\not\approx$	<code>\backsimeq</code>	$\not\approx$	<code>\nsimeq</code>	$\not\#$	<code>\nvarparallel</code>
$\not\approx$	<code>\bumpeq</code>	$\not\approx$	<code>\nsuccapprox</code>	$\not\#$	<code>\nvarparallelinv</code>
$\not\approx$	<code>\Bumpeq</code>	$\not\approx$	<code>\nsucccurlyeq</code>	$\not\#$	<code>\nVdash</code>
$\not\approx$	<code>\nequiv</code>	$\not\approx$	<code>\nsucceqq</code>		
$\not\approx$	<code>\precapprox</code>	$\not\approx$	<code>\succcsim</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>	\doteq	<code>\eqbumped</code>	$\asymp\asymp$	<code>\succcurlyeq</code>
\doteq	<code>\bumpedeq</code>	$=$	<code>\eqcirc</code>	$\triangleright\triangleright$	<code>\succdot</code>
\doteq	<code>\circeq</code>	$=$	<code>\eqcolon</code>	$\asymp\asymp$	<code>\succsim</code>
\doteq	<code>\coloneq</code>	\doteq	<code>\fallingdotseq</code>	$\therefore\therefore$	<code>\therefore</code>
\doteq	<code>\corresponds</code>	\gg	<code>\ggcurly</code>	$\doteq\doteq$	<code>\topdoteq</code>
\asymp	<code>\curlyeqprec</code>	\ll	<code>\llcurly</code>	$\models\models$	<code>\vDash</code>
\asymp	<code>\curlyeqsucc</code>	\asymp	<code>\precapprox</code>	$\models\models$	<code>\Vdash</code>
\dashv	<code>\DashV</code>	\asymp	<code>\preccurlyeq</code>	$\models\models$	<code>\VDash</code>
\dashv	<code>\Dashv</code>	\doteq	<code>\precdot</code>	$\models\models$	<code>\Vvdash</code>
\dashv	<code>\dashvVv</code>	\asymp	<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>\nwDash</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>
$\bar{\models}$	<code>\equivvclosed</code>	\models	<code>\rightmodels</code>	\times	<code>\vcrossing</code>
$\bar{\doteq}$	<code>\fallingdotseq</code>	\Vdash	<code>\rightModels</code>	\Vdash	<code>\Vdash</code>

MnSymbol additionally defines synonyms for some of the preceding symbols:

\dashv	<code>\dashv</code>	(same as <code>\leftVdash</code>)
\diagdown	<code>\diagdown</code>	(same as <code>\nwseLine</code>)
\diagup	<code>\diagup</code>	(same as <code>\neswLine</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>	$\mp\neq$	<code>\nrightModels</code>	$\not\asymp$	<code>\precnapprox</code>
$\not\equiv$	<code>\neswcrossing</code>	\mp	<code>\nrightmodels</code>	$\not\asymp$	<code>\precnSIM</code>
$\not\equiv$	<code>\nfallingdotseq</code>	\mp	<code>\nrightvDash</code>	$\not\asymp$	<code>\succnapprox</code>
$\not\equiv$	<code>\nhateq</code>	$\mp\neq$	<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>)
$\mp\neq$	<code>\nVdash</code>	(same as <code>\nrightVdash</code>)
$\mp\neq$	<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>	\cong	<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>	\shortmid	<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>	\approx	<code>\kernelcontraction</code>	$\not\simeq$	<code>\simneqq</code>
\bowtie	<code>\bowtie</code>	\prec	<code>\leftdbltail</code>	\approx	<code>\simrdots</code>
\Bumpeq	<code>\Bumpeq</code>	\succ	<code>\leftfishtail</code>	\circ	<code>\smallfrown</code>
\bumpeq	<code>\bumpeq</code>	\prec	<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>	\dashv	<code>\longdashv</code>	$\#$	<code>\smeparsl</code>
\cirmid	<code>\cirmid</code>	\sqcup	<code>\lsqhook</code>	$\circ)$	<code>\smile</code>
\closure	<code>\closure</code>	$\equiv\equiv$	<code>\measeq</code>	\star	<code>\stareq</code>
\Coloneq	<code>\Coloneq</code>	\mid	<code>\mid</code>	\succ	<code>\succ</code>
\coloneq	<code>\coloneq</code>	$\circ\mid$	<code>\midcir</code>	\gg	<code>\Succ</code>
\cong	<code>\cong</code>	\dagger	<code>\mlcp</code>	$\approx\approx\approx$	<code>\succapprox</code>
\congdot	<code>\congdot</code>	π	<code>\models</code>	$\approx\approx\approx$	<code>\succcurlyeq</code>
\curlyeqprec	<code>\curlyeqprec</code>	\multimap		$\approx\approx\approx$	<code>\succceq</code>
\curlyeqsucc	<code>\curlyeqsucc</code>	\multimapinv		$\approx\approx\approx$	<code>\succceqq</code>
\dashcolon	<code>\dashcolon</code>	\ni		$\approx\approx\approx$	<code>\succnapprox</code>
\dashv	<code>\dashv</code>	$\ni\bar{}$	<code>\niabar</code>	$\approx\approx\approx$	<code>\succcneq</code>
\dashV	<code>\dashV</code>	$\ni\circ$	<code>\nis</code>	$\approx\approx\approx$	<code>\succcneqq</code>
\Dashv	<code>\Dashv</code>	$\ni\circ\circ$	<code>\nisd</code>	$\approx\approx\approx$	<code>\succcnsim</code>
\DashV	<code>\DashV</code>	\sqcap	<code>\Not</code>	$\approx\approx\approx$	<code>\succcsim</code>
\DashVDash	<code>\DashVDash</code>	$/$	<code>\notchar</code>	$\approx\approx\approx$	<code>\thickapprox</code>
\DashVdash	<code>\DashVdash</code>	$\circ\bullet$	<code>\origof</code>	$\approx\approx\approx$	<code>\thicksim</code>
$\ddot{\cdot}$	<code>\ddot{\cdot}</code>	$=$	<code>\parallel</code>	$\approx\approx\approx$	<code>\topfork</code>
\disin	<code>\disin</code>	\nexists	<code>\parsim</code>	$\approx\approx\approx$	<code>\upfishtail</code>
\Doteq	<code>\Doteq</code>	\perp	<code>\perp</code>	$\approx\approx\approx$	<code>\upin</code>
\doteq	<code>\doteq</code>	$\circ\perp$	<code>\pitchfork</code>	$\approx\approx\approx$	<code>\varisobar</code>
\dotequiv	<code>\dotequiv</code>	\wedge	<code>\prec</code>	$\approx\approx\approx$	<code>\varisins</code>
\dotsim	<code>\dotsim</code>	$\approx\approx$	<code>\Prec</code>	$\approx\approx\approx$	<code>\varniobar</code>
\dotsminusdots	<code>\dotsminusdots</code>	$\approx\approx\approx$	<code>\precapprox</code>	$\approx\approx\approx$	<code>\varnis</code>
\downfishtail	<code>\downfishtail</code>	$\approx\approx\approx$	<code>\preccurlyeq</code>	$\approx\approx\approx$	<code>\varproto</code>
\dualmap	<code>\dualmap</code>	$\approx\approx\approx$	<code>\preceq</code>	$\approx\approx\approx$	<code>\varVdash</code>
\eparsl	<code>\eparsl</code>	$\approx\approx\approx$	<code>\preceqq</code>	$\approx\approx\approx$	<code>\vBar</code>
\eqcirc	<code>\eqcirc</code>	$\approx\approx\approx$	<code>\precnapprox</code>	$\approx\approx\approx$	<code>\Vbar</code>
\eqcolon	<code>\eqcolon</code>	$\approx\approx\approx$	<code>\precneq</code>	$\approx\approx\approx$	<code>\vBarv</code>
\eqdef	<code>\eqdef</code>	$\approx\approx\approx$	<code>\precneqq</code>	$\approx\approx\approx$	<code>\Vdash</code>
\eqdot	<code>\eqdot</code>	$\approx\approx\approx$	<code>\precnsim</code>	$\approx\approx\approx$	<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>
\eqsim	<code>\eqsim</code>	\curlyeqsucc	<code>\prurel</code>	\vDash	<code>\vDash</code>
\eqsim	<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>\Vvdash</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>	$\not\dagger$	<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>	$\not\dagger$	<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>	\coloneqq	<code>\coloneq</code>	$\cdots\cdots$	<code>\Eqcolon</code>
\approx	<code>\colonapprox</code>	\approx	<code>\colonsim</code>	$=$	<code>\eqqcolon</code>
\coloneqq	<code>\coloneqq</code>	$\approx\approx$	<code>\Colonsim</code>	$=\cdots$	<code>\Eqqcolon</code>
$\coloneqq\coloneqq$	<code>\Coloneqq</code>	$\cdots\cdots$	<code>\dblcolon</code>		
$\coloneqq\coloneqq$	<code>\Coloneqq</code>	$\cdots\cdots$	<code>\eqcolon</code>		

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

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

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

$\not\subseteq$	$\backslash nsubseteqq$	\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	$\backslash sqsupset$
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TABLE 115: *txfonts/pffonts* Subset and Superset Relations

$\not\sqsubset$	$\backslash nsqsubset$	$\not\sqsupset$	$\backslash nsqsupseteq$	$\not\sqsupseteq$	$\backslash nSupset$
$\not\sqsubset$	$\backslash nsqsubseteq$	$\not\sqsupseteq$	$\backslash nSubset$		
$\not\sqsupset$	$\backslash nsqsupset$	$\not\sqsubseteq$	$\backslash nsubseteqq$		

TABLE 116: *mathabx* Subset and Superset Relations

\nsubseteq	$\backslash nsqsubset$	\nsubseteq	$\backslash nsupset$	\sqsubseteq	$\backslash sqsupseteqq$	\sqsubseteq	$\backslash supseteqq$
\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	$\backslash varsqsubsetneq$
\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	$\backslash Supset$
$\not\sqsupseteqq$	$\backslash nsqsupset$	$\not\sqsupseteqq$	$\backslash nsupseteqq$	$\not\sqsupseteqq$	$\backslash sqsupseteqq$	\sqsupseteq	$\backslash supset$
$\not\sqsupseteqq$	$\backslash nsqsupseteq$	$\not\sqsupseteqq$	$\backslash Sqsubset$	$\not\sqsupseteqq$	$\backslash sqsupsetneq$	\sqsupseteq	$\backslash supseteq$
$\not\sqsupsetneq$	$\backslash nsqsupseteqq$	$\not\sqsupsetneq$	$\backslash sqsubset$	$\not\sqsupsetneq$	$\backslash sqsupsetneqq$	\sqsupseteq	$\backslash supseteqq$
$\not\sqsubseteq$	$\backslash nSubset$	$\not\sqsubseteq$	$\backslash sqsubseteq$	$\not\sqsubseteq$	$\backslash Subset$	$\not\sqsubseteq$	$\backslash supsetneq$
$\not\sqsubset$	$\backslash nsubset$	$\not\sqsubset$	$\backslash sqsubseteqq$	$\not\sqsubset$	$\backslash subset$	$\not\sqsubset$	$\backslash supsetneqq$

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	$\backslash supset$
$\not\sqsupseteqq$	$\backslash nsqsupset$	$\not\sqsupseteqq$	$\backslash nsupseteqq$	$\not\sqsupseteqq$	$\backslash sqsupseteqq$	\sqsupseteq	$\backslash Supset$
$\not\sqsupseteqq$	$\backslash nsqsupseteq$	$\not\sqsupseteqq$	$\backslash Sqsubset$	$\not\sqsupseteqq$	$\backslash sqsupsetneq$	\sqsupseteq	$\backslash supseteq$
$\not\sqsupsetneq$	$\backslash nsqsupseteqq$	$\not\sqsupsetneq$	$\backslash sqsubset$	$\not\sqsupsetneq$	$\backslash sqsupsetneqq$	\sqsupseteq	$\backslash supseteqq$
$\not\sqsubseteq$	$\backslash nsubset$	$\not\sqsubseteq$	$\backslash sqsubseteq$	$\not\sqsubseteq$	$\backslash subset$	$\not\sqsubseteq$	$\backslash supsetneq$
$\not\sqsubset$	$\backslash nSubset$	$\not\sqsubset$	$\backslash sqsubseteqq$	$\not\sqsubset$	$\backslash Subset$	$\not\sqsubset$	$\backslash supsetneqq$

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	$\backslash supsetplus$
$\not\subset$	$\backslash nsubseteq$	\equiv	$\backslash sqSupset$	\in	$\backslash subsetplus$	$\not\subseteq$	$\backslash varsubsetneq$
$\not\sqsubseteq$	$\backslash nsubseteqq$	\sqsubset	$\backslash sqsupset$	\ni	$\backslash Supset$	$\not\subseteq$	$\backslash varsubsetneqq$
$\not\sqsubset$	$\backslash nsupset$	\equiv	$\backslash Subset$	\ni	$\backslash supseteqq$	$\not\subseteq$	$\backslash varsupsetneq$
$\not\sqsupseteq$	$\backslash nsupseteq$	\equiv	$\backslash subsequeq$	$\not\subseteq$	$\backslash supsetneq$	\ni	$\backslash varsupsetneq$
$\not\sqsupseteqq$	$\backslash nsupseteqq$	$\not\subseteq$	$\backslash subsetneq$	$\not\subseteq$	$\backslash supsetneqq$	\ni	$\backslash varsupsetneqq$
\sqsubset	$\backslash sqsubset$	$\not\subseteq$	$\backslash subsetneqq$	\ni	$\backslash supsetplus$		

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>\leftarrowsubset</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>\subsetapprox</code>	\supsetdot	<code>\supsetdot</code>
\sqsupset	<code>\nsqsupset</code>	\supseteq	<code>\subsetcirc</code>	\supseteq	<code>\supseteq</code>
\sqsupseteq	<code>\nsqsupseteq</code>	\supseteqq	<code>\subsetdot</code>	\supseteqq	<code>\supseteqq</code>
\sqsubset	<code>\nssubset</code>	\subsetq	<code>\subseteq</code>	\supsetneq	<code>\supsetneq</code>
\sqsubseteq	<code>\nssubseteq</code>	\subsetqq	<code>\subseteqq</code>	\supsetneqq	<code>\supsetneqq</code>
\sqsubsetqq	<code>\nssubseteqq</code>	\subsetqqq	<code>\subsetneq</code>	\supsetplus	<code>\supsetplus</code>
\sqsupset	<code>\nsupset</code>	\supseteqq	<code>\subsetneqq</code>	\supsim	<code>\supsim</code>
\sqsupseteq	<code>\nsupseteq</code>	\supseteqqq	<code>\subsetneqqq</code>	\supsub	<code>\supsub</code>
\sqsupseteqq	<code>\nsupseteqq</code>	\supseteqqqq	<code>\subsetneqqqq</code>	\supsup	<code>\supsup</code>
$\rightarrow\supset$	<code>\rightarrowsupset</code>	\supsub	<code>\supsub</code>	\varsubsetneq	<code>\varsubsetneq</code>
\sqsubset	<code>\sqsubset</code>	\supsup	<code>\supsup</code>	\varsubsetneqq	<code>\varsubsetneqq</code>
\sqsupseteq	<code>\sqsubseteq</code>	\supdsub	<code>\supdsub</code>	\varsupsetneq	<code>\varsupsetneq</code>
\sqsupsetneq	<code>\sqsubsetneq</code>	\supedot	<code>\supedot</code>	\varsupsetneqq	<code>\varsupsetneqq</code>
\sqsupset	<code>\sqsubset</code>	\suphsol	<code>\suphsol</code>		

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

TABLE 121: Inequalities

$\geq \ \backslash geq \ \gg \ \backslash gg \ \leq \ \backslash leq \ \ll \ \backslash ll \ \neq \ \backslash neq$

 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>\gnapprox</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>	\ngtreqlesslant
\geq	<code>\geq</code>	\geqslant	<code>\gtrneqless</code>	\lll	<code>\lll</code>	\ngtreqless
\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
\nless	<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>\ngeqlantdot</code>	\nlesseqgtr
\nless	<code>\gtrapprox</code>	$\vee\wedge$	<code>\lesseqgtr</code>	\gg	<code>\ngg</code>	\nlesseqgrslant
\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>	$\vee\wedge$	<code>\lessgtr</code>	\gg	<code>\ngtrclosed</code>	\nll
\nless	<code>\gtreqlesslant</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>\leqclosed</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>)
\nless	<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>
\nleqapprox	<code>\gnapprox</code>	\approx	<code>\lessim</code>	$\not\approx$	<code>\nleqdot</code>
\nleq	<code>\gneq</code>	\ll	<code>\ll</code>	$\not\approx$	<code>\nleqq</code>
\nleq	<code>\gneqq</code>	\lll	<code>\lll</code>	$\not\approx$	<code>\nleqslant</code>
\nleq	<code>\gnsim</code>	$\not\approx$	<code>\lnapprox</code>	$\not\approx$	<code>\nleqslantdot</code>
$>$	<code>\gtr</code>	$\not\leq$	<code>\lneq</code>	$\not\approx$	<code>\nleqslcc</code>
\approx	<code>\gtrapprox</code>	$\not\leq$	<code>\lneqq</code>	$\not\approx$	<code>\nless</code>
\triangleright	<code>\gtrcc</code>	$\not\leq$	<code>\lnsim</code>	$\not\approx$	<code>\nlessapprox</code>
\triangleright	<code>\gtrclosed</code>	$\not\approx$	<code>\neqslantgtr</code>	$\not\approx$	<code>\nlesscc</code>
\triangleright	<code>\gtrdot</code>	$\not\approx$	<code>\neqslantless</code>	$\not\approx$	<code>\nlessclosed</code>
\nless	<code>\gtreqless</code>	$\not\approx$	<code>\ngeq</code>	$\not\approx$	<code>\nlessdot</code>
\nless	<code>\gtreqqless</code>	$\not\approx$	<code>\ngeqclosed</code>	$\not\approx$	<code>\nlesseqgtr</code>
\nless	<code>\gtreqslantless</code>	$\not\approx$	<code>\ngeqdot</code>	$\not\approx$	<code>\nlesseqqgtr</code>
\nless	<code>\gtrless</code>	$\not\approx$	<code>\ngeqq</code>	$\not\approx$	<code>\nlesseqslantgtr</code>
\nless	<code>\trrsim</code>	$\not\approx$	<code>\nqeqlant</code>	$\not\approx$	<code>\nlessgtr</code>
\nless	<code>\leq</code>	$\not\approx$	<code>\nqeqlantdot</code>	$\not\approx$	<code>\nlesssim</code>
\nleq	<code>\leqclosed</code>	$\not\approx$	<code>\nqeqlcc</code>	$\not\approx$	<code>\nll</code>
\nleq	<code>\leqdot</code>	$\not\approx$	<code>\ngg</code>	$\not\approx$	<code>\nlll</code>
\nleq	<code>\leqq</code>	\gg			
\nleq	<code>\leqslant</code>	$\not\approx$	<code>\ngtr</code>		

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

\geq	<code>\ge</code>	\leq	<code>\lesdot</code>	$\not\approx$	<code>\ngtcc</code>
\geq	<code>\gescc</code>	\leq	<code>\lesg</code>	$\not\approx$	<code>\ngtreqlesslant</code>
\geq	<code>\gesdot</code>	\leq	<code>\lesseqgtrslant</code>	$\not\approx$	<code>\nlescc</code>
\nless	<code>\gesl</code>	\triangleleft	<code>\lhd</code>	$\not\approx$	<code>\nlesdot</code>
\ggg	<code>\gggtr</code>	\lll	<code>\lll</code>	$\not\approx$	<code>\nlesg</code>
\triangleright	<code>\gtcc</code>	\triangleleft	<code>\ltcc</code>	$\not\approx$	<code>\nlesseqgtrslant</code>
\nless	<code>\gtreqlesslant</code>	$\not\approx$	<code>\lvertneqq</code>	$\not\approx$	<code>\nltcc</code>
\nless	<code>\gvertneqq</code>	$\not\approx$	<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	\gnsim	\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

(continued on next page)

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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	$\vee \wedge \vee \wedge$	\lesseqgtr	$\not\vee \wedge \vee \wedge$	\nlesssim
\glj	\glj	$\vee \wedge \vee \wedge$	\lesseqqgtr	$\not\vee \wedge \vee \wedge$	\nll
\gnapprox	\gnapprox	$\vee \wedge \vee \wedge$	\lessgtr	$\not\vee \wedge \vee \wedge$	∂
\gneq	\gneq	\lesssim	\lessdot	$\not\lesssim$	\rightarrow
\gneqq	\gneqq	\lesssim	\lgE	$\not\lesssim$	$\sim E$
\gnsim	\gnsim	\ll	\ll	$\not\ll$	$\sim gtr$
\gsime	\gsime	\ll	\lll	$\not\lll$	$\siml E$
\gsiml	\gsiml	\ll	\lllnest	$\not\lllnest$	\simless
\Gt	\Gt	\approx	\lnapprox	$\not\approx$	\smt
\gtcc	\gtcc	\leq	\lneq	$\not\leq$	\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 , \gggtr 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	\vartriangleleft	\vartrianglelefteq
\ntriangleleft	\ntriangleright	\triangleleft	\trianglelefteq	\vartriangleleft	\vartrianglelefteq
\ntrianglelefteq	\ntrianglerighteq	\trianglelefteq	\triangleleft	\vartrianglelefteq	\vartrianglelefteq

TABLE 131: stmaryrd Triangle Relations

\trianglelefteqslant	\trianglerighteqslant
\ntrianglelefteqslant	\ntrianglerighteqslant

TABLE 132: mathabx Triangle Relations

\ntriangleleft	\triangleleft	\triangleleft	\vartriangleleft
\ntrianglelefteq	\trianglelefteq	\trianglelefteq	\vartrianglelefteq
\ntriangleleft	\triangleleft	\triangleleft	\vartriangleleft
\ntrianglelefteq	\trianglelefteq	\trianglelefteq	\vartrianglelefteq

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

∇	<code>\geqclosed</code>	∇	<code>\medtriangledown</code>	\blacktriangleleft	<code>\smallblacktriangleleft</code>
\triangleright	<code>\gtrclosed</code>	\triangleleft	<code>\medtriangleleft</code>	\blacktriangleright	<code>\smallblacktriangleright</code>
∇	<code>\largetriangledown</code>	\triangleright	<code>\medtriangleright</code>	\blacktriangleup	<code>\smallblacktriangleup</code>
\triangleleft	<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>
∇	<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>
\triangleleft	<code>\bigtriangleup</code>	$\not\equiv$	<code>\ntriangleright</code>	\triangleright	<code>\triangleright</code>
\blacktriangleleft	<code>\blacktriangle</code>	$\not\equiv$	<code>\ntrianglerighteq</code>	\trianglerighteq	<code>\trianglerighteq</code>
∇	<code>\blacktriangledown</code>	\triangleleft	<code>\triangle</code>	\triangle	<code>\vartriangle</code>
\blacktriangleleft	<code>\blacktriangleleft</code>	∇	<code>\triangledown</code>	\triangleleft	<code>\vartriangleleft</code>
\triangleright	<code>\blacktriangleright</code>	\triangleleft	<code>\triangleleft</code>	\triangleright	<code>\vartriangleright</code>
$\not\equiv$	<code>\ntriangleleft</code>	\trianglelefteq	<code>\trianglelefteq</code>		

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

TABLE 135: *boisik* Triangle Relations

\trianglelefteq	<code>\ntriangleleft</code>	\trianglelefteq	<code>\trianglelefteq</code>	\triangleleft	<code>\varltriangle</code>
\trianglelefteq	<code>\ntrianglelefteq</code>	\trianglelefteq	<code>\trianglelefteqslant</code>	\triangleleft	<code>\vartriangle</code>
\triangleright	<code>\ntriangleright</code>	\triangleright	<code>\triangleright</code>	\triangleleft	<code>\vartriangleleft</code>
\triangleright	<code>\ntrianglerighteq</code>	\triangleright	<code>\trianglerighteq</code>	\triangleright	<code>\vartriangleright</code>
\triangleleft	<code>\triangleleft</code>	\triangleright	<code>\trianglerighteq</code>	\triangleleft	<code>\vartrianglerighteq</code>

TABLE 136: *stix* Triangle Relations

\trianglelefteq	<code>\ltriangleeq</code>	\trianglelefteq	<code>\nvartriangleright</code>	\triangleleft	<code>\vartriangle</code>
\triangleleft	<code>\ltrivb</code>	\triangleleft	<code>\rtriltri</code>	\triangleleft	<code>\vartriangleleft</code>
\trianglelefteq	<code>\ntrianglelefteq</code>	\trianglelefteq	<code>\trianglelefteq</code>	\triangleright	<code>\vartriangleright</code>
\triangleright	<code>\ntrianglerighteq</code>	\triangleright	<code>\triangleq</code>	\triangleright	<code>\vbrtri</code>
\triangleleft	<code>\nvartriangleleft</code>	\triangleright	<code>\triangleq</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

$\not\Leftarrow$	<code>\not\Leftarrow</code>	$\not\Leftarrowtail$	<code>\not\Leftarrowtail</code>	$\not\Rightarrow$	<code>\not\Rightarrow</code>
$\not\leftarrowtail$	<code>\not\leftarrowtail</code>	$\not\rightarrowtail$	<code>\not\rightarrowtail</code>	$\not\Rightarrowtail$	<code>\not\Rightarrowtail</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>\Rrightarrow</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>
\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	⤢⤸	\nlssquigarrow	⤢⤸	\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*	⤢⤿	\swswarrows
⤢⤿	\Leftarrow	⤢⤿	\partialovalvartrccircleleftint*	⤢⤿	\twoheaddownarrow

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\leftarrow	<code>\leftarrow</code>	\circlearrowleft	<code>\partial</code>	<code>\partial</code>	∂	\leftarrow	<code>\twoheadleftarrow</code>
\leftarrowtail	<code>\leftarrowtail</code>	\circlearrowright	<code>\partial</code>	<code>\partial</code>	\circlearrowright	\nearrow	<code>\twoheadnearrow</code>
\leftleftarrows	<code>\leftleftarrows</code>	\circlearrowleft	<code>\partial</code>	<code>\partial</code>	\circlearrowleft	\nwarrow	<code>\twoheadnarrow</code>
\leftrightsquigarrow	<code>\leftrightsquigarrow</code>	\circlearrowright	<code>\partial</code>	<code>\partial</code>	\circlearrowright	\rightarrow	<code>\twoheadrightarrow</code>
\leftmapsto	<code>\leftmapsto</code>	\circlearrowup	<code>\partial</code>	<code>\partial</code>	\circlearrowup	\swarrow	<code>\twoheadsearrow</code>
\leftrightrightarrow	<code>\leftrightrightarrow</code>	\curvearrowdown	<code>\partial</code>	<code>\partial</code>	\curvearrowdown	\nwarrow	<code>\twoheadswarrow</code>
\Leftrightarrow	<code>\Leftrightarrow</code>	\curvearrowleft	<code>\partial</code>	<code>\partial</code>	\curvearrowleft	\uparrow	<code>\twoheaduparrow</code>
\leftrightarrows	<code>\leftrightarrows</code>	\curvearrowne	<code>\partial</code>	<code>\partial</code>	\curvearrowne	\uparrow	<code>\uparrow</code>
\leftrightsquigarrow	<code>\leftrightsquigarrow</code>	\curvearrownw	<code>\partial</code>	<code>\partial</code>	\curvearrownw	\uparrow	<code>\Uparrow</code>
\lhookdownarrow	<code>\lhookdownarrow</code>	\curvearrowright	<code>\partial</code>	<code>\partial</code>	\curvearrowright	\uparrow	<code>\uparrowtail</code>
\lhookleftarrow	<code>\lhookleftarrow</code>	\curvearrowse	<code>\partial</code>	<code>\partial</code>	\curvearrowse	\updownarrow	<code>\updownarrow</code>
\lhookarrow	<code>\lhookarrow</code>	\curvearrowsw	<code>\partial</code>	<code>\partial</code>	\curvearrowsw	\updownarrow	<code>\Updownarrow</code>
\lhooknarrow	<code>\lhooknarrow</code>	\curvearrowup	<code>\partial</code>	<code>\partial</code>	\curvearrowup	\updownarrow	<code>\updownarrows</code>
\lhookrightarrow	<code>\lhookrightarrow</code>	\rhookdownarrow	<code>\partial</code>	<code>\partial</code>	\rhookdownarrow	\nwarrow	<code>\uplsquigarrow</code>
\lhooksearrow	<code>\lhooksearrow</code>	\rhookleftarrow	<code>\partial</code>	<code>\partial</code>	\rhookleftarrow	\uparrow	<code>\upmapsto</code>
\lhookswarrow	<code>\lhookswarrow</code>	\rhooknearrow	<code>\partial</code>	<code>\partial</code>	\rhooknearrow	\uparrow	<code>\uprsquigarrow</code>
\lhookuparrow	<code>\lhookuparrow</code>	\rhooknarrow	<code>\partial</code>	<code>\partial</code>	\rhooknarrow	\upuparrows	<code>\upuparrows</code>
\lightning	<code>\lightning</code>	\rhookrightarrow	<code>\partial</code>	<code>\partial</code>	\rhookrightarrow		
\Leftarrow	<code>\Leftarrow</code>	\rhooksearrow	<code>\partial</code>	<code>\partial</code>	\rhooksearrow		

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

$\not\leftarrow$	<code>\nleftarrow</code>	$\not\curvearrowdownup$	<code>\ncurvearrowdownup</code>	$\not\leftarrowtail$	<code>\nleftarrowtail</code>	$\not\leftleftarrows$	<code>\leftleftarrows</code>
$\not\leftarrowleftright$	<code>\leftarrowleftright</code>	$\not\curvearrowleftright$	<code>\ncurvearrowleftright</code>	$\not\leftarrowtail$	<code>\nleftarrowtail</code>	$\not\rightleftrightsquigarrow$	<code>\rightleftrightsquigarrow</code>
$\not\leftarrowtail$	<code>\leftarrowtail</code>	$\not\curvearrownesw$	<code>\ncurvearrownesw</code>	$\not\leftarrowtail$	<code>\nleftarrowtail</code>	$\not\rightmapsto$	<code>\rightmapsto</code>
$\not\leftarrowtail$	<code>\leftarrowtail</code>	$\not\curvearrownwse$	<code>\ncurvearrownwse</code>	$\not\leftarrowtail$	<code>\nleftarrowtail</code>	$\not\rightrightarrows$	<code>\rightrightarrows</code>
$\not\leftarrowtail$	<code>\leftarrowtail</code>	$\not\curvearrowrightleft$	<code>\ncurvearrowrightleft</code>	$\not\leftarrowtail$	<code>\nleftarrowtail</code>	$\not\righttrightsquigarrow$	<code>\righttrightsquigarrow</code>
$\not\leftarrowtail$	<code>\leftarrowtail</code>	$\not\curvearrowsenw$	<code>\ncurvearrowsenw</code>	$\not\leftarrowtail$	<code>\nleftarrowtail</code>	$\not\rightuparrow$	<code>\rightuparrow</code>
$\not\leftarrowtail$	<code>\leftarrowtail</code>	$\not\curvearrowswne$	<code>\ncurvearrowswne</code>	$\not\leftarrowtail$	<code>\nleftarrowtail</code>	$\not\Searrow$	<code>\Searrow</code>
$\not\leftarrowtail$	<code>\leftarrowtail</code>	$\not\curvearrowupdown$	<code>\ncurvearrowupdown</code>	$\not\leftarrowtail$	<code>\nleftarrowtail</code>	$\not\nearrow$	<code>\nearrow</code>

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\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>	\nearrow	<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>	\swarrow	<code>\swharpooncw</code>
\leftarrow	<code>\leftharpooncw*</code>	\nwarrow	<code>\nwseharpoonnesw</code>	\swarrow	<code>\swneharpoons</code>
\leftarrow	<code>\leftrightharpoondownup</code>	\nwarrow	<code>\nwseharpoons</code>	\uparrow	<code>\updownharpoonleftright</code>
\leftarrow	<code>\leftrightharpoons</code>	\nwarrow	<code>\nwseharpoonswne</code>	\uparrow	<code>\updownharpoonrightleft</code>
\leftarrow	<code>\leftrightharpoonupdown</code>	\rightarrow	<code>\rightharpoonccw*</code>	\updownarrow	<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>	\ddagger	<code>\nneswharpoonsenw</code>	\ddagger	<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>	\ddagger	<code>\nswneharpoons</code>
\ddagger	<code>\nleftrightharpoondownup</code>	\ddagger	<code>\nnwseharpoons</code>	\dagger	<code>\nupdownharpoonleftright</code>
\ddagger	<code>\nleftrightharpoons</code>	\times	<code>\nnwseharpoonswne</code>	\dagger	<code>\nupdownharpoonrightleft</code>
\ddagger	<code>\nleftrightharpoonupdown</code>	\dagger	<code>\nrightharpoonccw*</code>	\dagger	<code>\nupdownharpoons</code>
\times	<code>\nneharpoonccw</code>	\dagger	<code>\nrightharpooncw*</code>	\dagger	<code>\nupharpoonccw*</code>
\times	<code>\nneharpooncw</code>	\ddagger	<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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\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
\dasharrow	\dasharrow	\rightarrowtail	\rightarrowtail	\rightsquigarrowtail	\rightdowncurvedarrow
\dashleftarrow	\dashleftarrow	\leftarrowtail	\leftarrowtail	\rightarrowtail	\rightlcurvearrow
\dashrightarrow	\dashrightarrow	\rightarrowtail	\rightarrowtail	\rightsquigarrowtail	\rightleftcurvearrow
\downarrow	\downlcurvearrow	\uparrowtail	\uparrowtail	\rightarrowtail	\rightlcurvearrow
\downarrow	\downleftcurvedarrow	\rightsquigarrowtail	\longleadsto	\rightsquigarrowtail	\rightrsquigarrow
\downarrow	\downlsquigarrow	\rightsquigarrowtail	\longleftsquigarrow	\rightsquigarrowtail	\rightsquigarrow
\downarrow	\downrcurvearrow	\rightsquigarrowtail	\longrightsquigarrow	\rightsquigarrowtail	\rightupcurvedarrow
\downarrow	\downrightcurvedarrow	\downarrowtail	\mapsdown	\rightarrowtail	\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	\nwlcurvearrow	\uparrowtail	\uplsquigarrow
\leftarrowtail	\leftdowncurvedarrow	\leftarrowtail	\nwrcurvearrow	\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

\nexists	\nacwcirclearrowdown	\nleftarrow	\nleftarrow	\nrightarrow	\nrightarrow
\nexists	\nacwcirclearrowleft	\nLeftarrow	\nLeftarrow	\nsearrow	\nsearrow
\nexists	\nacwcirclearrowright	\nLeftarrowtail	\nLeftarrowtail	\nSearrow	\nSearrow
\nexists	\nacwcirclearrowup	\nleftarrowtail	\nleftarrowtail	\nsearrowtail	\nsearrowtail
\nexists	\nacwleftarcarrow	\nLeftarrowtail	\nLeftarrowtail	\nsebkarrown	\nsebkarrown
\nexists	\nacwnearcarrow	\nleftmapsto	\nleftmapsto	\nsearrowarrows	\nsearrowarrows
\nexists	\nacwnwarccarw	\nLeftmapsto	\nLeftmapsto	\nsesearrows	\nsesearrows
\nexists	\nacwoverarcarrow	\nleftrightarrowtail	\nleftrightarrowtail	\nswarrow	\nswarrow

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\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>\ncurvaturearrowleft</code>	\nwarrow	<code>\leftrightcurvearrow</code>	\nwarrow	<code>\rightleftsquigarrow</code>
\nwarrow	<code>\ncurvaturearrowright</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>\rightupcurvedarrow</code>
\dashrightarrow	<code>\ndashrightarrow</code>	\nwsearrow	<code>\nlongleftsquigarrow</code>	\nearrow	<code>\selcurvearrow</code>
\dashv	<code>\ndownlcurvearrow</code>	\nwswarrow	<code>\nlongrightsquigarrow</code>	\nwarrow	<code>\senwcurvearrow</code>
\dashv	<code>\ndownleftcurvedarrow</code>	\nwarrow	<code>\nmapsdown</code>	\nwarrow	<code>\sercurvearrow</code>
\dashv	<code>\ndownlsquigarrow</code>	\nwarrow	<code>\nMapsdown</code>	\nwarrow	<code>\swlcurvearrow</code>
\dashv	<code>\ndownrcurvearrow</code>	\nwarrow	<code>\nmapsfrom</code>	\nwarrow	<code>\snwcurvearrow</code>
\dashv	<code>\ndownrightcurvedarrow</code>	\nwarrow	<code>\nMapsfrom</code>	\nwarrow	<code>\swrcurvearrow</code>
\dashv	<code>\downrsquigarrow</code>	\nwarrow	<code>\nmapsto</code>	\rightarrow	<code>\nto</code>
\dashv	<code>\downupcurvearrow</code>	\nwarrow	<code>\nMapsto</code>	\nwarrow	<code>\updowncurvearrow</code>
\dashv	<code>\downupsquigarrow</code>	\nwarrow	<code>\nmapsup</code>	\nwarrow	<code>\updownsquigarrow</code>
\dashleftarrow	<code>\ngets</code>	\nwarrow	<code>\nMapsup</code>	\nwarrow	<code>\uplcurvearrow</code>
\dashv	<code>\nhknearrow</code>	\nwarrow	<code>\nnelcurvearrow</code>	\nwarrow	<code>\nuleftcurvedarrow</code>
\dashv	<code>\nhknarrow</code>	\nwarrow	<code>\nnercurvearrow</code>	\nwarrow	<code>\nuplsquigarrow</code>
\dashv	<code>\nhksearrow</code>	\nwarrow	<code>\nneswcurvearrow</code>	\nwarrow	<code>\nuprcurvearrow</code>
\dashv	<code>\nhkswarrow</code>	\nwarrow	<code>\nnwlcurvearrow</code>	\nwarrow	<code>\nuprightcurvearrow</code>
\dashrightarrow	<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>	\nwarrow	<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

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

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

TABLE 156: *boisik* Arrows

\leftarrow	<code>\barleftarrow</code>	\uparrow	<code>\Lsh</code>
$\overleftarrow{}$	<code>\barleftarrowrightarrowbar</code>	\downarrow	<code>\mapsdown</code>
\nearrow	<code>\barovernorthwestarrow</code>	\Leftarrow	<code>\Mapsfrom</code>
\hookleftarrow	<code>\carriagereturn</code>	\Leftarrow	<code>\mapsfrom</code>
\circlearrowleft	<code>\circlearrowleft</code>	\Rightarrow	<code>\Mapsto</code>
\circlearrowright	<code>\circlearrowright</code>	\rightarrowtail	<code>\mapsto</code>
\leftrightharpoonup	<code>\cupleftarrow</code>	\uparrowtail	<code>\mapsup</code>
\curlyveedownarrow	<code>\curlyveedownarrow</code>	\nearrowtail	<code>\Nearrow</code>
\curlyveeuparrow	<code>\curlyveeuparrow</code>	\nearrowcorner	<code>\nearrowcorner</code>
\curlywedgedownarrow	<code>\curlywedgedownarrow</code>	\nearrowtail	<code>\nnearrow</code>
\curlywedgeuparrow	<code>\curlywedgeuparrow</code>	\nwarrowtail	<code>\nnarrow</code>
\curvearrowbotleft	<code>\curvearrowbotleft</code>	\nwarrowtail	<code>\Narrow</code>
\curvearrowbotleftright	<code>\curvearrowbotleftright</code>	\nwarrowcorner	<code>\narrowcorner</code>
\curvearrowbotright	<code>\curvearrowbotright</code>	\rightarrowtail	<code>\rightarrowbar</code>
\curvearrowleft	<code>\curvearrowleft</code>	\rightarrowtail	<code>\rightarrowcircle</code>
\curvearrowleftright	<code>\curvearrowleftright</code>	\rightarrowtail	<code>\rightarrowtail</code>
\curvearrowright	<code>\curvearrowright</code>	\rightarrowtail	<code>\rightarrowTriangle</code>
\dsh	<code>\dsh</code>	\rightarrowtail	<code>\rightarrowtriangle</code>
\blackdownarrow	<code>\downblackarrow</code>	\rightarrowtail	<code>\rightblackarrow</code>
\dashdownarrow	<code>\downdasharrow</code>	\rightarrowtail	<code>\rightdasharrow</code>
\downdownarrows	<code>\downdownarrows</code>	\rightarrowtail	<code>\rightleftarrows</code>
\touparrow	<code>\downtouparrow</code>	\rightarrowtail	<code>\rightrightarrows</code>
\whitearrow	<code>\downwhitearrow</code>	\rightarrowtail	<code>\rightsquigarrow</code>
\zigzagarrow	<code>\downzigzagarrow</code>	\rightarrowtail	<code>\rightthreearrows</code>
\drsh	<code>\drsh</code>	\rightarrowtail	<code>\righttoleftarrow</code>
\eqleftrightarrow	<code>\eqleftrightarrow</code>	\rightarrowtail	<code>\rightwhitearrow</code>
\hookleftarrow	<code>\hookleftarrow</code>	\rightarrowtail	<code>\rightwhiteroundarrow</code>
\hookrightarrow	<code>\hookrightarrow</code>	\rightarrowtail	<code>\Rightarrow</code>
\leftarrowtail	<code>\leftarrowtail</code>	\rightarrowtail	<code>\Rsh</code>
\leftarrowtriangle	<code>\leftarrowtriangle</code>	\rightarrowtail	<code>\Searrow</code>

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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	⤢⤢⤢⤢	\rightarrowapprox
⤵	\diamondleftarrow	⤢⤢⤢⤢	\rightarrowbackapprox
⤶	\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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\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>\twoheadleftarrowdbkarw</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	⊵	\rightharpoonsdown
⊤	\dashleftharpoondown	⊳	\rightharpoonup
⊤	\dashrightharpoondown	⊳	\rightharpoonupbar
↓	\downharpoonleft	⊶	\rightharpoonupdash
↓	\downharpoonleftbar	⊶	\rightleftharpoons
↓	\downharpoonright	⊶	\rightleftharpoonsdown
↓	\downharpoonrightbar	⊶	\rightleftharpoonsup
↓↓	\downharpoonsleftright	↓	\updownharpoonleftleft
↓↓	\downupharpoonsleftright	↓	\updownharpoonleftright
⊤	\leftharpoondown	↓	\updownharpoonrightleft
⊤	\leftharpoondownbar	↓	\updownharpoonrightright
⊤	\leftharpoonsdown	⊷	\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>	\overleftarrow{abc}	<code>\underrightharpdown{abc}</code>
$\overrightarrow{}$	<code>\overrightharp{abc}</code>	$\underline{\overleftarrow{abc}}$	<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>	\sim	

* 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>\upspoon</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

<code>g</code>	<code>\varg</code>	<code>v</code>	<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

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

TABLE 187: `boisik` Variant Latin Letters

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

TABLE 188: `stix` Variant Greek Letters

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

TABLE 189: `stix` Transformed Greek Letters

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

TABLE 190: `AMS` Hebrew Letters

<code>beth</code>	<code>gimel</code>	<code>daleth</code>
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`\aleph` (\aleph_0) appears in Table 286 on page 112.

TABLE 191: `MnSymbol` Hebrew Letters

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

TABLE 192: `fdsymbol` Hebrew Letters

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

TABLE 193: `boisik` Hebrew Letters

<code>beth</code>	<code>gimel</code>	<code>daleth</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	\backslashLparengtr	\rangle	\backslashRparengtr
\lceil	\backslashbrackubar	\rceil	\backslashbrackubar	\langle	\backslashparenless	\rangle	\backslashparengtr
\lfloor	\backslashbrackultick	\rfloor	\backslashbracklrtick	\langle	\backslashvzigzag	\rangle	\backslashrvzigzag
\langle	\backslashbrbrak	\rangle	\backslashbrbrak	\langle	\backslashLvzigzag	\rangle	\backslashRvzigzag
\langle	\backslashcurvyangle	\rangle	\backslashcurvyangle	\lceil	\backslashulcorner	\rceil	\backslashurcorner

TABLE 213: nath Delimiters

 $\llcorner \ \backslashniv \ \lrcorner \ \backslashvin$

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	$\backslash\Arrowvert$	$\{$	$\left\{ \backslash lbrace$	$\right\} \backslash rbrace$	$\left[\backslash lceil$	$\right] \backslash rceil$
\mid	\mid	$\backslash arrowvert$	$[$	$\left[\backslash lceil$	$\right] \backslash rceil$	\rfloor	$\backslash rfloor$
\backslash	\backslash	$\backslash backslash$	$[$	$\left[\backslash lceil$	$\right] \backslash rceil$	$)$	$\backslash rgrou$
\mid	\mid	$\backslash bracevert$	$($	$\left(\backslash lgroup$	$\right) \backslash rgroup$	$\{$	$\backslash rmoustache$
$[$	$[$	$\backslash llangle$	\langle	$\langle\langle \backslash llangle$	$\rangle\rangle \backslash rrangle$	\rangle	$\backslash rrangle$
$]$	$]$	$\backslash llcorner$	\lrcorner	$\lrcorner\backslash llcorner$	$\rceil\backslash rsem$	\rceil	$\backslash rsem$
$($	$($	$\backslash lmoustache$	\rangle	$\rangle\backslash lmoustache$	$\rangle\langle\backslash rWavy$	$\rangle\langle$	$\backslash rWavy$
$)$	$)$	$\backslash lrcorner$	\lrcorner	$\lrcorner\backslash lrcorner$	$\rangle\langle\backslash rwavey$	$\rangle\langle$	$\backslash rwavey$
$/$	$/$	$\backslash lsem$	\lceil	$\lceil\backslash lsem$	$\rceil\backslash ulcorner$	\rceil	$\backslash ulcorner$
\langle	\langle	$\backslash lwavy$	$\{\!$	$\{\!\!\{\backslash lwavy$	$\}\!\!\}\backslash ullcorner$	\rceil	$\backslash ullcorner$
\rangle	\rangle	$\backslash lWavy$	$\}\!\!\}$	$\}\!\!\{\backslash lWavy$	$\}\!\!\}\backslash ulrcorner$	\rceil	$\backslash ulrcorner$
$ $	$ $	$\backslash range$	\rangle	$\rangle\backslash range$	$\rceil\backslash urcorner$	\rceil	$\backslash urcorner$

(continued on next page)

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```

(   {   \langle      }   }   \ranglebar      ||      \| 
(   {   \langlebar    }   }   \rbrace

```

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

TABLE 220: fdsymbol Variable-sized Delimiters

\	\backslash	\backslashbackslash	\downarrow	\downarrow\downarrow	\Downarrow	\langle	\langle\langle	\langle.\langle	\{	\[\[\lrcorner	\lvert	\lvert\lvert	\lVert	\lVert\lVert	\rangle	\rangle\rangle	\rangle.\rangle	\}	\}\}	\rparen	\rvert	\rvert\rvert	\rVert	\rVert\rVert	\ulcorner	\ullcorner	\urcorner	\uparrow	\uparrow\uparrow	\uparrow\uparrow	\Uparrow
\	\backslash	\backslashbackslash	\downarrow	\downarrow\downarrow	\Downarrow	\langle	\langle\langle	\langle.\langle	\{	\[\[\lrcorner	\lvert	\lvert\lvert	\lVert	\lVert\lVert	\rangle	\rangle\rangle	\rangle.\rangle	\}	\}\}	\rparen	\rvert	\rvert\rvert	\rVert	\rVert\rVert	\ulcorner	\ullcorner	\urcorner	\uparrow	\uparrow\uparrow	\uparrow\uparrow	\Uparrow
\	\backslash	\backslashbackslash	\downarrow	\downarrow\downarrow	\Downarrow	\langle	\langle\langle	\langle.\langle	\{	\[\[\lrcorner	\lvert	\lvert\lvert	\lVert	\lVert\lVert	\rangle	\rangle\rangle	\rangle.\rangle	\}	\}\}	\rparen	\rvert	\rvert\rvert	\rVert	\rVert\rVert	\ulcorner	\ullcorner	\urcorner	\uparrow	\uparrow\uparrow	\uparrow\uparrow	\Uparrow
\	\backslash	\backslashbackslash	\downarrow	\downarrow\downarrow	\Downarrow	\langle	\langle\langle	\langle.\langle	\{	\[\[\lrcorner	\lvert	\lvert\lvert	\lVert	\lVert\lVert	\rangle	\rangle\rangle	\rangle.\rangle	\}	\}\}	\rparen	\rvert	\rvert\rvert	\rVert	\rVert\rVert	\ulcorner	\ullcorner	\urcorner	\uparrow	\uparrow\uparrow	\uparrow\uparrow	\Uparrow
\	\backslash	\backslashbackslash	\downarrow	\downarrow\downarrow	\Downarrow	\langle	\langle\langle	\langle.\langle	\{	\[\[\lrcorner	\lvert	\lvert\lvert	\lVert	\lVert\lVert	\rangle	\rangle\rangle	\rangle.\rangle	\}	\}\}	\rparen	\rvert	\rvert\rvert	\rVert	\rVert\rVert	\ulcorner	\ullcorner	\urcorner	\uparrow	\uparrow\uparrow	\uparrow\uparrow	\Uparrow

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\lceil	$\left[\begin{array}{c} \backslash lceil \\ \backslash rBrack \end{array} \right]$	\rceil	\updownarrow	\updownarrow	$\backslash updownarrow$
\lfloor	$\left[\begin{array}{c} \backslash lfloor \\ \backslash rbrack \end{array} \right]$	\rfloor	\Updownarrow	\Updownarrow	$\backslash Updownarrow$
$\{$	$\left[\begin{array}{c} \backslash lgroup \\ \backslash rceil \end{array} \right]$	$\}$	$\negthickspace\lrcorner$	\lrcorner	$\backslash urcorner$
\llcorner	$\left[\begin{array}{c} \backslash llcorner \\ \backslash rfloor \end{array} \right]$	\lrcorner	\mid	\mid	$\backslash vert$
\int	$\left[\begin{array}{c} \backslash lmoustache \\ \backslash rgrou p \end{array} \right]$	\int	\parallel	\parallel	$\backslash Vert$
$($	$\left(\begin{array}{c} \backslash lparen \\ \backslash rmoustache \end{array} \right)$	$)$	$\parallel\parallel$	$\parallel\parallel$	$\backslash Vvert$

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

TABLE 221: stix Variable-sized Delimiters

\parallel	$\backslash Arrowvert$	$\langle\langle$	$\backslash lAngle$	$\rangle\rangle$	$\backslash rceil$
$ $	$\backslash arrowvert$	$\{$	$\backslash lbrace$	$\}$	$\backslash rfloor$
\backslash	$\backslash backslash$	$\{\!$	$\backslash lBrace$	$\})$	$\backslash rgrou p$
\Downarrow	$\backslash Ddownarrow$	\llbracket	$\backslash lBrack$	\rrbracket	$\backslash rmoustache$
\Downarrow	$\backslash DDownarrow$	$(\!\!$	$\backslash lbrbrak$	$\))$	$\backslash rParen$

(continued on next page)

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\downarrow	\downarrow	<code>\downarrow</code>	\lceil	\lceil	<code>\lceil</code>	\uparrow	\uparrow	<code>\uparrow</code>
\Downarrow	\Downarrow	<code>\Downarrow</code>	\lfloor	\lfloor	<code>\lfloor</code>	\Updownarrow	\Updownarrow	<code>\Updownarrow</code>
$[$	$[$	$[$	$($	$)$	<code>\lgroup</code>	\Updownarrow	\Updownarrow	<code>\Updownarrow</code>
$]$	$]$	$]$	$\{$	$\}$	<code>\lmoustache</code>	\Updownarrow	\Updownarrow	<code>\Updownarrow</code>
$($	$($	$($	$($	$($	<code>\lParen</code>	\Uparrow	\Uparrow	<code>\Uparrow</code>
$)$	$)$	$)$	\rangle	\rangle	<code>\rAngle</code>	\Uparrow	\Uparrow	<code>\Uparrow</code>
$/$	$/$	$/$	$)$	$)$	<code>\rangle</code>	\Vert	\Vert	<code>\Vert</code>
$<$	$<$	$<$	$}$	$}$	<code>\rbrace</code>	\vert	\vert	<code>\vert</code>
$>$	$>$	$>$	$\}$	$\}$	<code>\rBrace</code>	\Vvert	\Vvert	<code>\Vvert</code>
$ $	$ $	$ $	$\ $	$\ $	<code>\rBrack</code>			
\langle	\langle	\langle	\rangle	\rangle	<code>\rangle</code>			

TABLE 222: `mathdesign` Variable-sized Delimiters

$\left\langle \right\rangle$	<code>\leftwave</code>	$\left\langle \right\rangle$	<code>\rightwave</code>
$\left\langle \right\rangle$	<code>\leftevaw</code>	$\left\langle \right\rangle$	<code>\rightevaw</code>

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

TABLE 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>	$\grave{\acute{\grave{a}}}$	<code>\ovhook{a}</code>
$\ddot{\acute{a}}$	<code>\dddot{\acute{a}}</code>	$\grave{\acute{\acute{a}}}$	<code>\rightharpoonaccent{a}</code>
$\ddot{\grave{\acute{a}}}$	<code>\dddot{\grave{\acute{a}}}</code>	\tilde{a}	<code>\tilde{a}</code>
$\dot{\grave{\acute{a}}}$	<code>\ddot{\grave{\acute{a}}}</code>	$\grave{\acute{\acute{\grave{\acute{a}}}}}$	<code>\vec{a}</code>
$\acute{\grave{\acute{a}}}$	<code>\dot{\grave{\acute{a}}}</code>	\widehat{a}	<code>\widebridgeabove{a}</code>
$\grave{\acute{\acute{\grave{\acute{a}}}}}$	<code>\grave{\acute{\acute{\grave{\acute{a}}}}}</code>		

TABLE 234: `fge` Math-mode Accents

$\dot{\grave{\acute{a}}}$	<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{abc}	<code>\widehat{abc}</code>
$\overset{\circ}{abc}$	<code>\overset{\circ}{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>
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`\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>
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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>
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TABLE 251: `actuarialangle` Extensible Accents

\overline{abc}	<code>\actuarialangle{abc}</code>
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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>\xleftrightharpoons{abc}</code>	$\xrightleftharpoons[abc]$	<code>\xlongleftrightharpoons{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>\cdot</code>	\cdot	<code>\ddots</code>	\dots	<code>\mathellipsis</code>
\cdot	<code>\cdot</code>	\cdot	<code>\enleadertwodots</code>	\therefore	<code>\therefore</code>

stix defines `\centerdot` as a synonym for `\cdot` and `\cdotp` 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` \vdots `\vdots` \vdots `\vdots` \vdots `\vdots` \vdots `\vdots` `\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>	$\vdash \underline{\underline{\underline{a}}}$	<code>\Faquant{a}</code>	$\dashv \underline{\underline{\underline{a}}}$	<code>\Fnquant{a}</code>
$\vdash \underline{\underline{\underline{a}}}$	<code>\Fannquantsn{a}</code>	$\vdash \underline{\underline{\underline{a}}}$	<code>\Faquantnsn{a}</code>	$\dashv \underline{\underline{\underline{a}}}$	<code>\Fnquantsn{a}</code>
$\vdash \underline{\underline{\underline{a}}}$	<code>\Fannquantnn{a}</code>	$\vdash \underline{\underline{\underline{a}}}$	<code>\Faquantnn{a}</code>	$\dashv \underline{\underline{\underline{a}}}$	<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>\Fannquantnn{a}</code>	$\vdash \underline{\underline{\underline{a}}}$	<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>
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TABLE 276: dozenal Base-12 Digits

$\mathbb{2}$	<code>\x</code>	$\mathbb{8}$	<code>\e</code>
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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>\infnty</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>
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TABLE 282: MnSymbol Angles

\angle	<code>\angle</code>	\measuredangle	<code>\measuredangle</code>	\sphericalangle	<code>\sphericalangle</code>
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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>	\triangleleft	<code>\measangleltonw</code>	\triangleleft	<code>\rightanglesqr</code>
\triangleleft	<code>\angles</code>	\triangleleft	<code>\measangleurtone</code>	\triangleleft	<code>\sphericalangle</code>
\leq	<code>\angleubar</code>	\triangleleft	<code>\measuredangle</code>	\triangleleft	<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>
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* *wasysym* also defines an `\agem0` symbol, which is the same glyph as `\mho` but is intended for use in text mode.

TABLE 289: Miscellaneous *txfonts/pxfonts* Math Symbols

\blacklozenge	<code>\Diamondblack</code>	λ	<code>\lambda</code>	λ	<code>\lambda</code>
\blacklozenge	<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>	\vdash	<code>\hermitmatrix</code>	$\not\wedge$	<code>\notbot</code>
\backslash	<code>\backprime</code>	\approx	<code>\infin</code>	$\not\exists$	<code>\nottop</code>
\checkmark	<code>\checkmark</code>	\neg	<code>\invnot</code>	\imath	<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>	$\dot{+}$	<code>\hermitmatrix</code>	$\ddot{+}$	<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>	$\blacksquare\blacksquare$	<code>\inversebullet</code>	$\bowtie\bowtie$	<code>\rightouterjoin</code>
\top	<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>	$\sim\sim$	<code>\sinewave</code>
\wedge	<code>\caretinsert</code>	$\Join\Join$	<code>\leftouterjoin</code>	$\overline{}$	<code>\strns</code>
\checkmark	<code>\checkmark</code>	\circ	<code>\llarc</code>	$\pm\pm$	<code>\thermod</code>
\triangleright	<code>\conictaper</code>	\circ	<code>\lrarc</code>	$\circ\circ$	<code>\topcir</code>
\geq	<code>\danger</code>	\maltese		$\sqsubset\sqsubset$	<code>\turnednot</code>
\diagdown	<code>\diagdown</code>	$\$$	<code>\mathsection</code>	$\swarrow\swarrow$	<code>\ubrbrak</code>
\diagup	<code>\diagup</code>	$_$	<code>\mathvisible</code>	$\curvearrowleft\curvearrowleft$	<code>\ularc</code>
\emptyset	<code>\diameter</code>	∇	<code>\nabla</code>	$\curvearrowright\curvearrowright$	<code>\urarc</code>
$*$	<code>\dingasterisk</code>	\neg	<code>\neg^*</code>	$\#\#\#$	<code>\viewdata</code>
\times	<code>\elinters</code>	$_$	<code>\obrbrak</code>	$\wr\wr\wr$	<code>\vzigzag</code>
\eth	<code>\eth</code>	\llcorner	<code>\perps</code>	$\yen\yen\yen$	<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>
$\bowtie\bowtie$	<code>\fullouterjoin</code>	\square	<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`” → “ תְּבִנָּה ”).

[‡] 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

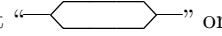
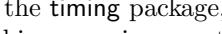
\sim	<code>\AC</code>	\approx	<code>\VHF</code>	f	<code>\photon</code>	F	<code>\HF</code>	$\sim\!\sim\!\sim\!\sim$	<code>\gluon</code>
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TABLE 302: `ifsym` Pulse Diagram Symbols

\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>
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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>
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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

□	\APLbox	□	\APLinv	*	\APLstar
◊	\APLcomment	□	\APLleftarrowbox	△	\APLup
▽	\APLdown	⊗	\APLlog	□	\APLuparrowbox
□	\APLdownarrowbox	—	\APLminus	+	\notbackslash
□	\APLinput	□	\APLrightarrowbox	+	\notslash
a	\APLcirc{a}	ø	\APLnot{a}	ø	\APLvert{a}

TABLE 313: *stix* APL Symbols

?	\APLboxquestion	+	\APLnotbackslash
◻	\APLboxupcaret	+	\APLnotslash

TABLE 314: *apl* APL Symbols

	\AB	..	\DD	¶	\GD	†	\LK	◊	\PD	↑	\UA	G	\ZG	Q	\ZQ
α	\AM	⊥	\DE	≥	\GE	○	\LO	□	\QQ	_	\US	H	\ZH	R	\ZR
\	\BL	▽	\DL	→	\GO	○	\LU	}	\RB	○	\UU	I	\ZI	S	\ZS
□	\BX	◊	\DM	▲	\GU	≠	\NE	+	\RK	◆	\XQ	J	\ZJ	T	\ZT
λ	\CB	■	\DQ	▀	\IB	-	\NG	ρ	\RO	A	\ZA	K	\ZK	U	\ZU
Γ	\CE	∩	\DU	~	\IO	∧	\NN	c	\RU	B	\ZB	L	\ZL	V	\ZV
Ω	\CO	τ	\EN	{	\LB	▼	\NR	φ	\RV	C	\ZC	M	\ZM	W	\ZW
ο	\CR	€	\EP	Δ	\LD	~	\NT	◦	\SO	D	\ZD	N	\ZN	X	\ZX
/	\CS	└	\FL	≤	\LE	ω	\OM	SS	\SS	E	\ZE	Q	\ZO	Y	\ZY
↓	\DA	¤	\FM	⊗	\LG	∨	\OR	◊	\TR	F	\ZF	P	\ZP	Z	\ZZ

TABLE 315: *marvosym* Computer Hardware Symbols

🖱	\ComputerMouse	📠	\ParallelPort	♾	\SerialInterface
⌨️	\Keyboard	🖨️	\Printer	.SerialPort	

TABLE 316: keystroke Computer Keys

	\Alt		\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.

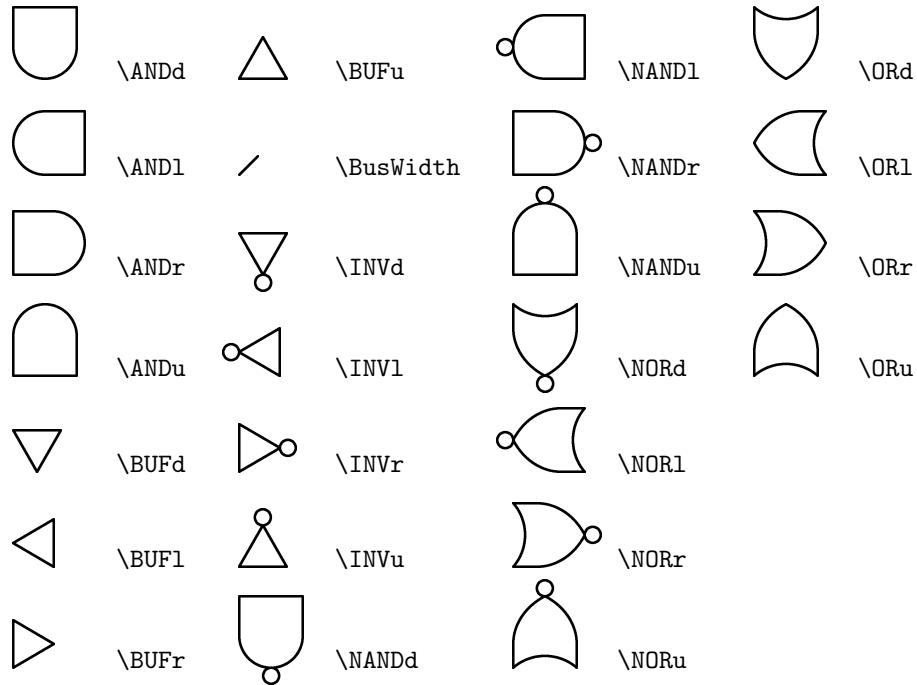
The `\keystroke` command draws a key with an arbitrary label. For example, “`\keystroke{F7}`” produces “”.

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

❸	\FEMALE	❹	\FemaleMale	❺	\Male	❻	\Neutral
❻	\Female	❺	\Hermaphrodite	❻	\MALE	❷	
❻	\FemaleFemale	❹	\HERMAPHRODITE	❹	\MaleMale	❷	

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	\bowtie	\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	\bullet	\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: `bbding` 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{221}</code>	→	<code>\ding{230}</code>	⇒	<code>\ding{239}</code>	↗	<code>\ding{249}</code>
→	<code>\ding{213}</code>	→	<code>\ding{222}</code>	→	<code>\ding{231}</code>	⇒	<code>\ding{241}</code>	⇒	<code>\ding{250}</code>
↔	<code>\ding{214}</code>	→	<code>\ding{223}</code>	→	<code>\ding{232}</code>	⇒	<code>\ding{242}</code>	⇒	<code>\ding{251}</code>
↑	<code>\ding{215}</code>	→	<code>\ding{224}</code>	⇒	<code>\ding{233}</code>	⇒	<code>\ding{243}</code>	⇒	<code>\ding{252}</code>
↘	<code>\ding{216}</code>	→	<code>\ding{225}</code>	⇒	<code>\ding{234}</code>	↘	<code>\ding{244}</code>	⇒	<code>\ding{253}</code>
→	<code>\ding{217}</code>	➢	<code>\ding{226}</code>	⇒	<code>\ding{235}</code>	⇒	<code>\ding{245}</code>	⇒	<code>\ding{254}</code>
↗	<code>\ding{218}</code>	➢	<code>\ding{227}</code>	⇒	<code>\ding{236}</code>	↗	<code>\ding{246}</code>		
→	<code>\ding{219}</code>	➢	<code>\ding{228}</code>	⇒	<code>\ding{237}</code>	↗	<code>\ding{247}</code>		
→	<code>\ding{220}</code>	➢	<code>\ding{229}</code>	⇒	<code>\ding{238}</code>	⇒	<code>\ding{248}</code>		

TABLE 330: `adfsymbols` Arrows

⇒	<code>\adfarroewe1</code>	↗	<code>\adfarrownne1</code>	↓	<code>\adfarrows1</code>	↖	<code>\adfarrowsw1</code>
→	<code>\adfarroewe2</code>	↗	<code>\adfarrownne2</code>	↓	<code>\adfarrows2</code>	✓	<code>\adfarrowsw2</code>
➡	<code>\adfarroewe3</code>	↗	<code>\adfarrownne3</code>	↓	<code>\adfarrows3</code>	↗	<code>\adfarrowsw3</code>
→	<code>\adfarroewe4</code>	↗	<code>\adfarrownne4</code>	↓	<code>\adfarrows4</code>	↗	<code>\adfarrowsw4</code>
→	<code>\adfarroewe5</code>	↗	<code>\adfarrownne5</code>	↓	<code>\adfarrows5</code>	✓	<code>\adfarrowsw5</code>
→	<code>\adfarroewe6</code>	↗	<code>\adfarrownne6</code>	↓	<code>\adfarrows6</code>	↗	<code>\adfarrowsw6</code>
↑	<code>\adfarrown1</code>	↘	<code>\adfarrownw1</code>	↖	<code>\adfarrowsse1</code>	←	<code>\adfarrowsw1</code>
↑	<code>\adfarrown2</code>	↘	<code>\adfarrownw2</code>	↖	<code>\adfarrowsse2</code>	←	<code>\adfarrowsw2</code>
↑	<code>\adfarrown3</code>	↘	<code>\adfarrownw3</code>	↖	<code>\adfarrowsse3</code>	↔	<code>\adfarrowsw3</code>
↑	<code>\adfarrown4</code>	↘	<code>\adfarrownw4</code>	↖	<code>\adfarrowsse4</code>	↔	<code>\adfarrowsw4</code>
↑	<code>\adfarrown5</code>	↘	<code>\adfarrownw5</code>	↖	<code>\adfarrowsse5</code>	←	<code>\adfarrowsw5</code>
↑	<code>\adfarrown6</code>	↘	<code>\adfarrownw6</code>	↖	<code>\adfarrowsse6</code>	↔	<code>\adfarrowsw6</code>
↖	<code>\adhalfarrowleft</code>			↗	<code>\adhalfarrowright</code>		
↖	<code>\adhalfarrowleftsolid</code>			↗	<code>\adhalfarrowrightsolid</code>		

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

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

TABLE 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>
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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>
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TABLE 338: dingbat Pencils



TABLE 339: arev Pencils

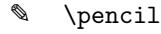


TABLE 340: fontawesome Pencils

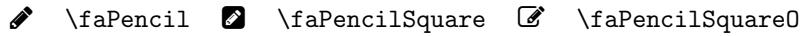


TABLE 341: bbdng Pencils and Nibs

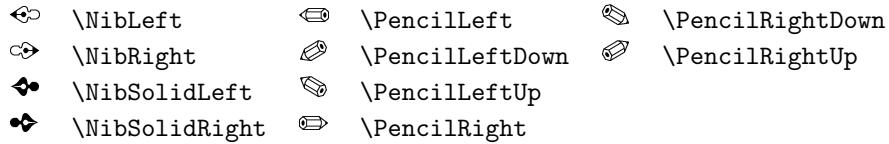


TABLE 342: pifont Pencils and Nibs

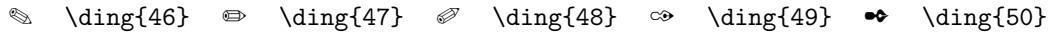


TABLE 343: dingbat Fists

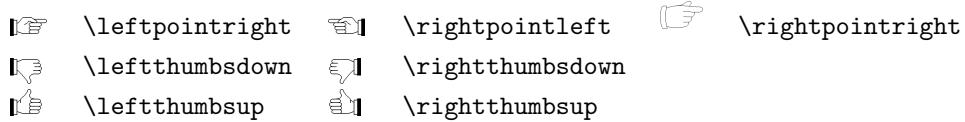


TABLE 344: bbdng Fists

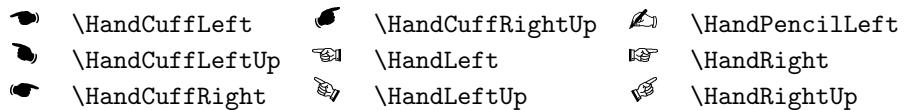


TABLE 345: pifont Fists

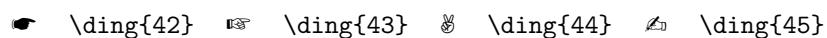


TABLE 346: fourier Fists

 \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: bbdng Crosses and Plusss

	\Cross		\CrossOpenShadow		\PlusOutline
	\CrossBoldOutline		\CrossOutline		\PlusThinCenterOpen
	\CrossCloverTips		\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: bbdng 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
-------------	---	-------------	---	------------

TABLE 357: arev Xs and Check Marks

✓	\ballotcheck	✗	\ballotx
---	--------------	---	----------

TABLE 358: fontawesome Xs and Check Marks

✓	\faCheck	✓	\faCheckSquare	✗	\faTimesCircle
✓	\faCheckCircle	☒	\faCheckSquareO	☒	\faTimesCircleO
☒	\faCheckCircleO	✗	\faTimes*		

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

TABLE 359: pifont Circled Numerals

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

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

TABLE 360: wasysym Stars

◊	\davidsstar	*	\hexstar	*	\varhexstar
---	-------------	---	----------	---	-------------

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

TABLE 361: bbdng Stars, Flowers, and Similar Shapes

* \Asterisk	❖ \FiveFlowerPetal	◆ \JackStar
* \AsteriskBold	★ \FiveStar	◆ \JackStarBold
* \AsteriskCenterOpen	☆ \FiveStarCenterOpen	* \SixFlowerAlternate
* \AsteriskRoundedEnds	☆ \FiveStarConvex	* \SixFlowerAltPetal
* \AsteriskThin	☆ \FiveStarLines	* \SixFlowerOpenCenter
* \AsteriskThinCenterOpen	☆ \FiveStarOpen	◊ \SixFlowerPetalDotted
* \DavidStar	● \FiveStarOpenCircled	* \SixFlowerPetalRemoved
* \DavidStarSolid	★ \FiveStarOpenDotted	* \SixFlowerRemovedOpenPetal
* \EightAsterisk	☆ \FiveStarOutline	★ \SixStar
* \EightFlowerPetal	☆ \FiveStarOutlineHeavy	* \SixteenStarLight
* \EightFlowerPetalRemoved	☆ \FiveStarShadow	* \Snowflake
* \EightStar	◆ \FourAsterisk	* \SnowflakeChevron
* \EightStarBold	◊ \FourClowerOpen	* \SnowflakeChevronBold
* \EightStarConvex	◆ \FourClowerSolid	* \Sparkle
* \EightStarTaper	◆ \FourStar	* \SparkleBold
* \FiveFlowerOpen	◊ \FourStarOpen	* \TwelweStar

TABLE 362: pifont Stars, Flowers, and Similar Shapes

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

TABLE 363: adfsymbols Stars, Flowers, and Similar Shapes

◊ \adfbullet{1}	*	\adfbullet{13}	◊ \adfbullet{18}	◊ \adfbullet{23}
◊ \adfbullet{2}	◊ \adfbullet{14}	◊ \adfbullet{19}	◊ \adfbullet{24}	
*	\adfbullet{3}	◊ \adfbullet{15}	○ \adfbullet{20}	*
*	\adfbullet{11}	◊ \adfbullet{16}	◊ \adfbullet{21}	◊ \adfbullet{26}
*	\adfbullet{12}	◊ \adfbullet{17}	◊ \adfbullet{22}	

TABLE 364: adforn Stars

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

TABLE 365: fontawesome Stars

★ \faStar □ \faStarHalf ▪ \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

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▲ \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
~~~	\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	Ѽ	\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
	\AAayod		\Ayod		\Aayin		\Aqoph		\Aresh		\Ahelmet		\AAahelmet		\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 “`אַתְּ אֵלֶּה אָזָיִן`”). See the *protosem* documentation for more information.

TABLE 393: `hierogl` 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
𓏺	\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	Ϟ	\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

ㅏ	\LinearAI	ㅑ	\LinearACIX	ㅓ	\LinearACXCVII	ㅕ	\LinearACCXCV
ㅓ	\LinearAII	ㅑ	\LinearAC	ㅓ	\LinearACXCVIII	ㅕ	\LinearACCXCVI
ㅑ	\LinearAIII	ㅑ	\LinearACI	ㅓ	\LinearACXCIX	ㅓ	\LinearACCXCVII
ㅓ	\LinearAIV	ㅓ	\LinearACII	ㅓ	\LinearACC	ㅓ	\LinearACCXCVIII
ㅓ	\LinearAV	ㅓ	\LinearACIII	ㅓ	\LinearACCI	ㅓ	\LinearACCXCIX
ㅓ	\LinearAVI	ㅓ	\LinearACIV	ㅓ	\LinearACCII	ㅓ	\LinearACCC
ㅓ	\LinearAVII	ㅓ	\LinearACV	ㅓ	\LinearACCI	ㅓ	\LinearACCCI
ㅓ	\LinearAVIII	ㅓ	\LinearACVI	ㅓ	\LinearACCIV	ㅓ	\LinearACCCII
ㅓ	\LinearAIX	ㅓ	\LinearACVII	ㅓ	\LinearACCV	ㅓ	\LinearACCCIII
ㅓ	\LinearAX	ㅓ	\LinearACVIII	ㅓ	\LinearACVI	ㅓ	\LinearACCCIV
ㅓ	\LinearAXI	ㅓ	\LinearACIX	ㅓ	\LinearACCVII	ㅓ	\LinearACCCV
ㅓ	\LinearAXII	ㅓ	\LinearACX	ㅓ	\LinearACCVIII	ㅓ	\LinearACCCVI
ㅓ	\LinearAXIII	ㅓ	\LinearACXI	ㅓ	\LinearACCIX	ㅓ	\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	₪ \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	₪ \LinearACCCCL
₪ \LinearALVII	₪ \LinearACLV	₪ \LinearACCLII	₪ \LinearACCCCLI
₪ \LinearALVIII	₪ \LinearACLVI	₪ \LinearACCLIV	₪ \LinearACCCCLI
₪ \LinearALIX	₪ \LinearACLVII	₪ \LinearACCLV	₪ \LinearACCCCLIII
₪ \LinearALX	₪ \LinearACLVIII	₪ \LinearACCLVI	₪ \LinearACCCCLIV
₪ \LinearALXI	₪ \LinearACLIX	₪ \LinearACCLVII	₪ \LinearACCCCLV
₪ \LinearALXII	₪ \LinearACLX	₪ \LinearACLVIII	₪ \LinearACCCCLVI
₪ \LinearALXIII	₪ \LinearACLXI	₪ \LinearACCLIX	₪ \LinearACCCCLVII
₪ \LinearALXIV	₪ \LinearACLXII	₪ \LinearACCLX	₪ \LinearACCCCLVIII
₪ \LinearALXV	₪ \LinearACLXIII	₪ \LinearACCLXI	₪ \LinearACCCCLIX
₪ \LinearALXVI	₪ \LinearACLXIV	₪ \LinearACCLXII	₪ \LinearACCCCLX

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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	¶	\LinearACCLXXX	??	\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
𢁋	\Bau	𢁋	\Bju	𢁎	\Bni	𢁊	\Bqa	𢁋	\Bse	𢁋	\Bu
ト	\Bda	⊕	\Bka	𢁉	\Bno	𢁊	\Bqe	𢁉	\Bsi	𢁉	\Bwa
𢁉	\Bde	𢁉	\Bke	𢁎	\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
𢁋	\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

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

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

TABLE 399: linearb Unidentified Linear B Symbols

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

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

TABLE 400: cypriot Cypriot Letters

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

These symbols must appear either within the argument to `\textcypr` or following the `\cyprfamily` font-selection command within a scope. Single-character shortcuts are also supported: Both “`\textcypr{\Cpa\Cki\Cna}`” and “`\textcypr{pcn}`” produce “

143

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

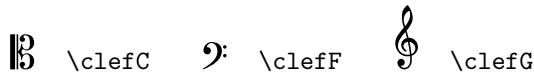
lilyglyphs defines synonyms for all of the preceding symbols:

	\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	<code>\lilyTimeC</code>	C	<code>\lilyTimeCHalf</code>
----------	-------------------------	----------	-----------------------------

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.7}
- \lilyGlyph{rests.1}	\lilyGlyph{rests.M1}
. \lilyGlyph{rests.1mensural}	\lilyGlyph{rests.M1mensural}
. \lilyGlyph{rests.1neomensural}	\lilyGlyph{rests.M1neomensural}
- \lilyGlyph{rests.1o}	\lilyGlyph{rests.M1o}
\lilyGlyph{rests.2}	\lilyGlyph{rests.M2}
\lilyGlyph{rests.2classical}	\lilyGlyph{rests.M2mensural}
\lilyGlyph{rests.2mensural}	\lilyGlyph{rests.M2neomensural}
\lilyGlyph{rests.2neomensural}	\lilyGlyph{rests.M3}
\lilyGlyph{rests.3}	\lilyGlyph{rests.M3mensural}
\lilyGlyph{rests.3mensural}	\lilyGlyph{rests.M3neomensural}
\lilyGlyph{rests.3neomensural}	\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.cephalicus}
·      \lilyGlyph{noteheads.svaticana.epiphonus}
·      \lilyGlyph{noteheads.svaticana.inclinatum}
·      \lilyGlyph{noteheads.svaticana.inner.cephalicus}
·      \lilyGlyph{noteheads.svaticana.linea.punctum}
·      \lilyGlyph{noteheads.svaticana.linea.punctum.cavum}
·      \lilyGlyph{noteheads.svaticana.lpes}
·      \lilyGlyph{noteheads.svaticana.plica}
·      \lilyGlyph{noteheads.svaticana.punctum}
·      \lilyGlyph{noteheads.svaticana.punctum.cavum}
·      \lilyGlyph{noteheads.svaticana.quilisma}
·      \lilyGlyph{noteheads.svaticana.reverse.plica}
·      \lilyGlyph{noteheads.svaticana.reverse.vplica}
·      \lilyGlyph{noteheads.svaticana.upes}
·      \lilyGlyph{noteheads.svaticana.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}
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\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>	\circledcirc	<code>\frownie</code>	\tanh	<code>\phone</code>	\odot	<code>\sun</code>
\mid	<code>\brokenvert</code>	\circledast	<code>\invdiameter</code>	\diamondleftarrow	<code>\pointer</code>	\blacktriangle	<code>\UParrow</code>
\checkmark	<code>\checked</code>	\maltese	<code>\kreuz</code>	\circlearrowright	<code>\recorder</code>	\square	<code>\wasylozenge</code>

TABLE 444: `manfnt` Dangerous Bend Symbols

	<code>\dbend</code>		<code>\lhbend</code>		<code>\reversedvideobend</code>
--	---------------------	--	----------------------	--	---------------------------------

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

TABLE 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>
$\blacktriangleright\blacktriangleright$	<code>\ForwardToEnd</code>	\blacktriangleleft	<code>\MoveUp</code>	\blacktriangleleft	<code>\RewindToStart</code>		
$\blacktriangleright\blacktriangleright\blacktriangleright$	<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		@	\MVAt	

TABLE 450: Miscellaneous universa Symbols

\bauforms \bauhead

TABLE 451: Miscellaneous fourier Symbols

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

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

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		\Mountain		\Joch		\VarSummit
	\Hut		\IceMountain		\Flag		
	\FilledHut		\VarMountain		\VarFlag		
	\Village		\VarIceMountain		\Tent		

TABLE 454: ifsym Clocks

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

ifsym also exports a \showclock macro. \showclock{\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	\ll	\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, ..., ⑫, 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

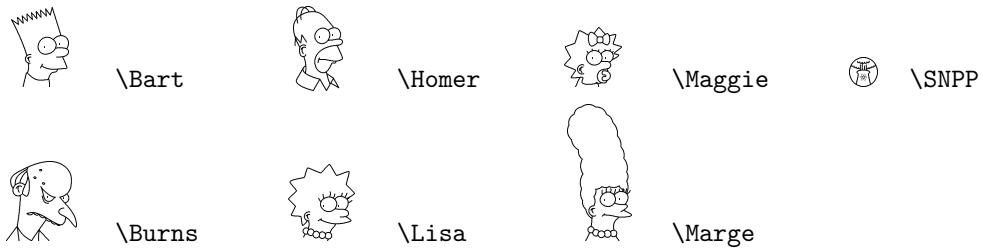
oo	\aeolicbii	o	\barbrevis	+	\ipercatal
ooo	\aeolicbiii	o	\bbrevis	-	\longa
oooo	\aeolicbiv	o	\brevis	<u>o</u>	\ubarbbrevis
x	\anceps	<u>o</u>	\catal	<u>o</u>	\ubarbrevis
<u>x</u>	\ancepsdbrevis	<u>o</u>	\corona	<u>oo</u>	\ubarsbrevis
<u>x</u>	\banceps	<u>o</u>	\coronainv	o	\ubrevONGLONGA
<u>o</u>	\barbbrevis	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

\ddagger	\dsaeronautical	\ddagger	\dscommercial	\ddagger	\dsmedical
\checkmark	\dsagricultural	\square	\dsheraldical	\times	\dsmilitary
\triangle	\dsarchitectural	\natural	\dsjuridical	\blacksquare	\dsrailways
\heartsuit	\dsbiological	\clubsuit	\dsliterary	\oplus	\dstechnical
\clubsuit	\dschemical	$\&$	\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:

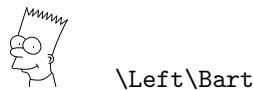


TABLE 474: `pmbboxdraw` Box-Drawing Symbols

	\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}

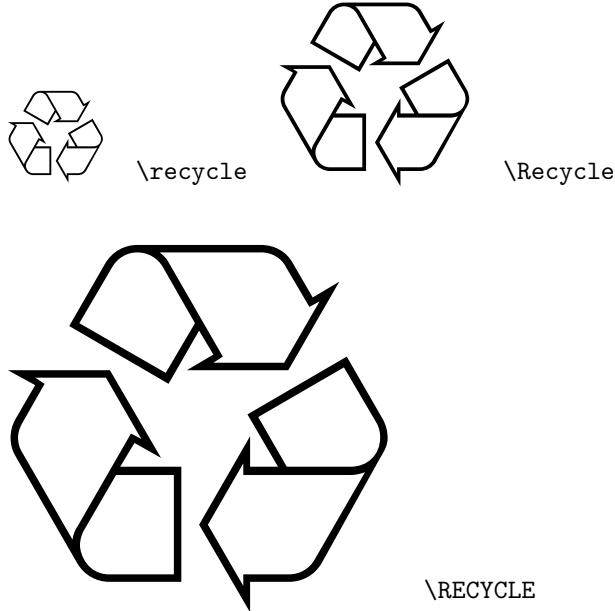
TABLE 478: GÍA2e Recycling Symbols

◎ \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



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

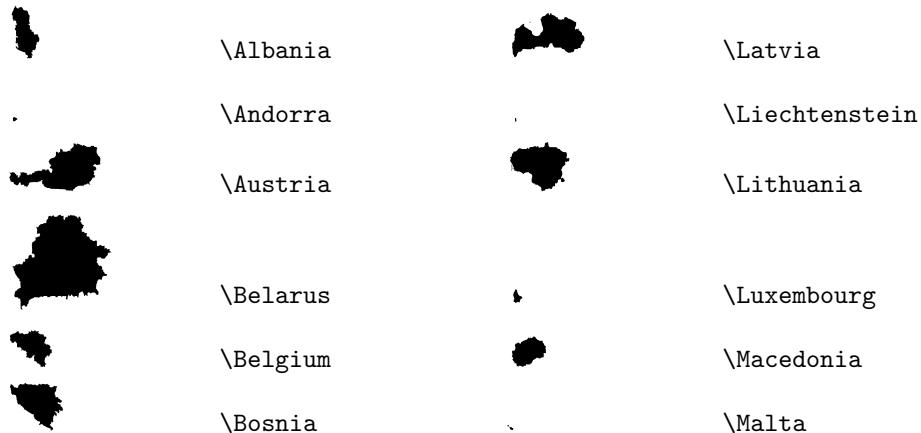
TABLE 483: knitting Knitting Symbols

\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>	$\nearrow\swarrow$	<code>\textknit{I}</code>	$\vee\vee$	<code>\textknit{v}</code>
$\forall\forall$	<code>\textknit{8}</code>	$\nearrow\swarrow$	<code>\textknit{i}</code>	$\square\vee\vee$	<code>\textknit{W}</code>
$\forall\forall$	<code>\textknit{9}</code>	$\nearrow\swarrow$	<code>\textknit{j}</code>	$\vee\vee$	<code>\textknit{w}</code>
$\wedge\wedge$	<code>\textknit{:}</code>	$\nearrow\swarrow$	<code>\textknit{j}</code>	$\square\vee\vee$	<code>\textknit{X}</code>
$\wedge\wedge$	<code>\textknit{;}</code>	$\nwarrow\swarrow$	<code>\textknit{l}</code>	$\vee\vee$	<code>\textknit{x}</code>
$\wedge\wedge$	<code>\textknit{<}</code>	$\nearrow\swarrow$	<code>\textknit{l}</code>	$\square\vee\vee$	<code>\textknit{Y}</code>
$-$	<code>\textknit{=}</code>	$\square\circlearrowright$	<code>\textknit{M}</code>	$\vee\vee$	<code>\textknit{y}</code>
$\wedge\wedge$	<code>\textknit{>}</code>	$\square\circlearrowleft$	<code>\textknit{m}</code>	$\square\circlearrowleft\circlearrowright$	<code>\textknit{Z}</code>
\bullet	<code>\textknit{@}</code>	$\circlearrowleft\circlearrowright$	<code>\textknit{o}</code>	$\circlearrowleft\circlearrowright$	<code>\textknit{z}</code>

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

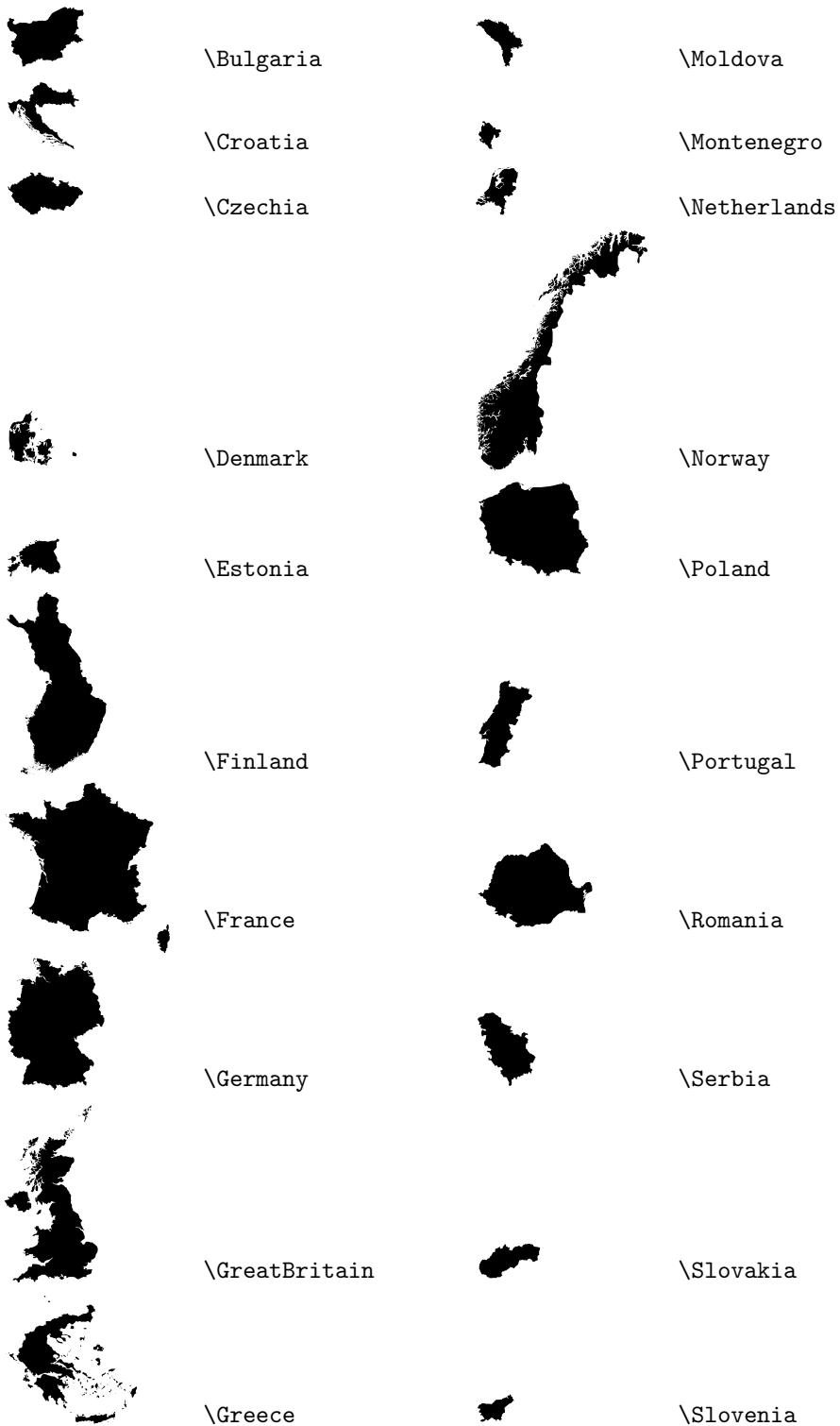
Some symbols behave differently when used as part of a sequence. For example, contrast `\textknit{1}` (“ \wedge ”), `\textknit{11}` (“ $\wedge\wedge$ ”), and `\textknit{111}` (“ $\wedge\wedge\wedge$ ”). Similarly, contrast `\textknit{"}` (“ \Rightarrow ”) and `\textknit{"}"` (“ \circlearrowleft ”). Again,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

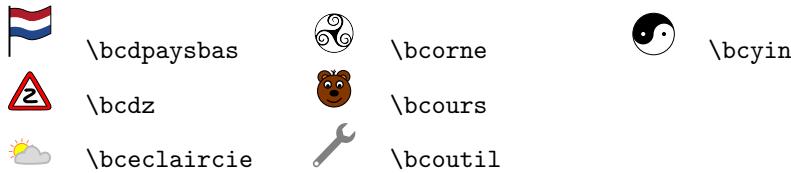
All `tikzsymbols` symbols are implemented with TikZ graphics, not with a font. `\Tribar` supports customization of the fill color for each bar. `\Strichmaxerl` supports customization of the angles at which the stick figure's arms and legs are drawn. See the `tikzsymbols` documentation for more information.

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		\faCcPaypal		\faCcStripe		\faCcVisa		\faCertificate		\faChainBroken		\faChild		\faChrome		\faClipboard		\faClock0		\faClone		\faCloud		\faCloudDownload		\faCloudUpload		\faCode		\faCodeFork		\faCodepen		\faCoffee		\faCog		\faCogs		\faColumns		\faComment		\faCommenting		\faCommenting0		\faComment0		\faComments		\faComments0		\faCompass		\faCompress		\faConnectdevelop		\faContao		\faCreditCard		\faCrop		\faCrosshairs		\faCss3		\faCube		\faCubes		\faCutlery		\faDashcube		\faDatabase		\faDelicious		\faDesktop		\faDeviantart		\faDiamond		\faDigg		\faDownload		\faDribbble		\faDropbox		\faDrupal		\faEject		\faEllipsisH		\faEllipsisV		\faEmpire		\faLanguage		\faLaptop		\faLastfm		\faLastfmSquare		\faLeaf		\faLeanpub		\faLemon0		\faLevelDown		\faLevelUp		\faLifeRing		\faLightbulb0		\faLineChart		\faLink		\faLinkedin		\faLinkedinSquare		\faLinux		\faList		\faListAlt		\faList01		\faListUl		\faLocationArrow		\faLock		\faMagic		\faMagnet		\faMale		\faMap		\faMapMarker		\faMap0		\faMapPin		\faMapSigns		\faMaxcdn		\faMeanpath		\faMedium		\faMedkit		\faMeh0		\faMicrophone		\faMicrophoneSlash		\faMinus		\faMinusCircle		\faMinusSquare		\faMinusSquare0		\faMobile		\faMoney		\faMotorcycle		\faMousePointer		\faMusic		\faNewspaper0		\faObjectGroup		\faObjectUngroup		\faOdnoklassniki		\faOdnoklassnikiSquare		\faOpencart		\faOpenid		\faSuitcase		\faSuperscript		\faTable		\faTablet		\faTachometer		\faTag		\faTags		\faTasks		\faTaxi		\faTelevision		\faTencentWeibo		\faTerminal		\faTextHeight		\faTextWidth		\faTh		\faThLarge		\faThList		\faThumbTack		\faTicket		\faTint		\faToggleOff		\faToggleOn		\faTrain		\faTrash		\faTrash0		\faTree		\faTrello		\faTripadvisor		\faTrophy		\faTruck		\faTty		\faTumblr		\faTumblrSquare		\faTwitch		\faTwitter		\faTwitterSquare		\faUmbrella		\faUnderline		\faUniversity		\faUnlock		\faUnlockAlt		\faUpload		\faUser		\faUserMd		\faUserPlus		\faUsers		\faUserSecret		\faUserTimes		\faVideoCamera		\faVimeo		\faVimeoSquare		\faVine		\faVk
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✉ \faEnvelope	ⓧ \faEnvelopeO	✉ \faEnvelopeSquare	ⓧ \faEraser	↑ \faExchange	! \faExclamation	● \faExclamationCircle	▲ \faExclamationTriangle	↗ \faExpand	🕒 \faExpeditedssl	↗ \faExternalLink	✉ \faExternalLinkSquare	👁 \faEye	eyedropper \faEyedropper	slash \faEyeSlash	f \faFacebook	fb \faFacebookOfficial	fb \faFacebookSquare	◀ \faFastBackward	▶ \faFastForward	✉ \faFax	O \faOpera	ⓧ \faOptinMonster	✉ \faOutdent	leaf \faPagelines	paintbrush \faPaintBrush	clip \faPaperclip	paperplane \faPaperPlane	paperplane0 \faPaperPlaneO	paragraph \faParagraph	pause \faPause	paw \faPaw	paypal \faPaypal	phone \faPhone	phonesquare \faPhoneSquare	picture0 \faPictureO	piechart \faPieChart	piedpiper \faPiedPiper	piedpiperalt \faPiedPiperAlt	pinterest \faPinterest	pinterestp \faPinterestP	pinterestsquare \faPinterestSquare	ⓧ \faVolumeDown	ⓧ \faVolumeOff	volumeup \faVolumeUp	weibo \faWeibo	weixin \faWeixin	whatsapp \faWhatsapp	wheelchair \faWheelchair	wifi \faWifi	W \faWikipediaW	windows \faWindows	wordpress \faWordpress	wrench \faWrench	xing \faXing	xingsquare \faXingSquare	yahoo \faYahoo	ycombinator \faYCombinator	yelp \faYelp	youtube \faYoutube	youtubeplay \faYoutubePlay	youtube-square \faYoutubeSquare
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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	facebookF \faFacebookF	feed \faFeed	file movie0 \faFileMovieO	file photo0 \faFilePhotoO	file picture0 \faFilePictureO	file sound0 \faFileSoundO	filezip0 \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 ball0 \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
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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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2	\Pisymbol{nkarta}{50}	Ճ	\Pisymbol{nkarta}{113}	◀	\Pisymbol{nkarta}{210}
3	\Pisymbol{nkarta}{51}	❖	\Pisymbol{nkarta}{114}	◀	\Pisymbol{nkarta}{211}
4	\Pisymbol{nkarta}{52}	❖	\Pisymbol{nkarta}{115}	▼	\Pisymbol{nkarta}{212}
5	\Pisymbol{nkarta}{53}	●	\Pisymbol{nkarta}{116}	↑	\Pisymbol{nkarta}{213}
6	\Pisymbol{nkarta}{54}	▢	\Pisymbol{nkarta}{117}	↖	\Pisymbol{nkarta}{214}
7	\Pisymbol{nkarta}{55}	❖	\Pisymbol{nkarta}{118}	↑	\Pisymbol{nkarta}{215}
8	\Pisymbol{nkarta}{56}	❖	\Pisymbol{nkarta}{119}	●	\Pisymbol{nkarta}{216}
9	\Pisymbol{nkarta}{57}	○	\Pisymbol{nkarta}{120}	❖	\Pisymbol{nkarta}{217}
□	\Pisymbol{nkarta}{58}	▢	\Pisymbol{nkarta}{121}	●	\Pisymbol{nkarta}{218}
○	\Pisymbol{nkarta}{59}	ি	\Pisymbol{nkarta}{122}	●	\Pisymbol{nkarta}{219}
□	\Pisymbol{nkarta}{60}	---	\Pisymbol{nkarta}{123}	■	\Pisymbol{nkarta}{220}
■	\Pisymbol{nkarta}{61}	↗	\Pisymbol{nkarta}{124}	●	\Pisymbol{nkarta}{221}
×	\Pisymbol{nkarta}{62}	↖	\Pisymbol{nkarta}{125}	●	\Pisymbol{nkarta}{222}
■	\Pisymbol{nkarta}{63}	▫	\Pisymbol{nkarta}{126}	❖	\Pisymbol{nkarta}{223}
□	\Pisymbol{nkarta}{64}	♦	\Pisymbol{nkarta}{161}	■	\Pisymbol{nkarta}{224}
*	\Pisymbol{nkarta}{65}	◆	\Pisymbol{nkarta}{162}	❖	\Pisymbol{nkarta}{225}
†	\Pisymbol{nkarta}{66}	▲	\Pisymbol{nkarta}{163}	■	\Pisymbol{nkarta}{226}
■	\Pisymbol{nkarta}{67}	▬	\Pisymbol{nkarta}{164}	●	\Pisymbol{nkarta}{227}
▲	\Pisymbol{nkarta}{68}	▬	\Pisymbol{nkarta}{165}	★	\Pisymbol{nkarta}{228}
☆	\Pisymbol{nkarta}{69}	▬	\Pisymbol{nkarta}{166}	★	\Pisymbol{nkarta}{229}
❖	\Pisymbol{nkarta}{70}	❖	\Pisymbol{nkarta}{167}	○	\Pisymbol{nkarta}{230}
■	\Pisymbol{nkarta}{71}	◎	\Pisymbol{nkarta}{168}	▢	\Pisymbol{nkarta}{231}
■	\Pisymbol{nkarta}{72}	▲	\Pisymbol{nkarta}{169}	▢	\Pisymbol{nkarta}{232}
▢	\Pisymbol{nkarta}{73}	■	\Pisymbol{nkarta}{170}	▢	\Pisymbol{nkarta}{233}
+	\Pisymbol{nkarta}{74}	★	\Pisymbol{nkarta}{171}	▲	\Pisymbol{nkarta}{234}
)	\Pisymbol{nkarta}{75}	□	\Pisymbol{nkarta}{172}	▬	\Pisymbol{nkarta}{235}
□	\Pisymbol{nkarta}{76}	▣	\Pisymbol{nkarta}{173}	↓	\Pisymbol{nkarta}{236}
■	\Pisymbol{nkarta}{77}	+	\Pisymbol{nkarta}{174}	Ω	\Pisymbol{nkarta}{237}
▪	\Pisymbol{nkarta}{78}	□	\Pisymbol{nkarta}{175}	॥	\Pisymbol{nkarta}{238}
○	\Pisymbol{nkarta}{79}	●	\Pisymbol{nkarta}{176}	≡	\Pisymbol{nkarta}{239}
▽	\Pisymbol{nkarta}{80}	□	\Pisymbol{nkarta}{177}	▨	\Pisymbol{nkarta}{240}
■	\Pisymbol{nkarta}{81}	☒	\Pisymbol{nkarta}{178}	☒	\Pisymbol{nkarta}{241}
★	\Pisymbol{nkarta}{82}	✗	\Pisymbol{nkarta}{179}	◊	\Pisymbol{nkarta}{242}
➤	\Pisymbol{nkarta}{83}	□	\Pisymbol{nkarta}{180}	✗	\Pisymbol{nkarta}{243}
◎	\Pisymbol{nkarta}{84}	▣	\Pisymbol{nkarta}{181}	+	\Pisymbol{nkarta}{244}
▢	\Pisymbol{nkarta}{85}	▫	\Pisymbol{nkarta}{182}	†	\Pisymbol{nkarta}{245}
▬	\Pisymbol{nkarta}{86}	★	\Pisymbol{nkarta}{183}	▀	\Pisymbol{nkarta}{246}
🍁	\Pisymbol{nkarta}{87}	▢	\Pisymbol{nkarta}{184}	◊	\Pisymbol{nkarta}{247}
♿	\Pisymbol{nkarta}{88}	▷	\Pisymbol{nkarta}{185}	▬	\Pisymbol{nkarta}{248}
💂	\Pisymbol{nkarta}{89}	▬	\Pisymbol{nkarta}{186}	▬	\Pisymbol{nkarta}{249}
{	\Pisymbol{nkarta}{90}	❖	\Pisymbol{nkarta}{187}	▬	\Pisymbol{nkarta}{250}
አ	\Pisymbol{nkarta}{91}	❖	\Pisymbol{nkarta}{188}	✗	\Pisymbol{nkarta}{251}
አ	\Pisymbol{nkarta}{92}	✉	\Pisymbol{nkarta}{189}	▀	\Pisymbol{nkarta}{252}
አ	\Pisymbol{nkarta}{93}	×	\Pisymbol{nkarta}{190}	▼	\Pisymbol{nkarta}{253}
አ	\Pisymbol{nkarta}{94}	○	\Pisymbol{nkarta}{191}	▶	\Pisymbol{nkarta}{254}
አ	\Pisymbol{nkarta}{95}	✳	\Pisymbol{nkarta}{192}		

TABLE 498: moonphase Astronomical Symbols

⌚	<code>\Pisymbol{moonphase}{0}</code>	⌚	<code>\Pisymbol{moonphase}{2}</code>
Ɖ	<code>\Pisymbol{moonphase}{1}</code>	Ɖ	<code>\Pisymbol{moonphase}{3}</code>

TABLE 499: astrosym Astronomical Symbols

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

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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}
θ \Pisymbol{dancers}{76}	θ \Pisymbol{dancers}{162}	θ \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”:

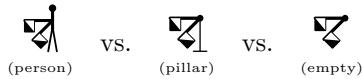


TABLE 507: `cryst` Crystallography Symbols

◦	<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>

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■ \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}

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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			\circ			
<code>\Cross</code>						\dagger	\dagger	\times		
<code>\ggg</code>			\ggg					\boxtimes		
<code>\Letter</code>				\sharp	\sharp			\blacktriangleright		
<code>\lightning</code>						ℓ				
<code>\Lightning</code>					\ll					
<code>\lll</code>					\lll					
<code>\Square</code>					\square			\square		\odot
<code>\Sun</code>						\odot	\odot			
<code>\TriangleDown</code>						\blacktriangledown		\triangledown		
<code>\TriangleUp</code>						\blacktriangleup		\triangle		

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	↑	↑	↑	↑	↑	↑	↑

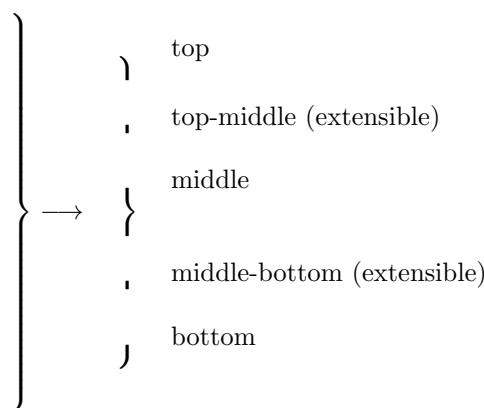


Figure 1: Implementation of variable-sized delimiters

- 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.

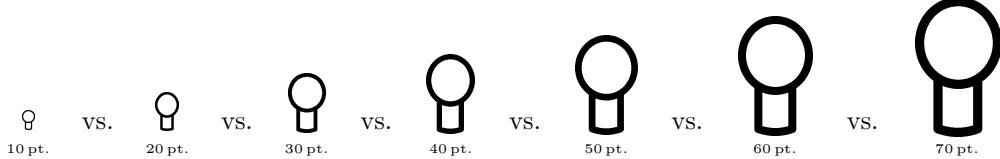
Developing new symbols from scratch

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`)

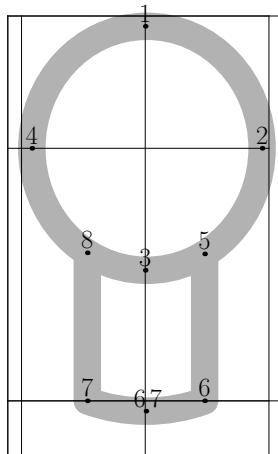


Figure 4: Proof diagram of `lightbulb10.mf`

```
[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 (`\[. . . \]`).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 `\[. . . \]`.

<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 $\text{\LaTeX}_2\epsilon$ typesetting of ASCII characters, i.e., the characters available on a typical U.S. computer keyboard. The first two columns list the character's ASCII code in decimal and hexadecimal. The third column shows what the character looks like. The fourth column lists the $\text{\LaTeX}_2\epsilon$ command to typeset the character as a text character. And the fourth column lists the $\text{\LaTeX}_2\epsilon$ command to typeset the character within a $\text{\texttt{}}\{\dots\}$ command (or, more generally, when \ttfamily is in effect).

TABLE 518: $\text{\LaTeX}_2\epsilon$ ASCII Table

Dec	Hex	Char	Body text	$\text{\texttt{}}$	Dec	Hex	Char	Body text	$\text{\texttt{}}$
33	21	!	!	!	62	3E	>	$\text{\texttt{textgreater}}$	>
34	22	"	$\text{\texttt{textquotedbl}}$	"	63	3F	?	?	?
35	23	#	$\text{\texttt{\#}}$	$\text{\texttt{\#}}$	64	40	@	$\text{\texttt{@}}$	$\text{\texttt{@}}$
36	24	\$	$\text{\texttt{\$}}$	$\text{\texttt{\$}}$	65	41	A	A	A
37	25	%	$\text{\texttt{\%}}$	$\text{\texttt{\%}}$	66	42	B	B	B
38	26	&	$\text{\texttt{\&}}$	$\text{\texttt{\&}}$	67	43	C	C	C
39	27	,	,	,	68	44	:	:	:
40	28	(((90	5A	Z	Z	Z
41	29)))	91	5B	[[[
42	2A	*	*	*	92	5C	\	$\text{\texttt{textbackslash}}$	$\text{\texttt{\char'\\}}$
43	2B	+	+	+	93	5D]]]
44	2C	,	,	,	94	5E	^	$\text{\texttt{\^{}}}$	$\text{\texttt{\^{}}}$
45	2D	-	-	-	95	5F	_	$\text{\texttt{_}}$	$\text{\texttt{_}}$
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	<	$\text{\texttt{textless}}$	$\text{\texttt{<}}$
53	35	=	=	=	103	67	=	$\text{\texttt{=}}$	$\text{\texttt{=}}$
54	36	>	>	>	104	68	~	$\text{\texttt{\~{}}}$	$\text{\texttt{\~{}}}$
55	37	^	^	^	105	69	~	$\text{\texttt{\~{}}}$	$\text{\texttt{\~{}}}$
56	38	_	_	_	106	6A	~	$\text{\texttt{\~{}}}$	$\text{\texttt{\~{}}}$
57	39	{	{	{	107	6B	}	$\text{\texttt{\{}}$	$\text{\texttt{\{}}$
58	3A	:	:	:	108	6C		$\text{\texttt{\ }}$	$\text{\texttt{\ }}$
59	3B	;	;	;	109	6D	}	$\text{\texttt{\}}}$	$\text{\texttt{\}}}$
60	3C	<	<	<	110	6E	~	$\text{\texttt{\~{}}}$	$\text{\texttt{\~{}}}$
61	3D	=	=	=	111	6F	~	$\text{\texttt{\~{}}}$	$\text{\texttt{\~{}}}$

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	²	\textpm	(tc)	225	E1	á	\'{}{a}	
178	B2	³	\texttwosuperior	(tc)	226	E2	â	\^{}{a}	
179	B3	⁴	\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 12, 2015
Symbols documented:	14030
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	2015/06/17
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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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
$\backslash.$	($.$) 19
$\backslash /$	($/$) 94
\backslash / \backslash	($/ \backslash$) 95
$\backslash / \backslash /$	($/ \backslash /$) 98
$\backslash : (:$	($:$) 109
$\backslash ; (;$	($;$) 109
$\backslash < (\langle \rangle)$	95
$\backslash < (\langle \langle \rangle \rangle)$	98
$\backslash ? (?:$	($?$) 109
$\backslash [(]$	($[\]$) 94
$\backslash [(]$	($[\]$) 95
$\backslash [(]$	($[\]$) 98
$\backslash \backslash$	211
$\backslash \langle \rangle$	($\langle \rangle$) 94
$\backslash \langle \rangle$	($\langle \rangle$) 95
$\backslash \langle \rangle$	($\langle \rangle$) 98
$\backslash ^ (\hat{\ })$	19
$\backslash ^ \{ \} (\hat{\ })$	($\hat{\ }$) 13, 221
$\backslash \backslash \langle \rangle (\backslash \langle \rangle)$	($\langle \rangle$) 94
$\backslash \backslash \langle \rangle (\backslash \langle \rangle)$	($\langle \rangle$) 96
$\backslash \backslash \langle \rangle (\backslash \langle \rangle)$	($\langle \rangle$) 19
$\backslash = (\text{=} \text{`})$	($= \text{`}$) 19
$\backslash = \{ \} (-)$	($= \{ \} (-)$) 221
$\backslash ()$	($ ()$) 97
$\backslash ()$	($ ()$) 95
$\backslash ()$	($ ()$) 98
$\backslash ()$	($ ()$) 46, 94, 96, 99
$\backslash (($	($(($) 97
$\backslash) ()$	($) ()$) 97
$\backslash / (/)$	($/ (/)$) 97
$\backslash [([)$	($[([)$) 97
$\backslash _$	($_$) 14
$\backslash _ (-)$	($_ (-)$) 13, 221
$\backslash \{ \{ \} \}$	($\{ \{ \} \}$) 13, 14, 94
$\backslash \{ \{ \} \}$	($\{ \{ \} \}$) 221
$\backslash \} \{ \} \}$	($\} \{ \} \}$) 13, 14, 94
$\backslash \} \{ \} \}$	($\} \{ \} \}$) 221
$\backslash \} (])$	($\} (])$) 97
$\backslash ' (\text{'})$	($' (\text{'})$) 19
$\backslash ^ (\text{'})$	($\hat{ } (\text{'})$) 19
$\backslash ^ \{ \} (\text{'})$	($\hat{ } \{ \} (\text{'})$) 13, 221
A	
$\backslash a (\text{`} a)$	($a (\text{`} a)$) 104
$\backslash \AA (\text{\'A})$	($\AA (\text{\'A})$) 14
$\backslash aa (\text{\'a})$	($aa (\text{\'a})$) 14
$\backslash \AA aleph (\text{\'\AA})$	($\AA aleph (\text{\'\AA})$) 138
$\backslash \AA ayin (\text{\'\o})$	($\AA ayin (\text{\'\o})$) 138
$\backslash \AA beth (\text{\'\BbbB})$	($\AA beth (\text{\'\BbbB})$) 138
$\backslash \AA cht (\text{\'\AA})$	($\AA cht (\text{\'\AA})$) 149
$\backslash \AA dalet (\text{\'\D})$	($\AA dalet (\text{\'\D})$) 138
$\backslash \AA he (\text{\'\H})$	($\AA he (\text{\'\H})$) 138
$\backslash \AA helmet (\text{\'\H})$	($\AA helmet (\text{\'\H})$) 138
$\backslash \AA heth (\text{\'\H})$	($\AA heth (\text{\'\H})$) 138
$\backslash \AA kaph (\text{\'\K})$	($\AA kaph (\text{\'\K})$) 138
$\backslash \AA alamed (\text{\'\O})$	($\AA alamed (\text{\'\O})$) 138
$\backslash \AA aleph (\text{\'\O})$	($\AA aleph (\text{\'\O})$) 138
$\backslash \AA pe (\text{\'\P})$	($\AA pe (\text{\'\P})$) 138
$\backslash \AA qoph (\text{\'\Q})$	($\AA qoph (\text{\'\Q})$) 138
$\backslash \AA resh (\text{\'\R})$	($\AA resh (\text{\'\R})$) 138
$\backslash \AA asade (\text{\'\S})$	($\AA asade (\text{\'\S})$) 138
$\backslash \AA yain (\text{\'\s})$	($\AA yain (\text{\'\s})$) 138
$\backslash \AA yod (\text{\'\y})$	($\AA yod (\text{\'\y})$) 138
$\backslash \AB (\text{`} \text{B})$	($\AB (\text{`} \text{B})$) 121
$\backslash \Abeth (\text{`} \text{B})$	($\Abeth (\text{`} \text{B})$) 138
$\backslash braces$ (package)	105, 226, 227
absolute value	<i>see</i> \lvert and \rvert
$\backslash accentset$	214
accidentals	<i>see</i> musical symbols
accordion notation	152
$\backslash accordionBayanBass$ (\square)	152
$\backslash accordionDiscant$ (\ominus)	152
$\backslash accordionFreeBass$ (\ominus)	152
$\backslash accordionOldEE$ (\otimes)	152
$\backslash accordionPull$ (\sqcap)	152
$\backslash accordionPush$ (\sqcup)	152

¹⁶This occurs frequently between `amssymb` and `mathabx`, for example.

\accordionStdBass (152
\accurrent (~)	114
\Acht (♪)	149
\AchtBL (♩)	149
\AchtBR (♫)	149
\acidfree (⊗)	111
\ACK (♣)	122
\acontraction	215
\AcPa (γ)	149
\actuarial (▣)	214
actuarial symbols	105, 214
actuarialangle (package)	105, 214, 226
\actuarialangle	214
\actuarialangle (▣)	105
\acute (ְ)	101
\acute (ִ)	100
acute (ֶ)	see accents
\acutus (ַ)	22
\acwcirclearrow (○)	81
\acwcirclearrowdown (◐)	75
\acwcirclearrowleft (◑)	75
\acwcirclearrowright (◑)	75
\acwcirclearrowup (◑)	75
\acwgapcirclearrow (◑)	76
\acwgapcirclearrow (◑)	81
\acwlefttarcarrow (↳)	75
\acwlefttarcarrow (↳)	81
\acwnearcarrow (↖)	75
\acwnearcarrow (↙)	75
\acwopencirclearrow (○)	76
\acwopencirclearrow (◑)	82, 133
\acwoverarcarrow (↖)	75
\acwoverarcarrow (↖)	81
\acwrighttarcarrow (↳)	75
\acwsearcarrow (↗)	75
\acwssearcarrow (↙)	75
\acwunderarcarrow (↑)	75
\acwunderarcarrow (↓)	81
\Adaleth (װ)	138
adeles (A) <i>see</i> alphabets, math	
\adfarrowspace	126
\adfarrowspace1 (↔)	126
\adfarrowspace2 (→)	126
\adfarrowspace3 (↔)	126
\adfarrowspace4 (↔)	126
\adfarrowspace5 (→)	126
\adfarrowspace6 (↔)	126
\adfarrown1 (↑)	126
\adfarrown2 (↑)	126
\adfarrown3 (↑)	126
\adfarrown4 (↑)	126
\adfarrown5 (↑)	126
\adfarrown6 (↑)	126
\adarrowne1 (↗)	126
\adarrowne2 (↗)	126
\adarrowne3 (↗)	126
\adarrowne4 (↗)	126
\adarrowne5 (↗)	126
\adarrowne6 (↗)	126
\adarrownw1 (↖)	126
\adfarrownw2 (↖)	126
\adfarrownw3 (↖)	126
\adfarrownw4 (↖)	126
\adfarrownw5 (↖)	126
\adfarrownw6 (↖)	126
\adfarrows1 (↑)	126
\adfarrows2 (↓)	126
\adfarrows3 (↓)	126
\adfarrows4 (↓)	126
\adfarrows5 (↓)	126
\adfarrows6 (↑)	126
\adarrowse1 (↖)	126
\adarrowse2 (↘)	126
\adarrowse3 (↖)	126
\adarrowse4 (↖)	126
\adarrowse5 (↖)	126
\adarrowse6 (↖)	126
\adarrowsw1 (↖)	126
\adarrowsw2 (↖)	126
\adarrowsw3 (↖)	126
\adarrowsw4 (↖)	126
\adarrowsw5 (↖)	126
\adarrowsw6 (↖)	126
\adarroww1 (↔)	126
\adarroww2 (↔)	126
\adarroww3 (↔)	126
\adarroww4 (↔)	126
\adarroww5 (↔)	126
\adarroww6 (↔)	126
\adfast{1} (⊛)	131
\adfast{2} (⊛)	131
\adfast{3} (⊛)	131
\adfast{4} (⊛)	131
\adfast{5} (⊛)	131
\adfast{6} (⊛)	131
\adfast{7} (⊛)	131
\adfast{8} (⊛)	131
\adfast{9} (⊛)	131
\adfast{10} (⊛)	131
\adbullet (•)	137
\adbullet{1} (◊)	131
\adbullet{2} (◊)	131
\adbullet{3} (◊)	131
\adbullet{4} (◊)	131
\adbullet{5} (◊)	131
\adbullet{6} (◊)	131
\adbullet{7} (◊)	131
\adbullet{8} (◊)	129
\adbullet{9} (◊)	129
\adbullet{10} (◊)	129
\adbullet{11} (◊)	131
\adbullet{12} (◊)	131
\adbullet{13} (◊)	131
\adbullet{14} (◊)	131
\adbullet{15} (◊)	131
\adbullet{16} (◊)	131
\adbullet{17} (◊)	131
\adbullet{18} (◊)	131
\adbullet{19} (◎)	131
\adbullet{20} (◎)	131
\adbullet{21} (◎)	131
\adbullet{22} (◎)	131
\adbullet{23} (◊)	131
\adbullet{24} (◊)	131
\adbullet{25} (•)	131
\adbullet{26} (◊)	131
\adbullet{27} (•)	136
\adbullet{28} (•)	136
\adbullet{29} (▪)	136
\adbullet{30} (♦)	136
\adbullet{31} (◀)	136
\adbullet{32} (▶)	136
\adbullet{33} (▲)	136
\adbullet{34} (▼)	136
\adbullet{41} (●)	136
\adbullet{42} (●)	136
\adbullet{43} (●)	136
\adbullet{44} (●)	136
\adbullet{45} (◊)	136
\adbullet{46} (▪)	136
\adbullet{47} (▪)	136
\adbullet{48} (●)	136
\adbullet{49} (●)	136
\adbullet{50} (♦)	136
\adbullet{51} (◊)	136
\adbullet{52} (◊)	136
\adclosedflourishleft (~~)	137
\adclosedflourishright (~~)	137
\addiamond (◊)	137
\addoubleflourishleft (~~)	137
\addoubleflourishright (~~)	137
\addoublesharpflourishleft (~~)	137
\addoublesharpflourishright (~~)	137
\addownhalfleafleft (՞)	132
\addownhalfleafright (՞)	132
\adflatdownhalfleafleft (՞)	132
\adflatdownhalfleafright (՞)	132
\adflatleafleft (՞)	132
\adflatleafoutlineleft (՞)	132
\adflatdownoutlineleafleft (՞)	132
\adflatdownoutlineleafright (՞)	132
\adflatleafleft (՞)	132
\adflatleafoutlineleft (՞)	132
\adflatleafoutlineright (՞)	132
\adflatleafright (՞)	132
\adflatleafsolidleft (՞)	132
\adflatleafsolidright (՞)	132
\adflourishleft (~~)	137
\adflourishleftdouble (~~)	137
\adflourishright (~~)	137

\adfflourishrightdouble (~~)	137
\adfflowerleft (↖)	132
\adfflowerright (↘)	132
\adfgee (⌚)	137
\adfhalfarrowleft (←)	126
\adfhalfarrowleftsolid (↔)	126
\adfhalfarrowright (→)	126
\adfhalfarrowrightsolid (↔)	126
\adfhalfleafleft (↶)	132
\adfhalfleafright (↷)	132
\adfhalfleftarrow (↶)	127
\adfhalfleftarrowhead (↶)	127
\adfhangingflatleafleft (⤶)	132
\adfhangingflatleafright (⤷)	132
\adfhangingingleafleft (⤸)	132
\adfhangingingleafright (⤹)	132
\adflleafleft (↶)	132
\adflleafright (↷)	132
\adflleftarrowhead (↶)	127
\adffopenflourishleft (↔)	137
\adffopenflourishright (↔)	137
adforn (package)	127, 131, 132, 137, 226, 227
\adfoutlineleafleft (⤶)	132
\adfoutlineleafright (⤷)	132
\adfrightharrowhead (→)	127
\adfsS (§)	137
\adfssharpflourishleft (↔)	137
\adfssharpflourishright (↔)	137
\adfsickleflourishleft (↔)	137
\adfsickleflourishright (↔)	137
\adfsingleflourishleft (↔)	137
\adfsingleflourishright (↔)	137
\adfsmallhangingleafleft (↶)	132
\adfsmallhangingleafright (↷)	132
\adfsmallleafleft (↶)	132
\adfsmallleafright (↷)	132
\adfsolidleafleft (↶)	132
\adfsolidleafright (↷)	132
\adfsquare (□)	137
adfsymbols (package)	126, 129, 131, 136, 226
\adftripleflourishleft (~~~~)	137
\adftripleflourishright (~~~~)	137
\adfwavesleft (~~~~)	137
\adfwavesright (~~~~)	137
adjoint (†)	see \dag
\Admetos (⌚)	120
Adobe Acrobat	218
\adots (‘‘)	109, 213
\adots (‘‘)	108
\adots (‘‘)	109
advancing	see \textadvancing
\AE (Æ)	14
\ae (æ)	14
\aeolicbii (oo)	172
\aeolicbiii (ooo)	172
\aeolicbiv (oooo)	172
\agemO (Ӯ)	112
\Agimel (ߵ)	138
\Ahe (ߴ)	138
\Ahelmet (߶)	138
\Aheth (߷)	138
\ain (߸)	23
\Air (߸)	120
\Akaph (߸)	138
\Alad (߸)	100
\alad (߸)	100
\Alamed (߸)	138
\Alas (߸)	100
\alas (߸)	100
\Albania (߸)	176
\aldine (߸)	132
\aldineleft (߸)	132
\aldineright (߸)	132
\aldinesmall (߸)	132
\aleph (߸)	90, 112
\aleph (߸)	90
\aleph (߸)	90
\aleph (߸)	91
\Alif (߸)	19
\allabreve (߲)	148
\Alpha (A)	88
\alpha (α)	88
alphabets	116
African	15
Cypriot	143
Cyrillic	209
Greek	14, 88, 89, 117, 144
Hebrew	90, 91, 117
hieroglyphic	139
Linear A	139
Linear B	142
math	116
phonetic	16–19
proto-Semitic	138
South Arabian	144
Vietnamese	15
\alphaphaup (α)	89
alpine symbols	166
\Alt (Alt)	122
alternative denial	see \uparrowarrow and
\AltGr (AltGr)	122
\altoclef (ܪ)	148
\AM (܃)	121
\amalg (II)	28
\amalg (II)	30
\amalg (II)	29
\amalg (II)	32
\Amem (ܾ)	138
\Amor (܄)	120
ampersand	see \&
\AMS (package)	11, 14, 28, 38, 47, 59, 61, 66, 69, 87, 88, 90, 91, 93, 94, 100, 102, 105, 108, 111, 112, 117, 206, 207, 225
amsbsy (package)	220
amsfonts (package)	112, 116
amsmath (package)	11, 87, 100, 210, 219
amssymb (package)	11, 100, 112, 116, 144, 226
amstext (package)	211, 213
\Anaclasis (܊)	171
\anaclasis (܊)	171
\anceps (܂)	172
\ancepsdbrevis (܂)	172
\anchor (܁)	178
\anchor (܁)	137
ancient-language symbols	138–146
and	see \wedge
AND gates	123
	123
\ANDd (AND)	123
	123
\AND1 (AND1)	176
	123
\ANDr (ANDr)	123
	123
\ANDu (ANDu)	123
	123
\angdnr (܂)	112
\angl (܂)	105
\angle (܂)	111
\angle (܂)	112
\angle (܂)	111
\angle (܂)	111
\angle (܂)	111
\angle (܂)	112
angle notation	119
angles	110–113, 115, 120
\angles (܂)	112
\AngleSign (܂)	110
\angleubar (܂)	112
\angln (܂)	105
\anglr (܂)	105

\Angstrom (\AA)	92
\{\{ \{\{ math mode <i>see \mathring{A}</i> text mode <i>see \AA</i>	
\Angud ()	100
\angud ()	100
angular minutes <i>see \prime</i>	
angular seconds <i>see \second</i>	
\Angus ()	100
\angus ()	100
animals 138, 139, 143	
\Ankh (†)	165
\Amnoey (⊖)	179
\annuity (ℳ)	101
annuity symbols 105, 214	
\Antidiple (<)	171
\antidiple (<)	171
\Antidiple* (<) 171	
\antidiple* (<) 171	
\antilabe (,:) 109	
\antimuon (μ^+) 125	
\antineutrino ($\bar{\nu}$) 125	
\antineutron (\bar{n}) 125	
\antiproton (p^-) 125	
\antiquark (\bar{q}) 125	
\antiquarkb (\bar{b}) 125	
\antiquarkc (\bar{c}) 125	
\antiquarkd (\bar{d}) 125	
\antiquarks (\bar{s}) 125	
\antiquarkt (\bar{t}) 125	
\antiquarku (\bar{u}) 125	
\Antisigma (⌚)	171
\antisigma (⌚)	171
\Anun (՞)	138
\aoeverbrace (՞)	105
\Ape (ܵ)	138
APL symbols 55–56	
apl (package) 121, 226	
APL symbols 121	
\APLbox (ℳ)	121
\APLboxquestion (ܵ)	121
\APLboxupcaret (ܵ)	121
\APLcirc (ܵ)	121
\APLcomment (ܵ)	121
\APLdown (ܵ)	121
\APLdownarrowbox (ܵ)	121
\APLinput (ℳ)	121
\APLinv (ܵ)	121
\APLleftarrowbox (ܵ)	121
\APLlog (ܵ)	121
\APLminus (ܵ)	121
\APLnot (ܵ)	121
\APLnotbackslash (ܵ)	121
\APLnotslash (ܵ)	121
\APLrightarrowbox (ܵ)	121
\APLstar (*) 121	
\APLup (Δ)	121
\APLuparrowbox (ܵ)	121
\APLvert (ܵ)	121
\Apollon (ܵ)	120
apostropha <i>see musixg</i>	
\apprge (⩵)	62
\apprle (⩵)	62
\approx (≈)	46
\approx (≈)	51
\approx (≈)	49
\approx (≈)	55
\approxcolon (⩵)	58
\approxcoloncolon (⩵)	58
\approxeq (⩵)	47
\approxeq (⩵)	54
\approxeq (⩵)	51
\approxeq (⩵)	49
\approxeq (⩵)	55
\approxeqqq (⩵)	55
\approxident (⩵)	52
\approxident (⩵)	55
\AQph (♾)	138
\Aquarius (♒)	119
\Aquarius (♒)	120
\aquarius (♒)	119
\AR (ܵ)	118
ar (package) 118, 226	
arc (ܵ) <i>see accents</i>
\arccos (arccos) 87	
\arceq (⠀)	54
\arceq (⠀)	52, 86
\arceq (⠀)	55
arcminutes <i>see \prime</i>	
arcs (package) 22, 226	
arcseconds <i>see \second</i>	
\arcsin (arcsin) 87	
\arctan (arctan) 87	
\Aresh (ܵ)	138
arev (package) 127–130, 137, 147, 178, 226	
\arg (arg) 87	
\Aries (♈)	120
\Aries (♉)	119
\Aries (♊)	120
\Aries (♋)	119
\aries (♌)	119
\ArrowBoldDownRight (➡)	126
\ArrowBoldRightCircled (⌚)	126
\ArrowBoldRightShort (➡)	126
\ArrowBoldRightStrobe ()	126
\ArrowBoldUpRight (➡)	126
\arrowbullet (➤)	127
\Arrownot (/)	86
\arrownot (/)	86
\ArrowOver (⩵)	24
\arrowOver (⩵)	24
arrows 69–71, 75, 79–84, 102–107, 120, 122, 126, 127, 138, 143, 165, 176, 181–184, 186– 187, 202–203, 209	
diagonal, for reducing subexpressions 102	
dotted 107	
double-headed, diagonal 213	
extensible 102–107	
fletched 84, 126	
negated 69, 70, 72, 76	
arrows (boisik package option) 80	
\Arrowvert ()	94
\Arrowvert ()	95
\Arrowvert ()	97
\arrowvert ()	94
\arrowvert ()	95
\arrowvert ()	97
Arseneau, Donald 211–214	
articulations <i>see musical</i> <i>symbols</i>	
\Asade (ܵ)	138
\Asamekh (ܵ)	138
\ASC (ܵ)	120
ASCII 11, 14, 122, 197, 206, 220–221, 223–225	
table 220	
ascii (package) 122, 221, 226	
\ascnode (ܵ)	119
\Ashin (ܵ)	138
aspect ratio 118	
\Assert ()	52
\assert ()	52
\assert ()	55
\assumption (★)	125
\ast (*)	29
\ast (*)	28
\ast (*)	31
\ast (*)	30
\ast (*)	29
\ast (*)	32
\asteq (⠀)	55
\asteraccent (ܵ)	101
\Asteriscus (ܵ)	171
\asteriscus (ܵ)	171
\Asterisk (*) 29	
\Asterisk (ܵ)	131
\asterisk (*) 29	
\AsteriskBold (ܵ)	131
\AsteriskCenterOpen (ܵ)	131
\AsteriskRoundedEnds (ܵ)	131
asterisks 29, 131	
\AsteriskThin (ܵ)	131
\AsteriskThinCenterOpen (ܵ)	131
\asterism (ܵ)	210
asteroids 120	
astrological symbols 119, 120, 188–190	
astronomical symbols 119, 120, 174, 188–190	
\astrosun (ܵ)	120
\astrosun (ܵ)	119
astrosym (package) 188, 226	
asymmetric braces 105	

\asymp (\asymp)	46
\asymp (\asymp)	52, 86
\asymp (\asymp)	85
\asymp (\asymp)	55
\atan (atan)	219
\ataribox (\bullet)	164
\Atav (+)	138
\Ateth (\eth)	138
\AtForty ($\text{\texttt{40}}$)	165
\AtNinetyFive ($\text{\texttt{95}}$)	165
\atom ($\text{\texttt{*}}$)	125
atomic math objects	87, 219
\AtSixty ($\text{\texttt{60}}$)	165
\aunderbrace ($\overbrace{}^{}$)	105
\Austria ($\text{\texttt{A}}$)	176
\autoleftarrow (\longleftarrow)	106
\autoleftrightharpoons ($\overleftarrow{\overrightarrow{x}}$)	106
\autorightarrow (\longrightarrow)	106
\autorightleftharpoons ($\overleftarrow{\overleftarrow{x}}$)	106
\AutumnTree ($\text{\texttt{Autumn}}$)	179
\Avav (?)	138
average	27
\awint ($\text{\texttt{f}}$)	43
\awint ($\text{\texttt{f}}$)	43
\awintsl ($\text{\texttt{f}}$)	45
\awintup ($\text{\texttt{f}}$)	45
\Ayn ($\text{\texttt{c}}$)	19
\Ayod ($\text{\texttt{L}}$)	138
\Azayin (=)	138
B	
\B	15
\B ($\text{\texttt{g}}$)	171
b (esvect package option)	104
\b ($\text{\texttt{b}}$)	19
\b ($\text{\texttt{v}}$)	171
\Ba ($\text{\texttt{T}}$)	142
babel (package)	14, 88, 89, 144
\babygamma ($\text{\texttt{y}}$)	18
\backapprox ($\text{\texttt{a}}$)	49
\backapproxeq ($\text{\texttt{a}}$)	49
\Backblech ($\text{\texttt{b}}$)	179
\backcong ($\text{\texttt{e}}$)	51
\backcong ($\text{\texttt{e}}$)	49
\backcong ($\text{\texttt{e}}$)	55
\backdprime ($\text{\texttt{w}}$)	111
\backepsilon ($\text{\texttt{e}}$)	47
\backepsilon ($\text{\texttt{e}}$)	114
\backepsilon ($\text{\texttt{e}}$)	90
\backeqsim ($\text{\texttt{a}}$)	49
\backneg ($\text{\texttt{r}}$)	113
\backneg ($\text{\texttt{r}}$)	113
\backprime ($\text{\texttt{l}}$)	112
\backprime ($\text{\texttt{l}}$)	114
\backprime ($\text{\texttt{l}}$)	113
\backprime ($\text{\texttt{l}}$)	113
\backprime ($\text{\texttt{l}}$)	111
\backproto ($\text{\texttt{o}}$)	51
\backsim ($\text{\texttt{s}}$)	47
\backsim ($\text{\texttt{s}}$)	54
\backsim ($\text{\texttt{s}}$)	51
\backsim ($\text{\texttt{s}}$)	49
\backsim ($\text{\texttt{s}}$)	55
\backsimeq ($\text{\texttt{m}}$)	47
\backsimeq ($\text{\texttt{m}}$)	54
\backsimeq ($\text{\texttt{m}}$)	51
\backsimeq ($\text{\texttt{m}}$)	49
\backsimeq ($\text{\texttt{m}}$)	55
\backsimneqq ($\text{\texttt{z}}$)	53
\backslash ()	94, 112
\backslash ()	96
\backslash ()	95
\backslash ()	114
\backslash ()	97
\backslashdiv ($\text{\texttt{x}}$)	29
\backtriplesim ($\text{\texttt{y}}$)	49
\backtrprime ($\text{\texttt{w}}$)	111
\backturn ($\text{\texttt{p}}$)	148
\bagmember ($\text{\texttt{E}}$)	54
\bagmember ($\text{\texttt{E}}$)	55
\Bai ($\text{\texttt{T}}$)	142
\Baiii ($\text{\texttt{w}}$)	142
\bakingplate ($\text{\texttt{b}}$)	179
\bakingplate ($\text{\texttt{b}}$)	179
\ballotcheck ($\text{\texttt{v}}$)	130
\ballotx ($\text{\texttt{X}}$)	130
banana brackets	
<i>see \llparenthesis and \rrparenthesis</i>	
\banceps ($\text{\texttt{x}}$)	172
\bar ($\text{\texttt{b}}$)	101
\bar ($\text{\texttt{b}}$)	100
\barb ($\text{\texttt{b}}$)	18
\barbbevis ($\text{\texttt{w}}$)	172
\barbrevis ($\text{\texttt{v}}$)	172
\barcap ($\text{\texttt{n}}$)	32
\barcirc ($\text{\texttt{e}}$)	211
\barcup ($\text{\texttt{U}}$)	32
\bard ($\text{\texttt{d}}$)	18
\bardownharpoonleft ($\text{\texttt{T}}$)	83
\bardownharpoonright ($\text{\texttt{T}}$)	83
\bari ($\text{\texttt{i}}$)	18
\barin ($\text{\texttt{E}}$)	91
\barj ($\text{\texttt{j}}$)	18
\barl ($\text{\texttt{t}}$)	18
\barlambda ($\text{\texttt{X}}$)	18
\barleftarrow (\leftarrow)	79
\barleftarrow (\leftarrow)	81
\barleftarrowrightarrowbar ($\overleftarrow{\overrightarrow{x}}$)	79
\barleftarrowrightarrowbar ($\overleftarrow{\overrightarrow{x}}$)	81
\barleftharpoon ($\text{\texttt{e}}$)	71
\barleftharpoondown (\leftarrow)	83
\barleftharpoonup (\leftarrow)	83
\baro (ϕ)	28
\baro (ϕ vs. Θ)	207
\baro (ϕ)	31
\baro (Θ)	18
\BarOver ($\text{\texttt{-}}$)	24
\barOver ($\text{\texttt{-}}$)	24
\barovernorthwestarrow ($\text{\texttt{K}}$)	79
\barovernorthwestarrow ($\text{\texttt{K}}$)	133
\barp ($\text{\texttt{p}}$)	18
barred letters	210
\barrightarrowdiamond (\leftrightarrow)	81
\barrightharpoon (\Rightarrow)	71
\barrightharpoondown (\leftarrow)	83
\barrightharpoonup (\leftarrow)	83
\barsci ($\text{\texttt{t}}$)	18
\barscu ($\text{\texttt{u}}$)	18
	
\Bart ($\text{\texttt{B}}$)	172
bartel-chess-fonts (package)	204, 205, 226
\baru ($\text{\texttt{u}}$)	18
\baruparrow ($\text{\texttt{T}}$)	81
\barupharpoonleft ($\text{\texttt{T}}$)	83
\barupharpoonright ($\text{\texttt{T}}$)	83
\Barv ($\text{\texttt{T}}$)	52
\Barv ($\text{\texttt{T}}$)	55
\barV ($\text{\texttt{T}}$)	52
\barV ($\text{\texttt{T}}$)	55
\barvee ($\text{\texttt{V}}$)	32
\barwedge ($\text{\texttt{w}}$)	29
\barwedge ($\text{\texttt{w}}$)	28
\barwedge ($\text{\texttt{w}}$)	31
\barwedge ($\text{\texttt{w}}$)	30
\barwedge ($\text{\texttt{w}}$)	32
base twelve	
numerals	110
tally markers	168
\BasicTree	179
\bassclef ($\text{\texttt{D}}$)	148
\Bat ($\text{\texttt{e}}$)	165
\Bau ($\text{\texttt{P}}$)	142
\baucircle ($\text{\texttt{O}}$)	136
\bauforms ($\text{\texttt{G}}$)	165
\bauhead ($\text{\texttt{I}}$)	165
\bausquare ($\text{\texttt{b}}$)	136
\bautriangle ($\text{\texttt{A}}$)	136
\BB ($\text{\texttt{L}}$)	171
\Bb ($\text{\texttt{L}}$)	171
\Bb ($\text{\texttt{L}}$)	171
\bb ($\text{\texttt{w}}$)	171
\bba ($\text{\texttt{Y}}$)	171
\bbalpha ($\text{\texttt{a}}$)	117
\bbar ($\text{\texttt{b}}$)	210
\bbb ($\text{\texttt{Y}}$)	171
\bbbeta ($\text{\texttt{B}}$)	117
\Bbbk ($\text{\texttt{k}}$)	91

\Bbbk (k)	92
\Bbbk (k̄)	92
\Bbbsum (Σ)	43
bding (package)	126–129, 131, 135, 137, 207, 226
\bbdollar (\$)	117
\bbetter (⊤)	169
\bbeuro (€)	117
\bbfinalnun (॥)	117
\bbgamma (ঃ)	117
bbgreekl (mathbbol package option)	117
\BBm (ୟ)	171
\Bbm (ୟ)	171
\bBm (ୟ)	171
bbm (package)	116, 226
\bbm (ୟ)	171
\bbmb (ୟ)	171
\bbmx (ୟ)	171
\bbnabla (ବିଭାଗ)	117
bbold (package)	116, 226
\bbpe (ଡିକ୍ଷଣ)	117
\bbqof (ପରିମାଣ)	117
\brevis (ୱାରିଙ୍ଗ)	172
\brbrktbrk (ବିନ୍ଦୁ)	114
\bbslash (\\)	28
\bbslash (\\)	31
\byod (୧୦)	117
\bcattention (⚠)	180
\bc bombe (💣)	180
\bc book (ବାଚିକାଳି)	180
\bccalendrier (ବିବରଣୀ)	180
\bc cle (କ୍ଲେମ୍)	180
\bc clefa (କ୍ଲେଫା)	180
\bcclesol (କ୍ଲେସୋଲ)	180
\bccoeur (ହର୍ତ୍ତ)	180
\bccrayon (କ୍ରେଡିଟ୍)	180
\bccube (କ୍ରେଡିଟ୍)	180
\bcdallemande (ଜାର୍ମାନିଆ)	180
\bcdanger (ପାତାନ୍ତରୀକରଣ)	180
\bcdautrichie (ଅର୍ଥାତ୍)	180
\bcdbelgique (ବେଲଗ୍ରେନ୍)	180
\bcdbulgarie (ବୁର୍ଗାରୀଆ)	180
\bcdfrance (ଫର୍ଞ୍ଚ୍)	180

\bcditalie (ଇତାଲୀଆ)	180
\bcdluxembourg (ଲୁକ୍ୟମ୍ବର୍ଗ)	180
\bcdodecaedre (ଦୋକେଡରେ)	180
\bcdpaysbas (ପାଇସବାସ)	181
\bcdz (ଡିଜିଟ୍)	181
\bceclaircie (ପାତାନ୍ତରୀକରଣ)	181
\bcetoile (ତାରୀଖ)	180
\bcfemme (ମହିଳା)	180
\bcfeujaune (ମାଲାମାଲା)	180
\bcfeuro rouge (ମାଲାମାଲା)	180
\bcfeutricolore (ମାଲାମାଲା)	180
\bcfeuvert (ମାଲାମାଲା)	180
\bcfleur (ଫୁଲ)	180
\bchomme (ପଦ୍ମାମାଲା)	180
\bchorloge (କୋକ୍ଟଲ୍)	180
\bcicosaedre (ଦୋକେଡରେ)	180
\bcinfo (ଜାଗାନ୍ତରୀକରଣ)	180
\bcinterdit (ବିନ୍ଦୁ)	180
\bclampe (ଲାମ୍ପ)	180
bclogo (package)	180, 181, 226, 227
\bc loupe (ଲୋପେ)	180
\bcneige (ଛାତିକାଳି)	180
\bcnote (ନୋଟ୍)	180
\bcnucleaire (ନୁକ୍ଲେଅର୍)	180
\bcoctaedre (ଦୋକେଡରେ)	180
\bcoeil (ପାତାନ୍ତରୀକରଣ)	180
\bcontraction	215
\bcorne (କୋର୍ନ୍)	181
\bcours (କୋର୍ନ୍)	181
\bcoutil (କୋର୍ନ୍)	181
\bcpanchant (କୋର୍ନ୍)	180

\bcpeaceandlove (ଶାନ୍ତିଏତନିକିତା)	180
\bcpluie (ପାତାନ୍ତରୀକରଣ)	180
\bcplume (ପାତାନ୍ତରୀକରଣ)	180
\bcpoisson (ମାଲାମାଲା)	180
\bcquestion (ପାତାନ୍ତରୀକରଣ)	180
\bcrecyclage (ମାଲାମାଲା)	180
\bcrosevents (ମାଲାମାଲା)	180
\bcsmbh (ମାଲାମାଲା)	180
\bcsmmh (ମାଲାମାଲା)	180
\bcsoleil (ମାଲାମାଲା)	180
\bcspadesuit (ମାଲାମାଲା)	180
\bcstop (ମାଲାମାଲା)	180
\bctakecare (ମାଲାମାଲା)	180
\bctetraedre (ମାଲାମାଲା)	180
\bctrefle (ମାଲାମାଲା)	180
\bctrombone (ମାଲାମାଲା)	180
\bcvaletcoeur (ମାଲାମାଲା)	180
\bcvelo (ମାଲାମାଲା)	180
\bcyin (ମାଲାମାଲା)	181
\Bda (ମାଲାମାଲା)	142
\Bde (ମାଲାମାଲା)	142
\bdecisive (+)	169
\Bdi (ମାଲାମାଲା)	142
\bdleftarrow (ମାଲାମାଲା)	75
\bdneararrow (ମାଲାମାଲା)	75
\bdnwarrow (ମାଲାମାଲା)	75
\Bdo (ମାଲାମାଲା)	142
\bdooverarrow (ମାଲାମାଲା)	75
\bdrightarrow (ମାଲାମାଲା)	75
\bdsearrow (ମାଲାମାଲା)	75
\bdswarrow (ମାଲାମାଲା)	75
\Bdu (ମାଲାମାଲା)	142
\bdunderarrow (ମାଲାମାଲା)	75
\Bdwe (ମାଲାମାଲା)	142
\Bdwo (ମାଲାମାଲା)	142
\Be (ମାଲାମାଲା)	142
\Beam (ମାଲାମାଲା)	123
\Bearing (ମାଲାମାଲା)	123
\because (∴)	47, 108
\because (∴)	54
\because (∴)	108
\because (∴)	108
\because (∴)	109
\Bed (ମାଲାମାଲା)	180

begriff (package)	109, 226
Begriffsschrift symbols	109, 110
\BEL (•)	122
\Belarus (¤)	176
\Belgium (€)	176
\bell (¤)	164
\benzenr (◎)	133
Berry, Karl	228
\Beta (B)	88
\betaa (β)	88
\betaau (β)	89
\beth (beth) (beth)	90
\beth (beth) (beth)	90
\beth (beth) (beth)	90
\beth (beth) (beth)	90
\beth (beth) (beth)	91
better see \triangleleft	
\betteris (▷)	169
\between (◊)	48
\between (◊)	47
\between (◊)	54
\between (◊)	51
\between (◊)	49
\between (◊)	55
\BGassert (†)	109
\BGconditional (■)	109
[■]	
\BGcontent (‐)	109
\BGnot (¬)	109
\BGquant (□)	109
\Bi (毙)	142
\bibridge (■)	21
biconditional	
... see \leftrightarrow and \equiv	
\Bicycle (🚲)	165
\Big	206, 208
\big	206, 208
big O (O) see alphabets, math	
\bigast (*)	29
\bigblacktriangledown (▼)	133
\bigblacktriangleup (▲)	133
\bigbosonloop (●)	125
\bigbosonloopA (●)	125
\bigbosonloopV (●)	125
\bigbot (⊥)	114
\bigbox (□)	38
\bigboxasterisk (☒)	39
\bigboxbackslash (☒)	39
\bigboxbot (☒)	39
\bigboxcirc (○)	39
\bigboxcoasterisk (☒)	39
\bigboxdiv (☒)	39
\bigboxdot (☒)	39
\bigboxleft (☒)	39
\bigboxminus (☒)	39
\bigboxplus (☒)	39
\bigboxright (☒)	39
\bigboxslash (☒)	38
\bigboxtimes (☒)	38
\bigboxtop (☒)	38
\bigboxtriangleup (☒)	39
\bigboxvoid (□)	39
\bigcap (∩)	37
\bigcap (∩)	42
\bigcap (∩)	41
\bigcap (∩)	43
\bigcapdot (∩)	42
\bigcapplus (⊕)	42
\bigcapplus (⊕)	41
\bigcirc (○)	28
\bigcirc (○)	133
\bigcirc (○)	132
\bigcirc (○)	134
\BigCircle (○)	135
\BigCircle (○)	135
\bigcircle (○)	41
\bigcoast (⊛)	29
\bigcomplementop (○)	39
\BigCross (✗)	135
\bigcup (∪)	37
\bigcup (∪)	42
\bigcup (∪)	41
\bigcup (∪)	43
\bigcupdot (∪)	42
\bigcupdot (∪)	41
\bigcupdot (∪)	43
\bigcupplus (∪)	42, 43
\bigcupplus (∪)	41, 42
\bigcurlyvee (⋎)	38
\bigcurlyvee (⋎)	38
\bigcurlyvee (⋎)	42
\bigcurlyvee (⋎)	41
\bigcurlyveedot (⋎)	41
\bigcurlywedge (⋋)	38
\bigcurlywedge (⋋)	38
\bigcurlywedge (⋋)	42
\bigcurlywedge (⋋)	41
\bigcurlywedgedot (⋋)	41
\BigDiamondshape (◇)	135
\bigdoublecurlyvee (⋎)	41
\bigdoublecurlywedge (⋋)	41
\bigdoublevee (⋎)	42, 43
\bigdoublevee (⋎)	41
\bigdoublewedge (⋋)	42, 43
\bigdoublewedge (⋋)	41
\Bigg	206, 208
\bigg	206, 208
\BigHBar (⊍)	135
\bigint (∫)	41
\biginterleave ()	38
\biginterleave ()	114
bigints (package)	41, 226, 227
\bigints (∫)	41
\bigintss (∫)	41
\bigintsss (∫)	41
\bigintssss (∫)	41
\biginvamp (⊗)	46
\BigLowerDiamond (◆)	135
\bignplus (⊕)	38
\bigoast (⊗)	42
\bigoast (⊗)	41
\bigoasterisk (⊗)	39
\bigobackslash (⊗)	39
\bigobackslash (⊗)	42
\bigobot (⊕)	39
\bigocirc (◎)	39
\bigocirc (◎)	42
\bigocoasterisk (⊗)	39
\bigodiv (÷)	39
\bigodot (⊙)	37
\bigodot (⊙)	42
\bigodot (⊙)	42
\bigodot (⊙)	43
\bigoint (ʃ)	41
\bigoints (ʃ)	41
\bigointss (ʃ)	41
\bigointsss (ʃ)	41
\bigointssss (ʃ)	41
\bigoleft (⊕)	39
\bigominus (⊖)	39
\bigominus (⊖)	41
\bigoplus (⊕)	37
\bigoplus (⊕)	42
\bigoplus (⊕)	41
\bigoplus (⊕)	43
\bigoright (⊕)	38
\bigoslash (⊗)	38
\bigoslash (⊗)	41
\bigostar (⊗)	41
\bigotimes (⊗)	37
\bigotimes (⊗)	42
\bigotimes (⊗)	41
\bigotimes (⊗)	43
\bigotop (⊕)	38
\bigotriangle (◎)	41
\bigotriangleup (⊗)	39
\bigovert (○)	41
\bigovoid (○)	39
\bigparallel ()	38
\bigparr (⊗)	46
\bigplus (+)	39
\bigplus (+)	42
\bigplus (+)	41
\BigRightDiamond (◆)	135
\bigslashedvee (⋎)	32
\bigslashedwedge (⋋)	32
\bigsqcap (⊓)	38
\bigsqcap (⊓)	38
\bigsqcap (⊓)	42
\bigsqcap (⊓)	41
\bigsqcap (⊓)	43
\bigsqcapdot (⊓)	42

<code>\bigsqcapdot (⊓)</code>	41	<code>\bigwedge (Λ)</code>	42	<code>\BlackKingOnWhite (</code>	170
<code>\bigsqcapplus (⊔)</code>	39	<code>\bigwedge (Λ)</code>	44	<code>\BlackKnightOnBlack (</code>	.
<code>\bigsqcapplus (⊔)</code>	42	<code>\bigwedgedot (Ⓐ)</code>	42	<code>\BlackKnightOnWhite (</code>	.
<code>\bigsqcapplus (⊔)</code>	41	<code>\bigwedgedot (Ⓐ)</code>	42	<code>\blacklefthalfcircle (</code>	170
<code>\bigsqcup (⊤)</code>	37	<code>\bigwhitestar (☆)</code>	133	<code>\blacklozenge (◆)</code>	133
<code>\bigsqcup (⊤)</code>	42	<code>\bigwith (&)</code>	46	<code>\blacklozenge (◆)</code>	112
<code>\bigsqcup (⊤)</code>	41	<code>\binampersand (&)</code>	28	<code>\blacklozenge (◆)</code>	35, 133
<code>\bigsqcup (⊤)</code>	41	<code>\binampersand (&)</code>	31	<code>\blacklozenge (◆)</code>	133
<code>\bigsqcup (⊤)</code>	43	binary operators	28–36	<code>\blacklozenge (◆)</code>	132
<code>\bigsqcupdot (⊤)</code>	42	binary relations	47–51, 54–66, 84–86	<code>\blacklozenge (◆)</code>	133, 134
<code>\bigsqcupdot (⊤)</code>	41	negated	47–51, 53, 54, 56	<code>\BlackPawnOnBlack (</code>	170
<code>\bigsqcupplus (⊔)</code>	39	<code>\bindnasrepma (⊗)</code>	28	<code>\BlackPawnOnWhite (</code>	170
<code>\bigsqcupplus (⊔)</code>	42	<code>\bindnasrepma (⊗)</code>	31	<code>\blackpointerleft (◀)</code>	. 133
<code>\bigsqcupplus (⊔)</code>	41	<code>\Biohazard (☣)</code>	124	<code>\blackpointerright (▶)</code>	. 133
<code>\BigSquare (□)</code>	135	<code>\biohazard (☣)</code>	178	<code>\BlackQueenOnBlack (</code>	.
<code>\bigsquplus (⊔)</code>	39	biological symbols	124	<code>\BlackQueenOnWhite (</code>	.
<code>\bigstar (★)</code>	29	birds	139	<code>\blackrighthalfcircle (●)</code>	. 133
<code>\bigstar (★)</code>	112	bishop	170, 204–205	<code>\BlackRookOnBlack (</code>	170
<code>\bigstar (★)</code>	133	<code>\bischoppair (¤)</code>	169	<code>\BlackRookOnWhite (</code>	170
<code>\bigstar (★)</code>	133	<code>\Bja (𦵃)</code>	142	<code>\blacksmiley (☺)</code>	. 114
<code>\bigstar (★)</code>	133	<code>\Bje (𦵄)</code>	142	<code>\blacksmiley (☻)</code>	. 164
<code>\bigtimes (×)</code>	39	<code>\Bjo (𦵅)</code>	142	<code>\blacksquare (■)</code>	. 112
<code>\bigtimes (×)</code>	42	<code>\Bju (𦵆)</code>	142	<code>\blacksquare (■)</code>	. 35, 133
<code>\bigtimes (×)</code>	41	<code>\Bka (⊕)</code>	142	<code>\blacksquare (■)</code>	. 34
<code>\bigtimes (X)</code>	44	<code>\Bke (⊗)</code>	142	<code>\blacksquare (■)</code>	. 134
<code>\bigtop (⊤)</code>	114	<code>\Bki (▽)</code>	142	<code>\blackstone (●)</code>	. 170
<code>\BigTriangleDown (▽)</code>	135	<code>\Bko (†)</code>	142	<code>\blacktriangle (▲)</code>	. 112
<code>\bigtriangledown (▽)</code>	38	<code>\Bku (‡)</code>	142	<code>\blacktriangle (▲)</code>	. 35, 133
<code>\bigtriangledown (▽ vs. ▽)</code>	207	<code>\BL (\backslash)</code>	121	<code>\blacktriangle (▲)</code>	. 35, 68
<code>\bigtriangledown (▽)</code>	28	<code>\black</code>	171	<code>\blacktriangle (▲)</code>	. 67
<code>\bigtriangledown (▽)</code>	68,	<code>\BlackBishopOnBlack (</code>	.	<code>\blacktriangle (▲)</code>	. 134
133		<code>\BlackBishopOnWhite (</code>	.	<code>\blacktriangle (▲)</code>	. 134
<code>\bigtriangledown (▽)</code>	67	<code>\blackboard bold</code>	see alphabets, math	<code>\blacktriangle (▲)</code>	. 112
<code>\bigtriangledown (▽)</code>	133,	<code>\blackbowtie (■)</code>	31	<code>\blacktriangle (▲)</code>	. 35, 133
134		<code>\blackcircledownarrow (◐)</code>	. 133	<code>\blacktriangle (▲)</code>	. 35, 68
<code>\BigTriangleLeft (◀)</code>	135	<code>\blackcircledrightdot (●)</code>	. 133	<code>\blacktriangle (▲)</code>	. 67
<code>\bigtriangleleft (◀)</code>	133	<code>\blackcircledtwodots (●)</code>	. 133	<code>\blacktriangle (▲)</code>	. 134
<code>\BigTriangleRight (▶)</code>	135	<code>\blackcircleulquadwhite (●)</code>	. 133	<code>\blacktriangledown (▼)</code>	. 33
<code>\BigTriangleUp (△)</code>	135	<code>\blackdiamond (◆)</code>	29	<code>\blacktriangledown (▼)</code>	. 112
<code>\bigtriangleup (△)</code>	38	<code>\blackdiamond (◆)</code>	35	<code>\blacktriangledown (▼)</code>	. 35,
<code>\bigtriangleup (△ vs. △)</code>	207	<code>\blackdiamonddownarrow (◆)</code>	. 133	133	
<code>\bigtriangleup (△)</code>	11, 28	<code>\BlackEmptySquare (</code>	170	<code>\blacktriangledown (▼)</code>	. 35,
<code>\bigtriangleup (△)</code>	68, 133	<code>\blackhourglass (☒)</code>	36	68	
<code>\bigtriangleup (△)</code>	67	<code>\blackinwhitediamond (◆)</code>	. 133	<code>\blacktriangledown (▼)</code>	. 67
<code>\bigtriangleup (△)</code>	133, 134	<code>\blackinwhitesquare (▣)</code>	133	<code>\blacktriangledown (▼)</code>	. 134
<code>\biguplus (⊎)</code>	37	<code>\BlackKingOnBlack (</code>	170	<code>\blacktriangleright (▶)</code>	. 33
<code>\biguplus (⊎)</code>	43			<code>\blacktriangleright (▶)</code>	. 66
<code>\biguplus (⊎)</code>	42			<code>\blacktriangleright (▶)</code>	. 35
<code>\biguplus (⊎)</code>	44			<code>\blacktriangleright (▶)</code>	. 35,
<code>\bigvarstar (★)</code>	29			68	
<code>\BigVBar ()</code>	135			<code>\blacktriangleleft (◀)</code>	. 67
<code>\bigvee (V)</code>	37			<code>\blacktriangleleft (◀)</code>	. 134
<code>\bigvee (V)</code>	42			<code>\blacktriangleleft (◀)</code>	. 33
<code>\bigvee (V)</code>	41			<code>\blacktriangleleft (◀)</code>	. 66
<code>\bigvee (V)</code>	44			<code>\blacktriangleleft (◀)</code>	. 35
<code>\bigveedot (V̄)</code>	42			<code>\blacktriangleleft (◀)</code>	. 35,
<code>\bigveedot (V̄)</code>	42			68	
<code>\bigwedge (Λ)</code>	37			<code>\blacktriangleleft (◀)</code>	. 67
<code>\bigwedge (Λ)</code>	42			<code>\blacktriangleleft (◀)</code>	. 134

\blacktriangleright (►)	35, 68	\BNviii ()	142	\boxbar (□)	36
\blacktriangleright (►)	67	\Bnwa (~~~~)	142	\boxbot (▣)	33
\blacktriangleright (►)	134	\BNx ()	142	\boxbot (▤)	35
\blacktriangleup (▲)	33	\BNxc (≡≡)	142	\boxbox (▣)	28
\blackwhitespoon (●○)	85	\BNxl (==)	142	\boxbox (▣)	35
blank	see \textblank	\BNxx (≡)	142	\boxbox (▣)	34
\Bleech (△)	165	\BNxxx (≡)	142	\boxbox (▣)	34
\blender (!)	179	\Bo (□)	142	\boxbox (▣)	36
\blender (!)	179	body-text symbols	13–26	\boxbslash (▣)	28
\blitza (↯)	86	\boisik (package)	31, 35, 43,	\boxbslash (▣)	35
\blitza (↯)	27	54, 60, 65, 68, 79, 80, 90,		\boxbslash (▣)	35
\blitzb (↯)	86	92, 93, 101, 111, 114, 133,		\boxcirc (▣)	33
\blitzc (↯)	86	136, 144, 147, 226		\boxcircle (▣)	28
\blitzd (↯)	86	bold symbols	219–220	\boxcircle (▣)	35
\blitze (↯)	86	\boldmath	220	\boxcircle (▣)	36
\blkhorzoval (◐)	134	\boldsymbol	220	\boxcoasterisk (✳)	33
\blkvertoval (◑)	134	\BOLogo (BO)	165	\boxdiag (▣)	35
block-element symbols	173	\BOLogoL (BO)	165	\boxdiag (▣)	36
\Bm (ℳ)	171	\BOLogoP (BO)	165	\boxdiv (▣)	33
bm (package)	220, 226, 227	bomb	180–181	\boxdivision (▣)	35
\bm	220	\bomb (💣)	165	\boxdot (▣)	33
\bm (ℳ)	171	Boolean domain (ℳ)	see alphabets, math	\boxdot (▣)	28
\Bma (ℳ)	142	Boolean logic gates	123	\boxdot (▣)	35
\Bme (ℳ)	142	borders	191–197	\boxdot (▣)	34
\Bmi (ℳ)	142	born	see \textborn	\boxdot (▣)	36
\Bmo (ℳ)	142	\Bosnia (•)	176	\boxdotLeft (↔)	70
\bmod	87	bosons	125	\boxdotleft (↔)	70
\Bmu (ℳ)	142	\Bot (⊍)	93	\boxdotRight (⇒)	70
\Bna (ℳ)	142	\bot (⊥)	27, 91, 212	\boxdotright (⇒)	70
\BNc (○)	142	\bot (⊥)	92	\boxempty (□)	28
\BNcc (○○)	142	\bot (⊥)	91	\boxLeft (↔)	70
\BNccc (○○○)	142	\bot (⊥)	92	\boxleft (▣)	33
\BNcd (○○○)	142	\botborder (⊥)	171	\boxleft (↔)	70
\BNcm (○○○○)	142	\botdoteq (=)	48	\boxleft (▣)	35
\BNd (○○○)	142	\botsemicircle (○)	134	\boxminus (⊖)	33
\BNdc (○○○○)	142	\Bottomheat (▣)	178	\boxminus (⊖)	28
\BNdcc (○○○○)	142	\Bouquet (❀)	165	\boxminus (⊖)	35
\BNdccc (○○○○○)	142	\bowl (⦿)	179	\boxminus (⊖)	34
\Bne (〒)	142	\bowl (⦿)	179	\boxminus (⊖)	34
\BNi (‘)	142	\Bowtie (❖)	164	\boxminus (⊖)	36
\Bni (ᢚ)	142	\bowtie (❖)	46	\boxonbox (▣)	134
\BNii (〃)	142	\bowtie (❖)	31	\boxplus (⊕)	33
\BNiii (‴)	142	\bowtie (❖)	31, 52	\boxplus (⊕)	28
\BNiv (〃)	142	\bowtie (❖)	29, 30	\boxplus (⊕)	35
\BNix ()	142	\bowtie (❖)	55	\boxplus (⊕)	34
\BNl (≡≡)	142	\Box (□)	112	\boxplus (⊕)	34
\BNlx (≡≡)	142	\Box (□)	112	\boxplus (⊕)	36
\BNlxx (≡≡)	142	\Box (□)	35	\boxRight (⇒)	70
\BNlxxx (≡≡)	142	\Box (□)	34	\boxright (▣)	33
\BNm (◊)	142	\Box (□)	134	\boxright (⇒)	70
\Bno (ℳ ^s)	142	box-drawing symbols	173	\boxright (▣)	35
\bNot (≠)	55	\boxast (▣)	28	\boxslash (▢)	33
\Bnu (⌚)	142	\boxast (▣)	35	\boxslash (▢)	28
\BNv (〃)	142	\boxast (▣)	36	\boxslash (▢)	35
\BNvi (‴)	142	\boxasterisk (✳)	33	\boxslash (▢)	34
\BNvii (‴)	142	\boxbackslash (▢)	33	\boxslash (▢)	34

\boxtimes (⊗)	36	\BPwine (霏)	143	\Bta (𠂇)	142
\boxtop (田)	33	\BPwineiih (𠂉)	143	\Btaii (𠂊)	142
\boxtop (畠)	35	\BPwineiih (𠂈)	143	\Bte (𩎤)	142
\boxtriangle (田)	35	\BPwineivh (𠂔)	143	\Bti (𠂆)	142
\boxtriangleup (田)	33	\BPwoman (𠂇)	143	\btimes (×)	31
\boxvert (畠)	34	\BPwool (𦵷)	143	\btimes (×)	32
\boxvert (畠)	34	\BPwta (𠂅)	142	\Bto (𠀃)	142
\boxvoid (□)	33	\BPwtb (𠀄)	142	\Btu (𩎔)	142
\boy (♂)	120	\BPwtc (𠀅)	142	\Btwe (𩎕)	143
\Bpa (†)	142	\BPwtd (𠀆)	142	\Btwo (߁)	142
\Bpaii (𠁥)	142	\Bqa (𩎇)	142	\Bu (܂)	142
\BPamphora (߁)	143	\Bqe (𩎈)	142	\BUFd (△)	123
\BParrow (»)	143	\Bqi (߁)	142	buffers	123
\BPbarley (߁)	143	\Bqo (߁)	142	\BUFl (◀)	123
\BPbilly (߁)	143	\Bra (܂)	142	\BUFr (▶)	123
\BPboar (߁)	143	bra	94	\BUFu (△)	123
\BPbronze (𠁥)	143	\braceld (܂)	215	\BUUi (߁)	143
\BPbull (߁)	143	\bracerd (܂)	215	\BUUi (߁)	143
\BPcauldroni (߁)	143	braces ...	13, 94–97, 102–105	\BUUi (߁)	143
\BPcauldronii (߁)	143	asymmetric	105	\BUUi (߁)	143
\BPchariot (߁)	143	extensible	102–105	\BUUi (߁)	143
\BPchassis (߁)	143	multiline	105	\BUUi (߁)	143
\BPCloth (畠)	143	\bracevert ()	94	\BUUi (߁)	143
\BPCow (߁)	143	\bracevert ()	95	\BUUi (߁)	143
\BPCup (߁)	143	\bracevert ()	114	\BUUi (߁)	143
\BPe (߁)	142	brackets	see delimiters	\BUUi (߁)	143
\BPe (߁)	143	\Braii (߁)	142	\BUUi (߁)	143
\BPfoal (߁)	143	\Braiii (߁)	142	\BUUi (߁)	143
\BPGoat (߁)	143	braket (package)	94	\BUUi (߁)	143
\BPGoblet (߁)	143	\Bratpfanne (߁)	179	\BUUi (߁)	143
\BPGold (߁)	143	\Bre (߁)	142	\BUUi (߁)	143
\BPhorse (߁)	143	\Break (Break)	122	\BUUi (߁)	143
\BPI (߁)	142	\breve (߁)	101	\Bullcntr (package)	168, 226, 227
\BPMAN (߁)	143	\breve (߁)	100	\bullcntr{1} (•)	168
\BPNanny (߁)	143	\breve (߁)	22	\bullcntr{2} (••)	168
\BPO (߁)	142	breve (߁)	see accents	\bullcntr{3} (•••)	168
\BPOX (߁)	143	\brevis (߁)	172	\bullcntr{4} (••••)	168
\BPPig (߁)	143	\Bri (߁)	142	\bullcntr{5} (•••••)	168
\BPRAM (߁)	143	\Bro (†)	142	\bullcntr{6} (••••••)	168
\BPSHEEP (߁)	143	\Broii (߁)	142	\bullcntr{7} (•••••••)	168
\BPSOW (߁)	143	\brokenvert (߁)	164	\bullcntr{8} (••••••••)	168
\BPSPEAR (߁)	143	Bronger, Torsten	212	\bullcntr{9} (•••••••••)	168
\BPSWORD (߁)	143	\Bru (߁)	142	bulletenum (package)	168
\BPTALENT (߁)	142	\BS (■)	122	bulletenum	168
\Bpte (߁)	142	\Bsa (߁)	142	\bullet (•)	28
\Bpu (߁)	142	\Bse (߁)	142	\bullet (•)	35
\Bpuui (߁)	142	\BSEfree (߁)	124	\bullet (•)	29
\BPvola (߁)	142	\Bsi (߁)	142	\bullet (•)	36
\BPvolb (߁)	142	\bsimilarleftarrow (⇐)	81	bullseye .	see \textbullseye
\BPvolcd (߁)	142	\bsimilarrightarrow (⇒)	81	\bullseye (◎)	134
\BPvolcf (߁)	142	\Bso (߁)	142	\Bumpedeq (≈)	48
\BPwheat (߁)	143	\bsolhsub (C)	61	\bumpedeq (≈)	48
\BPwheel (⊗)	143	\BSpace (←)	122	\Bumpeq (≈)	47



\GfNA2e (package)	25, 87, 117, 174, 175
china2e (package)	116, 226, 227
\Chiron (§)	120
\chiup (χ)	89
\Ci (✗)	143
cipher symbols	174
\cirbot (†)	55
\circ (◦)	28, 114, 211
\circ (◦)	35
\circ (◦)	29
\circ (◦)	134
\circeq (⊒)	48
\circeq (⊒)	47
\circeq (⊒)	54
\circeq (⊒)	52
\circeq (⊒)	49
\circeq (⊒)	55
\CIRCLE (●)	132
\Circle (○)	132
\Circle (○)	135
\Circle (○ vs. ○)	207
\circlearrowleft (↺)	70
\circlearrowleft (↺)	69
\circlearrowleft (↺)	79
\circlearrowleft (↺)	76
\circlearrowleft (↺)	72
\circlearrowleft (↺)	81, 82
\circlearrowright (↻)	70
\circlearrowright (↻)	69
\circlearrowright (↻)	79
\circlearrowright (↻)	76
\circlearrowright (↻)	72
\circlearrowright (↻)	81, 82
\circled numerals	130, 170, 171, 204
\CircledA (Ⓐ)	165
\circledast (⊛)	28
\circledast (⊛)	35
\circledast (⊛)	35
\circledast (⊛)	34
\circledast (⊛)	36
\circledbar (◐)	29
\circledbslash (◎)	29
\circledbullet (●)	134
\circledcirc (◎)	28
\circledcirc (◎)	35
\circledcirc (◎)	35
\circledcirc (◎)	34
\circledcirc (◎)	36
\circleddash (⊖)	28
\circleddash (⊖)	35
\circleddash (⊖)	35
\circleddash (⊖)	35
\circleddash (⊖)	34
\circleddash (⊖)	36
\circleddot see \odot	
\circleddotleft (←○)	70
\circleddotright (○→)	70
\CircledEq (⊒)	54
\circledequal (⊖)	35
\circledequal (⊖)	36
\circledgtr (⊖)	48
\circledless (⊖)	48
\circledminus see \ominus	
\circledotleft see \circleddotleft	
\circledotright see \circleddotright	
\circledownarrow (♀)	134
\circledparallel (ParallelGroup)	36
\circledplus see \oplus	
\circledR (Ⓡ)	14, 91
\circledR (Ⓡ)	92
\circledrightdot (○)	134
\circledS (Ⓢ)	91
\circledS (Ⓢ)	92
\circledslash see \oslash	
\circledstar (★)	134
\circledtimes see \otimes	
\circledtwodots (◎)	134
\circledvee (○)	29
\circledvert (◑)	35
\circledvert (◑)	36
\circledwedge (◎)	29
\circledwhitebullet (◎)	134
\circlebar (⊖)	36
\circleleft (←○)	70
\circlelefthalfblack (●)	134
\circlellquad (◎)	134
\circlelrquad (◎)	134
\circleonleftarrow (↔)	81
\circleonrightarrow (↔)	81
\circleright (○→)	70
\circlerighthalfblack (●)	134
circles	120, 132–137, 170, 171, 176, 186–187, 192, 202–203
\CircleShadow (○)	135
\CircleSolid (●)	135
\circletophalfblack (●)	134
\circleulquad (◎)	134
\circleurquad (◎)	134
\circleurquadblack (●)	134
\circlevertfill (◐)	134
\Circpipe (○)	123
\circcplus (†)	29
\circcplus (†)	31
\Circsteel (●)	123
circumflex (˜) see accents	
\circumflexus (˜)	22
\cirE (OE)	134
\circfnint (ƒ)	44
\circfnintsl (ƒ)	45
\circfnintup (ƒ)	45
\cirmid (՞)	85
\cirmid (՞)	55
\cirsir (օ)	134
\Cja (Ջ)	143
\Cjo (Վ)	143
\Cka (Ա)	143
\Cke (Ք)	143
\Cki (Յ)	143
\Cko (Շ)	143
\Cku (Կ)	143
\Cla (Վ)	143
\Cle (Ց)	143
\CleaningA (Ⓐ)	165
\CleaningF (Ⓕ)	165
\CleaningFF (Ⓕ)	165
\CleaningP (Ⓟ)	165
\CleaningPP (Ⓟ)	165
\clefC (Բ)	151
\clefCInline	151
\cleff (Դ)	151
\clefFInline	151
\clefG (Ժ)	151
\clefGInline	151
clefs	148, 149, 151, 156, 180–181
\Cli (≤)	143
\clickb (○)	18
\clickc (○)	18
\clickt (↑)	18
\Clo (+)	143
clock (package)	167, 226
\clock (⌚)	164
\clock (⌚⌚)	167
clock symbols	164–167, 180–181
\ClockFramefalse	167
\ClockFrametrue	167
\ClockLogo (⌚)	165
\ClockStyle	167
\clocktime	167
\closedcurlyvee (߻)	30
\closedcurlywedge (߳)	30
\closeddequal (≡)	49
\closedniomega (ߴ)	18
\closedprec (ߵ)	49
\closedrevepsilon (߶)	18
\closedsucc (߷)	49
\closedvarcap (߸)	32
\closedvarcup (߹)	32
\closedvarcupsmashprod (߹)	32
\closure (ܿ)	100
\closure (ܽ)	52, 86
\closure (ܾ)	55
\Cloud (ܼ)	166
clovers	131
\Clu (ܺ)	143
clubs	136, 137
\clubsuit (♣)	136
\clubsuit (♦)	136
\clubsuit (♠)	136
\clubsuit (◆)	136
\clubsuit (◆)	137
\Cma (ܻ)	143
\Cme (ܻ)	143
\Cmi (ܼ)	143

\cml (package)	27, 33, 46, 58, 93, 226
\Cmo (⌚)	143
\Cmu (Ⓜ)	143
\Cna (Ⓣ)	143
\Cne (ⓘ)	143
\Cni (Ⓜ)	143
\Cno (ⓘ)	143
\Cnu (Ⓜ)	143
\CO (⌚)	121
\Co (Ⓜ)	143
\coAsterisk (*)	29
\coAsterisk (*)	31
\coasterisk (*)	29
\Coda (⌚)	148
\coda (⌚)	148
code page 1252	223
table	223
code page 437	122, 173, 221
\Coffeecup (☕)	165, 180
\coh (⌚)	58
coins, ancient	25
\Colon (:)	108
\Colon (:)	109
\colon	107
\colon (:)	107
\colon (:)	108
\colon (:)	108
\Colonapprox (≈)	48
\Colonapprox (≈≈)	56
\colonapprox (≈)	58
\colonapprox (≈)	56
\colonapprox (≈)	48
\coloncolon (:)	58
\coloncolonapprox (≈≈)	58
\coloncolonquals (==)	58
\coloncolonminus (:-)	58
\Coloncolonsim (≈~)	58
\Coloneq (≈-)	48
\Coloneq (≈-)	56
\Coloneq (==)	55
\coloneq (==)	27, 48
\coloneq (:=)	56
\coloneq (:=)	48
\coloneq (:=)	52
\coloneq (:=)	49
\coloneq (:=)	55
\Coloneqq (==)	48
\Coloneqq (==)	56
\coloneqq (==)	56
\coloneqq (==)	27, 48
\coloneqq (==)	52
colonequals (package)	27, 58, 226
\colonequals (==)	27, 58
\colonminus (:-)	58
\Colonsim (≈~)	48
\Colonsim (≈~)	56
\colonsim (≈~)	58
\colonsim (≈~)	56
\convolusim (≈~)	48
\convolusim (≈~)	227
combinatorial logic gates	123
comma-below accent (,)	see accents
\commaminus (⊖)	32
communication symbols	123
commutative diagrams	213
\comp{text}{tex} (newsgroup)	11, 27, 28, 209–214
compass	186–187
\compensation (≈≈)	169
\complement (⌚)	91
\complement (⌚)	91
\complement (⌚)	92
\complement (⌚)	92
\complement (⌚)	41
\complement (⌚)	92
complete shuffle product (⊠)	33
\COMPLEX (⌚)	87
\Complex (⌚)	87
complex numbers (⌚)	see alphabets, math
composed accents	19
Comprehensive T <small>E</small> X Archive Network	1, 11, 102, 117, 123, 206, 223–225
computer hardware symbols	121
computer keys	122
Computer Modern (font)	206, 208, 221
computer symbols	181–184
\ComputerMouse (🖱)	121
\concavediamond (❖)	36
\concavediamondtickleleft (❖)	36
\concavediamondtickright (❖)	36
\Conclusion (⇒)	110
\cong (≈)	46
\cong (≈)	54
\cong (≈)	52
\cong (≈)	49
\cong (≈)	55
\congdot (≈)	55
\Congruent (≡)	110
congruent	see \equiv
\conictaper (▷)	114
\conjquant (ℳ)	43
\conjquant (ℳ)	44
\Conjunction (σ)	120
\conjunction (σ)	119
conjunction, logical	see \wedge and \&
consequence relations	57
contradiction symbols	27, 86
control characters	122
converse implication	see \leftarrow and \subset
converse nonimplication	see \leftarrow and \nsubset
\convolution (*)	29
\convolution (*)	31
\cooker (☒)	179
\cooker (☒)	179
cooking symbols	178, 179, 181–184
\cookingsymbols (package)	178, 226, 227
\Cooley (⊖)	179
\Coppa (Ϙ)	144
\coppa (ϙ)	144
\coprod (⅀)	27, 37
\coprod (⅀)	42
\coprod (⅀)	41
\coprod (⅀)	43
copyright	13, 14, 25, 26, 222
\copyright (⌚)	14
\copyright (⌚)	14
\corner (⊸)	23
corners, box	173
\corona (Ϙ)	172
\coronainv (ϙ)	172
\Corresponds (≡)	110
\corresponds (≡)	48
\corresponds (≡)	54
\cos (cos)	87, 219
\cosh (cosh)	87
\cot (cot)	87
\coth (coth)	87
\counterplay (⊣)	169
countries	176
European	176
\CountriesOfEurope (package)	176, 226, 227
CountriesOfEurope (font)	178
\CountriesOfEuropeFamily	178
Courier (font)	24
CP1252	see code page 1252
CP437	see code page 437
\Cpa (†)	143
\Cpe (⚡)	143
\Cpi (Ⓜ)	143
\Cpo (⚡)	143
\Cpu (₩)	143
\CR (Ϙ)	121, 122
\cr	211
\Cra (Ӣ)	143
\Cre (Ӣ)	143
Creative Commons licenses	25, 26
crescent (fge package option)	101
\creschairpin (≪)	152
\Cri (⚡)	143
\Cro (Ӆ)	143
\Croatia (Ѽ)	177
\Cross (†)	165
\Cross (†)	129
\Cross (×)	135
\Cross (✗)	135

\Cross (\dagger vs. \ddagger vs. \times)	207	\curvearrowbotleft (\curvearrowleft)	70
cross ratio	see \textrecip	\curvearrowbotleft (\curvearrowleft)	79
\crossb (\mathfrak{b})	18	\curvearrowbotleftright ($\curvearrowleft\curvearrowright$)	70
\CrossBoldOutline (\mathbb{T})	129	\curvearrowbotleftright (\curvearrowleft)	79
\CrossClowerTips (\mathfrak{d})	129	\curvearrowbotright (\curvearrowright)	70
\crossd (\mathfrak{d})	18	\curvearrowbotright (\curvearrowright)	79
\CrossedBox (\mathfrak{x})	130	\curvearrowdownup ($\curvearrowdown\curvearrowup$)	71
crosses	129, 157–161, 165, 170, 171, 186–187	\curvearrowleft (\curvearrowleft)	70
\crossh (\mathfrak{h})	18	\curvearrowleft (\curvearrowleft)	69
\crossing (\times)	52	\curvearrowleft (\curvearrowleft)	79
\CrossMaltese (\mathbb{H})	129	\curvearrowleft (\curvearrowleft)	76
\crossnilambda (\mathfrak{X})	18	\curvearrowleft (\curvearrowleft)	72
\CrossOpenShadow (\mathbb{T})	129	\curvearrowleft (\curvearrowleft)	81
\CrossOutline (\mathbb{T})	129	\curvearrowleftplus ($\curvearrowleft\curvearrowright$)	81
crotchet	see musical symbols	\curvearrowleftright ($\curvearrowleft\curvearrowright$)	70
\crotchet (\mathfrak{J})	150	\curvearrowleftright ($\curvearrowleft\curvearrowright$)	79
\crotchetDotted (\mathfrak{J})	150	\curvearrowleftright ($\curvearrowleft\curvearrowright$)	71
\crotchetDottedDouble ($\mathfrak{J..}$)	150	\curvearrownwse ($\curvearrownw\curvearrowse$)	71
\crotchetDottedDoubleDown ($\mathfrak{P..}$)	150	\curvearrowright (\curvearrowright)	70
\crotchetDottedDown ($\mathfrak{P..}$)	150	\curvearrowright (\curvearrowright)	69
\crotchetDown (\mathfrak{P})	150	\curvearrowright (\curvearrowright)	79
\crotchetRest (\mathfrak{K})	151	\curvearrowright (\curvearrowright)	76
\crotchetRestDotted ($\mathfrak{K..}$)	151	\curvearrowright (\curvearrowright)	72
\crtilde (\mathfrak{z})	21	\curvearrowright (\curvearrowright)	81
\Cru ()()	143	\curvearrowrightleft ($\curvearrowright\curvearrowleft$)	71
crucifixes	129, 165, 186–187	\curvearrowrightminus ($\curvearrowright\curvearrowleft$)	81
\Crux (\dagger)	100	\curvearrowsenw ($\curvearrownw\curvearrowsw$)	71
\crux (\dagger)	100	\curvearrowswne ($\curvearrowsw\curvearrowne$)	71
cryst (package)	202, 226	\curvearrowupdown ($\curvearrowup\curvearrowdown$)	71
crystallography symbols	202–203	\CutLeft (\curvearrowleft)	127
\CS (\mathcal{G})	121	cutoff subtraction	see \dotdiv
\Csa (\mathcal{V})	143	\CutRight (\curvearrowright)	127
\csc (csc)	87	\CuttingLine (\cdots)	127
\Cse (\mathcal{W})	143	\Cwa (\mathcal{W})	143
\cshuffle (\mathcal{W})	33	\cwcirclearrow (\circlearrowleft)	81
\Csi (\mathcal{U})	143	\cwcirclearrowdown (\circlearrowdown)	75
\Cso (\mathcal{Y})	143	\cwcirclearrowleft (\circlearrowleft)	75
\Csu (\mathcal{X})	143	\cwcirclearrowright (\circlearrowright)	75
\csub (\mathcal{A})	61	\cwcirclearrowup (\circlearrowup)	75
\csube (\mathcal{A})	61	\Cwe (\mathcal{I})	143
\csup (\mathcal{D})	61	\cwgapcirclearrow (\circlearrowleft)	76
\csupe (\mathcal{D})	61	\cwgapcirclearrow (\circlearrowright)	81
\Cta (\mathcal{F})	143	\Cwi (\mathcal{K})	143
CTAN	see Comprehensive TeX Archive Network	\cwleftarcarrow (\curvearrowleft)	75
\Cte (\mathcal{L})	143	\cnearcarrow (\curvearrowup)	75
\Cti (\mathcal{U})	143	\cwnwarcarrow (\curvearrowright)	75
\Cto (\mathcal{F})	143	\Cwo (\mathcal{J})	143
\Ctrl ([Ctrl])	122	\cwopencirclearrow (\circlearrowleft)	76
\Ctu (\mathcal{F}_{\parallel})	143	\cwopencirclearrow (\circlearrowright)	82,
\Cu (\mathcal{Y})	143	134	
\Cube ([$\square\blacksquare\blacksquare\blacksquare\blacksquare\blacksquare$])	166,	\cwoverarcarrow ($\curvearrowleft\curvearrowright$)	75
209		\cwrightarcarrow (\curvearrowleft)	75
cube root	see \sqrt	\cwrightarcarrow (\curvearrowright)	81
cube rotations	185	\cwsearcarrow (\curvearrowup)	75
		\cswarcarrow (\curvearrowleft)	75
		\cwunderarcarrow (\curvearrowleft)	75
		\cwundercurvearrow (\curvearrowright)	81
		\Cxa ()()	143

\Cxe (⊣)	143	\DashV (=)	48	\DDownarrow (¶)	97
\Cya (Ϭ)	143	\DashV (⊣)	54	\Ddownarrow (ϭ)	75
\Cyo (ϭ)	143	\DashV (⊣)	52	\Ddownarrow (Ϯ)	81
\cyprfamily	143	\DashV (⊣)	55	\Ddownarrow (ϭ)	97
Cypriot	143	\Dashv (=)	48	\ddststile ()	57
cypriot (package)	143, 226, 227	\Dashv (⊣)	52	\ddtstile ()	57
\CYRSH (III)	209	\Dashv (⊣)	55	\ddttstile ()	57
\Cza (>✗)	143	\dashV (=)	54	\DE (⊥)	121
\Czechia (⦿)	177	\dashV (⊣)	52	\DeclareFontFamily	205, 218
\Czo (☒)	143	\dashV (⊣)	55	\DeclareFontShape	205, 218
		\dashv (⊣)	46	\DeclareMathOperator	219
		\dashv (⊣)	52	\DeclareMathOperator*	219
		\dashv (⊣)	50	\declareslashed	211
d'Alembert operator	see \laplac	\dashv (⊣)	55	\DeclareUnicodeCharacter	224
\DA (↓)	121	\dashVv (=)	48	\decofourleft (∞)	132
\dag (†)	14, 223	\dashVv (⊣)	54	\decofourright (∞)	132
\dag (†)	14	database symbols	114	\decoone (☒)	132
\dagger (†)	28	\davidsstar (◊)	130	decorative borders	191–197
\dagger (†)	31	\DavidStar (◊)	131	\decosix (❖)	132
\dagger (†)	32	\DavidStarSolid (★)	131	\decothreeleft (∞)	132
\dalambert (□)	114	\dBar ()	172	\decothreeleft (∞)	132
\daleth (Դ)	90	\dbar (d̄)	210	\decotwo (❖)	132
\daleth (Դ)	90	\dbend (⌚)	164	\decreschairpin (⇒)	152
\daleth (Դ)	90	\dbkarow (→)	81, 82	Dedekind, Richard	209
\daleth (Դ)	90	dblaccnt (package)	214	definite-description operator (℩)	209
\daleth (Դ)	91	\dblcolon (::)	56	definition symbols	27, 214
dancers (package)	198, 226	\DCa (◀)	122	\deg (deg)	87
dancing men	198–200	\DCb (↑)	122	\degree (◦)	113
\danger (ࡗ)	114	\DCc (!!)	122	\degree (°)	118
\danger (ࡇ)	165	\DCd (¶)	122	degrees	see \textdegree
dangerous bend symbols	164	\dCooley (☺)	179	\DEL (△)	122
\dAnnoey (☺)	179	\DD (‘)	121, 149	\DEL (△)	122
\DArrow (▣)	122	\ddag (‡)	14, 223	\Del (Del)	122
\dasharrow	see \dashrightarrow	\ddag (‡)	14	\Del (Del)	122
\dasharrow (→)	76	\ddagger (‡)	28	\Deleatur	see \Denarius
\dasharrow (↔)	82	\ddagger (‡)	31	delimiters	93–100
\dashcolon (:-)	55	\ddashint (ƒ)	212	text-mode	99, 100
\dasheddownarrow (↓)	71	\Ddashv (≡)	52	variable-sized	94–99
\dashedleftarrow (←)	71	\dddot (■)	101	wavy-line	95–98
\dashednearrow (↗)	71	\dddot (■)	100	\Delta (Δ)	88
\dashednarrow (↖)	71	\ddot (■)	101	\delta (δ)	88
\dashedrightarrow (→)	71	\ddot (■)	100	\deltaup (δ)	89
\dashedsearrow (↘)	71	\ddotststile ()	57	deminutum	see musixgre
\dashedswarrow (↙)	71	\ddigamma (ϝ)	144	demisemiquaver	see musical
\dasheduparrow (↑)	71	\DDohne (𝔻)	149	symbols	
\dashint (f)	212	\ddot (■)	101	\demisemiquaver (♪)	150
\dashleftarrow (↔)	69	\ddot (■)	100	\demisemiquaverDotted (♪.)	150
\dashleftarrow (↔)	76	\ddotdot (..)	30, 108	\demisemiquaverDottedDouble (♪..)	150
\dashleftarrow (↔)	72	\ddotdot (..)	30, 108	\demisemiquaverDottedDown (⠃..)	150
\dashleftarrow (↔)	82	\ddots (..)	109	\demisemiquaverDottedDown (⠃)	150
\dashleftharpoondown (==)	83	\ddots (..)	107, 213	\demisemiquaverDown (⠃)	150
\dashleftrightarrow (↔)	70	\ddots (..)	108	\Denarius (֍)	24
\dashrightarrow (→)	69	\ddots (..)	108	\denarius (☒)	25
\dashrightarrow (→)	76	\ddots (..)	109	\Denmark (♦)	177
\dashrightarrow (→)	72	\ddotseq (≈)	55		
\dashrightarrow (→)	82	\DDownarrow (¶)	81		
\dashrightharpoondown (==)	.				
	83				

\dental (▀)	21	\digamma (F)	92
\Dep (❖)	148	\digamma (F)	144
derivative, partial	<i>see</i> \partial	digital logic gates	123
Descartes's equal sign (♾)	...	digits	<i>see</i> numerals
... <i>see</i> \rightarrowproto and \backarrowproto		\dim (dim)	87
\descnode (⌚)	119	\ding .	15, 126–131, 136, 137
\det (det)	87	\ding{33} (⌚)	127
\devadvantage (⌚)	169	\ding{34} (⌚)	127
\Dfourier (〽)	58	\ding{35} (❖)	127
\Dfourier (〽)	54	\ding{36} (❖)	127
\dfourier (〽)	58	\ding{37} (ϖ)	137
\dfourier (〽)	54	\ding{38} (⌚)	137
\DFT (▀▀)	107	\ding{39} (⌚)	137
\dft (▀▀)	107	\ding{40} (✈)	137
\DH (ⓘ)	18	\ding{41} (✉)	137
\DH (ⓘ)	14, 222	\ding{42} (✉)	128
\dh (ⓘ)	18	\ding{43} (❖)	128
\dh (ⓘ)	14, 222	\ding{44} (⌚)	128
diacritics	<i>see</i> accents	\ding{45} (⌚)	128
\diaeresis (ẅ)	22	\ding{46} (⌚)	128
diæresis (ẅ)	<i>see</i> accents	\ding{47} (⌚)	128
\diagdown (↘)	113	\ding{48} (⌚)	128
\diagdown (↖)	112	\ding{49} (⌚)	128
\diagdown (↗)	114	\ding{50} (⌚)	128
\diagdown (↙)	50	\ding{51} (✓)	130
\diagdown (↘)	114	\ding{52} (✓)	130
\diagonal (">//)	169	\ding{53} (✗)	130
\diagup (↙)	113	\ding{54} (✗)	130
\diagup (↗)	112	\ding{55} (✗)	130
\diagup (↖)	114	\ding{56} (✗)	130
\diagup (↗)	50	\ding{57} (✚)	129
\diagup (↗)	114	\ding{58} (✚)	129
\diameter (∅)	113	\ding{59} (✚)	129
\diameter (∅)	27	\ding{60} (✚)	129
\diameter (∅)	113	\ding{61} (†)	129
\diameter (∅)	113	\ding{62} (†)	129
\diameter (∅)	114	\ding{63} (†)	129
\diameter (∅)	164	\ding{64} (✖)	129
\Diamond (◊)	112	\ding{65} (✖)	131
\Diamond (◊)	112	\ding{66} (✚)	131
\Diamond (◊)	35	\ding{67} (✚)	131
\Diamond (◊)	34	\ding{68} (❖)	131
\Diamond (◊)	134	\ding{69} (❖)	131
\diamond (◊)	28	\ding{70} (◆)	131
\diamond (◊)	35, 133	\ding{71} (❖)	131
\diamond (◊)	35	\ding{72} (★)	131
\diamond (◊)	34	\ding{73} (☆)	131
\diamond (◊)	36, 134	\ding{74} (✖)	131
\diamondbackslash (◊)	34	\ding{75} (★)	131
\diamondbackslash (◊)	34	\ding{76} (★)	131
\diamondbar (◊)	35	\ding{77} (★)	131
\Diamondblack (♦)	112	\ding{78} (☆)	131
\diamondbotblack (◊)	134	\ding{79} (★)	131
\diamondbslash (◊)	35	\ding{80} (☆)	131
\diamondcdot (◊)	35	\ding{81} (✖)	131
\diamondcdot (◊)	134	\ding{82} (✖)	131
\diamondcircle (◊)	35	\ding{83} (✖)	131
\diamonddiamond (◊)	34	\ding{84} (✖)	131
\diamonddiamond (◊)	34	\ding{85} (✖)	131
\Diamonddot (◊)	112	\ding{86} (✖)	131
\diamonddot (◊)	34	\ding{87} (✖)	131

\ding{90} (⌚)	131	\ding{187} (⌚)	130
\ding{91} (⌚)	131	\ding{188} (⌚)	130
\ding{92} (⌚)	131	\ding{189} (⌚)	130
\ding{93} (⌚)	131	\ding{190} (⌚)	130
\ding{94} (⌚)	131	\ding{191} (⌚)	130
\ding{95} (⌚)	131	\ding{192} (⌚)	130
\ding{96} (⌚)	131	\ding{193} (⌚)	130
\ding{97} (⌚)	131	\ding{194} (⌚)	130
\ding{98} (⌚)	131	\ding{195} (⌚)	130
\ding{99} (⌚)	131	\ding{196} (⌚)	130
\ding{100} (⌚)	131	\ding{197} (⌚)	130
\ding{101} (⌚)	131	\ding{198} (⌚)	130
\ding{102} (⌚)	131	\ding{199} (⌚)	130
\ding{103} (⌚)	131	\ding{200} (⌚)	130
\ding{104} (⌚)	131	\ding{201} (⌚)	130
\ding{105} (⌚)	131	\ding{202} (⌚)	130
\ding{106} (⌚)	131	\ding{203} (⌚)	130
\ding{107} (⌚)	131	\ding{204} (⌚)	130
\ding{108} (⌚)	136	\ding{205} (⌚)	130
\ding{109} (⌚)	136	\ding{206} (⌚)	130
\ding{110} (⌚)	136	\ding{207} (⌚)	130
\ding{111} (⌚)	136	\ding{208} (⌚)	130
\ding{112} (⌚)	136	\ding{209} (⌚)	130
\ding{113} (⌚)	136	\ding{210} (⌚)	130
\ding{114} (⌚)	136	\ding{211} (⌚)	130
\ding{115} (⌚)	136	\ding{212} (⌚)	126
\ding{116} (⌚)	136	\ding{213} (⌚)	126
\ding{117} (⌚)	136	\ding{214} (⌚)	126
\ding{118} (⌚)	137	\ding{215} (⌚)	126
\ding{119} (⌚)	136	\ding{216} (⌚)	126
\ding{120} (⌚)	136	\ding{217} (⌚)	126
\ding{121} (⌚)	136	\ding{218} (⌚)	126
\ding{122} (⌚)	136	\ding{219} (⌚)	126
\ding{123} (⌚)	15	\ding{220} (⌚)	126
\ding{124} (⌚)	15	\ding{221} (⌚)	126
\ding{125} (⌚)	15	\ding{222} (⌚)	126
\ding{126} (⌚)	15	\ding{223} (⌚)	126
\ding{161} (⌚)	15	\ding{224} (⌚)	126
\ding{162} (⌚)	15	\ding{225} (⌚)	126
\ding{163} (⌚)	15	\ding{226} (⌚)	126
\ding{164} (⌚)	137	\ding{227} (⌚)	126
\ding{165} (⌚)	137	\ding{228} (⌚)	126
\ding{166} (⌚)	137	\ding{229} (⌚)	126
\ding{167} (⌚)	137	\ding{230} (⌚)	126
\ding{168} (⌚)	137	\ding{231} (⌚)	126
\ding{169} (⌚)	137	\ding{232} (⌚)	126
\ding{170} (⌚)	137	\ding{233} (⌚)	126
\ding{171} (⌚)	137	\ding{234} (⌚)	126
\ding{172} (⌚)	130	\ding{235} (⌚)	126
\ding{173} (⌚)	130	\ding{236} (⌚)	126
\ding{174} (⌚)	130	\ding{237} (⌚)	126
\ding{175} (⌚)	130	\ding{238} (⌚)	126
\ding{176} (⌚)	130	\ding{239} (⌚)	126
\ding{177} (⌚)	130	\ding{241} (⌚)	126
\ding{178} (⌚)	130	\ding{242} (⌚)	126
\ding{179} (⌚)	130	\ding{243} (⌚)	126
\ding{180} (⌚)	130	\ding{244} (⌚)	126
\ding{181} (⌚)	130	\ding{245} (⌚)	126
\ding{182} (⌚)	130	\ding{246} (⌚)	126
\ding{183} (⌚)	130	\ding{247} (⌚)	126
\ding{184} (⌚)	130	\ding{248} (⌚)	126
\ding{185} (⌚)	130	\ding{249} (⌚)	126
\ding{186} (⌚)	130	\ding{250} (⌚)	126
		\ding{251} (⌚)	126
		\ding{252} (⌚)	126
		\ding{253} (⌚)	126
		\ding{254} (⌚)	126
		\dingasterisk (⌚)	114
		dingautolist	130
		dingbat (package)	128, 137, 194, 207, 226
		dingbat symbols	126–137
		\dInnocey (⌚)	179
		\Diple (>)	171
		\diple (>)	171
		\Diple* (⌚)	171
		\diple* (⌚)	171
		Dirac notation	94
		\Direct (⌚)	120
		discount . <i>see</i> \textdiscount	
		discretionary hyphen	223
		\Dish (⌚)	178
		\disin (⌚)	54
		\disin (⌚)	55
		disjoint union	27
		\disjquant (⌚)	43
		\disjquant (⌚)	43
		disjunction <i>see</i> \vee	
		\displaystyle . 212–214, 219	
		ditto marks <i>see</i> \textquotedbl	
		\div (⌚)	28
		\div (⌚)	31
		\div (⌚)	30
		\div (⌚)	30
		\div (⌚)	32
		\divdot (⌚)	29
		\divideontimes (⌚)	29
		\divideontimes (⌚)	28
		\divideontimes (⌚)	31
		\divideontimes (⌚)	30
		\divideontimes (⌚)	32
		\Divides (⌚)	110
		\divides (⌚)	48
		\divides (⌚)	50
		\DividesNot (⌚)	110
		division 28, 102–103, 107	
		long 102–103	
		non-commutative 107	
		polynomial 102	
		division times <i>see</i> \divideontimes	
		\divideontimes	
		divorced <i>see</i> \textdivorced	
		\divslash (⌚)	30
		\DJ (⌚)	14
		\dj (⌚)	14
		\DL (⌚)	121
		\dLaughey (⌚)	179
		\dlbari (⌚)	18
		\DLE (⌚)	122
		\dlsh (⌚)	70
		\dlsh (⌚)	79
		\DM (⌚)	121
		\dnntstile (⌚)	57
		\dNeutrey (⌚)	179
		\dNinja (⌚)	179
		\dnststile (⌚)	57

\dntstile ()	57
\dntstile ()	57
\dNursey (✿)	179
do not enter	see \noway
does not divide	see \nmid
does not exist	see \nexists
does not imply	211
\Dohne (Ø)	149
Dohse, Max	212
dollar	see \textdollar
dollar sign	see \\$
dominance	see \prec
negative	see \nprec
negative weak	see \npreccurlyeq
strict	see \Prec
weak	see \preccurlyeq
\Dontwash (☒)	165
\dot (◐)	101
\dot (◑)	100
dot accent (◑ or ☐)	see accents
dot symbols	13, 107–109, 213
DotArrow (package)	. 107, 226, 227
\dotarrow (---→)	107
\dotcong (≈)	52
\dotcup (⋎)	27, 210
\dotdiv (÷)	29
\Doteq	see \doteqdot
\Doteq (≠)	52
\Doteq (≠)	49
\Doteq (≠)	55, 56
\doteq (≠)	46
\doteq (≠)	54
\doteq (≠)	52
\doteq (≠)	49
\doteq (≠)	55
\doteqdot (÷)	47
\doteqdot (÷)	54
\doteqdot (÷)	52
\doteqdot (÷)	50
\doteqdot (÷)	56
\dotequiv (≡)	55
dotless <i>j</i> (j)	
text mode	19
dotless <i>i</i> (i)	
math mode	100, 112
text mode	19
dotless <i>j</i> (j)	
math mode	100, 112
\dotmedvert (·)	30
\dotminus (−)	54
\dotminus (÷)	30
\dotminus (÷)	30
\dotminus (÷)	32
\dotplus (+)	29
\dotplus (+)	28
\dotplus (+)	31
\dotplus (+)	30
\dotplus (+)	32
\dots	14
\dots (...)	223
dots (ellipses)	13, 14, 107–109, 112, 213
\dotsb (…)	108
\dotsb (…)	109
\dotsc (…)	108
\dotseq (÷)	48
\dotsi (…)	108
\dotsim (˜)	54
\dotsim (˜)	55
\dotsint (∫..∫)	40
\dotsint (∫..∫)	43
\dotsm (…)	108
\dotsm (…)	109
\dotsminusdots (⋮⋮)	52
\dotsminusdots (⋮⋮)	55
\dotso (…)	108
dotted arrows	107
dotted union (⊎)	219
\dottedcircle (○)	134
\dottedsquare (□)	134
\dottedtilde (˜)	21
\dottimes (×)	29
\dottimes (×)	31
\dottimes (×)	31
\dottimes (×)	32
\double	99
double acute (˝)	see accents
\doublebarvee (ˇ)	32
\doublebarwedge (˘)	29
\doublebarwedge (˘)	28
\doublebarwedge (˘)	31
\doublebarwedge (˘)	31
\doublebarwedge (˘)	32
\doublecap	see \Cap
\doublecap (∩)	29
\doublecap (∩)	31
\doublecap (∩)	30
\doublecap (∩)	32
\doublecup	see \Cup
\doublecup (∪)	29
\doublecup (∪)	31
\doublecup (∪)	30
\doublecup (∪)	32
\doublecurlyvee (₩)	30
\doublecurlywedge (₩)	30
\doublefrown (⌿)	85
\doublefrown (⌿)	85
\doublepawns (օ)	169
\doubleplus (⊕)	32
\doublesharp (⊛)	151
\doublesmile (⌣)	85
\doublesmile (⌣)	85
\doubleplus (⊕)	32
\doubleplus (⊕)	31
\doubleplus (⊕)	30
\doubleplus (⊕)	29
\doubleplus (⊕)	29
\doubleplus (⊕)	28
\doubleplus (⊕)	31
\doubleplus (⊕)	30
\doubleplus (⊕)	32
\doubleplus (⊕)	29
\doubleplus (⊕)	28
\doubleplus (⊕)	31
\doubleplus (⊕)	30
\doubleplus (⊕)	32
\dots (…)	14
\dots (…)	223
\Downarrow (⇓)	69, 94
\Downarrow (⇓)	75
\Downarrow (↓)	96
\Downarrow (↓)	71
\Downarrow (↓)	81
\Downarrow (↓)	98
\downarrow (↓)	219
\downarrow (↓)	69, 94
\downarrow (↓)	
\downarrow (↓)	96
\downarrow (↓)	75
\downarrow (↓)	71
\downarrow (↓)	98
\downarrow (↓)	81
\downarrowbar (↓)	81
\downarrowbarred (‡)	81
\downarrowtail (↓)	75
\downarrowtail (↓)	71
\downAssert (⊤)	52
\downassert (⊤)	52
\downarrowbkarow (↓)	75
\downblackarrow (↓)	79
\downblackspoon (●)	85
\downbow (¶)	148
\downbracketfill	215
\downdasharrow (↓)	79
\downdasharrow (↓)	81
\downdownarrows (↓↓)	70
\downdownarrows (↓↓)	69
\downdownarrows (↓↓)	79
\downdownarrows (↓↓)	75
\downdownarrows (↓↓)	71
\downdownarrows (↓↓)	81
\downdownharpoons (↓↓)	71
Downes, Michael J.	. . . 87, 228
\downfilledspoon (↓)	84
\downfishtail (↓)	55
\downfootline (↓)	49
\downfree (↓)	49
\downharpoonccw (↓)	74
\downharpooncw (↓)	74
\downharpoonleft (↓)	71
\downharpoonleft (↓)	69
\downharpoonleft (↓)	80
\downharpoonleft (↓)	78
\downharpoonleft (↓)	83
\downharpoonleftbar (↓)	83
\downharpoonright (↓)	71
\downharpoonright (↓)	69
\downharpoonright (↓)	80
\downharpoonright (↓)	78
\downharpoonright (↓)	83
\downharpoonright (↓)	78
\downharpoonright (↓)	83
\downharpoonright (↓)	83
\downharpoonrightbar (↓)	83
\downharpoonsleftright (↓↓)	
\downharpoonsleftright (↓↓)	83
\downlcurvearrow (⤒)	76
\downleftcurvedarrow (⤓)	76
\downlsquigarrow (⤔)	76
\downlsquigarrow (⤔)	71
\Downmapsto (⤑)	75
\downmapsto (⤑)	75

\downmapsto (↓)	71	\draftingarrow (→)	81	\dz (ձ)	18
\downModels (¶)	49	\drbkarow (↔»)	81	E	
\downmodels (¶)	52	\Dreizack (↯)	179	e (esvect package option) .	104
\downmodels (¶)	49	\droang (՞)	101	\e (e)	92
\downnp (՞)	23	\drsh (↳)	70	\e-TEX	94
\downparentfill	215	\drsh (↳)	79	\Earth (⊕)	120
\downpitchfork (Ψ)	86	\drumclef (♪)	149	\Earth (δ)	119
\downpitchfork (Ψ)	84	\drValley (՞)	179	\Earth (▽)	120
\downpropto (∞)	49	\DS (፳)	149	\earth (ዶ)	119
\downrcurvarrow (↶)	76	\Ds (፳)	149	\eastcross (‡)	129
\downrightcurvedarrow (↗)	76	\ds (՞)	148	\EastPoint (E²)	120
\downrightcurvedarrow (↗)	81	\dSadey (՞)	179	\Ecommerce (℮)	24
\downrsquigarrow (§)	76	\dsaeronautical (❖)	172	\eggbeater (♪)	179
\downrsquigarrow (§)	71	\dsagricultural (❖)	172	\eggbeater (♪)	179
\downslice (▽)	34	\dsarchitectural (❖)	172	\egsdot (»)	65
\downspoon (↓)	85	\dsbiological (❖)	172	\EightAsterisk (*)	131
\downspoon (↓)	84	\DSC (D²)	120	\EightFlowerPetal (❀)	131
\downt (τ)	23	\dschemical (❖)	172	\EightFlowerPetalRemoved (✿)	131
\downtherefore (∴)	108	\dscommercial (❖)	172	eighth note	see musical symbols
\downtherefore (∴)	29, 108	\dsdtstile ()	57	\eighthNote (♪)	150
\downtouparrow (↑)	70	\dSey (՞)	179	\eighthnote (♪)	147
\downtouparrow (↑)	79	dsfont (package)	116, 226	\eighthnote (♪)	147
\downtriangleleftblack (▽)	133	\dsheraldic (⊖)	172	\eighthnote (♪)	147
\downtrianglerightblack (▽)	133	\dsjuridical (❖)	172	\eighthNoteDotted (♪.)	150
\downuparrows (↑↑)	70	\dsliterary (❖)	172	\eighthNoteDottedDouble (♪..)	150
\downuparrows (↑↑)	75	\dsmathematical (❖)	172	\eighthNoteDottedDoubleDown (♪..)	150
\downuparrows (↑↑)	71	\dsmedical (❖)	172	\eighthNoteDottedDown (♪..)	150
\downuparrows (↑↑)	81	\dSmiley (՞)	179	\eighthNoteDown (♪)	150
\downupcurvearrow (↓)	76	\dsmilitary (❖)	172	\EightStar (*)	131
\downupharpoons ()	71	\dsol (˥)	32	\EightStarBold (*)	131
\downupharpoons ()	78	\dsrailways (❖)	172	\EightStarConvex (*)	131
\downupharpoons ()	74	\dsststile ()	57	\EightStarTaper (*)	131
\downupharpoonsleftright ()	78	\dststile ()	57	\ejective (?)	18
\downupharpoonsleftright ()	83	\dsttstile ()	57	electrical impulse	118
\downupsquigarrow (§)	76	\dssub (◁)	36	electrical symbols	118
\downvDash (¶)	52	\dtbstile ()	57	electromotive force (ℰ)	see alphabets, math
\downVdash (¶)	52	\dtimes (×)	30, 31	\electron (e⁻)	125
\downVdash (¶)	52	\dtimes (×)	32	element of	see \in
\downVdash (¶)	50	\dtimes (×)	29	elements	120
\downvDash (¶)	52	\dTongey (՞)	179	\eliners (✖)	114
\downvdash (⊤)	52	\dtststile ()	57	\ell (ℓ)	91
\downvdash (⊤)	49	\dttstile ()	57	\ell (ℓ)	92
\downwavearrow (↓)	75	\dtttstile ()	57	\Ellipse (○)	135
\downwhitearrow (↓)	79	\DU (∩)	121	ellipses (dots)	13, 14, 107–109, 112, 213
\downwhitearrow (↓)	81	\dualmap (↔↔)	85	ellipses (ovals)	135, 136, 157–161, 186–187, 192, 202–203
\downY (Υ)	30	\dualmap (↔↔)	55	\EllipseShadow (○)	135
\downY (Υ)	29	\duevolte (❖)	148	\EllipseSolid (●)	135
\downzigzagarrow (⤵)	79	duodecimal (base 12)		\elsdot («)	65
\downzigzagarrow (⤵)	76	numerals	110	\EM (↓)	122
\downzigzagarrow (⤵)	81	tally markers	168	\Email (✉)	123
Doyle, Sir Arthur Conan .	200	DVI	26, 122, 216	\EmailCT (✉)	123
dozenal (package) .	110, 168, 226	.dvi files	223		
dozenal (base 12)		\dVomey (՞)	179		
numerals	110	\dWalley (՞)	179		
tally markers	168	\dWinkey (՞)	179		
\dprime (〃)	111	\dKey (՞)	179		
\DQ (☒)	121				
\dracma (ℳ)	25				

\emgma (mj)	18	\EOgovernor (ଭୋର୍ଣ୍ଣ)	145	\EOofficerII (କେନ୍ଦ୍ରୀୟ ପାତ୍ର)	145
Emmentaler (font)	152	\EOGuise (କୁଳାଳ)	145	\EOofficerIII (କେନ୍ଦ୍ରୀୟ ପାତ୍ର)	145
emoticons	179	\EOHallow (ହଲୋ)	145	\EOofficerIV (କେନ୍ଦ୍ରୀୟ ପାତ୍ର)	145
\empty (+)	171	\EOi (୦ ୦)	146	\EOPa (ପାତ୍ର)	145
empty set	111–114	\EOiii (୦ ୦ ୦)	146	\EOpak (ପାତ୍ର)	145
\emptyset ()	112	\EOiv (୦ ୦ ୦ ୦)	146	\EOPatron (ପାତ୍ର)	145
\emptyset ()	113	\EOix (୦ ୦ ୦ ୦)	146	\EOPatronII (ପାତ୍ର)	145
\emptyset ()	113	\EOja (ଜାଗା)	145	\EOPe (ପାତ୍ର)	145
\emptysetoarr (Ø)	111	\EOjaguar (ଜାଗୁର)	145	\EOpenis (ପାତ୍ର)	145
\emptysetoarrl (Ø)	111	\EOje (ଜେ)	145	\EOPi (ପାତ୍ର)	145
\emptysetobar (Ø)	111	\EOJI (ଜି)	145	\EOPierce (ପାତ୍ର)	145
\emptysetocirc (Ø)	111	\EOji (ଜି)	145	\EOPPlant (ପାତ୍ର)	145
\EN (τ)	121	\EOjo (ଜୋ)	145	\EOPPlay (ପାତ୍ର)	145
\enclosecircle()	133	\EOju (ଜୁ)	145	\EOPo (ପାତ୍ର)	145
\enclosediamond()	133	\EOkak (କାକ)	145	\EOPriest (ପାତ୍ର)	145
\enclosesquare()	133	\EOke (କେ)	145	\EOPPrince (ପାତ୍ର)	145
\enclosetriangle(Δ)	133	\EOki (କି)	145	\EOPpu (ପାତ୍ର)	145
\End ([End])	122	\EOkj (କିଜି)	145	\EOPpuu (ପାତ୍ର)	145
end of proof	112	\EOKing (କିଙ୍ଗ)	145	\EOPpuuk (ପାତ୍ର)	145
\ending (⊥)	169	\EOknottedCloth (କିଟାନ୍ତ୍ରିକ୍ଷଣ)	145	\EORain (ପାତ୍ର)	145
\eng (ং)	18	\EOknottedClothStraps (କିଟାନ୍ତ୍ରିକ୍ଷଣ ଶର୍ପ୍‌ରୁତିକାଣ୍ଡିକା)	146	\EOSa (ପାତ୍ର)	145
engineering symbols	114, 118, 123	\EOko (କୋ)	146	\EOSa (ପାତ୍ର)	145
\engma (ং)	18	\EOku (କୁକୁ)	146	\EOSacrifice (ପାତ୍ର)	145
\enleadertwodots (..)	109	\EOkuu (କୁକୁ)	146	\EOSaw (ପାତ୍ର)	145
\ENQ (♣)	122	\EOLetBlood (କିମ୍ବାର୍ଦ୍ଦିତ ରତ୍ନ)	146	\EOScorpius (ପାତ୍ର)	145
entails see \models		\EOLoinCloth (କିଟାନ୍ତ୍ରିକ୍ଷଣ)	146	\EOset (ପାତ୍ର)	146
\Enter ([Enter])	122	\EOLongLipII (କିଟାନ୍ତ୍ରିକ୍ଷଣ)	146	\EOSi (ପାତ୍ର)	146
enumerate	168	\EOLord (କିନ୍ତୁ)	146	\EOSi (ପାତ୍ର)	146
\Envelope (✉)	137	\EOLose (କିମ୍ବାର୍ଦ୍ଦିତ)	146	\EOSing (ପାତ୍ର)	146
envelopes	137, 175	\EOMa (କିମ୍ବାର୍ଦ୍ଦିତ)	146	\EOSini (ପାତ୍ର)	146
\enya (ং)	18	\EOMacaw (କିମ୍ବାର୍ଦ୍ଦିତ)	146	\EOSkin (ପାତ୍ର)	146
\EOafter (ପାତ୍ର)	144	\EOMacawI (କିମ୍ବାର୍ଦ୍ଦିତ)	146	\EOSky (ପାତ୍ର)	146
\EOandThen (ପାତ୍ର)	144	\EOMe (କିମ୍ବାର୍ଦ୍ଦିତ)	146	\EOSkyAnimal (ପାତ୍ର)	146
\EOAppear (ପାତ୍ର)	144	\EOMexNew (କିମ୍ବାର୍ଦ୍ଦିତ)	146	\EOSkyPillar (ପାତ୍ର)	146
\EOBeardMask (ପାତ୍ର)	144	\EOMi (କିମ୍ବାର୍ଦ୍ଦିତ)	146	\EOSnake (ପାତ୍ର)	146
\EOBedeck (ପାତ୍ର)	144	\EOMiddle (କିମ୍ବାର୍ଦ୍ଦିତ)	144	\EOSo (ପାତ୍ର)	146
\EOBlood (ପାତ୍ର)	145	\EOmonster (କିମ୍ବାର୍ଦ୍ଦିତ)	144	\EOSpan (ପାତ୍ର)	146
\EObrace (ପାତ୍ର)	145	\EOMountain (କିମ୍ବାର୍ଦ୍ଦିତ)	144	\EOSprinkle (ପାତ୍ର)	146
\EObuilding (ପାତ୍ର)	145	\EOmuu (କିମ୍ବାର୍ଦ୍ଦିତ)	144	\EOstar (ପାତ୍ର)	146
\EObundle (ପାତ୍ର)	145	\EOna (କିମ୍ବାର୍ଦ୍ଦିତ)	144	\EOstarWarrior (ପାତ୍ର)	144
\EOChop (ପାତ୍ର)	145	\EOone (କିମ୍ବାର୍ଦ୍ଦିତ)	145	\EOstarWarrior (ପାତ୍ର)	146
\EOChronI (ପାତ୍ର)	145	\EOni (କିମ୍ବାର୍ଦ୍ଦିତ)	145	\EOstep (ପାତ୍ର)	144
\EOcloth (ପାତ୍ର)	145	\EOnow (କିମ୍ବାର୍ଦ୍ଦିତ)	145	\EOSu (ପାତ୍ର)	144
\EODealWith (ପାତ୍ର)	145	\EOonu (କିମ୍ବାର୍ଦ୍ଦିତ)	145		
\EODeer (ପାତ୍ର)	145	\EOonuu (କିମ୍ବାର୍ଦ୍ଦିତ)	145		
\EOeat (ପାତ୍ର)	145	\EOofficerI (ପାତ୍ର)	145		
\EOflint (ପାତ୍ର)	145				
\EOflower (ପାତ୍ର)	145				
\EOFold (ପାତ୍ର)	145				
\EOGod (ପାତ୍ର)	145				
\EOGoUp (ପାତ୍ର)	145				

\EOsu (⌚)	144	\EOx (≡)	146	\eqqcolon (=:)	52
\EOsun (⌚⌚)	144	\EOxi (♾)	146	\eqgtr (⤵)	65
\EOSuu (⌚⌚⌚)	145	\EOxii (♾♾)	146	\eqless (⤶)	65
\EOsuu (⌚⌚⌚⌚)	145	\EOxiii (♾♾♾)	146	\eqplus (⤷)	32
\EOT (♦)	122	\EOxiv (♾♾♾)	146	\eqqsim (⤿)	56
\Eota (⌚⌚⌚⌚⌚)	145	\EOxix (♾♾♾)	146	\eqqslantgtr (⤿⤿)	65
\Eote (⌚⌚⌚⌚⌚⌚)	145	\EOxv (♾♾)	146	\eqqslantless (⤿⤿)	65
\EOthrone (nors)	145	\EOxvi (♾)	146	\eqsim (⤿)	48
\Eoti (nors)	145	\EOxvii (♾)	146	\eqsim (⤿)	54
\EOTime (nors)	145	\EOxviii (♾)	146	\eqsim (⤿)	52
\Eotime (nors)	145	\EOxx (⤿)	146	\eqsim (⤿)	50
\EOTitle (nors)	145	\EOya (⤿)	146	\eqsim (⤿)	56
\EOTitleII (nors)	145	\EOyaj (⤿)	146	\eqslantgtr (⤿⤿)	62
\EOTitleIV (nors)	145	\EOye (⤿)	146	\eqslantgtr (⤿⤿)	61
\Eoto (nors)	145	\EOYear (nors)	146	\eqslantgtr (⤿⤿)	65
\Eotu (nors)	145	\EOyuu (⤿⤿)	146	\eqslantless (⤿⤿)	62
\Eotuki (nors)	145	\EOzero (⤿⤿)	146	\eqslantless (⤿⤿)	61
\Eotukpa (nors)	145	\EP (€)	121	\eqslantless (⤿⤿)	65
\Eoturtle (nors)	145	\eparsl (#)	55	\eqslantless (⤿⤿)	64
\Eotuu (⤿⤿⤿)	145	Epi-Olmec script	144–146	\eqsmile (⤿)	85
\Eotza (nors)	145	epiOlmec (package)	144, 146, 226, 227	\equal (=)	52
\Eotze (nors)	145	epsdice (package)	167, 226	\equal (=)	50
\Eotzete (nors)	145	\epsdice (⤿⤿⤿⤿⤿⤿)	167	\equalclosed (⤿)	169
\Eotzi (nors)	145	\epsi (ε)	18	\equalleftarrow (⤿⤿)	50
\Eotzu (nors)	145	\Epsilon (E)	88	\equalparallel (⤿⤿)	54
\Eotzuu (⤿⤿⤿)	145	\epsilon (ε)	88	\equalparallel (⤿⤿)	56
\EOundef (nors)	145	\epsilonup (ε)	89	\equalrightarrow (⤿⤿⤿)	81
\EOv (⤿)	146	\eqbump (⤿)	50	\equalscolon (=:)	58
\EOvarBeardMask (nors)	145	\eqbumped (⤿)	48	\equalscoloncolon (=::) .	58
\EOvarja (nors)	145	\eqbumped (⤿)	54	\equalsfill .	27, 214
\EOvarji (nors)	145	\eqcirc (==)	48	euidecomposable .	210
\EOvarki (nors)	145	\eqcirc (==)	47	equilibrium .	see \rightleftharpoons
\EOvarkuu (nors)	145	\eqcirc (==)	54	\Equiv (≡)	56
\EOvarni (⤿⤿)	145	\eqcirc (==)	52	\equiv (≡)	27, 46
\EOvarpa (⤿⤿⤿)	145	\eqcirc (==)	50	\equiv (≡)	51
\EOvarSi (⤿⤿)	146	\eqcirc (⤿)	55	\equiv (≡)	50
\EOvarsi (⤿⤿⤿)	146	\Eqcolon (=:)	48	\equiv (≡)	56
\EOvartzza (nors)	146	\Eqcolon (=:)	56	\Equivalence (↔)	110
\EOvarwuu (⤿⤿)	146	\Eqcolon (=:)	48	equivalence .	see \equiv, \leftrightarrow, and \threesim
\EOvarYear (nors)	146	\Eqcolon (=:)	52	\equivvclosed (⤿)	50
\EOvi (⤿)	146	\Eqcolon (=:)	55	\equivvDD (⤿)	56
\EOvii (⤿⤿)	146	\Eqdot (⤿)	55	\equivvert (⤿)	56
\EOviii (⤿⤿⤿)	146	\Eqdot (⤿)	52	\equivvvert (⤿)	56
\EOwa (nors)	146	\Eqdot (⤿)	50	\eqvparsl (#)	55
\EOwe (nors)	146	\Eqdot (⤿)	55	\er (⤿)	18
\EOwi (nors)	146	\eqeq (==)	56	\Eros (⤿)	120
\EOwo (nors)	146	\eqeqeq (==)	56	\errbarblackcircle (⤿)	133
\EOwu (⤿⤿)	146	\eqfrown (⤿)	85	\errbarblackdiamond (⤿)	133
\EOx (⤿)	146	\eqgtr (⤵)	65	\errbarblacksquare (⤿)	133
\EOx (⤿)	146	\eqleftarrow (⤿⤿⤿)	79	\errbarcircle (⤿)	133
\EOxi (⤿)	146	\eqless (⤶)	65	\errbardiamond (⤿)	133
\EOxii (⤿⤿)	146	\Eqcolon (=:)	48	\errbarsquare (⤿)	133
\EOxiii (⤿⤿⤿)	146	\Eqcolon (=:)	56	\errorsym (⤿)	125
\EOxiv (⤿⤿⤿⤿)	146	\Eqcolon (=:)	56	es-zet .	see \ss

\ESC (\leftarrow) 122
 \Esc ($\text{\texttt{[Esc]}}$) 122
 escapable characters 13
 \esh ($\text{\texttt{f}}$) 18
 \esh ($\text{\texttt{f'}}$) 18
 esint (package) 40, 226
 \Estatically ($\text{\texttt{A}}$) 124
 estimated *see* \textestimated
 \Estonia ($\text{\texttt{A}}$) 177
 esvect (package) 104, 226
 \Eta ($\text{\texttt{H}}$) 88
 \eta ($\text{\texttt{\eta}}$) 88
 \etaup ($\text{\texttt{\eta}}$) 89
 \ETB ($\text{\texttt{t}}$) 122
 \eth ($\text{\texttt{\eth}}$) 112
 \eth ($\text{\texttt{\eth'}}$) 18
 \eth ($\text{\texttt{\eth}}$) 114
 \eth ($\text{\texttt{\eth'}}$) 18
 \ETX ($\text{\texttt{\heartsuit}}$) 122
 eufrak (package) 116
 Euler Roman 89
 \Eulerconst ($\text{\texttt{\mathcal{E}}}$) 92
 \EUR ($\text{\texttt{\texteuro}}$) 24
 \EURcr ($\text{\texttt{\texteuro}}$) 24
 \EURdig ($\text{\texttt{\texteuro}}$) 24
 \EURhv ($\text{\texttt{\texteuro}}$) 24
 \Euro ($\text{\texttt{\texteuro}}$) 25
 \euro 25
 euro signs 24, 25
 blackboard bold 117
 \eurologo ($\text{\texttt{\texteuro}}$) 25
 European countries 176
 eurosym (package) 25, 226
 \EURtm ($\text{\texttt{\texteuro}}$) 24
 euscript (package) 116, 226
 evaluated at *see* \vert
 evil spirits 174
 \exciton ($\text{\texttt{\neg h^+}}$) 125
 \Exclam (!!) 114
 exclusive disjunction
 see \nletrightarrow
 \nequiv, and \oplus
 exclusive or 209
 \exists ($\text{\texttt{\exists}}$) 91
 \exists ($\text{\texttt{\exists}}$) 91
 \exists ($\text{\texttt{\exists}}$) 92
 \exists ($\text{\texttt{\exists}}$) 91
 \exists ($\text{\texttt{\exists}}$) 92
 \exp (exp) 87
 \experimentalsym ($\text{\texttt{\mathbb{X}}}$) 125
 \Explosionsafe ($\text{\texttt{\mathbb{S}}}$) 124
 extarrows (package) 106, 226
 extensible accents 102–105,
 107, 214–215
 extensible arrows 102–107
 extensible braces 102–105
 extensible symbols, creating
 214–215
 extensible tildes 102, 105
 extension characters 86, 87
 extpfeil (package) 107, 226
 extraipa (package) 21, 226
 \eye ($\text{\texttt{\textcircled{e}}}$) 137

\EyesDollar (\$) 24
F
 f (esvect package option) 104
 \f ($\text{\texttt{f}}$) 19
 \fa ($\text{\texttt{\textbf{f\texttt{o}}}}$) 181
 \faAdjust ($\text{\texttt{\textbf{O}}}$) 181
 \faAdn ($\text{\texttt{\textbf{A}}}$) 181
 \faAlignCenter ($\text{\texttt{\textbf{=}}}$) 181
 \faAlignJustify ($\text{\texttt{\textbf{=}}}$) 181
 \faAlignLeft ($\text{\texttt{\textbf{=}}}$) 181
 \faAlignRight ($\text{\texttt{\textbf{=}}}$) 181
 \faAmazon ($\text{\texttt{\textbf{a}}}$) 181
 \faAmbulance ($\text{\texttt{\textbf{a\texttt{v}}}}$) 181
 \faAnchor ($\text{\texttt{\textbf{a\texttt{n}}}}$) 181
 \faAndroid ($\text{\texttt{\textbf{a\texttt{nd}}}}$) 181
 \faAngellist ($\text{\texttt{\textbf{a\texttt{ng}}}}$) 181
 \faAngleDoubleDown ($\text{\texttt{\textbf{a\texttt{ngd\texttt{d}}}}}$) 181
 \faAngleDoubleLeft ($\text{\texttt{\textbf{a\texttt{ngd\texttt{l}}}}}$) 181
 \faAngleDoubleRight ($\text{\texttt{\textbf{a\texttt{ngd\texttt{r}}}}}$) 181
 \faAngleDoubleUp ($\text{\texttt{\textbf{a\texttt{ngd\texttt{u}}}}}$) 181
 \faAngleDown ($\text{\texttt{\textbf{a\texttt{ngd}}}}$) 181
 \faAngleLeft ($\text{\texttt{\textbf{a\texttt{ngl}}}}$) 181
 \faAngleRight ($\text{\texttt{\textbf{a\texttt{ngr}}}}$) 181
 \faAngleUp ($\text{\texttt{\textbf{a\texttt{ngu}}}}$) 181
 \faApple ($\text{\texttt{\textbf{a\texttt{pple}}}}$) 181
 \faArchive ($\text{\texttt{\textbf{a\texttt{rch}}}}$) 181
 \faAreaChart ($\text{\texttt{\textbf{a\texttt{rea}}}}$) 181
 \faArrowCircleDown ($\text{\texttt{\textbf{a\texttt{rrowc\texttt{d}}}}}$) 127
 \faArrowCircleLeft ($\text{\texttt{\textbf{a\texttt{rrowc\texttt{l}}}}}$) 127
 \faArrowCircleODown ($\text{\texttt{\textbf{a\texttt{rrowc\texttt{o\texttt{d}}}}}}$) 127
 \faArrowCircleOLeft ($\text{\texttt{\textbf{a\texttt{rrowc\texttt{o\texttt{l}}}}}}$) 127
 \faArrowCircleORight ($\text{\texttt{\textbf{a\texttt{rrowc\texttt{o\texttt{r}}}}}}$) 127
 \faArrowCircleOUp ($\text{\texttt{\textbf{a\texttt{rrowc\texttt{o\texttt{u}}}}}}$) 127
 \faArrowCircleRight ($\text{\texttt{\textbf{a\texttt{rrowc\texttt{r}}}}}$) 127
 \faArrowCircleUp ($\text{\texttt{\textbf{a\texttt{rrowc\texttt{u}}}}}$) 127
 \faArrowDown ($\text{\texttt{\textbf{a\texttt{rrowd}}}}$) 127
 \faArrowLeft ($\text{\texttt{\textbf{a\texttt{rrowl}}}}$) 127
 \faArrowRight ($\text{\texttt{\textbf{a\texttt{rrowr}}}}$) 127
 \faArrows ($\text{\texttt{\textbf{a\texttt{rrow}}}}$) 127
 \faArrowsAlt ($\text{\texttt{\textbf{a\texttt{rrowx}}}}$) 127
 \faArrowsH ($\text{\texttt{\textbf{a\texttt{rrowx\texttt{h}}}}}$) 127
 \faArrowsV ($\text{\texttt{\textbf{a\texttt{rrowx\texttt{v}}}}}$) 127
 \faArrowUp ($\text{\texttt{\textbf{a\texttt{rrowu}}}}$) 127
 \faAsterisk ($\text{\texttt{\textbf{*}}}$) 181
 \faAt (@) 181
 \faAutomobile ($\text{\texttt{\textbf{a\texttt{uto}}}}$) 184
 \faBackward ($\text{\texttt{\textbf{a\texttt{rrowb}}}}$) 181
 \faBalanceScale ($\text{\texttt{\textbf{a\texttt{bal}}}}$) 181
 \faBan ($\text{\texttt{\textbf{a\texttt{an}}}}$) 181
 \faBank ($\text{\texttt{\textbf{a\texttt{ban}}}}$) 184
 \faBarChart ($\text{\texttt{\textbf{a\texttt{bar}}}}$) 181
 \faBarChartO ($\text{\texttt{\textbf{a\texttt{baro}}}}$) 184
 \faBarcode ($\text{\texttt{\textbf{a\texttt{barc}}}}$) 181
 \faBars ($\text{\texttt{\textbf{a\texttt{bar}}}}$) 181
 \faBattery0 ($\text{\texttt{\textbf{a\texttt{bat0}}}}$) 184
 \faBattery1 ($\text{\texttt{\textbf{a\texttt{bat1}}}}$) 184
 \faBattery2 ($\text{\texttt{\textbf{a\texttt{bat2}}}}$) 184
 \faBattery3 ($\text{\texttt{\textbf{a\texttt{bat3}}}}$) 184
 \faBattery4 ($\text{\texttt{\textbf{a\texttt{bat4}}}}$) 184
 \faBatteryEmpty ($\text{\texttt{\textbf{a\texttt{bat\texttt{e}}}}}$) 181
 \faBatteryFull ($\text{\texttt{\textbf{a\texttt{bat\texttt{f}}}}}$) 181
 \faBatteryHalf ($\text{\texttt{\textbf{a\texttt{bat\texttt{h}}}}}$) 181

\faBatteryQuarter ($\text{\texttt{\textbf{a\texttt{bat\texttt{q}}}}}$) 181
 \faBatteryThreeQuarters
 ($\text{\texttt{\textbf{a\texttt{bat\texttt{t\texttt{q}}}}}}$) 181
 \faBed ($\text{\texttt{\textbf{a\texttt{bed}}}}$) 182
 \faBeer ($\text{\texttt{\textbf{a\texttt{beer}}}}$) 182
 \faBehance ($\text{\texttt{\textbf{a\texttt{beh}}}}$) 182
 \faBehanceSquare ($\text{\texttt{\textbf{a\texttt{beh\texttt{s}}}}}$) 182
 \faBell ($\text{\texttt{\textbf{a\texttt{bel}}}}$) 182
 \faBell0 ($\text{\texttt{\textbf{a\texttt{bel0}}}}$) 182
 \faBellSlash ($\text{\texttt{\textbf{a\texttt{bel\texttt{s}}}}}$) 182
 \faBellSlash0 ($\text{\texttt{\textbf{a\texttt{bel\texttt{s0}}}}}$) 182
 \faBicycle ($\text{\texttt{\textbf{a\texttt{bicy}}}}$) 182
 \faBinoculars ($\text{\texttt{\textbf{a\texttt{bin}}}}$) 182
 \faBirthdayCake ($\text{\texttt{\textbf{a\texttt{bir}}}}$) 182
 \faBitbucket ($\text{\texttt{\textbf{a\texttt{bit}}}}$) 182
 \faBitbucketSquare ($\text{\texttt{\textbf{a\texttt{bit\texttt{s}}}}}$) 182
 \faBitcoin ($\text{\texttt{\textbf{a\texttt{bit}}}}$) 24
 \faBlackTie ($\text{\texttt{\textbf{a\texttt{bt}}}}$) 182
 \faBold ($\text{\texttt{\textbf{a\texttt{bold}}}}$) 182
 \faBolt ($\text{\texttt{\textbf{a\texttt{bol}}}}$) 182
 \faBomb ($\text{\texttt{\textbf{a\texttt{bom}}}}$) 182
 \faBook ($\text{\texttt{\textbf{a\texttt{book}}}}$) 182
 \faBookmark ($\text{\texttt{\textbf{a\texttt{bookm}}}}$) 182
 \faBookmarkO ($\text{\texttt{\textbf{a\texttt{bookm0}}}}$) 182
 \faBriefcase ($\text{\texttt{\textbf{a\texttt{brief}}}}$) 182
 \faBtc ($\text{\texttt{\textbf{a\texttt{btc}}}}$) 24
 \faBtc ($\text{\texttt{\textbf{a\texttt{btc}}}}$) 24
 \faBug ($\text{\texttt{\textbf{a\texttt{bug}}}}$) 182
 \faBuilding ($\text{\texttt{\textbf{a\texttt{buil}}}}$) 182
 \faBuildingO ($\text{\texttt{\textbf{a\texttt{buil\texttt{o}}}}}$) 182
 \faBullhorn ($\text{\texttt{\textbf{a\texttt{bul}}}}$) 182
 \faBullseye ($\text{\texttt{\textbf{a\texttt{bulseye}}}}$) 182
 \faBus ($\text{\texttt{\textbf{a\texttt{bus}}}}$) 182
 \faBuySellads ($\text{\texttt{\textbf{a\texttt{buysellads}}}}$) 182
 \faCab ($\text{\texttt{\textbf{a\texttt{cab}}}}$) 184
 \faCalculator ($\text{\texttt{\textbf{a\texttt{calc}}}}$) 182
 \faCalendar ($\text{\texttt{\textbf{a\texttt{cal}}}}$) 182
 \faCalendarCheckO ($\text{\texttt{\textbf{a\texttt{cal\texttt{ch}}}}}$) 182
 \faCalendarMinusO ($\text{\texttt{\textbf{a\texttt{cal\texttt{-}}}}}$) 182
 \faCalendarO ($\text{\texttt{\textbf{a\texttt{cal\texttt{o}}}}}$) 182
 \faCalendarPlusO ($\text{\texttt{\textbf{a\texttt{cal\texttt{+}}}}}$) 182
 \faCalendarTimesO ($\text{\texttt{\textbf{a\texttt{cal\texttt{\times}}}}}$) 182
 \faCamera ($\text{\texttt{\textbf{a\texttt{cam}}}}$) 182
 \faCameraRetro ($\text{\texttt{\textbf{a\texttt{cam\texttt{r}}}}}$) 182
 \faCar ($\text{\texttt{\textbf{a\texttt{car}}}}$) 182
 \faCaretDown ($\text{\texttt{\textbf{a\texttt{car\texttt{d}}}}}$) 182
 \faCaretLeft ($\text{\texttt{\textbf{a\texttt{car\texttt{l}}}}}$) 182
 \faCaretRight ($\text{\texttt{\textbf{a\texttt{car\texttt{r}}}}}$) 182
 \faCaretSquareODown ($\text{\texttt{\textbf{a\texttt{car\texttt{sd}}}}}$) 182
 \faCaretSquareOLeft ($\text{\texttt{\textbf{a\texttt{car\texttt{sl}}}}}$) 182
 \faCaretSquareORight ($\text{\texttt{\textbf{a\texttt{car\texttt{sr}}}}}$) 182
 \faCaretSquareOUp ($\text{\texttt{\textbf{a\texttt{car\texttt{su}}}}}$) 182
 \faCaretUp ($\text{\texttt{\textbf{a\texttt{car\texttt{u}}}}}$) 182
 \faCartArrowDown ($\text{\texttt{\textbf{a\texttt{cart\texttt{d}}}}}$) 182
 \faCartPlus ($\text{\texttt{\textbf{a\texttt{cart\texttt{+}}}}}$) 182
 \faCc ($\text{\texttt{\textbf{a\texttt{cc}}}}$) 182
 \faCcAmex ($\text{\texttt{\textbf{a\texttt{cc\texttt{amex}}}}}$) 182
 \faCcDinersClub ($\text{\texttt{\textbf{a\texttt{cc\texttt{dc}}}}}$) 182
 \faCcDiscover ($\text{\texttt{\textbf{a\texttt{cc\texttt{dis}}}}}$) 182
 \faCcJcb ($\text{\texttt{\textbf{a\texttt{cc\texttt{jcb}}}}}$) 182
 \faCcMastercard ($\text{\texttt{\textbf{a\texttt{cc\texttt{mc}}}}}$) 183
 \faCcPaypal ($\text{\texttt{\textbf{a\texttt{cc\texttt{pay}}}}}$) 183
 \faCcStripe ($\text{\texttt{\textbf{a\texttt{cc\texttt{st}}}}}$) 183

\faCcVisa (visa)	183
\faCertificate (⌘)	183
faces	114, 122, 138, 164, 165, 172, 174, 178–184, 188–190
\faChain (🔗)	184
\faChainBroken (☒)	183
\faCheck (✓)	130
\faCheckCircle (✔)	130
\faCheckCircleO (○)	130
\faCheckSquare (▢)	130
\faCheckSquareO (☒)	130
\faChevronCircleDown (▼)	127
\faChevronCircleLeft (◀)	127
\faChevronCircleRight (▶)	127
\faChevronCircleUp (▲)	127
\faChevronDown (▼)	127
\faChevronLeft (◀)	127
\faChevronRight (▶)	127
\faChevronUp (▲)	127
\faChild (🚼)	183
\faChrome (⚙)	183
\faCircle (●)	136
\faCircleO (○)	136
\faCircleONotch (○)	136
\faCircleThin (○)	136
\faClipboard (📋)	183
\faClockO (⌚)	183
\faClone (🕒)	183
\faClose (✖)	130
\faCloud (☁)	183
\faCloudDownload (🌩)	183
\faCloudUpload (🌩)	183
\faCny (¥)	24
\faCode (</>)	183
\faCodeFork (变异)	183
\faCodepen (❖)	183
\faCoffee (☕)	183
\faCog (⚙)	183
\faCogs (⚙)	183
\faColumns (.columnHeader)	183
\faComment (💬)	183
\faCommenting (💬)	183
\faCommentingO (💬)	183
\faCommentO (💬)	183
\faComments (💬)	183
\faCommentsO (🗨)	183
\faCompass (🧭)	183
\faCompress (✖)	183
\faConnectdevelop (🌐)	183
\faContao (SupportedContent)	183
\faContent (——)	110
\faCopy (📄)	184
\faCopyright (©)	25
\faCreativeCommons ((CC))	25
\faCreditCard (💳)	183
\faCrop (✂)	183
\faCrosshairs (❖)	183
\faCss3 (_CSS)	183
\faCube (ześród)	183
\faCubes (ześród)	183
\faCut (✂)	184
\faCutlery (🍴)	183
\faDashboard (📊)	184
\faDashcube (📦)	183
\faDatabase (🗄)	183
\faDedent (➡)	184
\faDelicious (➕)	183
\faDesktop (💻)	183
\faDeviantart (Ｚ)	183
\faDiamond (💎)	183
\faDigg (digg)	183
\faDollar (\$)	24
\faDotCircleO (●)	136
\faDownload (⬇)	183
\faDribbble (⤒)	183
\faDropbox (Dropbox)	183
\faDrupal (Drupal)	183
\faEdit (📝)	184
\faEject (⏏)	183
\faEllipsisH (…)	183
\faEllipsisV (↓)	183
\faEmpire (帝)	183
\faEnvelope (✉)	184
\faEnvelopeO (✉)	184
\faEnvelopeSquare (✉)	184
\faEraser (ลบ)	184
\faEur (€)	24
\faEur (€)	24
\faEuro (€)	24
\faExchange (↔)	184
\faExclamation (!)	184
\faExclamationCircle (❗)	184
\faExclamationTriangle (⚠)	184
\faExpand (↗)	184
\faExpeditedssl (🌐)	184
\faExternalLink (↗)	184
\faExternalLinkSquare (↗)	184
\faEye (👁)	184
\faEyedropper (eyedropper)	184
\faEyeSlash (⊘)	184
\faFacebook (ƒ)	184
\faFacebookF (ƒ)	184
\faFacebookOfficial (ƒ)	184
\faFacebookSquare (ƒ)	184
\faFastBackward (⏮)	184
\faFastForward (⏭)	184
\faFax (📠)	184
\faFeed (RSS)	184
\faFemale (👩)	181
\faFighterJet (✈)	181
\faFile (📄)	181
\faFileArchiveO (📁)	181
\faFileAudioO (🎵)	181
\faFileCodeO (💻)	181
\faFileExcelO (xl)	181
\faFileImageO (🖼)	181
\faFileMovieO (🎥)	184
\faFileO (📄)	181
\faFilePdfO (PDF)	181
\faFilePhotoO (📸)	184
\faFilePictureO (🖼)	184
\faFilePowerpointO (PPT)	181
\faFilesO (📄)	181
\faFileSoundO (🔊)	184
\faFileText (📄)	181
\faFileTextO (📄)	181
\faFileVideoO (🎥)	181
\faFileWordO (WORD)	181
\faFileZipO (ZIP)	184
\faFilm (🎞)	181
\faFilter (🔍)	181
\faFire (🔥)	181
\faFireExtinguisher (滅火器)	181
\faFirefox (Firefox)	181
\faFlag (🚩)	181
\faFlagCheckered (🏳)	181
\faFlag0 (🚩)	181
\faFlash (⚡)	184
\faFlask (Flask)	181
\faFlickr (Flickr)	181
\faFloppy0 (floppy)	181
\faFolder (📁)	181
\faFolder0 (📁)	181
\faFolderOpen (📁)	181
\faFolderOpen0 (📁)	181
\faFont (A)	181
\faFonticons (font)	181
\faForumbee (🐝)	181
\faForward (▶)	181
\faFoursquare (📍)	181
\faFrownO (☹)	182
\faFutbol0 (⚽)	182
\faGamepad (🎮)	182
\faGavel (🔨)	182
\faGbp (£)	24
\faGe (🌐)	184
\faGear (⚙)	184
\faGears (⚙)	184
\faGenderless (○)	124
\faGetPocket (Pocket)	182
\faGg (GG)	182
\faGgCircle (🌐)	182
\faGift (🎁)	182
\faGit (git)	182
\faGithub (GitHub)	182
\faGithubAlt (GitHub)	182
\faGithubSquare (GitHub)	182
\faGitSquare (git)	182
\faGittip (Tip)	184
\faGlass (喝水)	182
\faGlobe (🌐)	182
\faGoogle (-google)	182
\faGooglePlus (Google+)	182
\faGooglePlusSquare (Google)	182
\faGoogleWallet (Wallet)	182
\faGraduationCap (graduation cap)	182
\faGratipay (Gratipay)	182
\faGroup (👥)	184
\faHackerNews (Hacker News)	182
\faHandGrabO (握手)	129
\faHandLizardO (🦎)	129
\faHandODown (✋)	129
\faHandOLeft (👉)	129

\faHand0Right (☞)	129	\faLevelUp (⬆)	183
\faHand0Up (☝)	129	\faLifeBouy (⌚)	184
\faHandPaper0 (✋)	129	\faLifeRing (⌚)	183
\faHandPaper0 (✋)	129	\faLifeSaver (⌚)	184
\faHandPeace0 (✌)	129	\faLightbulb0 (💡)	183
\faHandPointer0 (👉)	129	\faLineChart (📈)	183
\faHandRock0 (✊)	129	\faLink (🔗)	183
\faHandRock0 (✊)	129	\faLinkedin (㏌)	183
\faHandScissors0 (✂)	129	\faLinkedinSquare (㏌)	183
\faHandSpock0 (🖖)	129	\faLinux (🐧)	183
\faHandStop0 (✋)	129	\faList (☰)	183
\faHdd0 (💁)	182	\faListAlt (☷)	183
\faHeader (ℋ)	182	\faListOl (☷)	183
\faHeadphones (🎧)	182	\faListUl (☷)	183
\faHeart (❤)	182	\fallingdotseq (≒)	48
\faHeartbeat (❤)	182	\fallingdotseq (≒)	47
\faHeart0 (❤)	182	\fallingdotseq (≒)	54
\faHistory (ἱ)	182	\fallingdotseq (≒)	51
\faHome (🏡)	182	\fallingdotseq (≒)	50
\faHospital0 (🏥)	182	\fallingdotseq (≒)	55
\faHotel (🏨)	184	\FallingEdge (↖)	118
\faHourglass (⏳)	182	\faLocationArrow (↗)	183
\faHourglassEnd (⌛)	182	\faLock (🔒)	183
\faHourglassHalf (⏳)	182	\faLongArrowDown (⬇)	127
\faHourglass0 (⌚)	182	\faLongArrowLeft (⬅)	127
\faHourglassStart (⌚)	182	\faLongArrowRight (➡)	127
\faHouzz (🏡)	182	\faLongArrowUp (⬆)	127
\faHSquare (𝑯)	182	falsum	see \bot
\faHtml5 (🌐)	182	\faMagic (🧙)	183
\faICursor (ⓘ)	182	\faMagnet (🧲)	183
\faIls (₪)	24	\faMailForward (➡)	184
\faIls (₪)	24	\faMailReply (✉)	184
\faImage (🖼)	184	\faMailReplyAll (✉✉)	184
\faInbox (✉)	182	\faMale (🚹)	183
\faIndent (≡)	182	\faMap (gMaps)	183
\faIndustry (🏭)	182	\faMapMarker (📍)	183
\faInfo (ℹ)	182	\faMapO (gMaps)	183
\faInfoCircle (ⓘ)	182	\faMapPin (📍)	183
\faInr (₹)	24	\faMapSigns (📍)	183
\faInr (₹)	24	\faMars (♂)	119, 124
\faInstagram (📸)	182	\faMarsDouble (⚥)	124
\faInstitution (🏛)	184	\faMarsStroke (♂)	124
\faInternetExplorer (_EDGE)	182	\faMarsStrokeH (ଓ)	124
\faIntersex (⚥)	124	\faMarsStrokeV (ଓ)	124
\faIoxhost (🌐)	182	\faMaxcdn (.maxcdn)	183
\faItalic (.Italic)	182	\faMeanpath ("path")	183
\faJoomla (Joomla)	182	\faMedium (Ⓜ)	183
\faJpy (¥)	24	\faMedkit (💊)	183
\faJpy (¥)	24	\faMeh0 (☺)	183
\faJsfiddle (🔗)	182	\faMercury (☿)	119
\faKey (🔑)	182	\faMicrophone (🎤)	183
\faKeyboard0 (⌨)	182	\faMicrophoneSlash (🎤)	183
\faKrw (₩)	24	\faMinus (▬)	183
\faKrw (₩)	24	\faMinusCircle (▬)	183
\faLanguage (🌐)	183	\faMinusSquare (▬)	183
\faLaptop (💻)	183	\faMinusSquare0 (▬)	183
\faLastfm (听得歌)	183	\faMobile (📱)	183
\faLastfmSquare (听得歌)	183	\faMobilePhone (📱)	184
\faLeaf (🌿)	183	\faMoney (💰)	183
\faLeanpub (📖)	183	\faMoon0 (🌙)	119
\faLegal (⚖)	184	\faMortarBoard (🎓)	184
\faLemon0 (🍋)	183	\faMotorcycle (🏍)	183
\faLevelDown (⬇)	183	\faMousePointer (🖱)	183
		\faMusic (🎵)	183
		\faNavIcon (☰)	184
		\faFanContent (━)	110
		fancy borders	191–197
		\faNeuter (⚲)	124
		\faNewspaper0 (📰)	183
		\faFanContent (━)	110
		\faFanQuant (━)	110
		\faFanQuantN (━)	110
		\faFanoven (-pane)	178
		\faFanQuant (━)	110
		\faFanQuantN (━)	110
		\faObjectGroup (⧉)	183
		\faObjectUngroup (⤒)	183
		\faOdnoklassniki (ଓ)	183
		\faOdnoklassnikiSquare (ଓ)	183
		\faOpenCart (⤓)	183
		\faOpenID (👤)	183
		\faOpera (ଓ)	184
		\faOptinMonster (viagra)	184
		\faOutdent (≡)	184
		\faPagelines (🕒)	184
		\faPaintBrush (🖌)	184
		\faPaperclip (📎)	184
		\faPaperPlane (✈)	184
		\faPaperPlane0 (✈)	184
		\faParagraph (¶)	184
		\faPaste (📋)	184
		\faPause (⏸)	184
		\faPaw (🐾)	184
		\faPaypal (🅿)	184
		\faPencil (🖍)	128
		\faPencilSquare (🖍)	128
		\faPencilSquare0 (🖍)	128
		\faPhone (📞)	184
		\faPhoneSquare (📱)	184
		\faPhoto (📸)	184
		\faPicture0 (🖼)	184
		\faPieChart (🥧)	184
		\faPiedPiper (ᵔ)	184
		\faPiedPiperAlt (ᵔ)	184
		\faPinterest (ප)	184
		\faPinterestP (ප)	184
		\faPinterestSquare (ප)	184
		\faPlane (✈)	181
		\faPlay (▶)	181
		\faPlayCircle (◉)	181
		\faPlayCircle0 (◉)	181
		\faPlug (🔌)	181
		\faPlus (➕)	181
		\faPlusCircle (⊕)	181
		\faPlusSquare (✚)	181
		\faPlusSquare0 (✚)	181
		\faPowerOff (📴)	181
		\faPrint (🖨)	181
		\faPuzzlePiece (🧩)	181
		\faQq (ଡ)	181
		\faQrcode (QR)	181
		\Faquant (━)	110

\faQuarantine	110
\faQuestion	181
\faQuestionCircle	181
\faQuoteLeft	181
\faQuoteRight	181
\faRa	184
\faRandom	181
\faRebel	181
\faRecycle	181
\faReddit	181
\faRedditSquare	181
\faRefresh	181
\faRegistered	25
\faRemove	130
\faRenren	181
\faReorder	184
\faRepeat	127
\faRepeat	127
\faReply	181
\faReplyAll	181
\faRetweet	181
\faRmb	24
\faRoad	181
\faRocket	181
\faRotateLeft	127
\faRotateRight	127
\faRouble	24
\faRss	181
\faRssSquare	181
\faRub	24
\faRub	24
\faRuble	24
\faRupee	24
\faSafari	181
\faSave	184
\faScissors	181
\faSearch	181
\faSearchMinus	181
\faSearchPlus	182
\faSellsy	182
\faSend	184
\faSendO	184
\faServer	182
\faShare	182
\faShareAlt	182
\faShareAltSquare	182
\faShareSquare	182
\faShareSquareO	182
\faShekel	24
\faSheqel	24
\faShield	182
\faShip	182
\faShirtsinbulk	182
\faShoppingCart	182
\faSignal	182
\faSignIn	182
\faSignOut	182
\faSimplybuilt	182
\faSitemap	182
\faSkyatlas	182
\faSkype	182
\faSlack	182
\faSliders	182
\faSlideshare	182
\faSmileO	182
\faSoccerBallO	184
\faSort	182
\faSortAlphaAsc	182
\faSortAlphaDesc	182
\faSortAmountAsc	182
\faSortAmountDesc	182
\faSortAsc	182
\faSortDesc	182
\faSortDown	184
\faSortNumericAsc	182
\faSortNumericDesc	182
\faSortUp	184
\faSoundcloud	182
\faSpaceShuttle	182
\faSpinner	182
\faSpoon	182
\faSpotify	182
\faSquare	136
\faSquareO	136
\faStackExchange	182
\faStackOverflow	182
\faStar	132
\faStarHalf	132
\faStarHalfEmpty	132
\faStarHalfFull	132
\faStarHalfO	132
\faStarHalfO	132
\faStarO	132
\faSteam	182
\faSteamSquare	182
\faStepBackward	182
\faStepForward	182
\faStethoscope	182
\faStickyNote	182
\faStickyNoteO	182
\faStop	182
\faStreetView	182
\faStrikethrough	182
\faStumbleupon	182
\faStumbleuponCircle	182
\faSubscript	182
\faSubway	182
\faSuitcase	183
\faSunO	119
\faSuperscript	183
\faSupport	184
\faTable	183
\faTablet	183
\faTachometer	183
\faTag	183
\faTags	183
\faTasks	183
\faTaxi	183
\fatbslash	28
\fatbslash	54
\faTelevision	183
\faTencentWeibo	183
\faTerminal	183
\faTextHeight	183
\faTextWidth	183
\faTh	183
\faThLarge	183
\faThList	183
\faThumbsDown	129
\faThumbsODown	129
\faThumbsOUp	129
\faThumbsUp	129
\faThumbTack	183
\faTicket	183
\faTimes	130
\faTimes	130
\faTimesCircle	130
\faTimesCircleO	130
\faTint	183
\faToggleDown	184
\faToggleLeft	184
\faToggleOff	183
\faToggleOn	183
\faToggleRight	184
\faToggleUp	184
\faTrademark	25
\faTrain	183
\faTransgender	124
\faTransgender	124
\faTransgenderAlt	124
\faTrash	183
\faTrashO	183
\faTree	183
\faTrello	183
\faTripadvisor	183
\faTrophy	183
\faTruck	183
\faTry	24
\faTry	24
\fatsemi	28
\fatsemi	31
\fatslash	28
\fatslash	54
\faTty	183
\faTumblr	183
\faTumblrSquare	183
\faTurkishLira	24
\faTv	184
\faTwitch	183
\faTwitter	183
\faTwitterSquare	183
\faUmbrella	183
\faUnderline	183
\faUndo	127
\faUndo	127
\faUniversity	183
\faUnlink	184
\faUnlock	183
\faUnlockAlt	183
\faUnsorted	184
\faUpload	183
\faUsd	24
\faUsd	24
\faUser	183
\faUserMd	183
\faUserPlus	183
\faUsers	183

\faUserSecret (⌚)	183	\female (♀)	123	\fgef (ƒ)	92
\faUserTimes (☒)	183	\FemaleFemale (☒)	124	\fgeinfty (∞)	115
\faVenus (♀)	119, 124	\FemaleMale (♂)	124	\fgelangle (↖)	115
\faVenusDouble (♀♀)	124	\Ferli (ⓘ)	149	\fgelb (ყ)	92
\faVenusMars (♀♀)	124	\fermata	154	\fgeleftB (✉)	92
\faViacoin (₩)	24	\fermata (ⓘ)	152	\fgeleftC (ଓ)	92
\faVideoCamera (🎥)	183	\fermatadown (ⓘ)	148	\fgeN (ყ)	92
\faVimeo (Vimeo)	183	\fermataup (ⓘ)	148	\fgeoverU (ყ)	92
\faVimeoSquare (Vimeo)	183	\Fermi (ⓘ)	149	\fgerightarrow (↗)	84
\faVine (Vine)	183	\fermion (⚡)	125	\fgerightB (ව)	92
\faVk (VK)	183	fermions	125	\fges (f)	92
\faVolumeDown (🔉)	184	feyn (package)	125, 226	\fgestruckone (ⓘ)	110
\faVolumeOff (🔇)	184	Feynman slashed character notation	211	\fgestruckzero (ⓘ)	110
\faVolumeUp (🔊)	184	Feynman-diagram symbols	125	\fgeU (ყ)	92
\faWarning (⚠)	184	\feyn{a} (ⓘ)	125	\fgeuparrow (↑)	84
\faWechat (QQ)	184	\feyn{c} (ⓘ)	125	\fgeupbracket (⌈)	115
\faWeibo (QQ)	184	\feyn{fd} (ⓘ)	125	field (F) <i>see alphabets, math</i>	
\faWeixin (QQ)	184	\feyn{flS} (ⓘ)	125	\file (⇒)	169
\faWhatsapp (ⓘ)	184	\feyn{f1} (ⓘ)	125	file extensions	
\faWheelchair (♿)	184	\feyn{fs} (ⓘ)	125	.dvi	223
\faWifi (WiFi)	184	\feyn{fu} (ⓘ)	125	.fd	11, 218, 224
\faWikiwandW (W)	184	\feyn{fv} (ⓘ)	125	.mf	11, 186, 216
\faWindows (Windows)	184	\feyn{f} (ⓘ)	125	.otf	147
\faWon (₩)	24	\feyn{g1} (ⓘ)	125	.pdf	223
\faWordpress (WordPress)	184	\feyn{gd} (ⓘ)	125	.sty	11
\faWrench (🔧)	184	\feyn{glB} (ⓘ)	125	.tex	223, 224
\FAX (FAX)	123	\feyn{glS} (ⓘ)	125	.tfm	11, 186, 206, 224
\fax (Fax)	123	\feyn{glu} (ⓘ)	125	file symbols	181–184
\faXing (X)	184	\feyn{gl} (ⓘ)	125	\FilledBigCircle (●)	135
\faKingSquare (KING)	184	\feyn{gu} (ⓘ)	125	\FilledBigDiamondshape (◆)	
\Faxmachine (Fax)	123	\feyn{gvs} (ⓘ)	125	\FilledBigSquare (■)	135
\faYahoo (Y)	184	\feyn{gv} (ⓘ)	125	\FilledBigTriangleDown (▼)	
\faYc (Y)	184	\feyn{g} (ⓘ)	125	\FilledBigTriangleLeft (◀)	
\faYCombinator (Y)	184	\feyn{hd} (ⓘ)	125	\FilledBigTriangleRight (▶)	
\faYCombinatorSquare (Y)	184	\feyn{hs} (ⓘ)	125	\FilledBigTriangleUp (▲)	
\faYcSquare (Y)	184	\feyn{hu} (ⓘ)	125	\FilledCircle (●)	135
\faYelp (Yelp)	184	\feyn{h} (ⓘ)	125	\FilledCloud (☁)	166
\faYen (¥)	24	\feyn{ms} (ⓘ)	125	\filleddiamond (◆)	34
\faYoutube (YouTube)	184	\feyn{m} (ⓘ)	125	\FilledDiamondShadowA (◆)	
\faYoutubePlay (YouTube)	184	\feyn{P} (●)	125	\FilledDiamondShadowC (◆)	
\faYoutubeSquare (YouTube)	184	\feyn{p} (ⓘ)	125	\FilledDiamondshape (◆)	135
\fbowtie (bowtie)	55	\feyn{x} (ⓘ)	125	\FilledHut (▲)	166
fc (package)	15, 19	\fge (package)	84, 92, 101, 110, 115, 226	\filledlargestar (★)	132
\fcdice (☐ ☐ ☐ ☐ ☐ ☐)	167	\fgeA (V)	92	\filledlozenge (◆)	132
fclfont (package)	226	\fgebackslash (\)	115	\filledmedlozenge (◆)	132
\fcmp (;)	32	\fgebaracute (ⓘ)	115	\filledmedsquare (■)	34
\Fcontent (—)	110	\fgebarcap (ⓘ)	115	\filledmedtriangledown (▼)	
\fcscore (I II III IIII)	168	\fgec (ȝ)	92	\filledmedtriangleleft (◀)	
.fd files	11, 218, 224	\fgecap (^)	115	\filledmedtriangleright (▶)	
\fdiagovnearrow (☒)	81	\fgecapbar (≈)	115	\filledmedtriangleright (▶)	
\fdiagovrdiag (☒)	114	\fgecup (∞)	115	\filledmedtriangleright (▶)	
fdsymbol (package)	30, 31, 34, 42, 43, 51–53, 60, 64, 68, 75–79, 85, 86, 90, 92, 96, 97, 101, 103, 108, 111, 113, 133, 136, 147, 226	\fgecupacute (↴)	115	\filledmedtriangledown (▼)	
feet	<i>see \prime and \textquotesingle</i>	\fgecupbar (≈)	115	\filledmedtriangleup (▲)	
\FEMALE (♀)	124	\fged (p)	92	\filledmedtriangleup (▲)	
\Female (♀)	124	\fgee (ȝ)	92	\filledmedtriangleup (▲)	
female	17, 119, 120, 123, 124, 180–184, 188–190	\fgeeszett (g)	92	\filledmedtriangleup (▲)	
\female (♀)	124	\fgeeta (ყ)	92	\fgeF (J)	92

\filledmedtriangleup (\blacktriangle)	34, 67	\Fire (\blacktriangleleft)	166, 180
\FilledRainCloud (\clubsuit)	.. 166	\Fire (\blacktriangleright)	120
\FilledSectioningDiamond (\diamondsuit)	.. 166	fish	192
\FilledSmallCircle (\bullet)	135	fish hook	<i>see \strictif</i>
\FilledSmallCircle (\bullet)	135	\fisheye (\odot)	133
\FilledSmallDiamondshape (\blacklozenge)	.. 135	fists	128, 129, 186
\FilledSmallSquare (\blacksquare)	135	\fivedots (\cdots)	29, 108
\FilledSmallTriangleDown (\blacktriangledown)	.. 135	\FiveFlowerOpen (\blacklozenge)	.. 131
\FilledSmallTriangleLeft (\blacktriangleleft)	.. 135	\FiveFlowerPetal (\blacklozenge)	.. 131
\FilledSmallTriangleRight (\blacktriangleright)	.. 135	\FiveStar (\star)	.. 131
\FilledSmallTriangleUp (\blacktriangleup)	.. 135	\FiveStarCenterOpen (\star)	.. 131
\FilledSnowCloud (\clubsuit)	.. 166	\FiveStarConvex (\star)	.. 131
\FilledSquare (\blacksquare)	.. 135	\FiveStarLines (\star)	.. 131
\filledsquare (\blacksquare)	.. 34	\FiveStarOpen (\star)	.. 131
\FilledSquareShadowA (\blacksquare)	.. 135	\FiveStarOpenCircled (\star)	.. 131
\FilledSquareShadowC (\blacksquare)	.. 135	\FiveStarOpenDotted (\star)	.. 131
\filledsquarewithdots (\blacklozenge)	.. 137	\FiveStarOutline (\star)	.. 131
\filledstar (\star)	.. 34	\FiveStarOutlineHeavy (\star)	.. 131
\FilledSunCloud (\clubsuit)	.. 166	\FiveStarShadow (\star)	.. 131
\FilledTriangleDown (\blacktriangledown)	135	\Fixedbearing (Δ)	.. 123
\filledtriangledown (\blacktriangledown)	34, 67	\fixedddots (\cdots)	.. 107
\FilledTriangleLeft (\blacktriangleleft)	135	\fixedvdots (\cdot)	.. 107
\filledtriangleleft (\blacktriangleleft)	34, 67	fixmath (package)	.. 220
\FilledTriangleRight (\blacktriangleright)	.. 135	\fj (f_j)	.. 18
\filledtriangleright (\blacktriangleright)	34, 67	\FL (L)	.. 121
\FilledTriangleUp (\blacktriangleup)	.. 135	\Flag (\uparrow)	.. 166
\filledtriangleup (\blacktriangleup)	34, 67	\flageolett (\wp)	.. 148
\FilledWeakRainCloud (\clubsuit)	.. 166	flags	180–181
finger, pointing	.. <i>see</i> fists	\flap (f)	.. 18
finite field (\mathbb{F})	. <i>see</i> alphabets, math	\flapr (f)	.. 18
\Finland (\blacktriangleleft)	.. 177	\flat (\flat)	.. 147
\finpartvoice (\square)	.. 21	\flat (\flat)	.. 147
\finpartvoiceless (\square)	.. 21	\flatflat ($\flat\flat$)	.. 151
\fint (f)	.. 39	\Flatsteel ($\overline{-}$)	.. 123
\fint (f)	.. 40	fletched arrows	84, 126
\fint (f)	.. 42	fleurons	132, 137, 191
\fint (f)	.. 43	\Florin (\wp)	.. 24
\fintsl (f)	.. 45	florin	<i>see \textflorin</i>
\fintup (f)	.. 45	flourishes	137, 194
\Finv (\exists)	.. 91	\floweroneleft (\circlearrowleft)	.. 132
\Finv (\exists)	.. 91	\floweroneright (\circlearrowright)	.. 132
\Finv (\exists)	.. 92	flowers	.. 131, 132, 180–181, 191–192
\Finv (\exists)	.. 92	\fltns (\square)	.. 133
\Finv (\exists)	.. 92	Flynn, Peter	.. 210
\Fnquant (τ)	.. 110	\FM ($\overline{\tau}$)	.. 121
\Fncontent ($\overline{\tau\tau}$)	.. 110	\Fncontent ($\overline{\tau\tau}$)	.. 110
\Fnnccontent ($\overline{\tau\tau}$)	.. 110	\Fnncquant ($\tau\overline{\tau}$)	.. 110
\Fnncquantn ($\tau\overline{\tau}$)	.. 110	\Fnncquantn ($\tau\overline{\tau}$)	.. 110
\Fnquantn ($\tau\overline{\tau}$)	.. 110	\Fnquant ($\tau\overline{\tau}$)	.. 110

\forks (\swarrow)	56	\Game (\odot)	91	\gesdot (\gg)	65
\forksnot (\Downarrow)	55	\Game (\ominus)	92	\gesdoto (\gg)	65
\forkv (\nwarrow)	54	\Game (\ominus)	92	\gesdotol (\gg)	65
\forkv (\nwarrow)	55	\Game (\ominus)	92	\gesl (\gtrless)	64
forte (\textbf{f})	152, 163	game-related symbols	136, 137, 166, 167, 169–171, 181–184, 203–205	\gesles (\gtrless)	66
\Fortune (\otimes)	120	\Gamma	88	\gets	see \leftarrow
\Forward (\blacktriangleright)	164	\gamma	88	\gets (\leftarrow)	76
\ForwardToEnd ($\blacktriangleright\!\!\!\blacktriangleright$)	164	\gammaup	89	\gg (\gg)	62
\ForwardToIndex ($\blacktriangleright\!\!\!\blacktriangleright\!\!$)	164	\Ganz (\circ)	149	\gg (\gg)	61
\FourAsterisk (\star)	131	\GaPa (--)	149	\gg (\gg)	64
\FourCloverOpen (\circlearrowleft)	131	Garamond (font)	24, 46	\gg (\gg)	63
\FourCloverSolid (\clubsuit)	131	\Gasstove (\square)	178	\gg (\gg)	66
\Fourier (—o)	58	\gcd (gcd)	87	\ggcurly (\gg)	48
fourier (package)	25, 58, 89, 93, 99, 104, 129, 132, 165, 226	\GD (∇)	121	\ggcurly (\gg)	54
\fourier ($\circ\text{—}$)	58	\GE (\geq)	121	\ggg (\gg)	62
Fourier transform (\mathcal{F})	see alphabets, math	\ge	see \geq	\ggg (\gg)	61
\FourStar (\blacklozenge)	131	\ge (\geq)	64	\ggg (\gg)	207
\FourStarOpen ($\blacklozenge\!\!$)	131	\ge (\geq)	64	\ggg (\gg)	65
\fourth (///)	113	\Gemini (\beth)	120	\ggg (\gg)	64
\fourvdots (:)	109	\Gemini (\beth)	119	\ggg (\gg)	63
\Fquantn ($\overline{\square}\!\!\!\square$)	110	\Gemini (\beth)	120	\ggg (\gg)	66
\Fquantnn ($\overline{\square}\!\!\!\square\!\!$)	110	\gemini (\beth)	119	\gggnest (\gg)	66
\fracslash (/)	32	genealogical symbols	164	\gggttr	see \ggg
fractions	114	\geneuro (€)	25	\gggttr (\gg)	64
fraktur	see alphabets, math	\geneuronarrow (€)	25	\gggttr (\gg)	63
\France (\star)	177	\geneuronwide (€)	25	\gggttr (\gg)	66
Freemason's cipher	174	gensymb (package)	118	ghosts	174
frege (package)	110, 226, 227	\Gentsroom (\natural)	165	Gibbons, Jeremy	228
Frege logic symbols	84, 92, 109, 110, 115	geometric shapes	120, 132–136, 157–161, 170, 171, 181–184, 186–187, 202–203	\gimel (\beth)	90
Frege, Gottlob	109, 110	\geq	62	\gimel (\beth)	90
\frown (\smile)	46	\geq (\geq)	61, 62	\gimel (λ)	90
\frown (\smile)	54	\geq (\geq)	64	\gimel (ι)	90
\frown (\smile)	51, 86	\geq (\geq)	63	\gimel (λ)	91
\frown (\smile)	85	\geqclosed (\geq)	65, 66	\girl (ϑ)	120
\frown (\smile)	55	\geqclosed (\geq)	64, 68	\gla (\times)	66
frown symbols	85, 86	\geqdot (\geq)	64	\glE (\gtrless)	66
\frownneq (\equiv)	51, 86	\geqdot (\geq)	63	\gleichstark (\beth)	55
\frownneq (\equiv)	85	\geqq (\geq)	62	\glj (\times)	65
\frownneqsmile (\equiv)	85	\geqq (\geq)	61	\glj (\times)	66
\frownie (\circledcirc)	164	\geqq (\geq)	65	globe	165
\frownsmile (\circ)	51, 86	\geqq (\geq)	64	\glotstop (?)	18
\frownsmile (\circ)	85	\geqq (\geq)	63	\glottal (?)	18
\frownsmileeq (\circledcirc)	85	\geqq (\geq)	65	\Gloves (\heartsuit)	178
\Frowny (\circledcirc)	165	\geqqslant (\gtrless)	65	\gluon ($\wedge\wedge\wedge\wedge$)	118
frowny faces	122, 164, 165, 178–184	\geqsllant (\gg)	61	gluons	125
\fryingpan (---)	179	\geqsllant (\gg)	65	\gnapprox (\gtrapprox)	62
\fryingpan (---)	179	\geqsllant (\gg)	64	\gnapprox (\gtrapprox)	61
\FS (L)	122	\geqsllant (\gg)	63	\gnapprox (\gtrapprox)	65
\fullmoon (\bigcirc)	120	\geqsllant (\gg)	65	\gnapprox (\gtrapprox)	64
\fullmoon (\bigcirc)	119	\geqslantdot (\gg)	64	\gnapprox (\gtrapprox)	63
\fullnote (\circ)	147	\geqslantdot (\gg)	63	\gnapprox (\gtrapprox)	66
\fullouterjoin (\bowtie)	114	\geqlcc (\gg)	64	\gneqq (\gtrless)	62
G		german (keystroke package option)	122	\gneqq (\gtrless)	61
\G (\blacksquare)	19	\gescc (\gg)	177	\gneqq (\gtrless)	65
g (esvect package option)	104	\gescc (\gg)	64	\gneqq (\gtrless)	64
\Game (\odot)	91	\gescc (\gg)	65	\gneqq (\gtrless)	63
		\gesdot (\gg)	64	\gneqq (\gtrless)	66
		\gesdot (\gg)	64	\gnsim (\gtrapprox)	62

\gnsim (\gtrsim)	61	\gtr (>)	63	\h (h)	19
\gnsim (\approx)	65	\gtrapprox (\gtrapprox)	62	\HA (A)	139
\gnsim (\gtrapprox)	64	\gtrapprox (\gtrapprox)	61	\Ha (A)	139
\gnsim (\gtrapprox)	63	\gtrapprox (\gtrapprox)	65	háček (č)	see accents
\gnsim (\gtrapprox)	66	\gtrapprox (\gtrapprox)	64	\Hades (f)	120
\GO (\rightarrow)	121	\gtrapprox (\gtrapprox)	63	\Hail (p)	166
go (package)	171, 226	\gtrapprox (\gtrapprox)	65	\Halb (d)	149
Go boards	170, 171	\gtrarr (\gtrapprox)	65	half note	see musical symbols
Go stones	170, 171	\gtrcc (\triangleright)	64	\HalfCircleLeft (C)	135
goban	170, 171	\gtrclosed (\triangleright)	64, 68	\HalfCircleRight (D)	135
\Goofy	172	\gtrclosed (\triangleright)	63, 67	\HalfFilledHut (H)	166
\graphene (\textcircled{O})	125	\gtrdot (>)	62	\halflength (')	23
graphics (package)	84, 209	\gtrdot (>)	61	\halfNote (j)	150
graphicx (package)	23, 206, 209	\gtrdot (>)	31	\halfnote (j)	147
\grave (`)	101	\gtrdot (>)	64	\halfNoteDotted (j..)	150
\grave (`)	100	\gtrdot (>)	63	\halfNoteDottedDouble (j..)	150
grave (`)	see accents	\gtrdot (>)	65	\halfNoteDottedDoubleDown	
\gravis (`)	22	\gtreqless (\gtrless)	62	($\text{P}^{\cdot\cdot}$)	150
\GreatBritain (GB)	177	\gtreqless (\gtrless)	61	\halfNoteDottedDown (P^{\cdot})	150
greater-than signs	see inequalities	\gtreqless (\gtrless)	65	\halfNoteDown (P)	150
greatest lower bound	see	\gtreqless (\gtrless)	63	\halfNoteRest (--)	151
\sqcap		\gtreqless (\gtrless)	64	\halfNoteRestDotted (-.)	151
\Greece (€)	177	\gtreqlessslant (\gtrless)	64	\HalfSun (S)	166
Greek	14, 88, 89	\gtreqlessslant (\gtrless)	63	Hamiltonian (\mathcal{H})	see alphabets, math
blackboard bold	117	\gtreqlessslant (\gtrless)	62	\HandCuffLeft (C)	128
bold	88, 220	\gtreqlessslant (\gtrless)	61	\HandCuffLeftUp (C)	128
coins	25	\gtreqlessslant (\gtrless)	65	\HandCuffRight (C)	128
letters	14, 88, 89, 117,	\gtreqlessslant (\gtrless)	64	\HandCuffRightUp (C)	128
144, 220		\gtreqqless (\gtrless)	65	\HandLeft (L)	128
numerals	144	\gtreqqless (\gtrless)	64	\HandLeftUp (L)	128
polytonic	14, 88, 89	\gtreqqless (\gtrless)	63	\HandPencilLeft (P)	128
upright	14, 89	\gtreqqless (\gtrless)	65	\HandRight (R)	128
greek (babel package option)	14, 88, 89, 144	\gtreqqless (\gtrless)	64	\HandRightUp (R)	128
Green Dot	see \Greenpoint and \PackingWaste	\gtreqslantless (\gtrless)	64	hands	see fists
\Greenpoint (O)	174	\gtreqslantless (\gtrless)	62	hands (package)	186, 226
greenpoint (package)	186, 226	\gtreqslantless (\gtrless)	61	\Handwash (W)	165
Gregorian music	149	\gtreqslantless (\gtrless)	61	\HaPa (-)	149
\gregorianCclef (C)	149	\gtreqslantless (\gtrless)	65	harmony (package)	149, 226
\gregorianFclef (F)	149	\gtreqslantless (\gtrless)	64	harpoon (package)	84, 226, 227
Gregorio, Enrico	100, 210, 211	\gtreqslantless (\gtrless)	63	harpoons	69, 71, 74, 78–80, 83–84, 202–203
Griffith's separation vector (α)	116	\gtreqslantless (\gtrless)	65	\hash (#)	113
\grimace (G)	165	\gtreqslantless (\gtrless)	62	\hash (#)	54
Grüne Punkt	see \Greenpoint and \PackingWaste	\gtreqslantless (\gtrless)	61	hash mark	see \#
\GS (G)	122	\gtreqslantless (\gtrless)	65	\hat (^)	101
\gsime (\gtrsim)	66	\gtreqslantless (\gtrless)	64	\hat (^)	100
\gsiml (\gtrapprox)	66	\gtreqslantless (\gtrless)	63	\hatapprox (\approx)	55
\Gt (\gg)	65	\gtreqslantless (\gtrless)	65	\hateq (\triangleq)	52
\Gt (\gg)	66	\gtreqslantless (\gtrless)	62	\hateq (\triangleq)	49
\gtcc (\triangleright)	64	\gtreqslantless (\gtrless)	61	\hausaB (B)	18
\gtcc (\triangleright)	66	\gtreqslantless (\gtrless)	65	\hausab (b)	18
\gtcir (\triangleright)	65	\gtreqslantless (\gtrless)	64	\hausaD (D)	18
\gtcir (\triangleright)	66	\gtreqslantless (\gtrless)	63	\hausad (d)	18
\gtlpar (\triangleright)	111	\gtreqslantless (\gtrless)	65	\hausaK (K)	18
\gtlpar (\triangleright)	112			\hausak (k)	18
\gtquest (\triangleright)	65			\HB (b)	139
\gtr (>)	64			\Hb (b)	139

H

\H (H)	19
h (esvect package option)	104

\HBar (—)	135	\HI (អ)	139	\hookh (ឃ)	18
\hbar (\hbar)	91, 210	\Hi (ឃ)	139	\hookheng (ឃ)	18
\hbar (\hbar)	92	\hiatus (៩)	172	\hookleftarrow (↔)	69
\hbar (\hbar)	92	\Hibl (ធម្ម)	139	\hookleftarrow (↔)	79
\hbar (\hbar)	92	\Hibp (ធម្ម)	139	\hookleftarrow (↔)	75
\hbipropto (\propto)	29	\Hibs (ធម្ម)	139	\hookleftarrow (↔)	72
\HC (៧)	139	\Hibw (ធម្ម)	139	\hookleftarrow (↔)	81
\Hc (ឈ)	139	\Hidalgo (ឈ)	120	\hooknearrow (↗)	75
\hcrossing (\times)	49	hieroglf (package)	139, 226	\hooknarrow (↖)	75
\HCthousand (៨)	139	hieroglyphics	139	\hookrevespsilon (៣)	18
\HD (៤)	139	Hilbert space (\mathcal{H})	see alphabets, math	\hookrightarrow (↔)	69
\Hd (៤)	139	\hill (៧)	22	\hookrightarrow (↔)	79
\hdotdot (..)	30, 108	\HJ (ឈ)	139	\hookrightarrow (↔)	75
\hdotdot (..)	29, 108	\Hj (ញ)	139	\hookrightarrow (↔)	72
\hdots (...)	108	\HK (៤)	139	\hookrightarrow (↔)	81
\hdots (...)	108	\Hk (៤)	139	\hooksearrow (↘)	75
\Hdual (៧)	139	\hknearrow (↗)	76	\hookswarrow (↗)	75
\HE (៧)	139	\hknearrow (↗)	81	\hookuparrow (↑)	75
\He (៤)	139	\hknarrow (↖)	76	\hookuparrow (↑)	75
heads	see faces	\hknarrow (↖)	81	\hookuparrow (↑)	75
\Heart (៩)	165	\hksearrow (↖)	81	\hookupminus (⊖)	31
heartctrbull (bullcntr package option)	168	\hksearrow (↖)	81	\hookupminus (⊖)	113
\heartctrbull	168	\hksqrt ($\sqrt{\square}$)	212	Horn, Berthold	117
hearts	120, 136, 137, 180–184	\hkswarow (↗)	81	\hoshi (៤)	171
\heartsuit (៩)	136	\hkswarow (↗)	76	\hourglass (៧)	31
\heartsuit (៩)	136	\hkswarrow (↗)	76	\hourglass (៧)	36
\heartsuit (៩)	136	\hL (៤)	139	\house (៤)	133
\heartsuit (៩)	136	\hL (៤)	139	\HP (៤)	139
\heartsuit (៩)	136	\HM (៤)	139	\Hp (៦)	139
\heartsuit (៩)	136	\Hm (៨)	139	\hpause (—)	148
\heavyqleft (“)	178	\Hman (អ)	139	\Hplural (៣)	139
\heavyqright (”)	178	\Hmillion (៨)	139	\Hplus (៤)	139
Hebrew	90, 91, 117	\Hms (៨)	139	\HQ (៧)	139
Helvetica (font)	24	\HN (៧)	139	\Hq (៧)	139
\hemibelion (៤)	25	\Hn (៧)	139	\Hquery (១)	139
\Herd (៨)	179	\HO (០)	139	\HR (៨)	139
\HERMAPHRODITE (៤)	124	\Ho (៨)	139	\Hr (៤)	139
\Hermaphrodite (៤)	124	\hole (h^*)	125	\hrectangle (៦)	133
\Hermaphrodite (៤)	124	\HollowBox (៦)	130	\hrectangleblack (■)	133
\hermitmatrix (+)	114	Holmes, Sherlock	200	\HS (—)	139
\hermitmatrix (+)	114	Holt, Alexander	1, 225	\Hs (៨)	139
\Heta (៧)	144	\holter (៧)	107		
\heta (៧)	144	holtpolt (package)	107, 226	\hs (៨)	148
\hexagon (៧)	133	\hom (hom)	87	\Hscribe (៧)	139
\hexagon (៧)	132	\Home (៧)	122	\Hslash (១)	139
\hexagonblack (៧)	133			\hslash (៩)	91
\Hexasteel (៧)	123	\Homer (៧)	172	\hslash (៩)	92
\hexstar (៧)	130	hook accent (៩)	see accents	\hslash (៩)	92
\HF (F)	118	\hookb (៩)	18	\hslash (៩)	92
\HF (៧)	139	\hookd (៩)	18	\Hsv (៧)	139
\Hf (៤)	139	\hookd (៩)	18	\HT (៧)	122
\hfermion (៤)	125	\hookdownarrow (៧)	75	\HT (៤)	139
\hfil	211	\hookdownarrow (៧)	75	\Ht (៤)	139
\HG (៩)	139	\hookdownminus (៩)	113	\Hten (៧)	139
\Hg (៧)	139	\hookdownminus (៩)	113	\Hthousand (៨)	139
\HH	149	\hookg (៩)	18	\Htongue (៧)	139
\HH (៩)	139			\HU (១)	139
\Hh (៧)	139			\Hu (៩)	139
hhcount (package)	167, 168, 226, 227			Hungarian umlaut (៩)	see accents
\Hhundred (៩)	139			\Hungary (៤)	178

\Hut (◊)	166	\iiint (fff)	38	\infty (∞)	113
\HV (¶)	139	\iiint (fff)	38	\infty (∞)	111
\Hv (¤)	139	\iiint (fff)	40	\inipartvoice (¤)	21
\hv (hv)	18	\iiint (fff)	40	\inipartvoiceless (¤)	21
\Hvbar (!)	139	\iiint (fff)	42	\injlim (injlim)	87
\HW (©)	139	\iiint (fff)	41	\Innocey (©)	179
\Hw (♪)	139	\iiint (fff)	43	\inplus (€)	47
\HX (¤)	139	\iiintsl (fff)	44	\inplus (€)	54
\Hx (♩)	139	\iiintup (fff)	44	inputenc (package)	224
\HXthousand (♩)	139	\iinfin (∞)	114	\Ins (Ins)	122
\HY (♪)	139	\iinfin (∞)	111	\int (ʃ)	39
\Hy (¶)	139	\iint (ff)	39	\int (ʃ)	38
\Hygiea (¥)	120	\iint (ff)	38	\int (ʃ)	38
hyphen, discretionary	223	\iint (ff)	40	\int (ʃ)	37
\hyphenbullet (•)	114	\iint (ff)	40	\int (ʃ)	42
\HZ (¤)	139	\iint (ff)	42	\int (ʃ)	41
\Hz (—)	139	\iint (ff)	41	\int (ʃ)	43
\hzigzag (∼)	114	\iint (ff)	43	\intBar (ʃ)	42
I					
\i	19	\iintsl (ff)	44	\intBar (ʃ)	43
\i (i)	19	\iintup (ff)	44	\intbar (ʃ)	42
\ialign	211, 213, 214	\Im (S)	91	\intbar (ʃ)	43
\IB (I)	121	\Im (S)	92	\intBarsl (ʃ)	45
\ibar (i)	18	\im (j)	92	\intbarsl (ʃ)	45
IBM PC	122, 173, 221	\imageof (↔)	85	\intBarup (ʃ)	45
\IC (I©)	120	\imageof (↔)	55	\intbarup (ʃ)	45
\Iceland (•)	178	\imath (i)	91, 100	\intcap (ʃ)	43
Icelandic staves	173	\imath (i)	92	\intcapsl (ʃ)	45
\IceMountain (△)	166	\imath (i)	92	\intcapup (ʃ)	45
\iddots (..)	109	\impliedby	see \Longleftarrow	\intclockwise (ʃ)	43
\iddots ()	213	\implies	see \Longrightarrow	\intclockwise (ʃ)	46
\idotsint (f...f)	38	impulse train	see sha	\intclockwise (ʃ)	43
\idotsint (f...f)	39	\in (€)	91	\intclockwisesl (ʃ)	44
\idotsint (f...f)	42, 43	\in (€)	91	\intclockwiseup (ʃ)	44
\idotsint (f...f)	41	\in (€)	51, 92	\intctr-clockwise (ʃ)	43
\iff	see \Longleftrightarrow	\in (€)	92	\intcup (ψ)	44
\ifsym (package)	118, 135, 166,	\in (€)	91	\intcups1 (ψ)	45
207, 209, 226		\in (€)	55	\intcupup (ψ)	45
\igo (package)	170, 226	inches	see \second and \textruedbl	\INTEGER (Z)	87
\igocircle (◎)	170	\incoh (≈)	58	\Integer (Z)	87
\igocircle (◎)	170	\increment (Δ)	114	integers (Z)	see alphabets, math
\igocross (⊗)	170	impulse train	see sha	integrals	36–46, 113, 212
\igocross (⊗)	170	\in (€)	91	product	46
\igonone (●)	170	\in (€)	91	integrals (wasysym package op- tion)	38
\igonone (○)	170	\in (€)	51, 92	\intercal (⊤)	28
\igosquare (□)	170	\in (€)	92	\intercal (⊤)	31, 92
\igosquare (□)	170	\in (€)	91	\intercal (⊤)	30
\igotriangle (▲)	170	\in (€)	55	\intercal (⊤)	91
\igotriangle (△)	170	independence	see \bot	\intercal (⊤)	32, 92
\iiiiint (ffff)	38	probabilistic	212	interior	see \mathring
\iiiiint (ffff)	39	statistical	212	\interleave ()	28
\iiiiint (ffff)	40	stochastic	see \bot	\interleave ()	32
\iiiiint (ffff)	42	\independent (⊥)	212	intersection	see \cap
\iiiiint (ffff)	41	\Industry (¤)	165	\Interval (⌚)	166
\iiiiint (ffff)	43	inequalities	13, 61–66	\intlarhk (ʃ)	44
\iiiiintsl (ffff)	45	inexact differential	see \dbar	\intlarhksl (ʃ)	45
\iiiiintup (ffff)	45	\inf (inf)	87	\intlarhkup (ʃ)	45
\iiiiint (fff)	39	infimum	see \inf and \sqcap	\intprod (¬)	30, 31, 113
		infinity	111–113, 115, 212	\intprod (¬)	32
		\Info (✉)	165	\intprodr (¬)	30, 31, 113
		\Info (✉)	175		
		information symbols	165		
		informator symbols	169		
		\infty (∞)	113		
		\infty (∞)	112		
		\infty (∞)	113		

\intprod{r} (⊣)	32	\IroningII (⤠)	165
\intsl (ʃ)	44	\IroningIII (⤡)	165
\intup (ʃ)	43	irony mark (՞)	209
\intup (ʃ)	44	irrational numbers (Ȉ)	<i>see</i> alphabets, math
\intx (ֆ)	44	\Irritant (✗)	166
\intxsl (ֆ)	45	\isindot (߹)	55
\intxup (ֆ)	45	\isinE (ܵ)	55
\inva (܃)	18	\isinobar (ܴ)	55
\invamp (܂)	29	\isins (܄)	55
\invamp (܂)	33	\isinvb (܆)	55
\invbackneg (⊣)	113	\ismodeledby (=)	210
\INVd (܊)	123	ISO character entities	223
\invdiameter (܂)	164	\isoent (package)	223
\inve (܃)	18	Isthmian script	144–146
inverse limit	<i>see</i> \varprojlim	italic	13, 14, 25, 216, 218, 220,
\inversebullet (܂)	114	223	
\inversewhitecircle (܂)	133	\Italy (܂)	178
\InversTransformHoriz (•◦)	58		
\InversTransformVert (܂)	58		
inverted symbols	16–18, 23, 209		
inverters	123		
\invf (܃)	18		
\invglotstop (܃)	18		
\invh (܃)	18		
\INVL (܊)	123		
\invlazys (܂)	32		
\invlegr (܃)	18		
\invm (܂)	18		
\invneg (⊣)	47		
\invneg (⊣)	113		
\invneg (⊣)	113		
\invnot (⊣)	114		
\invnot (⊣)	113		
\invnot (⊣)	114		
\INVr (܊)	123		
\invr (܃)	18		
\invscr (܂)	18		
\invscripta (܂)	18		
\invsmileface (܂)	178		
\INVu (܊)	123		
\invv (܃)	18		
\invw (܃)	18		
\invwhitelowerhalfcircle (܂)	133		
\invwhiteupperhalfcircle (܂)	133		
\invy (܃)	18		
\IO (܂)	121		
\ion (܂)	125		
\Iota (܃)	88		
\iota (܃)	88		
iota, upside-down	209		
\iotaup (܃)	89		
\ipagamma (܂)	18		
\ipercatal (+)	172		
\Ireland (܂)	178		
\IroningI (⤠)	165	knot (package)	194, 197, 226
		knots	194–197
		Knuth, Donald E.	11, 221, 228
		symbols by	164
		\Kochtopf (܂)	179
		\Koppa (܃)	144
		\koppa (܃)	144
		\Kr (܂)	149
		\kreuz (✖)	164
		Kronecker product	<i>see</i> \otimes
		Kronecker sum	<i>see</i> \oplus
		\Kronos (܂)	120
		kroužek (܂)	<i>see</i> accents
		\kside (»)	169
		L	
		\L (܂)	14
		\l (܃)	14
		\labdentalnas (܃)	18
		\labvel	22
		\Ladiesroom (܂)	165
		Lagrangian (܂)	<i>see</i> alphabets, math
		\Lambda (܂)	88
		\lambda (܂)	88
		\lambdabdbar (܂)	112
		\lambdabdbabar (܂)	114
		\lambdabdash (܂)	112
		\lambdabdaslash (܂)	114
		\lambdaambdaup (܂)	89
		Lamport, Leslie	225, 228
		\land	<i>see</i> \wedge
		\land (܂)	31
		\land (܂)	32
		land masses	176
		\landdownint (܂)	40
		\landdownint (܂)	42, 43
		\landdownint (܂)	41
		\landupint (܂)	40
		\landupint (܂)	42, 43
		\landupint (܂)	41
		\Lang (܂)	117
		\lAngle (܂)	99
		\lAngle (܂)	96
		\lAngle (܂)	97
		\langle (܂)	27, 94
		\langle (܂)	96
		\langle (܂)	96
		\langle (܂)	98
		\langlebar (܂)	96
		\langledot (܂)	96
		\langledot (܂)	93
		\laplac (܂)	114

\Laplace ($\bullet\!\!\!-\!\!\!\circ$)	58
\laplace ($\circ\!\!\!-\!\!\!\bullet$)	58
Laplace transform (\mathcal{L})	see alphabets, math
Laplacian (Δ)	see \Delta
Laplacian (∇^2)	see \nabla
\largeblackcircle (\bullet)	133
\largeblacksquare (\blacksquare)	133
\largeblackstar (\star)	133
\largecircle (\bigcirc)	133
\largecircle (\bigodot)	132
\largecircle (\bigtriangleup)	132
\largectrbull (bullcnt package option)	168
\largectrbull	168
\argediamond (\diamond)	132
\largeiamond (\lozenge)	132
\largepencil ()	128
\largepentagram (\star)	132
\LargerOrEqual (\geq)	110
\largesquare (\square)	133
\largesquare (\bigsquare)	132
\largestar (\star)	132
\largestarofdavid (\bigstar)	132
\largetriangledown (\bigtriangledown)	68, 133
\largetriangledown (\bigtriangledown)	67
\largetriangleleft (\triangleleft)	67
\largeangleright (\triangleright)	67
\largeangleup (\triangleup)	68, 133
\largeangleup (\triangleup)	67
\largewhitestar (\star)	133
\LArrow ()	122
\arrowfill	106
\Laserbeam (\ast)	124
\lat (>)	65
\late (\geq)	65
\LaTeX	1, 11, 19, 46, 87, 94, 107, 112, 126, 168, 186, 205, 206, 209–215, 219, 221, 223– 225, 227, 228
\LaTeX 2 ε	1, 11, 13, 14, 25, 28, 46, 58, 69, 101, 107, 112, 117, 136, 147, 186, 205– 207, 209, 210, 212, 213, 218, 220–223, 228
\latexsym (package)	28, 46, 58, 69, 112, 206, 226
\latfric (\mathfrak{l})	18
Latin 1	11, 221–223, 225
\Latvia ($\text{\textcircled{L}}$)	176
\Laughey ($\text{\textcircled{D}}$)	179
laundry symbols	165
\LB ($\{$)	121
\Lbag (\langle)	93
\lbag (\langle)	93
\lbag (\langle)	31
\lbag (\langle)	93
\lblackbowtie (\bowtie)	31
\lblkbrbrak (\langle)	93
\lBrace ($\left\{$)	97
\lbrace ($\left\{$)	96
\lbrace ($\left\{$)	97
\lbrace ($\left\{$)	95
\lbrace ($\left\{$)	97
\Lbrack ($\left[\right]$)	117
\lBrack ($\left[\right]$)	99
\lBrack ($\left[\right]$)	96
\lBrack ($\left[\right]$)	97
\lBrack ($\left[\right]$)	97
\lBrack ($\left[\right]$)	97
\lBrack ($\left[\right]$)	97
\lBrack ($\left[\right]$)	97
\lBrack ($\left[\right]$)	97
\lBrack ($\left[\right]$)	97
\lceil	118
\lceil	99
\lceil	94
\lceil	97
\lceil	95
\lceil	98
\lceil	71
\lceil	71
\lceil	71
\lceil	71
\lceil	42, 43
\lceil	41
\lceil	42, 43
\lceil	41
\lcm (lcm)	219
\lcorners (\langle)	93
\lcurvearrowdown (\curvearrowleft)	71
\lcurvearrowleft (\curvearrowleft)	71
\lcurvearrowright (\curvearrowright)	71
\lcurvearrowup (\curvearrowup)	71
\lcircleleftint (\oint)	42, 43
\lcircleleftint (\oint)	41
\lcirclerightint (\oint)	42, 43
\lcirclerightint (\oint)	41
\lcurvearrowse (\curvearrowse)	71
\lcurvearrowsw (\curvearrowsw)	71
\lcurvearrowup (\curvearrowup)	71
\lcurvyangle (\langle)	93
\LD (Δ)	121
\ldbrack ($\left[\right]$)	95
\ldotp (.)	107
\ldotp (.)	109
\ldots (.)	107
\Ldsh (\leftrightarrow)	75
\Ldsh (\downarrow)	81
\LE (\leq)	121
\le	see \leq
\le (\leq)	65
\le (\leq)	66
\leadsto (\rightsquigarrow)	47, 69
\leadsto (\rightsquigarrow)	76
\leadsto (\rightsquigarrow)	72
\leadsto (\rightsquigarrow)	82
leaf	see \textleaf
\leafleft (\leftarrow)	132
\leafNE (\nearrow)	132
\leafright (\rightarrow)	132
leaves	132, 137, 191
Lefschetz motive (\mathcal{L})	see alphabets, math
\Left	172
\left	94, 98, 99, 206, 208
\LEFTarrow (\blacktriangleleft)	164
\Leftarrow (\Leftarrow)	27, 69
\Leftarrow (\Leftarrow)	76
\Leftarrow (\Leftarrow)	71
\Leftarrow (\Leftarrow)	82
\leftarrow (\leftarrow)	70
\leftarrow (\leftarrow)	69
\leftarrow (\leftarrow)	75
\leftarrow (\leftarrow)	72
\leftarrow (\leftarrow)	82
\leftarrowaccent ($\overline{\leftarrow}$)	101
\leftarrowapprox (\approx)	82
\leftarrowbackapprox (\approx)	82
\leftarrowbsimilar (\approx)	82
\leftarrowless (\ll)	65
\leftarrowonoplus (\oplus)	82
\leftarrowplus (\leftrightarrow)	82
\leftarrowshortrightarrowarrow (\leftrightarrow)	82
\leftarrowsimilar (\approx)	82
\leftarrowsubset (\Subset)	61
\leftarrowtail (\leftarrow)	69
\leftarrowtail (\leftarrow)	79
\leftarrowtail (\leftarrow)	75
\leftarrowtail (\leftarrow)	72
\leftarrowtail (\leftarrow)	82
\leftarrowTriangle (\leftarrow)	79
\leftarrowtriangle (\leftarrow)	70
\leftarrowtriangle (\leftarrow)	80
\leftarrowtriangle (\leftarrow)	82
\leftarroww (\rightsquigarrow)	82
\leftAssert (\parallel)	52
\leftassert (\vdash)	51
\leftbarharpoon (\Leftarrow)	71
\leftbkarrow (\leftarrow)	75
\leftbkarrow (\leftarrow)	82
\leftblackarrow (\leftarrow)	80
\leftblackspoon (\leftarrow)	85
\LEFTCIRCLE (\bullet)	132
\LEFTcircle (\bullet)	132
\Leftcircle (\langle)	132
\leftcurvedarrow (\leftarrow)	76
\leftcurvedarrow (\leftarrow)	82
\leftdasharrow (\leftarrow)	80

\leftdasharrow (↔)	82	\leftrightarrow (↔)	70	\leftrightsquigarrow (↭)	76
\leftdbkarrow (↔)	82	\leftrightarrow (↔)	69	\leftrightsquigarrow (↭)	72
\leftdbltail (→)	55	\leftrightarrow (↔)	75	\leftrightsquigarrow (↭)	82
\leftdotarrow (↔)	82	\leftrightarrow (↔)	72	\leftrightwavearrow (↔)	75
\leftdowncurvedarrow (↙)	76	\leftrightarrow (↔)	82	\leftrsquigarrow (↭)	76
\leftdowncurvedarrow (↙)	82	\leftrightarrowaccent (▀)	..	\leftrsquigarrow (↖)	72
\leftevaw (⌚)	98		101	\LeftScissors (✂)	127
\leftfilledspoon (←)	84	\leftrightarrowcircle (↔)	..	\leftslice (▷)	28
\leftfishtail (↶)	55		82	\leftslice (▷)	31
\leftfootline (↤)	52	\leftrightarroweq (≣)	..	\leftslice (▷)	49
\leftfootline (↤)	49	\leftrightarroweq (≣)	..	\leftspoon (↼)	85
\leftfree (←)	49	\leftrightarrows (⤠)	..	\leftspoon (↼)	84
\lefthalfcap (⊐)	29	\leftrightarrows (⤠)	..	\leftsquigarrow (↭)	70
\lefthalfcup (⊓)	30	\leftrightarrows (⤠)	..	\leftsquigarrow (↭)	70
\lefthand (⌚)	129	\leftrightarrows (⤠)	..	\leftsquigarrow (↭)	80
\leftharpoonaccent (▀)	101	\leftrightarrows (⤠)	..	\leftsquigarrow (↭)	80
\leftharpoonccw (⤠)	74	\leftrightarrowTriangle (↔)	..	\leftsquigarrow (↭)	76
\leftharpooncw (⤠)	74		80	\leftsquigarrow (↭)	82
\leftharpoondown (⤠)	71	\leftrightarrowtriangle (↔)	..	\lefttail (⤠)	23
\leftharpoondown (⤠)	69		70	\lefttherefore (∴)	55
\leftharpoondown (⤠)	80	\leftrightarrowtriangle (↔)	..	\lefttherefore (∴)	108
\leftharpoondown (⤠)	78		80	\leftthreearrows (☰)	82
\leftharpoondown (⤠)	83	\leftrightarrowtriangle (↔)	..	\leftthreetimes (⤠)	113
\leftharpoondownbar (⤠)	83		82	\leftthreetimes (⤠)	28
\leftharpoonsupdown (≣)	83	\leftrightblackarrow (↔)	80	\leftthreetimes (⤠)	31
\leftharpoonup (⤠)	71	\leftrightblackspoon (↔)	85	\lefthreethrees (⤠)	30
\leftharpoonup (⤠)	69	\leftrightcurvearrow (⤠)	76	\lefthreethrees (⤠)	30
\leftharpoonup (⤠)	80	\leftrightharpoon (⤠)	..	\lefthreethrees (⤠)	32
\leftharpoonup (⤠)	78	\leftrightharpoondowndown (⤠)	..	\lefthumbsdown (👎)	128
\leftharpoonup (⤠)	83		83	\lefthumbsup (👍)	128
\leftharpoonupbar (⤠)	83	\leftrightharpoondownup (⤠)	..	\lefttorightarrow (↗)	70
\leftharpoonupdash (≣)	83		78	\lefttorightarrow (↗)	80
\leftlcurvearrow (⤠)	76	\leftrightharpoondownup (⤠)	..	\Lefttorque (⌚)	123
\leftleftarrows (≣)	70		74	\leftturn (⌚)	164
\leftleftarrows (≣)	69	\leftrightharpoondownup (⤠)	..	\leftupcurvedarrow (⤠)	76
\leftleftarrows (≣)	80		83	\leftVDash (≡)	52
\leftleftarrows (≣)	75	\leftrightharpoons (≣)	71	\leftVdash (¬≡)	52
\leftleftarrows (≣)	72	\leftrightharpoons (≣)	69	\leftVdash (¬≡)	49
\leftleftarrows (≣)	82	\leftrightharpoons (≣)	80	\leftvDash (≡)	52
\leftleftharpoons (≣)	71	\leftrightharpoons (≣)	78	\leftvDash (¬≡)	52
\leftlsquigarrow (↭)	76	\leftrightharpoons (≣)	74	\leftwave (⌚)	98
\leftlsquigarrow (↭)	72	\leftrightharpoons (≣)	83	\leftwavearrow (↭)	75
\Leftmapsto (≣)	75	\leftrightharpoonsdown (≣)	..	\leftwavearrow (↭)	82
\leftmapsto (↔)	75		83	\leftwhitearrow (⤠)	80
\leftmapsto (↔)	72	\leftrightharpoonsfill (⤠)	106	\leftwhitearrow (⤠)	82
\leftModels (≡)	49	\leftrightharpoonsup (≣)	83	\leftwhiteroundarrow (⤠)	80
\leftmodels (≡)	52	\leftrightharpoonupdown (⤠)	..	\leftY (⤠)	30
\leftmodels (≡)	49		78	\leftY (⤠)	30
\leftmoon (⌚)	120	\leftrightharpoonupdown (⤠)	..	\leftzigzagarrow (↭)	80
\leftmoon (⌚)	120		74	legal symbols	13, 14, 25, 26,
\leftmoon (⌚)	119	\leftrightharpoonupdown (⤠)	..	222	
\leftouterjoin (⋈)	114		83	\legm (Ϣ)	18
\leftp (⏜)	23	\leftrightharpoonupup (⤠)	..	\legr (Ր)	18
\leftpitchfork (←)	86		83	\length (!:)	23
\leftpitchfork (←)	84	\Leftrightline (≣)	..	\Leo (Ղ)	119
\leftpointright (👉)	128	\Leftrightline (⤠)	..	\Leo (Ջ)	120
\leftproto (♾)	49	\leftrightspoon (↼)	..	\leo (Ջ)	119
\leftrcurvearrow (⤠)	76	\leftrightsquigarrow (↭)	..	\leq (≤)	62
\Leftrightarrow (↔)	69		70	\leq (≤)	61, 62
\Leftrightarrow (↔)	75	\leftrightsquigarrow (↭)	..	\leq (≤)	64
\Leftrightarrow (↔)	72		69	\leq (≤)	63
\Leftrightarrow (↔)	82	\leftrightsquigarrow (⤠)	80		

\leq (\leq)	65, 66	\lessgtr (\lessgtr)	61	\LHD (\blacktriangleleft)	29
\leqclosed (\trianglelefteq)	64, 68	\lessgtr (\lessgtr)	65	\lhd (\triangleleft)	28, 29
\leqclosed (\triangleleft)	63, 67	\lessgtr (\lessgtr)	64	\lhd (\triangleleft)	64
\leqdot (\trianglelefteq)	64	\lessgtr (\lessgtr)	63	\lhd (\triangleleft)	63, 67
\leqdot (\trianglelefteq)	63	\lessgtr (\lessgtr)	66	\lhd (\triangleleft)	32, 134
\leqq (\trianglelefteq)	62	\lessneqqgtr (\lessneqqgtr)	63	\lhd bend ($\triangleleft\!\!\!\triangleleft$)	164
\leqq (\trianglelefteq)	61	\LessOrEqual (\trianglelefteq)	110	\lhook (\triangleleft)	87
\leqq (\trianglelefteq)	65	\lessssim (\lessssim)	62	\lhookdownarrow ($\triangleleft\!\!\!\downarrow$)	76
\leqq (\trianglelefteq)	64	\lessssim (\lessssim)	61	\lhookdownarrow ($\triangleleft\!\!\!\downarrow$)	72
\leqq (\trianglelefteq)	63	\lessssim (\lessssim)	65	\lhookleftarrow ($\triangleleft\!\!\!\leftarrow$)	76
\leqq (\trianglelefteq)	65	\lessssim (\lessssim)	64	\lhookleftarrow ($\triangleleft\!\!\!\leftarrow$)	72
\leqqslant (\lessapprox)	65	\lessssim (\lessssim)	63	\lhooknearrow ($\triangleleft\!\!\!\nearrow$)	76
\leqslant (\lessapprox)	61	\lessssim (\lessssim)	66	\lhooknearrow ($\triangleleft\!\!\!\nearrow$)	72
\leqslant (\lessapprox)	65	\Letter (\boxtimes)	123	\lhooknwarrow ($\triangleleft\!\!\!\nwarrow$)	76
\leqslant (\lessapprox)	64	\Letter (\boxtimes)	166	\lhooknwarrow ($\triangleleft\!\!\!\nwarrow$)	72
\leqslant (\lessapprox)	63	\Letter (\boxtimes vs. \boxtimes)	207	\lhookrightarrow ($\triangleleft\!\!\!\rightarrow$)	76
\leqslant (\lessapprox)	65	letter-like symbols	91–93, 181–184	\lhookrightarrow ($\triangleleft\!\!\!\rightarrow$)	72
\leqslantdot (\lessapprox)	64	letters <i>see</i> alphabets, 210, 211		\lhooksearrow ($\triangleleft\!\!\!\searrow$)	76
\leqslantdot (\lessapprox)	64	barred	210	\lhooksearrow ($\triangleleft\!\!\!\swarrow$)	72
\lescc (\trianglelefteq)	65	non-ASCII	14	\lhookswarrow ($\triangleleft\!\!\!\swarrow$)	76
\lescc (\trianglelefteq)	65	slashed	211	\lhookuparrow ($\triangleleft\!\!\!\uparrow$)	76
\lesdot (\lessapprox)	64	variant Greek	90	\lhookuparrow ($\triangleleft\!\!\!\uparrow$)	72
\lesdot (\lessapprox)	65	variant Latin	90	\Libra (Ω)	119
\lesdoto (\lessapprox)	66			\Libra (Δ)	120
\lesdotor (\lessapprox)	66			\libra (\vartriangle)	119
\lesg (\lessapprox)	64			Lie derivative (\mathcal{L})	<i>see</i> alphabets, math
\lesges (\lessapprox)	66			\Liechtenstein ()	176
\less ($<$)	64			life-insurance symbols	105, 214
\less ($<$)	63			\lightbulb (\varnothing)	218
less-than signs <i>see</i> inequalities				\lightbulb.mf (file)	216, 217
\lessapprox (\lessapprox)	62			\lightbulb.sty (file)	218
\lessapprox (\lessapprox)	61			\lightbulb10.2602gf (file)	216
\lessapprox (\lessapprox)	65			\lightbulb10.dvi (file)	216
\lessapprox (\lessapprox)	64			\lightbulb10.mf (file)	216–218
\lessapprox (\lessapprox)	65			\lightbulb10.tfm (file)	218
\lessapprox (\lessapprox)	66			\Lightning (\mathcal{F})	123
\lesscc (\triangleleft)	64			\Lightning (\mathcal{M})	166
\lessclosed (\triangleleft)	64, 68			\Lightning (\mathcal{F} vs. \mathcal{M})	207
\lessclosed (\triangleleft)	63, 67			\lightning (\mathcal{F})	70
\lessdot (\lessapprox)	62			\lightning (\mathcal{F} vs. \mathcal{G})	207
\lessdot (\lessapprox)	61			\lightning (\mathcal{F})	75
\lessdot (\lessapprox)	31			\lightning (\mathcal{G})	72
\lessdot (\lessapprox)	64			\lightning (\mathcal{G})	164
\lessdot (\lessapprox)	64			\Lilith (\mathcal{O})	120
\lessdot (\lessapprox)	63			\lilyAccent (\Rightarrow)	152
\lessdot (\lessapprox)	66			\lilyDynamics{f} (\mathbf{f})	152
\lessdot (\lessapprox)	66			\lilyDynamics{m} (\mathbf{m})	152
\lesseqgtr (\lessapprox)	62			\lilyDynamics{p} (\mathbf{p})	152
\lesseqgtr (\lessapprox)	61			\lilyDynamics{r} (\mathbf{r})	152
\lesseqgtr (\lessapprox)	65			\lilyDynamics{s} (\mathbf{s})	152
\lesseqgtr (\lessapprox)	64			\lilyDynamics{z} (\mathbf{z})	152
\lesseqgtr (\lessapprox)	63			\lilyEspressivo ($\Leftarrow\Rightarrow$)	152
\lesseqgtr (\lessapprox)	66			\lilyGlyph{...} (\mathbf{x})	162
\lesseqgtrslant (\lessapprox)	64			\lilyGlyph{...} (\downarrow)	162
\lesseqgtrslant (\lessapprox)	63			\lilyGlyph{...} (\downarrow)	162
\lesseqgtrslant (\lessapprox)	63			\lilyGlyph{...} (\downarrow)	162
\lesseqgtrslant (\lessapprox)	62			\lilyGlyph{...} (\downarrow)	162
\lesseqgtrslant (\lessapprox)	61			\lilyGlyph{...} (\downarrow)	162
\lesseqgtrslant (\lessapprox)	65			\lilyGlyph{...} (\downarrow)	162
\lesseqgtrslant (\lessapprox)	64			\lilyGlyph{...} (\downarrow)	162
\lesseqgtrslant (\lessapprox)	63			\lilyGlyph{...} (\downarrow)	162
\lesseqgtrslant (\lessapprox)	66			\lilyGlyph{...} (\downarrow)	162
\lesseqslantgtr (\lessapprox)	64			\lilyGlyph{...} (\downarrow)	162
\lessgtr (\lessapprox)	62			\lilyGlyph{...} (\downarrow)	162

\lilyGlyph{...} (%)	153	\lilyGlyph{...} (0)	163
\lilyGlyph{...} (>)	153	\lilyGlyph{...} (z)	163
\lilyGlyph{...} (δ)	153	<i>lilylyphbs</i> (package)	147, 150–157, 161–163
\lilyGlyph{...} (.)	153	\lilyglyphs (package)	226
\lilyGlyph{...} (+)	153	\lilyPrintMoreDots	151
\lilyGlyph{...} (-)	153	\lilyRF (<i>rf</i>)	152
\lilyGlyph{...} (ø)	153	\lilyRFZ (<i>rfz</i>)	152
\lilyGlyph{...} (✓)	153	\lilyStaccato (.)	152
\lilyGlyph{...} (♦)	153	\lilyText	163
\lilyGlyph{...} (↝)	153	\lilyThumb (ø)	152
\lilyGlyph{...} (↯)	153	\lilyTimeC (C)	151
\lilyGlyph{...} (∞)	153	\lilyTimeCHalf (⌚)	151
\lilyGlyph{...} (.)	153	\lilyTimeSignature	151
\lilyGlyph{...} (⌚)	153	\lim (lim)	87, 219
\lilyGlyph{...} (▣)	153	\liminf (lim inf)	87, 219
\lilyGlyph{...} (♪)	153	limits	87
\lilyGlyph{...} (▽)	153	\limsup (lim sup)	87, 219
\lilyGlyph{...} (▽)	153	\linbfamily	142, 143
\lilyGlyph{...} (ℳ)	153	Linear A	139
\lilyGlyph{...} (〽)	153	Linear B	142, 143
\lilyGlyph{...} (.)	153	linear implication	<i>see</i> \multimap
\lilyGlyph{...} (Δ)	153	linear logic symbols	27–29, 33, 34, 37, 41–43, 46, 58, 91, 92
\lilyGlyph{...} (₪)	154	linearA (package)	139, 226
\lilyGlyph{...} (₪)	154	\LinearAC (ꝝ)	139
\lilyGlyph{...} (₪)	154	\LinearACC (ꝝ)	139
\lilyGlyph{...} (₪)	154	\LinearACCC (ꝝ)	139
\lilyGlyph{...} (₪)	154	\LinearACCI (ꝝ)	139
\lilyGlyph{...} (₪)	154	\LinearACCCII (ꝝ)	139
\lilyGlyph{...} (₪)	154	\LinearACCCIII (ꝝ)	139
\lilyGlyph{...} (₪)	154	\LinearACCCIV (ꝝ)	139
\lilyGlyph{...} (₪)	154	\LinearACCCIX (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXL (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXLII (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXLIII (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXLIV (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXLV (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXLVI (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXLVII (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXLVIII (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXLIX (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCX (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXI (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXII (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXIII (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXIV (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXV (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXVI (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXVII (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXVIII (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXX (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXI (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXII (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXIII (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXIV (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXIX (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXX (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXXI (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXXII (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXXIII (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXXIV (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXXIX (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXXIX (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXXV (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXXVI (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXXVII (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXXVIII (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCCXXXIX (ꝝ)	140
\lilyGlyph{...} (₪)	154	\LinearACCL (ꝝ)	140

\LinearACXXXV (⌚)	140	\LinearAXCVI (⌚)	141	\llangle (⟨)	95
\LinearACXXXVI (⌚)	140	\LinearAXCVII (⌚)	141	\llangle (⌚)	93
\LinearACXXXVII (⌚)	140	\LinearAXCVIII (⌚)	141	\llap (⌚)	23, 24, 213
\LinearACXXXVIII (⌚)	140	\LinearAXI (⊕)	139	\llarc (⌚)	114
\LinearAI (⌚)	139	\LinearAXII (⌚)	139	\llblacktriangle (⌚)	134
\LinearAII (⌚)	139	\LinearAXIII (⌚)	139	\llbracket (⌚)	94
\LinearAIII (⌚)	139	\LinearAXIV (⌚)	140	\llbracket (⌚)	99
\LinearAIV (⌚)	139	\LinearAXIX (⌚)	140		
\LinearAIX (⌚)	139	\LinearAXL (⌚)	140		
\LinearAL (⌚)	140	\LinearAXLI (⌚)	140	\llceil (⌚)	93
\LinearALI (⌚)	140	\LinearAXLII (⌚)	140	\llcorner (⌚)	93
\LinearALII (⌚)	140	\LinearAXLIII (⌚)	140	\llcorner (⌚)	93
\LinearALIII (⌚)	140	\LinearAXLIV (⌚)	140	\llcorner (⌚)	93
\LinearALIV (⌚)	140	\LinearAXLIX (⌚)	140	\llcorner (⌚)	97
\LinearALIX (⌚)	140	\LinearAXLV (⌚)	140		
\LinearALV (⌚)	140	\LinearAXLVI (⌚)	140		
\LinearALVI (⌚)	140	\LinearAXLVII (⌚)	140		
\LinearALVII (⌚)	140	\LinearAXLVIII (⌚)	140		
\LinearALVIII (⌚)	140	\LinearAXV (⌚)	140		
\LinearALX (⌚)	140	\LinearAXVI (⌚)	140		
\LinearALXI (⌚)	140	\LinearAXVII (⌚)	140		
\LinearALXII (⌚)	140	\LinearAXVIII (⌚)	140		
\LinearALXIII (⌚)	140	\LinearAXX (⌚)	140		
\LinearALXIV (⌚)	140	\LinearAXXI (⌚)	140		
\LinearALXIX (⌚)	141	\LinearAXXII (⌚)	140		
\LinearALXV (⌚)	140	\LinearAXXIII (⌚)	140		
\LinearALXVI (⌚)	140	\LinearAXXIV (⌚)	140		
\LinearALXVII (⌚)	141	\LinearAXXIX (⌚)	140		
\LinearALXVIII (⌚)	141	\LinearAXXV (⌚)	140		
\LinearALXX (⌚)	141	\LinearAXXVI (⌚)	140		
\LinearALXXI (⌚)	141	\LinearAXXVII (⌚)	140		
\LinearALXXII (⌚)	141	\LinearAXXVIII (⌚)	140		
\LinearALXXIII (⌚)	141	\LinearAXXX (⌚)	140		
\LinearALXXIV (⌚)	141	\LinearAXXI (⌚)	140		
\LinearALXXIX (⌚)	141	\LinearAXXII (⌚)	140		
\LinearALXXV (⌚)	141	\LinearAXXIII (⌚)	140		
\LinearALXXVI (⌚)	141	\LinearAXXIV (⌚)	140		
\LinearALXXVII (⌚)	141	\LinearAXXIX (⌚)	140		
\LinearALXXVIII (⌚)	141	\LinearAXXIII (⌚)	140		
\LinearALXXX (⌚)	141	\LinearAXXIV (⌚)	140		
\LinearALXXXI (⌚)	141	\LinearAXXV (⌚)	140		
\LinearALXXXII (⌚)	141	\LinearAXXVI (⌚)	140		
\LinearALXXXIII (⌚)	141	\LinearAXXVII (⌚)	140		
\LinearALXXXIV (⌚)	141	\LinearAXXVIII (⌚)	140		
\LinearALXXXIX (⌚)	141	linearb (package)	142, 143, 226,		
\LinearALXXXV (⌚)	141	227			
\LinearALXXXV (⌚)	141	\linefeed (⌚)	80	\lmoustache (⌚)	97
\LinearALXXXVI (⌚)	141	\linefeed (⌚)	82	\lmoustache (⌚)	95
\LinearALXXXVII (⌚)	141	\Lineload (⌚)	123	\lmoustache (⌚)	98
\LinearALXXXVIII (⌚)	141	linguistic symbols	16–19		
		\Lisa (⌚)	172	\ln (ln)	87
		\Lithuania (⌚)	176	\lnapprox (⌚)	62
		liturgical music	149	\lnapprox (⌚)	61
		\lJoin (⌚)	48	\lnapprox (⌚)	65
		\lJoin (⌚)	31	\lnapprox (⌚)	64
		\LK (⌚)	121	\lnapprox (⌚)	63
		\ll (⌚)	62	\lnapprox (⌚)	66
		\ll (⌚)	61	\lneq (⌚)	62
		\ll (⌚)	64	\lneq (⌚)	61
		\ll (⌚)	63	\lneq (⌚)	65
		\ll (⌚)	66	\lneq (⌚)	64
				\lneq (⌚)	66



\lneqq ($\not\leq$)	62	\longmapsfrom (\longleftrightarrow)	70	\lParen (())	98
\lneqq ($\not\geq$)	61	\longmapsfrom (\longleftrightarrow)	52, 75	\lparen (())	97
\lneqq ($\not\approx$)	65	\longmapsfrom (\longleftrightarrow)	82	\lparen (())	97
\lneqq ($\not\equiv$)	64	\Longmapsto (\Longrightarrow)	70	\lparengtr (())	93
\lneqq ($\not\equiv$)	63	\Longmapsto (\Longrightarrow)	75	\lparenless ((<))	93
\lneqq ($\not\approx$)	66	\Longmapsto (\Longrightarrow)	81	\lrarc ((,))	114
\lnot see \neg		\longmapsto (\longrightarrow)	71	\lrblacktriangle ((▲))	134
\lnot (\neg)	113	\longmapsto (\longrightarrow)	69	\lrcorner ((,))	93
\lnot (\neg)	113	\longmapsto (\longrightarrow)	75	\lrcorner ((,))	93
\lnot (\neg)	114	\longmapsto (\longrightarrow)	81	\lrcorner ((,))	96
\lnsim (\approx)	62	\LongPulseHigh ((⊞))	118	\lrcorner ((,))	95
\lnsim (\approx)	61	\LongPulseLow ((⊞))	118	\lrcorner ((,))	93
\lnsim (\approx)	65	\Longrightarrow ((==>))	69	\lrcorner ((,))	93
\lnsim (\approx)	64	\Longrightarrow ((==>))	71	\lrcorner ((,))	93
\lnsim (\approx)	63	\Longrightarrow ((==>))	75	\lrcorner ((,))	93
\lnsim (\approx)	65	\Longrightarrow ((==>))	81	\lrcorner ((,))	95
\L0 (\circ)	121	\longrightarrow ((==>))	71	\lrcorner ((,))	93
local ring (\mathcal{O}) see alphabets, math		\longrightarrow ((==>))	69	\lJoin see \Join	
\log (log)	87, 219	\longrightarrow ((==>))	75	\lrtimes ((×))	48
log-like symbols	87, 219	\longrightarrow ((==>))	81	\lrtimes ((×))	31
logic (package)	123	\longrightsquigarrow ((~~~))	52	\ltriangle ((△))	134
logic gates	123	\longrightsquigarrow ((~~~))	76	\ltriangleeq ((≡))	68
logical operators		\longrightsquigarrow ((~~~))	81	\lsem (())	97
and see \wedge		\longrightwavearrow ((~~~))	75	\lsem (())	95
not see \neg and \sim		\looparrowdownleft ((←))	70	\lsemantic see \ldbbrack	
or see \vee		\looparrowdownleft ((←))	80	\lsf (())	148
\logof (\oplus)	47	\looparrowdownright ((→))	70	\lsfz (())	148
lollipop see \multimap		\looparrowdownright ((→))	80	\Lsh ((↑))	70
long s (f)	209	\looparrowleft ((←))	70	\Lsh ((↑))	69
long division	102–103	\looparrowleft ((←))	69	\Lsh ((↑))	79
\longa (())	148	\looparrowleft ((←))	80	\Lsh ((↑))	75
\longa (())	172	\looparrowleft ((←))	75	\Lsh ((↑))	71
\longcastling (O-O-O)	169	\looparrowleft ((←))	71	\Lsh ((↑))	81
\longdashv ((==>))	52	\looparrowleft ((←))	81	\lsime ((≈))	65
\longdashv ((==>))	55	\looparrowright ((→))	70	\lsimg ((≈))	65
longdiv (package)	102	\looparrowright ((→))	69	\lsqhook ((⊞))	55
longdiv.tex (file)	102	\looparrowright ((→))	69	\Lsteel ((L))	123
\longdivision (())	102, 103	\looparrowright ((→))	71	\Lt ((<))	65
\longleadsto ((~~~))	76	\looparrowright ((→))	81	\Lt ((<))	65
\Longleftarrow ((==<))	69	\looparrowright ((→))	81	\ltcc ((<))	64
\Longleftarrow ((==<))	71	\looparrowright ((→))	81	\ltcc ((<))	65
\Longleftarrow ((==<))	75	\LowerDiamond ((♦))	135	\ltcir ((<))	65
\Longleftarrow ((==<))	82	lowering see \textlowering		\ltcir ((<))	65
\longleftarrow ((==<))	71	\lowint ((∫))	44	\lttimes ((×))	29
\longleftarrow ((==<))	69	\lowintsl ((∫))	45	\lttimes ((×))	28
\Longleftrightarrow ((==>))	71	\lowintup ((∫))	45	\lttimes ((×))	31
\Longleftrightarrow ((==>))	75	\lozenge ((◊))	112	\lttimes ((×))	30, 31
\Longleftrightarrow ((==>))	82	\lozenge ((◊))	133	\lttimes ((×))	30
\longleftrightarrow ((==>))	71	\lozenge ((◊))	133	\lttimes ((×))	32
\longleftrightarrow ((==>))	69	\lozenge ((◊))	132	\ltimesblack ((×))	31
\longleftrightarrow ((==>))	75	\lozenge ((◊))	134	\ltlarr ((≪))	65
\longleftrightarrow ((==>))	82	\lozengedot ((◊))	133	\ltquest ((?))	65
\longleftsquigarrow ((~~~))	76	\lozengeminus ((◊))	133	\ltriple	99
\longleftsquigarrow ((~~~))	82	\lozengeminus ((◊))	36	\ltrivb ((¶))	68
\longleftwavearrow ((~~~))	75	lozenges	112, 132–134,	\LU (())	121
\Longmapsfrom ((==>))	70	157–161, 164		\LuaTEX	147
\Longmapsfrom ((==>))	52, 75	\lVert (())	117	Luecking, Dan	212
\Longmapsfrom ((==>))	82	\lVert (())	99	\Luxembourg ()	176

\lVert ()	96
\lvert ()	94
\lvert ()	96
\lvertneqq (≢)	62
\lvertneqq (≢)	61
\lvertneqq (≢)	65
\lvertneqq (≢)	64
\lvertneqq (≢)	63
\lvertneqq (≢)	65
\lVvert ()	96
\Lvzigzag (≪)	93
\lvzigzag (≪)	93
\lwave (≪)	98
\lWavy (≪)	95
\lwavey (≪)	95
\lz (≤)	18
M	
\M (Ⓜ)	15
\M (Ⓛ)	171
\m (Ⓜ)	15
\m (Ⓛ)	171
\ma (Ⓛ)	171
\Macedonia (Ⓜ)	176
\macron (Ⓜ)	22
macron (Ⓜ)	see accents
	
\Maggie (Ⓛ)	172
magic (package)	204, 226
<i>Magic: The Gathering</i> symbols	204
magical signs	173
majuscules	88
\makeatletter	213
\makeatother	213
\MALE (♂)	124
\Male (♂)	124
male	119, 120, 123, 124, 180–184, 188–190
\male (♂)	124
\male (♂)	123
\MaleMale (♂♂)	124
\Malta (Ⓜ)	176
\maltese (Ⓜ)	14
\maltese (Ⓜ)	114
\maltese (Ⓜ)	113
\maltese (Ⓜ)	113
\maltese (Ⓜ)	114
\maltese (Ⓜ)	114
man	138, 165, 180, 186–187, 198–202
\manboldkidney (Ⓜ)	164
\manconcentriccircles (Ⓜ)	164
\manconcentricdiamond (Ⓜ)	164
\mancone (Ⓜ)	164

\mancube (Ⓜ)	164
\manerrarrow (Ⓛ)	164
\ManFace (Ⓛ)	165
\manfilledquartercircle (Ⓜ)	164
manfont (package)	164, 226
\manhpennib (Ⓛ)	164
\manimpossiblecube (Ⓜ)	164
\mankidney (Ⓜ)	164
\manlhpinkidney (Ⓜ)	164
\manpenkidney (Ⓜ)	164
\manquadrifolium (Ⓜ)	164
\manquartercircle (Ⓜ)	164
\manrotatedquadrifolium (Ⓜ)	164
\manrotatedquartercircle (Ⓜ)	164
\manstar (Ⓜ)	164
\mantiltPennib (Ⓛ)	164
\mantriangledown (Ⓛ)	164
\mantriangleright (Ⓛ)	164
\mantriangleup (Ⓛ)	164
\manvpenib (Ⓛ)	164
map symbols	186–187
\Mappedfromchar (Ⓛ)	86
\mappedfromchar (Ⓛ)	86
maps	176
\Mapsdown (Ⓜ)	76
\mapsdown (Ⓛ)	79
\mapsdown (Ⓛ)	76
\mapsdown (Ⓛ)	81
\Mapsfrom (Ⓛ)	70
\Mapsfrom (Ⓛ)	79
\Mapsfrom (Ⓛ)	76
\Mapsfrom (Ⓛ)	81
\mapsfrom (Ⓛ)	70
\mapsfrom (Ⓛ)	79
\mapsfrom (Ⓛ)	76
\mapsfrom (Ⓛ)	81
\Mapsfromchar (Ⓛ)	86
\mapsfromchar (Ⓛ)	87
\Mapsto (Ⓛ)	70
\Mapsto (Ⓛ)	79
\Mapsto (Ⓛ)	76
\Mapsto (Ⓛ)	81
\mapsto (Ⓛ)	69
\mapsto (Ⓛ)	79
\mapsto (Ⓛ)	76
\mapsto (Ⓛ)	72
\mapsto (Ⓛ)	81
\Mapstochar (Ⓛ)	86
\Mapstochar (Ⓛ)	86
\mapstochar (Ⓛ)	86
\mapstochar (Ⓛ)	87
\Mapsup (Ⓛ)	76
\mapsup (Ⓛ)	79
\mapsup (Ⓛ)	76
\mapsup (Ⓛ)	81
\marcato (Ⓛ)	152
\marcatoDown (Ⓛ)	152
M	
\mathaccent (Ⓛ)	210
\mathbb (Ⓛ)	116, 117
\mathbbm (Ⓛ)	116
\mathbbmss (Ⓛ)	116
\mathbbmtt (Ⓛ)	116
\mathbbol (package)	116, 117
\mathbf (Ⓛ)	220
\mathbin (Ⓛ)	219
\mathbold (Ⓛ)	220
\mathcal (euscript package option)	116
\mathcal (Ⓛ)	116
\mathcent (Ⓛ)	91
\mathchoice (Ⓛ)	212
\mathclose (Ⓛ)	219
\mathcolon (:)	108
\mathcomp (package)	110
\mathdesign (package)	24, 32, 46, 92, 98, 115, 226
\mathdollar (\$)	27
\mathdollar (\$)	92
\mathdots (package)	100, 107, 109, 213, 226
\mathds (Ⓛ)	116
\mathellipsis (...)	27
\mathellipsis (...)	109
mathematical symbols	27–117



\mathfrak{...}	116	\mdlgblkdiamond (◆)	134
\mathit{...}	116	\mdlgblklozenge (◆)	133
\mathnormal{...}	116	\mdlgblklozenge (◆)	134
\mathop{...}	219	\mdlgblksquare (■)	35
\mathopen{...}	219	\mdlgblksquare (■)	134
\mathord{...}	219	\mdlgwhtcircle (○)	35
\mathpalette{...}	212, 213	\mdlgwhtcircle (○)	36
\mathparagraph (¶)	27	\mdlgwdiamond (◇)	35
\mathparagraph (¶)	92	\mdlgwdiamond (◇)	134
\mathpunct{...}	219	\mdlgwhtlozenge (◊)	133
\mathratio (:)	108	\mdlgwhtlozenge (◊)	134
\mathrel{...}	210, 219	\mdlgwhtsquare (□)	35
\mathring (°)	101	\mdlgwhtsquare (□)	134
\mathring (°)	100, 101	\mdsmblkcircle (●)	134
\mathrm{...}	116	\mdsmblsquare (■)	134
mathrsfs (package)	116, 226	\mdsmwhtcircle (○)	134
mathscr (<i>euscript</i> package option)	116	\mdsmwhtsquare (□)	134
mathscr (<i>urwchancal</i> package option)	116	\mdwhtcircle (○)	134
\mathscr{...}	116	\mdwtdiamond (◇)	35
\mathsection (§)	27	\mdwtdiamond (◇)	134
\mathsection (§)	114	\mdwhtlozenge (◊)	133
\mathslash (/)	96	\mdwhtlozenge (◊)	134
\mathslash (/)	97	\mdwhtsquare (□)	35
mathspec (package)	88	\mdwhtsquare (□)	134
mathspec.sty (file)	88	\measangledtosw (⤠)	112
\mathsterling (£)	91	\measangledtose (⤠)	112
\mathsterling (£)	27	\measangleltonw (⤠)	112
\mathsterling (£)	92	\measanglerdtose (⤠)	112
mathtools (package)	27, 56, 104, 106, 226	\measanglerutone (⤠)	112
\mathunderscore (_)	27	\measangleultonw (⤠)	112
\mathvisible{space} (_)	114	\measeq (⤢)	55
\max (max)	87	\measuredangle (⦵)	113
\maxima (⤠)	148	\measuredangle (⦵)	111
Maxwell-Stefan diffusion coefficient	see \DH	\measuredangle (⦵)	111
\maya{...}	110	\measuredangle (⦵)	111
Mayan numerals	110	\measuredangle (⦵)	112
\Mb (⤠)	171	\measuredangleleft (⤠)	111
\mb (⤠)	171	\measuredangleleft (⤠)	112
\Mbb (⤠)	171	\measuredrightangle (⤠)	111
\mBb (⤠)	171	\measuredrightangle (⤠)	111
\mbB (⤠)	171	\measuredrightangle (⤠)	112
\mbb (⤠)	171	\measuredrightangledot (⤠)	111
mbboard (package)	116, 117, 226	mechanical scaling	216, 218
\mbbx (⤠)	171	\medbackslash (＼)	30, 31
\mbox{...}	212, 213	\medbackslash (＼)	30
\MC (ℳ)	120	\medblackcircle (●)	34
\mdblkcircle (●)	134	\medblackdiamond (◆)	34
\mdblkdiamond (◆)	35	\medblacklozenge (◆)	133
\mdblkdiamond (◆)	134	\medblacksquare (■)	34
\mdblklozenge (◆)	133	\medblackstar (★)	34
\mdblklozenge (◆)	134	\medblackstar (★)	134
\mdblklozenge (◆)	134	\medblacktriangledown (▼)	34, 68
\mdblksquare (■)	35	\medblacktriangleleft (◀)	34, 68
\mdblksquare (■)	134	\medblacktriangleright (▶)	34, 68
\mdlgblkcircle (●)	35	\medblacktriangleup (▲)	34, 68
\mdlgblkcircle (●)	134	\medbullet (●)	29
\mdlgblkdiamond (◆)	35	\medcirc (○)	29
\medblacktriangleup (▲)	34, 68	\medcircle (○)	34
\medbullet (●)	29	\medcircle (○)	30
\medcirc (○)	29	\mediadiamond (◇)	34
\medcircle (○)	34	\mediadiamond (◇)	34
\meddiamond (◇)	34	media control symbols	164, 181–184
\meddiamond (◇)	34	\medlozenge (◊)	133
\medlozenge (◊)	132	\medlozenge (◊)	132
\medslash (／)	30, 31, 34	\medslash (／)	30
\medslash (／)	30	\medsquare (□)	34
\medsquare (□)	34	\medsquare (□)	34
\medstar (★)	35	\medstar (★)	35
\medstar (☆)	34	\medstarofdavid (◊)	132
\medstarofdavid (◊)	132	\medtriangledown (▽)	34, 68
\medtriangledown (▽)	34, 68	\medtriangledown (▽)	34, 67
\medtriangledown (▽)	34, 67	\medtriangleleft (◀)	34, 68
\medtriangleleft (◀)	34, 67	\medtriangleleft (◀)	34, 67
\medtriangleleft (◀)	34, 67	\medtriangleleft (◀)	34, 68
\medtriangleleft (◀)	34, 68	\medtriangleleft (◀)	34, 67
\medtriangleup (△)	34, 68	\medtriangleup (△)	34, 67
\medtriangleup (△)	34, 67	\medvert (⠇)	30
\medvert (⠇)	30	\medvertdot (⠇)	30
\medwhitestar (☆)	34	\medwhitestar (☆)	134
\medwhitestar (☆)	134	Mellin transform (ℳ)	see alphabets, math
membership	see \in	membership	see \in
\Mercury (☿)	120	\Mercury (☿)	119
\Mercury (☿)	120	\Mercury (☿)	120
\mercury (☿)	119	\merge (⤧)	28
\merge (⤧)	31	\merge (⤧)	31
METAFONT	11, 117, 215–218	METAFONT	11, 117, 215–218
METAFONTbook symbols	164	METAFONTbook symbols	164
\meterplus (⊕)	148	\method (ℳ)	125
\method (ℳ)	125	metre (package)	22, 100, 171, 226
metre	171	metre	171
metrical symbols	171, 172	metrical symbols	171, 172
\mezzo (m)	152, 163	\mezzo (m)	152, 163
.mf files	11, 186, 216	.mf files	11, 186, 216
\mglwhtcircle (○)	134	\mglwhtcircle (○)	134
\mglwhtlozenge (◊)	134	\mglwhtlozenge (◊)	134
\mho (℧)	112	\mho (℧)	112
\mho (℧)	90	\mho (℧)	90
micro	see \textmu	micro	see \textmu
\micro (μ)	118	\micro (μ)	118
Microsoft® Windows®	223	Microsoft® Windows®	223
\mid ()	46, 96	\mid ()	46, 96
\mid ()	52	\mid ()	52
\mid ()	55	\mid ()	55
\midbarvee (⋎)	32	\midbarvee (⋎)	32
\midbarwedge (⋎)	32	\midbarwedge (⋎)	32
\midcir ()	85	\midcir ()	85

\midcir (⌚)	55
\middle	94
\middlebar (֍)	101
\middleslash (֍)	101
\midtilde (~)	23
MIL-STD-806	123
millesimal sign	see \textrthousand
milstd (package) .	123, 226, 227
\min (min)	87, 219
\MineSign (❖)	165
minim	see musical symbols
\minim (♪)	150
\minimDotted (♪.)	150
\minimDottedDouble (♪..)	150
\minimDottedDoubleDown (♪‘)	150
\minimDottedDown (♪‘)	150
\minimDown (♪)	150
Minkowski space (ℳ)	see alphabets, math
minus	see \textminus
\minus (-)	30
\minus (-)	30
minus, double-dotted (÷)	see \div
\minuscolon (:-)	58
\minuscoloncolon (:-:)	58
\minusdot (‐)	30
\minusdot (‐)	30
\minusdot (‐)	32
\minusfdots (‐.)	30
\minusfdots (‐.)	32
\minushookdown (‐)	113
\minushookdown (‐)	113
\minushookup (‐)	31
\minushookup (‐)	113
\minuso (⊖)	28, 211
\minuso (⊖)	31
\minusrdots (‐‐)	30
\minusrdots (‐‐)	32
minutes, angular	see \prime
miscellaneous symbols	112–115, 137, 164–181, 185
“Missing \$ inserted”	27
\mlcp (Ⓜ)	55
\Mmappedfromchar (Ⓜ)	86
\mmappedfromchar (Ⓜ)	86
\Mmapstochar (Ⓜ)	86
\mmapstochar (Ⓜ)	86
MnSymbol (package) .	27, 29, 30, 34, 41, 42, 49–51, 60, 63, 67, 71–74, 84, 85, 90, 91, 95, 100, 102, 103, 108, 111, 113, 132, 136, 147, 226
\Moai (Ⓣ)	180
\Mobilefone (Ⓣ)	123
\mod	87
\models (=)	46, 210
\models (\models)	52
\models (\models)	50
\models (\models)	55
\modtwosum (Σ)	43
\modtwosum (Σ̄)	44
moduli space	see alphabets, math
\Moldova (ଓ)	177
monetary symbols	24, 25, 117
\Montenegro (ଓ)	177
monus	see \dotdiv
\moo (±)	28
\moo (±)	31
\Moon (ࡓ)	120
\Moon (ࡔ)	119
\Moon (ࡔ)	120
moon	119, 120, 174, 188–190
\MoonPha	174
moonphase (package) .	188, 226
\Mordent (ࡕ)	148
\mordent (ࡕ)	148
\morepawns (>)	169
\moreroom (ࡓ)	169
\Mountain (ࡔ)	166
mouse	see \ComputerMouse
\MoveDown (▼)	164
\overlay	213
\MoveUp (▲)	164
\mp (±)	28
\mp (±)	31
\mp (±)	30
\mp (±)	30
\mp (±)	32
\Mu (ℳ)	88
\mu (μ)	88
multiline braces	105
\multimap (‐o)	47, 48
\multimap (‐o)	54
\multimap (‐o)	85
\multimap (‐o)	84
\multimap (‐o)	55
\multimapboth (‐‐o)	48
\multimapboth (‐‐o)	54
\multimapboth (‐‐o)	58
\multimapbothvert (Ѡ)	48
\multimapbothvert (Ѡ)	54
\multimapdot (‐o)	48
\multimapdot (‐o)	54
\multimapdotboth (‐‐‐)	48
\multimapdotboth (‐‐‐)	54
\multimapdotbothA (‐‐‐)	48
\multimapdotbothA (‐‐‐)	54
\multimapdotbothAvert (Ѡ)	48
\multimapdotbothAvert (Ѡ)	54
\multimapdotbothB (‐‐‐)	48
\multimapdotbothB (‐‐‐)	54
\multimapdotbothBvert (Ѡ)	48
\multimapdotbothBvert (Ѡ)	54
\multimapdotbothvert (Ѡ)	48
\multimapdotbothvert (Ѡ)	54
\multimapdotinv (‐‐)	48
\multimapdotinv (‐‐)	54
\multimapinv (‐‐)	48
\multimapinv (‐‐)	54
\multimapinv (‐‐)	85
\multimapinv (‐‐)	55
multiple accents per character	214
\MultiplicationDot (·)	110
multiplicative disjunction	see \bindnasrepma, \invamp, and \parr
\Mundus (ࡔ)	165
\muon (μ)	125
Museum of Icelandic Sorcery and Witchcraft	174
musical symbols	26, 147–163, 180–184
musixgre (package)	149
musixlit (package)	149
musixer (package)	149
MusiXTEX	148, 149
musixtex (package)	226, 227
\muup (μ)	89
\MVAt (@)	165
\MVComma (,)	110
\MVDivision (/)	110
\MVEight (8)	110
\MVFive (5)	110
\MVFour (4)	110
\MVLefBracket (()	110
\MVMinus (-)	110
\MVMultiplication (×)	110
\MVNine (9)	110
\MVOne (1)	110
\MVPPeriod (.)	110
\MVPlus (+)	110
\MVRightArrow (→)	110
\MVRightBracket ())	110
\MVSSeven (7)	110
\MVSix (6)	110
\MVThree (3)	110
\MVTwo (2)	110
\MVZero (0)	110
N	
\nabla (∇)	112
\nabla (∇)	113
\nabla (∇)	114
\nacwcirclearrowdown (ࡔ)	76
\nacwcirclearrowleft (ࡔ)	76
\nacwcirclearrowright (ࡔ)	76
\nacwcirclearrowup (ࡔ)	76
\nacwgapcirclearrow (ࡔ)	77
\nacwleftarcarrow (ࡔ)	76
\nacwneararcarrow (ࡔ)	76
\nacwnwarcarrow (ࡔ)	76
\nacwopencirclearrow (ࡔ)	77
\nacwoverarcarrow (ࡔ)	76
\nacwrightarcarrow (ࡔ)	77
\nacwsearcarrow (ࡔ)	77
\nacswarcarrow (ࡔ)	77
\nacwunderarcarrow (ࡔ)	77
\NAK (§)	122
NAND gates	123
\NANDd (ࡔ)	123



	\NAND1	123
	\NANDr	123
	\NANDu	123
\napprox (\(\approx\))	\napprox	49
\napprox (\(\not\approx\))	\napprox	53
\napprox (\(\approx\))	\napprox	50
\napprox (\(\approx\))	\napprox	56
\napproxeq (\(\approx\))	\napproxeq	48
\napproxeq (\(\not\approx\))	\napproxeq	53
\napproxeq (\(\approx\))	\napproxeq	50
\napproxeq (\(\not\approx\))	\napproxeq	56
\nproxid (\(\approx\))	\nproxid	53
\narceq (\(\approx\))	\narceq	53, 86
\nAssert (\(\mathbb{A}\))	\nAssert	53
\nassert (\(\mathbb{A}\))	\nassert	53
\nasympt (\(\approx\))	\nasympt	48
\nasympt (\(\not\approx\))	\nasympt	53, 86
\nasympt (\(\approx\))	\nasympt	85
\nasympt (\(\not\approx\))	\nasympt	56
\Natal (\(\mathbb{N}\))	\Natal	120
nath (package)	nath	93, 99, 226
\NATURAL (\(\mathbb{N}\))	\NATURAL	87
\Natural (\(\mathbb{N}\))	\Natural	87
\natural (\(\natural\))	\natural	147
\natural (\(\natural\))	\natural	147
\natural (\(\natural\))	\natural	147
\natural (\(\natural\))	\natural	151
\natural (\(\natural\))	\natural	147
\natural (\(\natural\))	\natural	147
natural numbers (\(\mathbb{N}\))	see alphabets, math	
\nbackapprox (\(\approx\))	\nbackapprox	50
\nbackapproxeq (\(\approx\))	\nbackapproxeq	50
\nbackcong (\(\approx\))	\nbackcong	53
\nbackcong (\(\not\approx\))	\nbackcong	50
\nbackeqsim (\(\approx\))	\nbackeqsim	50
\nbacksim (\(\rightsquigarrow\))	\nbacksim	48
\nbacksim (\(\rightsquigleftarrow\))	\nbacksim	53
\nbacksimeq (\(\approx\))	\nbacksimeq	48
\nbacksimeq (\(\not\approx\))	\nbacksimeq	53
\nbacksimeq (\(\not\approx\))	\nbacksimeq	50
\nbacktriplesim (\(\approx\))	\nbacktriplesim	50
\nBarv (\(\overline{\mathbb{A}}\))	\nBarv	53
\nbarV (\(\overline{\mathbb{A}}\))	\nbarV	53
\nbdleftarcarrow (\(\curvearrowleft\))	\nbdleftarcarrow	77
\nbdneararcarrow (\(\curvearrowright\))	\nbdneararcarrow	77
\nbdnwarcarrow (\(\curvearrowleft\))	\nbdnwarcarrow	77
\nbdoverarcarrow (\(\curvearrowleft\))	\nbdoverarcarrow	77
\nbdrightarcarrow (\(\curvearrowright\))	\nbdrightarcarrow	77
\nbdsearcarrow (\(\curvearrowleft\))	\nbdsearcarrow	77
\nbdswarcarrow (\(\curvearrowleft\))	\nbdswarcarrow	77
\nbdunderarcarrow (\(\curvearrowleft\))	\nbdunderarcarrow	77
\nblackwhitespoon (\(\leftrightarrow\))	\nblackwhitespoon	85
\NBSP (\(\text{ } \))	\NBSP	122
\NBSP (\(\text{ } \))	\NBSP	122
\nBumpeq (\(\not\approx\))	\nBumpeq	48
\nBumpeq (\(\not\approx\))	\nBumpeq	53

\nBumpeq (\(\not\approx\))	\nBumpeq	50	\ndashedswarrow (\(\curvearrowleft\))	\ndashedswarrow	73
\nbumpseq (\(\not\approx\))	\nbumpseq	48	\ndasheduparrow (\(\overset{\wedge}{\rightarrow}\))	\ndasheduparrow	73
\nbumpseq (\(\not\approx\))	\nbumpseq	53	\ndashleftarrow (\(\leftarrow/\!\!\!\!-\))	\ndashleftarrow	78
\nbumpseq (\(\not\approx\))	\nbumpseq	50	\ndashleftarrow (\(\leftarrow/\!\!\!-\))	\ndashleftarrow	74
\nbumpseq (\(\not\approx\))	\nbumpseq	56	\ndashrightarrow (\(\rightarrow/\!\!\!-\))	\ndashrightarrow	78
\nbumpseqq (\(\not\approx\))	\nbumpseqq	53	\ndashrightarrow (\(\rightarrow/\!\!\!-\))	\ndashrightarrow	74
\ncirceq (\(\not\approx\))	\ncirceq	53	\nDashV (\(\mathbb{A}\))	\nDashV	49
\ncirceq (\(\not\approx\))	\ncirceq	50	\nDashV (\(\mathbb{A}\))	\nDashV	53
\ncleararrowleft (\(\curvearrowleft\))	\ncleararrowleft	77	\nDashV (\(\mathbb{A}\))	\nDashV	49
\ncleararrowleft (\(\curvearrowleft\))	\ncleararrowleft	74	\nDashV (\(\mathbb{A}\))	\nDashV	53
\ncleararrowright (\(\curvearrowright\))	\ncleararrowright	77	\nDashV (\(\mathbb{A}\))	\nDashV	53
\ncleararrowright (\(\curvearrowright\))	\ncleararrowright	74	\nDashV (\(\mathbb{A}\))	\nDashV	49
\ncirmid (\(\not\approx\))	\ncirmid	85	\nDashV (\(\mathbb{A}\))	\nDashV	53
\closedeq (\(\not\approx\))	\closedeq	50	\nDashV (\(\mathbb{A}\))	\nDashV	51
\closure (\(\not\approx\))	\closure	53, 86	\nDashVv (\(\mathbb{A}\))	\nDashVv	49
\cong (\(\not\approx\))	\cong	49	\nDashVv (\(\mathbb{A}\))	\nDashVv	53
\cong (\(\not\approx\))	\cong	47	\nDdashv (\(\mathbb{A}\))	\nDdashv	53
\cong (\(\not\approx\))	\cong	54	\nDdownarrow (\(\not\approx\))	\nDdownarrow	77
\cong (\(\not\approx\))	\cong	53	\nddtstile (\(\not\models\))	\nddtstile	57
\cong (\(\not\approx\))	\cong	50	\ndiagdown (\(\times\))	\ndiagdown	51
\cong (\(\not\approx\))	\cong	56	\ndiagup (\(\times\))	\ndiagup	51
\congdot (\(\not\approx\))	\congdot	56	\ndivides (\(+\))	\ndivides	51
\curlyeqprec (\(\not\approx\))	\curlyeqprec	49	\nDoteq (\(\not\approx\))	\nDoteq	53
\curlyeqprec (\(\not\approx\))	\curlyeqprec	53	\nDoteq (\(\not\approx\))	\nDoteq	51
\curlyeqprec (\(\not\approx\))	\curlyeqprec	50	\ndoteq (\(\not\approx\))	\ndoteq	53
\curlyeqsucc (\(\not\approx\))	\curlyeqsucc	49	\ndoteq (\(\not\approx\))	\ndoteq	51
\curlyeqsucc (\(\not\approx\))	\curlyeqsucc	53	\ndoublefrown (\(\not\approx\))	\ndoublefrown	85
\curlyeqsucc (\(\not\approx\))	\curlyeqsucc	50	\ndoublefrown (\(\not\approx\))	\ndoublefrown	85
\curvearrowdownup (\(\curvearrowleft\))	\curvearrowdownup	72	\ndoublesmile (\(\not\approx\))	\ndoublesmile	85
\curvearrowleft (\(\curvearrowleft\))	\curvearrowleft	77	\ndoublesmile (\(\not\approx\))	\ndoublesmile	85
\curvearrowleft (\(\curvearrowleft\))	\curvearrowleft	74	\Downarrow (\(\Downarrow\))	\Downarrow	77
\curvearrowleftright (\(\curvearrowleft\))	\curvearrowleftright	72	\Downarrow (\(\Downarrow\))	\Downarrow	73
\curvearrowrownesw (\(\curvearrowleft\))	\curvearrowrownesw	72	\downarrow (\(\downarrow\))	\downarrow	77
\curvearrowrownwse (\(\curvearrowleft\))	\curvearrowrownwse	72	\downarrow (\(\downarrow\))	\downarrow	73
\curvearrowwright (\(\curvearrowleft\))	\curvearrowwright	77	\downarrowtail (\(\Downarrow\))	\downarrowtail	77
\curvearrowwright (\(\curvearrowleft\))	\curvearrowwright	74	\downarrowtail (\(\Downarrow\))	\downarrowtail	73
\curvearrowwrightleft (\(\curvearrowleft\))	\curvearrowwrightleft	72	\downarrowtail (\(\Downarrow\))	\downarrowtail	73
\curvearrowswne (\(\curvearrowleft\))	\curvearrowswne	72	\downarrowtail (\(\Downarrow\))	\downarrowtail	73
\curvearrowupdown (\(\curvearrowleft\))	\curvearrowupdown	72	\downarrowtail (\(\Downarrow\))	\downarrowtail	73
\circlearrowdown (\(\curvearrowleft\))	\circlearrowdown	77	\downarrowtail (\(\Downarrow\))	\downarrowtail	73
\circlearrowleft (\(\curvearrowleft\))	\circlearrowleft	77	\downarrowtail (\(\Downarrow\))	\downarrowtail	73
\circlearrowright (\(\curvearrowright\))	\circlearrowright	77	\downarrowtail (\(\Downarrow\))	\downarrowtail	73
\circlearrowup (\(\curvearrowright\))	\circlearrowup	77	\downarrowtail (\(\Downarrow\))	\downarrowtail	73
\gapcirclearrow (\(\curvearrowleft\))	\gapcirclearrow	77	\downarrowtail (\(\Downarrow\))	\downarrowtail	73
\leftarcarrow (\(\curvearrowleft\))	\leftarcarrow	77	\downarrowtail (\(\Downarrow\))	\downarrowtail	73
\neararcarrow (\(\curvearrowright\))	\neararcarrow	77	\downarrowtail (\(\Downarrow\))	\downarrowtail	73
\nwarcarrow (\(\curvearrowright\))	\nwarcarrow	77	\nwarcarrow (\(\curvearrowright\))	\nwarcarrow	79
\openccleararrow (\(\curvearrowright\))	\openccleararrow	77	\openccleararrow (\(\curvearrowright\))	\openccleararrow	79
\overarcarrow (\(\curvearrowright\))	\overarcarrow	77	\overarcarrow (\(\curvearrowright\))	\overarcarrow	78
\overarcarrow (\(\curvearrowright\))	\overarcarrow	77	\overarcarrow (\(\curvearrowright\))	\overarcarrow	78
\searcarrow (\(\curvearrowright\))	\searcarrow	77	\searcarrow (\(\curvearrowright\))	\searcarrow	78
\swarcarrow (\(\curvearrowright\))	\swarcarrow	77	\swarcarrow (\(\curvearrowright\))	\swarcarrow	78
\underarcarrow (\(\curvearrowright\))	\underarcarrow	78	\underarcarrow (\(\curvearrowright\))	\underarcarrow	78
\dashleftarrow (\(\leftarrow/\!\!\!-\))	\dashleftarrow	78	\dashleftarrow (\(\leftarrow/\!\!\!-\))	\dashleftarrow	74
\dashrightarrow (\(\rightarrow/\!\!\!-\))	\dashrightarrow	74	\dashrightarrow (\(\rightarrow/\!\!\!-\))	\dashrightarrow	74
\dasheddownarrow (\(\downarrow/\!\!\!-\))	\dasheddownarrow	73	\dasheddownarrow (\(\downarrow/\!\!\!-\))	\dasheddownarrow	73
\dashedleftarrow (\(\leftarrow/\!\!\!-\))	\dashedleftarrow	73	\dashedleftarrow (\(\leftarrow/\!\!\!-\))	\dashedleftarrow	73
\dashedrightarrow (\(\rightarrow/\!\!\!-\))	\dashedrightarrow	73	\dashedrightarrow (\(\rightarrow/\!\!\!-\))	\dashedrightarrow	73
\dasheduparrow (\(\overset{\wedge}{\rightarrow}\))	\dasheduparrow	73	\dasheduparrow (\(\overset{\wedge}{\rightarrow}\))	\dasheduparrow	73
\downmapsto (\(\not\models\))	\downmapsto	77	\downmapsto (\(\not\models\))	\downmapsto	77
\downmapsto (\(\not\models\))	\downmapsto	77	\downmapsto (\(\not\models\))	\downmapsto	73
\downmapsto (\(\not\models\))	\downmapsto	73	\downmapsto (\(\not\models\))	\downmapsto	73
\downModels (\(\not\models\))	\downModels	51	\downModels (\(\not\models\))	\downModels	51
\downmodels (\(\not\models\))	\downmodels	53	\downmodels (\(\not\models\))	\downmodels	51
\downmodels (\(\not\models\))	\downmodels	51	\downpitchfork (\(\not\models\))	\downpitchfork	86
\downpitchfork (\(\not\models\))	\downpitchfork	84	\downpitchfork (\(\not\models\))	\downpitchfork	84

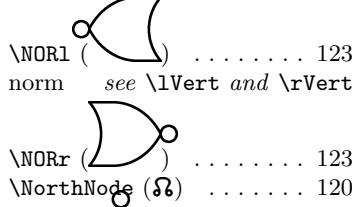
\ndownrcurverarrow (⌚)	78	\nenearrows (↗)	75	\neswline (↙)	49
\ndownrightcurvedarrow (↝)	78	\nenearrows (↗)	71	\Netherlands (🇳)	177
\ndownrsquigarrow (⤒)	78	\neovnarrow (☒)	81	neumes	149
\ndownrsquigarrow (⤒)	73	\neovsearrow (☒)	81	\neuter (♀)	124
\downspoon (⤓)	85	\nepitchfork (⚡)	84	\Neutral (ଓ)	124
\downspoon (⤓)	84	\Neptune (Ψ)	120	\Neutrey (ଓ)	179
\downuparrows (⤔)	77	\Neptune (Ψ)	119	\neutrino (ν)	125
\downuparrows (⤔)	73	\Neptune (Ψ)	120	\neutron (n^0)	125
\downupcurvearrow (⤔)	78	\neptune (օ)	119	\nevDash (☒)	49
\downuppharpoons (⤔)	79	\neq (≠)	49	\nevDash (↙)	49
\downuppharpoons (⤔)	74	\neq (≠)	61	\newextarrow	107
\downuppharpoonsleftright (⤔)	79	\neq (≠)	54	\newmetrics	172
\downupsquigarrow (⤒)	78	\neq (≠)	53	\newmoon (●)	120
\downVDash (⤔)	53	\neq (≠)	51	\newmoon (●)	119
\downVdash (⤔)	53	\neqbump (≠)	51	\newtie (Ⓜ)	19
\downVdash (⤔)	51	\neqcirc (≠)	53	\nexists (">#)	91
\downnvDash (⤔)	53	\neqcirc (≠)	51	\nexists (">#)	91
\downnvDash (⤔)	53	\neqdot (≠)	53	\nexists (">#)	92
\downnvDash (⤔)	53	\neqdot (≠)	51	\nexists (">#)	92
\downnvDash (⤔)	51	\neqfrown (≠)	85	\nexists (">#)	91
\downwavearrow (⤔)	77	\neqsim (≠)	53	\nexists (">#)	92
\dststile (⤕)	57	\neqsim (≠)	51	\nfallingdotseq (≠)	53
\dtstile (⤕)	57	\neqsim (≠)	56	\nfallingdotseq (≠)	51
\dttstile (⤕)	57	\eqslantgtr (≠)	62	\nforksnot (☒)	56
\ndualmap (⤠⠃⠃)	85	\eqslantgtr (≠)	64	\nfrown (↑)	53, 86
\NE (≠)	121	\eqslantgtr (≠)	63	\nfrown (↑)	85
\ne	see \neq	\eqslantgtr (≠)	65	\nfrownneq (≠)	53, 86
\ne (≠)	53	\eqslantless (≠)	62	\nfrownneq (≠)	85
\ne (≠)	51	\eqslantless (≠)	64	\nfrownsmile (≠)	53, 86
\ne (≠)	56	\eqslantless (≠)	63	\nfrownsmile (≠)	85
\Narrow (⤚)	70	\eqsmile (≠)	85	\nfrownsmileeq (≠)	85
\Narrow (⤚)	79	\nequal (≠)	53	\NG (՞)	121
\Narrow (⤚)	75	\nequal (≠)	51	\NG (՞)	14
\Narrow (⤚)	71	\nequalclosed (≠)	51	\ng (յ)	14
\Narrow (⤚)	81	\nequiv (≠)	48	\nge (՞)	66
\nearrow (↗)	70	\nequiv (≠)	54	\ngeq (≠)	62
\nearrow (↗)	69, 213	\nequiv (≠)	53	\ngeq (՞)	61, 62
\nearrow (↗)	75	\nequiv (≠)	51	\ngeq (≠)	65
\nearrow (↗)	71	\nequiv (≠)	56	\ngeq (≠)	64
\nearrow (↗)	81	\nequivclosed (≠)	51	\ngeq (≠)	63
\nearrowcorner (⤜)	79	\nercurvearrow (↗)	76	\ngeq (՞)	65, 66
\nearrowtail (↗)	75	\nersquigarrow (⤗)	71	\ngeqclosed (≠)	64, 68
\nearrowtail (↗)	71	\nespoon (՞)	84	\ngeqclosed (՞)	63, 67
\nebkarrow (↗)	75	\Neswarrow (⤗)	75	\ngeqdot (≠)	64
\nefilledspoon (↗)	84	\Neswarrow (⤗)	71	\ngeqdot (≠)	63
\nefootline (↗)	49	\neswarrow (⤗)	213	\ngeqq (≠)	62
\nefree (↗)	49	\neswarrow (⤗)	75	\ngeqq (՞)	61
\neg (¬)	112	\neswarrow (⤗)	71	\ngeqq (≠)	65
\neg (¬)	113	\neswarrow (⤗)	81	\ngeqq (՞)	64
\neg (¬)	113	\neswarrows (⤗)	75	\ngeqq (՞)	63
\neg (¬)	114	\neswarrows (⤗)	71	\ngeqq (՞)	65
negation	see \neg and \sim	\neswbiproto (՞)	30	\ngeqlant (≠)	61
\neharpoonccw (↘)	74	\neswcrossing (↗)	51	\ngeqlant (≠)	65
\neharpooncw (↗)	74	\neswcurvearrow (↗)	76	\ngeqlant (≠)	64
\neharpoonnw (↘)	78	\neswharpoonnwse (↘)	78	\ngeqlant (≠)	63
\neharpoonse (↗)	78	\neswharpoonnwse (↘)	74	\ngeqlant (≠)	65
\nelcurvearrow (↗)	76	\neswharpoons (⤗)	78	\ngeqlantdot (≠)	64
\elsquigarrow (⤗)	71	\neswharpoons (⤗)	74	\ngeqlantdot (≠)	63
\nemapsto (⤗)	71	\neswharpoonsenw (↗)	78	\ngeqlcc (՞)	64
\neModels (՞)	49	\neswharpoonsenw (↗)	74	\ngescc (՞)	64
\nemodels (՞)	49	\Neswline (⤗)	49	\gesdot (՞)	65

\ngesl (⌘)	65	\ni (ⓘ)	91, 211	\leftarrow (←)	69
\ngets (↔)	78	\ni (ⓘ)	52	\leftarrowtail (⤠)	80
\ngets (↔)	74	\ni (ⓘ)	92	\leftarrowtail (⤠)	76
\ngets (↔)	83	\ni (ⓘ)	91	\leftarrowtail (⤠)	73
\ngg (⩵)	62	\ni (ⓘ)	55, 56	\leftarrowtail (⤠)	83
\ngg (⩵)	64	\nialpha (α)	18	\leftarrowtail (⤠)	76
\ngg (⩵)	63	\nibar	see \ownsbar	\leftarrowtail (⤠)	73
\ngg (⩵)	65	\nibeta (β)	18	\leftassert (⤣)	53
\nggg (⩵)	64	\NibLeft (⤠)	128	\leftassert (⤣)	53
\nggg (⩵)	63	\NibRight (⤠)	128	\leftbkarrow (⤠)	76
\ngtcc (⌚)	64	nibs	128	\leftblackspoon (⤠)	85
\ngtr (⤠)	62	\NibSolidLeft (⤠)	128	\leftcurvedarrow (⤠)	78
\ngtr (⤠)	61	\NibSolidRight (⤠)	128	\leftdowncurvedarrow (⤠)	.
\ngtr (⤠)	65	nicefrac (package)	114, 226, 227		77
\ngtr (⤠)	64	niceframe (package)	. 191–194,	\leftfilledspoon (⤠)	84
\ngtr (⤠)	63		197	\leftfootline (⤠)	53
\ngtr (⤠)	65	\NiceReapey (⤠)	179	\leftfootline (⤠)	50
\ngtrapprox (⠃)	62	\nichi (ⓘ)	18	\leftfree (⤠)	50
\ngtrapprox (⠃)	62	\niepsilon (ε)	18	\leftharpoonccw (⤠)	74
\ngtrapprox (⠃)	64	\nigamma (γ)	18	\leftharpooncw (⤠)	74
\ngtrcc (⌚)	64	\niota (ⓘ)	18	\leftharpoondown (⤠)	79
\ngtrclosed (⌚)	64, 68	\nilambda (λ)	18	\leftharpoonup (⤠)	79
\ngtrclosed (⌚)	63, 67	\nimageof (⤠)	85	\leftlcurvearrow (⤠)	77
\ngtrdot (⠄)	64	\nin (₧)	53, 92	\leftleftarrows (⤣)	76
\ngtrdot (⠄)	63	\nin (₧)	91	\leftleftarrows (⤣)	73
\ngtreqless (⠃)	64	\Ninja (⤠)	179	\leftlsquigarrow (⤠)	77
\ngtreqless (⠃)	63	\niobar (ⓘ)	55	\leftlsquigarrow (⤠)	73
\ngtreqlesslant (⠃)	64	\niomega (ω)	18	\leftmapsto (⤣)	76
\ngtreqlesslant (⠃)	63	\niphil (φ)	18	\leftmapsto (⤣)	76
\ngtreqqlless (⠃)	64	\niplus (₧)	47	\leftmapsto (⤣)	73
\ngtreqqlless (⠃)	63	\niplus (₧)	54	\leftModels (⤣)	50
\ngtreqslantless (⠃)	64	\nis (₧)	55	\leftmodels (⤣)	53
\ngtrless (⠄)	62	\nisd (ⓘ)	54	\leftpitchfork (⤠)	86
\ngtrless (⠃)	64	\nisd (ⓘ)	55	\leftpitchfork (⤠)	84
\ngtrless (⠃)	63	\nisigma (σ)	18	\leftrccurvearrow (⤠)	77
\ngtrless (⠃)	65	\nitheta (θ)	18	\Leftrightarrow (⤠)	80
\ngtrsime (⠃)	62	\niupsilon (υ)	18	\Leftrightarrow (⤠)	70
\ngtrsime (⠃)	62	\niv (⌄)	93	\Leftrightarrow (⤠)	69
\ngtrsime (⠃)	64	\nj (₧)	18	\Leftrightarrow (⤠)	80
\ngtrsime (⠃)	64	\nkarta (package)	186, 226	\Leftrightarrow (⤠)	77
\nhateq (⠄)	53	\nlcirculararrowdown (⤠)	73	\Leftrightarrow (⤠)	73
\nhateq (⠄)	51	\nlcirculararrowleft (⤠)	73	\Leftrightarrow (⤠)	83
\nHdownarrow (⠄)	80	\nlcirculararrowright (⤠)	73	\Leftrightarrow (⤠)	70
\nHdownarrow (⠄)	83	\nlcirculararrowup (⤠)	73	\Leftrightarrow (⤠)	27, 69
\nhknearrow (↗)	78	\nlcurvearrowdown (⤠)	73	\Leftrightarrow (⤠)	80
\nhknarrow (↖)	78	\nlcurvearrowleft (⤠)	73	\Leftrightarrow (⤠)	76
\nhksearrow (↖)	78	\nlcurvearrowne (↗)	73	\Leftrightarrow (⤠)	73
\nhkswarro (↗)	78	\nlcurvearrownw (↖)	73	\Leftrightarrow (⤠)	83
\nhookdownarrow (⤠)	77	\nlcurvearrowright (⤠)	73	\Leftrightarrow (⤠)	77
\nhookleftarrow (⤠)	77	\nlcurvearrowse (↘)	73	\Leftrightarrow (⤠)	73
\nhookleftarrow (⤠)	74	\nlcurvearrowsw (⤠)	73	\Leftrightarrow (⤠)	83
\nhooknearrow (↗)	77	\nlcurvearrowup (⤠)	73	\Leftrightarrow (⤠)	83
\nhooknarrow (↖)	77	\nle (₧)	66	\Leftrightarrow (⤠)	85
\nhookrightarrow (⤠)	77	\leadsto (⤠)	78	\Leftrightarrow (⤠)	77
\nhookrightarrow (⤠)	74	\leadsto (⤠)	74	\leftrightharpoondownup (⤠)	79
\nhooksearrow (↖)	77	\Leftarrow (⤠)	70	\leftrightharpoondownup (⤠)	74
\nhookswarrow (↗)	77	\Leftarrow (⤠)	69	\leftrightharpoons (⤠)	79
\nhookuparrow (⠄)	77	\Leftarrow (⤠)	80	\leftrightharpoons (⤠)	74
\nhpar (⠄)	56	\Leftarrow (⤠)	76	\leftrightharpoons (⤠)	74
\nHuparrow (⠄)	80	\Leftarrow (⤠)	73	\leftrightharpoonupdown (⤠)	79
\nHuparrow (⠄)	83	\Leftarrow (⤠)	83		
\nhVvert (⠄)	32	\Leftarrow (⤠)	70		

\nleftrightharpoonupdown (↔)	74	\nlessdot (≲)	64	\nMapsto (⤵)	78
\nLeftrightline (=)	50	\nlessdot (≲)	63	\nmapsto (⤵)	78
\nleftrightline (+)	50	\nlesseqtr (≳)	64	\nmapsto (⤵)	74
\nleftrightspoon (∾)	85	\nlesseqtr (≳)	63	\nMapsup (⤶)	78
\nleftrightsquigarrow (↭)	77	\nlesseqtrslant (≳)	64	\nmapsup (⤶)	78
\nleftrightsquigarrow (↭)	74	\nlesseqtrslant (≳)	63	\nmid (⤷)	47
\nleftrightharpoonup (⤵)	77	\nlesseqgtr (≳)	64	\nmid (⤷)	54
\nleftrightharpoonup (⤵)	77	\nlesseqgtr (≳)	63	\nmid (⤷)	53
\nleftrightharpoonup (⤵)	77	\nlesseqgtr (≳)	63	\nmid (⤷)	51
\nleftrightharpoonup (⤵)	77	\nlesseqgtr (≳)	63	\nmid (⤷)	56
\nleftrightharpoonup (⤵)	77	\nlesseqslantgtr (≳)	64	\nmidcir (⤷)	85
\nleftrightharpoonup (⤵)	73	\nlessgtr (≲)	62	\nmodels (⤵)	53
\nleftrightharpoonup (⤵)	73	\nlessgtr (≲)	64	\nmodels (⤵)	51
\nleftrightharpoonup (⤵)	85	\nlessgtr (≲)	63	\nmultimap (⤵)	85
\nleftrightharpoonup (⤵)	84	\nlessgtr (≲)	63	\nmultimap (⤵)	84
\nleftrightharpoonup (⤵)	77	\nlessgtr (≲)	66	\nmultimapinv (⤵)	85
\nleftupcurvedarrow (⤷)	78	\nlessssim (≲)	62	\nN (⤵)	121
\nleftVDash (⤷)	53	\nlessssim (≲)	62	\nnndtstile (⤷)	57
\nleftVdash (⤷)	53	\nlessssim (≲)	64	\nNearrow (⤷)	77
\nleftVdash (⤷)	50	\nlessssim (≲)	66	\nNearrow (⤷)	72
\nleftvDash (⤷)	53	\nlhookdownarrow (⤷)	73	\nnearrow (⤷)	70
\nleftvdash (⤷)	53	\nlhookleftarrow (⤵)	73	\nnearrow (⤷)	79
\nleftvdash (⤷)	50	\nlhooknearrow (⤷)	73	\nnearrow (⤷)	77
\nleftwavearrow (⤵)	77	\nlhooknwarrow (⤷)	72	\nnearrow (⤷)	72
\nleq (≲)	62	\nlhookrightarrow (⤵)	72	\nnearrowtail (⤷)	77
\nleq (≲)	61, 62	\nlhooksearrow (⤷)	72	\nnearrowtail (⤷)	73
\nleq (≲)	65	\nlhookswarrow (⤷)	72	\nnebkarrow (⤷)	77
\nleq (≲)	64	\nlhookuparrow (⤷)	72	\nnefilledspoon (⤷)	84
\nleq (≲)	63	\nll (≲)	62	\nnefootline (⤷)	50
\nleq (≲)	66	\nll (≲)	64	\nnefree (⤷)	50
\nleqclosed (⤵)	64, 68	\nll (≲)	63	\nneharpoonccw (⤷)	74
\nleqclosed (⤵)	63, 67	\nlll (≪)	66	\nneharpooncw (⤷)	74
\nleqdot (⤵)	64	\nlll (≪)	66	\nneharpoonnw (⤷)	79
\nleqdot (⤵)	63	\nLleftarrow (⤵)	77	\nneharpoonse (⤷)	79
\nleqq (⊲)	62	\nLleftarrow (⤵)	72	\nnelcurvearrow (⤷)	78
\nleqq (⊲)	61	\nLleftarrow (⤵)	77	\nnelsquigarrow (⤷)	73
\nleqq (⊲)	65	\nlongdashv (⤵)	53	\nnemapsto (⤷)	73
\nleqq (⊲)	64	\nlongleadsto (⤵)	78	\nneModels (⤷)	50
\nleqq (⊲)	63	\nLongleftarrow (⤵)	77	\nnemodels (⤷)	50
\nleqq (⊲)	66	\nlongleftarrow (⤵)	77	\nnenearrows (⤷)	77
\nleqlslant (⤵)	61	\nlongleftfootline (⤵)	53	\nnenearrows (⤷)	73
\nleqlslant (⤵)	65	\nlongleftrightarrow (⤵)	77	\nnepitchfork (⤷)	84
\nleqlslant (⤵)	64	\nlongleftrightarrow (⤵)	77	\nnercurvearrow (⤷)	78
\nleqlslant (⤵)	63	\nlongleftsquigarrow (⤵)	78	\nnersquigarrow (⤷)	73
\nleqlslant (⤵)	66	\nlongleftsquigarrow (⤵)	78	\nnespoon (⤷)	84
\nleqlslantdot (⤵)	64	\nlongleftwavearrow (⤵)	77	\nNeswarrow (⤷)	77
\nleqlslantdot (⤵)	63	\nlongleftwavearrow (⤵)	77	\nNeswarrow (⤷)	73
\nleqlslcc (⤵)	64	\nLongmapsfrom (⤵)	53, 77	\nneswarrow (⤷)	77
\nlescc (⤵)	64	\nlongmapsfrom (⤵)	53, 77	\nneswarrow (⤷)	73
\nlesdot (⤵)	64	\nLongmapsto (⤵)	77	\nneswarrows (⤷)	77
\nlesg (⤵)	64	\nlongmapsto (⤵)	77	\nneswarrows (⤷)	73
\nless (≲)	62	\nLongrightarrow (⤵)	77	\nneswcurvearrow (⤷)	78
\nless (≲)	61	\nlongrightarrow (⤵)	77	\nneswharpoonnwse (⤷)	79
\nless (≲)	65	\nlongrightfootline (⤵)	53	\nneswharpoonnwse (⤷)	74
\nless (≲)	64	\nlongrightsquigarrow (⤵)	78	\nneswharpoons (⤷)	79
\nless (≲)	63	\nlongrightsquigarrow (⤵)	78	\nneswharpoons (⤷)	74
\nless (≲)	66	\nlongrightwavearrow (⤵)	77	\nneswharpoonsenw (⤷)	79
\nlessapprox (⤵)	62	\nlongrightwavearrow (⤵)	77	\nneswharpoonsenw (⤷)	74
\nlessapprox (⤵)	62	\nltcc (⤵)	64	\nNeswline (⤷)	50
\nlessapprox (⤵)	64	\nMapsdown (⤶)	78	\nneswline (⤷)	50
\nlesscc (⤵)	64	\nmapsdown (⤶)	78	\nnevDash (⤷)	50
\nlessclosed (⤵)	64, 68	\nMapsfrom (⤵)	78	\nni (⤵)	53
\nlessclosed (⤵)	63, 67	\nmapsfrom (⤵)	78		

\nni (Ξ)	92
\nni (Ξ)	56
\nnststile (▀)	57
\nntstile (▀)	57
\nnttstile (▀▀)	57
\nNwarrow (☒)	77
\nNwarrow (☒)	73
\nnwarrow (↑)	70
\nnwarrow (↑)	79
\nnwarrow (☒)	77
\nnwarrow (☒)	73
\nnwarrowtail (☒)	77
\nnwarrowtail (☒)	73
\nnwbkarrown (☒)	77
\nnwfilledspoon (☒)	84
\nnwfootline (☒)	51
\nnwfree (☒)	51
\nnwharpoonccw (☒)	74
\nnwharpooncw (☒)	74
\nnwharpoonne (☒)	79
\nnwharpoonsw (☒)	79
\nnwlcurvearrow (☒)	78
\nnwlsquigarrow (☒)	73
\nnwmapsto (☒)	73
\nnwModels (☒)	51
\nnwmodels (☒)	51
\nnwnwarrows (☒)	77
\nnwnwarrows (☒)	73
\nnwpitchfork (☒)	84
\nnwrcurvearrow (☒)	78
\nnwrsquigarrow (☒)	73
\nNwsearrow (☒)	77
\nNwsearrow (☒)	73
\nnwsearrow (☒)	77
\nnwsearrow (☒)	73
\nnwsearrows (☒)	77
\nnwsearrows (☒)	73
\nnwsearrows (☒)	73
\nnwsecurvearrow (☒)	78
\nnwseharpoonnesw (☒)	79
\nnwseharpoonnesw (☒)	74
\nnwseharpoons (☒)	79
\nnwseharpoons (☒)	74
\nnwseharpoonswne (☒)	79
\nnwseharpoonswne (☒)	74
\nNwseline (☒)	51
\nnwseline (☒)	51
\nnwspoon (☒)	84
\nnwVdash (☒)	51
\nnwvdash (☒)	51
no entry	see \noway
\NoBleech (△)	165
\NoChemicalCleaning (○)	165
nointegrals (wasysym package option)	38
\NoIroning (〓)	165
non-commutative division	107
nonbreaking space	122
NOR gates	123

\NORd (123
\norigof (85



\NORl (123
norm	see \lVert and \rVert
\NORr (123
\NorthNode (Ω)	120
\NORu (123
\Norway (●)	177
\NoSun (●)	166
\Not (⌐)	55
not	see \neg
\not	49, 211
not equal (≠ vs. ±)	49
\notasymp (⌐)	49
\notbackslash (⊐)	121
\notbot (⌐)	91
\notbot (⌐)	114
\notchar (⊓)	55
\NotCongruent (⌐)	110
\notdivides (⌐)	49
\notequiv (⌐)	49
\notin (∉)	91
\notin (∉)	91
\notin (∉)	92
\notin (∉)	53
\notin (∉)	92
\notin (∉)	91
\notin (∉)	56
\notni (⌐)	91
\notowner (⌐)	91
\notowns	see \notowner and \notni
\notperp (⊥)	49
\notslash (⊐)	121
\notsmallin (∉)	92
\notsmallowns (⌐)	92
\nottop (⊤)	91
\nottop (⊤)	114
\NoTumbler (□)	165
\novelty (N)	169
\noway (●)	165
\nowns (⌐)	53, 92
\nowns (Ξ)	92
\nowns (⌐)	91
\parallel ()	47
\parallel ()	54
\parallel ()	53
\parallel ()	51
\parallel ()	56
\parallel ()	58
\nperp (⊥)	53
\nperp (⊥)	51
\npitchfork (⊔)	86
\npitchfork (⊔)	84
\nplus (⊕)	28
\nplus (⊕)	31
\npoint (♂)	44
\nointsl (♂)	45
\nointup (♂)	45
\nprec (⌢)	49

\nprec (⌢)	47
\nprec (⌢)	54
\nprec (⌢)	53
\nprec (⌢)	51
\nprec (⌢)	56
\nprecapprox (⌢)	49
\nprecapprox (⌢)	48
\nprecapprox (⌢)	53
\nprecapprox (⌢)	51
\npreccurlyeq (⌢)	49
\npreccurlyeq (⌢)	48
\npreccurlyeq (⌢)	53
\npreccurlyeq (⌢)	51
\npreccurlyeq (⌢)	56
\npreceq (⌢)	49
\npreceq (⌢)	47
\npreceq (⌢)	54
\npreceq (⌢)	53
\npreceq (⌢)	51
\npreceq (⌢)	56
\npreceqq (⌢)	48
\npreceqq (⌢)	53
\nprecsim (⌢)	49
\nprecsim (⌢)	48
\nprecsim (⌢)	53
\nprecsim (⌢)	51
\NR (₩)	121
\ncirclearrowdown (◐)	73
\ncirclearrowleft (◑)	73
\ncirclearrowright (◑)	73
\ncirclearrowup (◑)	73
\ncurvearrowdown (↓)	73
\curvearrowleft (↶)	73
\curvearrowone (↷)	73
\curvearrownw (↖)	73
\curvearrowright (↷)	73
\curvearrowse (↘)	73
\curvearrowsw (↙)	73
\curvearrowup (↑)	73
\nRelbar (=)	51
\relbar (+)	51
\restriction (‡)	79
\restriction (‡)	74
\hookdownarrow (‡)	73
\hookleftarrow (↶)	73
\hooknearrow (↷)	73
\hooknarrow (⤏)	73
\hookrightarrow (⤏)	73
\hooksearrow (⤏)	73
\hookswarrow (⤏)	73
\hookuparrow (‡)	73
\rightarrow (⇒)	70
\rightarrow (⇒)	69
\rightarrow (⇒)	80
\rightarrow (⇒)	77
\rightarrow (⇒)	73
\rightarrow (⇒)	83
\rightarrow (⇒)	83

\nrightarrowtail (⤠)	77	\nsearrowtail (⤡)	73	\nsqdoublefrown (⤢)	85
\nrightarrowtail (⤠)	73	\nsebkarrow (⤢)	76	\nsqdoublesmile (⤣)	85
\nrightAssert (⤤)	53	\nsefilledspoon (⤥)	84	\nsqdoublesmileeq (⤣)	85
\nrightassert (⤤)	53	\nsefootline (⤦)	50	\nsqeqlfrown (⤤)	85
\nrightbkarrow (⤧)	77	\nsefree (⤧)	50	\nsqeqlsmile (⤤)	85
\nrightblackspoon (⤧)	85	\nseharpoonccw (⤨)	74	\nsqfrown (⤧)	85
\nrightcurvedarrow (⤧)	77	\nseharpooncw (⤩)	74	\nsqfrown (⤢)	85
\nrightdowncurvedarrow (⤪)		\nseharpoonne (⤪)	79	\nsqfrownqsmile (⤢)	85
	77	\nseharpoonsw (⤪)	79	\nsqfrownsmile (⤢)	85
\nrightfilledspoon (⤧)	84	\nsecurvearrow (⤪)	78	\nsqsmile (⤧)	85
\nrightfootline (⤧)	53	\nselsquigarrow (⤪)	73	\nsqsmileeq (⤢)	85
\nrightfootline (⤧)	51	\nsemapsto (⤪)	73	\nsqsmileeqfrown (⤢)	85
\nrightfree (⤧)	51	\nseModels (⤩)	50	\nsqsmilefrown (⤢)	85
\nightharpoonccw (⤧)	74	\nsemmodels (⤩)	50	\nSqssubset (⤤)	60
\nightharpooncw (⤧)	74	\nsenarrows (⤩)	76	\nSqssubset (⤤)	60
\nightharpoondown (⤧)	79	\nsenarrows (⤩)	73	\nSqSubset (⤤)	59
\nightharpoonup (⤧)	79	\nsenwcurvearrow (⤪)	78	\nSqsubset (⤤)	59
\nrightlcurvearrow (⤧)	77	\nsenwharpoons (⤩)	79	\nSqsubset (⤤)	59
\nrightleftarrows (⤤)	77	\nsenwharpoons (⤩)	74	\nSqsubset (⤤)	60
\nrightleftarrows (⤤)	72	\nsepitchfork (⤩)	84	\nSqsubset (⤤)	60
\nrightleftcurvearrow (⤧)		\nsercurvearrow (⤪)	78	\nSqsubset (⤤)	61
	77	\nsersquigarrow (⤪)	73	\nSqsubseteq (⤤)	59
\nrightleftharpoons (⤤)	79	\nsesearrows (⤩)	76	\nSqsubseteq (⤤)	59
\nrightleftharpoons (⤤)	74	\nsesearrows (⤩)	73	\nSqsubseteq (⤤)	60
\nrightleftsquigarrow (⤧)		\nsespoon (⤩)	84	\nSqsubseteq (⤤)	60
	77	\nseVdash (⤩)	50	\nSqsubseteq (⤤)	61
\nrightlsquigarrow (⤧)	77	\nsevdash (⤩)	50	\nSqsubseteqq (⤤)	59
\nrightlsquigarrow (⤧)	72	\nshortdowntack (⤤)	53	\nSqsubseteqq (⤤)	60
\nRightmapsto (⤤)	77	\nshortlefttack (⤤)	53	\nSqsubseteqq (⤤)	60
\nrightmapsto (⤧)	77	\nshortmid (⤤)	47	\nSqsupset (⤤)	60
\nrightmapsto (⤧)	72	\nshortmid (⤤)	54	\nSqsupset (⤤)	60
\nrightModels (⤤)	51	\nshortmid (⤤)	53	\nSqsupset (⤤)	59
\nrightmodels (⤤)	53	\nshortmid (⤤)	50	\nSqsupset (⤤)	59
\nrightmodels (⤤)	51	\nshortmid (⤤)	56	\nSqsupset (⤤)	60
\nrightpitchfork (⤤)	86	\nshortparallel (⤤)	47	\nSqsupset (⤤)	60
\nrightpitchfork (⤤)	84	\nshortparallel (⤤)	54	\nSqsupset (⤤)	61
\nrightrcurvearrow (⤧)	77	\nshortparallel (⤤)	53	\nSqsupseteq (⤤)	59
\nrightrightarrows (⤤)	77	\nshortparallel (⤤)	50	\nSqsupseteq (⤤)	59
\nrightrightarrows (⤤)	72	\nshortparallel (⤤)	56	\nSqsupseteq (⤤)	60
\nrightrsquigarrow (⤧)	77	\nshortrighttack (⤤)	53	\nSqsupseteq (⤤)	60
\nrightrsquigarrow (⤧)	72	\nshortuptack (⤤)	53	\nSqsupseteq (⤤)	60
\nrightspoon (⤧)	85	\nsim (⤧)	49	\nSqsupseteq (⤤)	61
\nrightspoon (⤧)	84	\nsim (⤧)	47	\nSqsupseteqq (⤤)	59
\nightsquigarrow (⤧)	78	\nsim (⤧)	54	\nSqsupseteqq (⤤)	60
\nightsquigarrow (⤧)	74	\nsim (⤧)	53	\nSqsupseteqq (⤤)	60
\nrightupcurvedarrow (⤧)	78	\nsim (⤧)	50	\nSqtriplefrown (⤤)	85
\nrightVDash (⤤)	53	\nsim (⤧)	56	\nSqtriplesmile (⤤)	85
\nrightVdash (⤤)	53	\nsime (⤤)	53	\nSquigarrowdownup (⤤)	73
\nrightVdash (⤤)	51	\nsime (⤤)	56	\nSquigarrowleftright (⤧)	
\nrightvDash (⤤)	53	\nsimeq (⤤)	49		73
\nrightvdash (⤤)	53	\nsimeq (⤤)	48	\nSquigarrownesw (⤧)	73
\nrightvdash (⤤)	51	\nsimeq (⤤)	53	\nSquigarrownwse (⤤)	73
\nrightwavearrow (⤧)	77	\nsimeq (⤤)	50	\nSquigarrowrightleft (⤤)	
\nrisingdotseq (⤤)	53	\nsimeq (⤤)	56		73
\nrisingdotseq (⤤)	50	\nsmile (⤤)	53, 86	\nSquigarrowsenw (⤤)	73
\nRightarrow (⤤)	76	\nsmile (⤤)	85	\nSquigarrowswne (⤤)	73
\nRightarrow (⤤)	72	\nsmileeq (⤤)	53, 86	\nSquigarrowupdown (⤤)	73
\nsdtstile (⤤)	57	\nsmileeq (⤤)	85	\nSststile (⤤)	57
\nSearrow (⤤)	76	\nsmilerefrown (⤤)	85	\nstareq (⤤)	53
\nSearrow (⤤)	72	\nsmilerefrown (⤤)	53, 86	\nststile (⤤)	57
\nsearrow (⤤)	76	\nsmilerefrown (⤤)	85	\nsttstile (⤤)	57
\nsearrow (⤤)	72	\nsmilerefrown (⤤)	85	\nSubset (⤤)	59
\nsearrowtail (⤤)	76	\nsqdoublefrown (⤤)	85	\nSubset (⤤)	59

\nSubset (⌚)	60	\nsupseteqq (⌚)	60	\ntrianglerighteq (⌚)	66
\nSubset (⌚)	60	\nsupseteqq (⌚)	60	\ntrianglerighteq (⌚)	68
\nsubset (⌚)	59	\nsupseteqq (⌚)	60	\ntrianglerighteq (⌚)	68
\nsubset (⌚)	60	\nsupseteqq (⌚)	61	\ntrianglerighteq (⌚)	63, 67
\nsubset (⌚)	60	\nSwallow (𝕏)	77	\ntrianglerighteq (⌚)	68
\nsubset (⌚)	60	\nSwallow (𝕏)	73	\ntrianglerighteqslant (⌚)	
\nsubset (⌚)	61	\nswarrow (×)	76		66
\nsubseteq (⌚)	59	\nswarrow (×)	73	\ntriplefrown (❀)	85
\nsubseteq (⌚)	59	\nswarrowtail (⤔)	77	\ntriplesim (⌘)	53
\nsubseteq (⌚)	60	\nswarrowtail (⤔)	73	\ntriplesim (❀)	51
\nsubseteq (⌚)	60	\nswbkarrow (⤔)	77	\ntriplesmile (Ỳ)	85
\nsubseteq (⌚)	60	\nswfilledspoon (⤔)	84	\ntststile (≡)	57
\nsubseteq (⌚)	61	\nswfootline (⤔)	51	\nttstile (≡)	57
\nsubseteqq (⌚)	59	\nswfree (⤔)	51	\nhttstile (≡)	57
\nsubseteqq (⌚)	59	\nswharpoonccw (⤔)	74	\ntwoheaddownarrow (⤔)	77
\nsubseteqq (⌚)	60	\nswharpooncw (⤔)	74	\ntwoheaddownarrow (⤔)	73
\nsubseteqq (⌚)	60	\nswharpoonnw (⤔)	79	\ntwoheadleftarrow (⤔)	48
\nsubseteqq (⌚)	60	\nswharpoonse (⤔)	79	\ntwoheadleftarrow (⤔)	77
\nsubseteqq (⌚)	61	\nswlcurvearrow (⤔)	78	\ntwoheadleftarrow (⤔)	73
\nsucc (✚)	49	\nswlsquigarrow (⤔)	73	\ntwoheadnearrow (⤔)	77
\nsucc (✚)	47	\nswmapsto (⤔)	73	\ntwoheadnearrow (⤔)	73
\nsucc (✚)	54	\nswModels (❀)	51	\ntwoheadnarrow (⤔)	77
\nsucc (✚)	53	\nswmodels (❀)	51	\ntwoheadnarrow (⤔)	73
\nsucc (✚)	50	\nswnearrows (⤔)	77	\ntwoheadnarrow (⤔)	73
\nsucc (✚)	56	\nswnearrows (⤔)	73	\ntwoheadrightarrow (⤔)	48
\nsuccapprox (⌘)	49	\nswnecurvearrow (⤔)	78	\ntwoheadrightarrow (⤔)	77
\nsuccapprox (⌘)	48	\nswneharpoons (⤔)	79	\ntwoheadrightarrow (⤔)	73
\nsuccapprox (⌘)	53	\nswneharpoons (⤔)	74	\ntwoheadsearrow (⤔)	77
\nsuccapprox (⌘)	50	\nswpitchfork (⤔)	84	\ntwoheadsearrow (⤔)	73
\nsucccurlyeq (❀)	49	\nswrcurvearrow (⤔)	78	\ntwoheadswarrow (⤔)	77
\nsucccurlyeq (❀)	48	\nswrsquigarrow (⤔)	73	\ntwoheadswarrow (⤔)	73
\nsucccurlyeq (❀)	53	\nswspoon (⤔)	84	\ntwoheaduparrow (⤔)	77
\nsucccurlyeq (❀)	50	\nswswallows (⤔)	77	\ntwoheaduparrow (⤔)	73
\nsucccurlyeq (❀)	56	\nswswallows (⤔)	73	\nNu (N)	88
\nsucceq (⌚)	49	\nswVdash (❀)	51	\nu (ν)	88
\nsucceq (⌚)	47	\nsvdash (⤔)	51	nuclear power plant	see \SNPP
\nsucceq (⌚)	54	\NT (❀)	121	\nucleus (❖)	125
\nsucceq (⌚)	53	\ntdtstile (≡)	57	\NUL (߂)	122
\nsucceq (⌚)	50	\ntheorem (package)	112	\NUL (߂)	122
\nsucceq (⌚)	56	\nthickapprox (⌘)	48	null infinity	see alphabets, math
\nsucceqq (⌚)	48	\nto (⤔)	78	null set	111–114
\nsucceqq (⌚)	53	\nto (⤔)	74	number sets	see alphabets, math
\nsuccsim (⌚)	49	\ntriangleeq (⌚)	68	number sign	see \textnumero
\nsuccsim (⌚)	48	\ntriangleeq (⌚)	67	numbers	see numerals
\nsuccsim (⌚)	53	\ntriangleleft (⌚)	66	numerals	26, 110, 118, 130, 163,
\nSupset (⌚)	59	\ntriangleleft (⌚)	66	170, 171, 186–187, 204	
\nSupset (⌚)	59	\ntriangleleft (⌚)	68	circled	130, 170, 171, 204
\nSupset (⌚)	60	\ntriangleleft (⌚)	68	Epi-Olmec	146
\nSupset (⌚)	60	\ntriangleleft (⌚)	63, 67	Isthmian	146
\nSupset (⌚)	59	\ntrianglelefteq (⌚)	66	LCD	118
\nSupset (⌚)	60	\ntrianglelefteq (⌚)	66	Linear B	142
\nSupset (⌚)	59	\ntrianglelefteq (⌚)	68	Mayan	110
\nSupset (⌚)	60	\ntrianglelefteq (⌚)	68	old-style	26
\nSupset (⌚)	60	\ntrianglelefteq (⌚)	63, 67	segmented	118
\nSupset (⌚)	59	\ntrianglelefteq (⌚)	66	\NumLock (Num)	122
\nSupset (⌚)	60	\ntrianglelefteq (⌚)	66	\nUparrow (⤔)	77
\nSupset (⌚)	60	\ntrianglelefteq (⌚)	68	\nUparrow (⤔)	73
\nSupset (⌚)	60	\ntrianglelefteq (⌚)	68	\nuparrow (↑)	77
\nSupset (⌚)	61	\ntrianglelefteq (⌚)	68	\nuparrow (↑)	73
\nSupseteq (⌚)	59	\ntrianglelefteq (⌚)	63, 67	\nuparrowtail (⤔)	77
\nSupseteq (⌚)	59	\ntrianglelefteq (⌚)	66		

\nuparrowtail (‡)	73	\nuup (ν)	89	\nvlongdash (↔)	53
\nupAssert (±)	53	\nUparrow (⤒)	77	\nVrightarrow (⤔)	80
\nupassert (±)	53	\nvardownwavearrow (⤓)	77	\nVrightarrow (⤔)	83
\nupbkarrow (⤓)	77	\nvargeq (⤒)	62	\nvRightarrow (⤔)	83
\nupblackspoon (⤒)	85	\nvarhookdownarrow (⤒)	77	\nvrightarrow (⤔)	83
\nUpdownarrow (⤒)	77	\nvarhookleftarrow (⤔)	77	\nVrightarrowtail (⤔⤔)	83
\nUpdownarrow (⤒)	73	\nvarhooknearrow (⤔)	77	\nvrightarrowtail (⤔⤔)	83
\nupdownarrow (⤒)	77	\nvarhooknarrow (⤔)	77	\nVtwoheadleftarrow (⤔⤔)	83
\nupdownarrow (⤒)	73	\nvarhookrightarrow (⤔)	77	\nvtwoheadleftarrow (⤔⤔)	83
\nupdownarrows (⤒)	77	\nvarhooksearrow (⤔)	77	\nVtwoheadleftarrowtail (⤔⤔)	83
\nupdownarrows (⤒)	73	\nvarhookswarrow (⤔)	77	\nvtwoheadleftarrowtail (⤔⤔)	83
\nupdowncurvearrow (⤒)	78	\nvarhookuparrow (⤒)	77	\nVtwoheadrightarrow (⤔⤔)	83
\nupdownharpoonleftright (⤒)	79	\nvarisinobar (⤒)	56	\nvtwoheadrightarrow (⤔⤔)	83
\nupdownharpoonleftright (⤒)	74	\nvarleftrightwavearrow (⤔⤔)	77	\nVtwoheadrightarrow (⤔⤔)	83
\nupdownharpoonrightleft (⤒)	79	\nvarleftwavearrow (⤔)	77	\nvtwoheadrightarrow (⤔⤔)	83
\nupdownharpoonrightleft (⤒)	74	\nvarleq (⤒)	62	\nVtwoheadrightarrowtail (⤔⤔)	83
\nupdownharpoons (⤒)	79	\nvarniobar (⤒)	56	\nVtwoheadrightarrowtail (⤔⤔)	83
\nupdownharpoons (⤒)	74	\nvarparallel (⤒)	48	\nVtwoheadrightarrowtail (⤔⤔)	83
\nupdownharpoonsleftright (⤒)	79	\nvarparallelinv (⤒)	48	\nVvash (⤒)	49
\nUpdownline (⤒)	51	\nvarrightwavearrow (⤔)	77	\nVvdash (⤒⤒)	53
\nupdownline (⤒)	51	\nvartriangleleft (⤔)	68	\Nwarrow (⤒)	70
\nupsquigarrow (⤒)	78	\nvartriangleright (⤔)	68	\Nwarrow (⤒)	79
\nupdownwavearrow (⤒)	77	\nvarupdownwavearrow (⤒)	77	\Nwarrow (⤒)	75
\nupfilledspoon (⤒)	84	\nvarupwavearrow (⤒)	77	\Nwarrow (⤒)	71
\nupfootline (⤒)	51	\nvBar (⤒)	53	\Nwarrow (⤒)	81
\nupfree (⤒)	51	\nvBar (⤒)	53	\nwarrow (⤒)	70
\nupharpoonccw (⤒)	74	\nVDash (⤒)	49	\nwarrow (⤒)	69, 213
\nupharpooncw (⤒)	74	\nVDash (⤒)	47	\nwarrow (⤒)	75
\nupharpoonleft (⤒)	79	\nVDash (⤒)	54	\nwarrow (⤒)	71
\nupharpoonright (⤒)	79	\nVDash (⤒⤒)	53	\nwarrow (⤒)	81
\nplcurvearrow (⤒)	78	\nVdash (⤒)	51	\narrowcorner (⤒)	79
\npleftcurvedarrow (⤒)	78	\nVdash (⤒⤒)	56	\narrowtail (⤒)	75
\nplsquigarrow (⤒)	78	\nVdash (⤒⤒)	49	\narrowtail (⤒)	71
\nplsquigarrow (⤒)	73	\nVdash (⤒⤒)	48	\nbarrow (⤒)	75
\nUpmapsto (⤒)	77	\nVdash (⤒⤒)	54	\nwedgeq (⤒)	53
\nupmapsto (⤒)	77	\nVdash (⤒⤒)	53	\nwilledspoon (⤒)	84
\nupmapsto (⤒)	73	\nVdash (⤒⤒)	51	\nwfootline (⤒)	49
\nupModels (⤒)	51	\nVdash (⤒⤒)	56	\nwfree (⤒)	49
\nupmodels (⤒)	53	\nVdash (⤒⤒)	53	\nwharpoonccw (⤒)	74
\nupmodels (⤒)	51	\nVdash (⤒⤒)	51	\nwharpooncw (⤒)	74
\nuppitchfork (⤒)	86	\nVdash (⤒⤒)	56	\nwharpoonne (⤒)	78
\nuppitchfork (⤒)	84	\nvdash (⤒)	49	\nwharpoonsw (⤒)	78
\nprcurvearrow (⤒)	78	\nvdash (⤒)	47	\nwhiteblackspoon (⤒⤒)	85
\nprightcurvearrow (⤒)	78	\nvdash (⤒)	54	\nwlcurvearrow (⤒)	76
\nprsquigarrow (⤒)	78	\nvdash (⤒)	53	\nwlsquigarrow (⤒)	71
\nprsquigarrow (⤒)	73	\nvdash (⤒)	53	\nwmapsto (⤒)	71
\nupspoon (⤒)	85	\nvdash (⤒)	51	\nwModels (⤒)	49
\nupspoon (⤒)	84	\nvdash (⤒)	56	\nwmodels (⤒)	49
\nupuparrows (⤒)	77	\nvdash (⤒)	51	\nwnnarrows (⤒)	75
\nupuparrows (⤒)	73	\nvdash (⤒)	56	\nwnnarrows (⤒)	71
\nupVDash (⤒)	53	\nVdash (⤒)	53	\nwovnearrow (⤒)	81
\nupVdash (⤒)	53	\nVdash (⤒)	53	\nwpitchfork (⤒)	84
\nupVdash (⤒)	51	\nVdash (⤒)	51	\nwrcurvearrow (⤒)	76
\nupvDash (⤒)	53	\nVdash (⤒)	80	\nwrsquigarrow (⤒)	71
\nupvDash (⤒)	53	\nVleftarrow (⤔)	83	\nWsearrow (⤒)	75
\nupvDash (⤒)	51	\nVleftarrow (⤔)	83	\nWsearrow (⤒)	71
\nupwavearrow (⤒)	77	\nVleftarrow (⤔)	83	\nWsearrow (⤒)	213
\Nursey (⤒)	179	\nVleftarrowtail (⤔⤔)	83	\nWsearrow (⤒)	75
		\nVleftarrowtail (⤔⤔)	83	\nWsearrow (⤒)	71
		\nVleftrightarrow (⤔⤔)	83	\nWsearrow (⤒)	81
		\nLeftrightarrow (⤔⤔)	83	\nWsearrows (⤒)	75
		\nLeftrightarrow (⤔⤔)	83	\nWsearrows (⤒)	71

\nwsebipropto (%)	30	\odplus (\oplus)	33	old-style numerals	26
\nwsecrossing (+)	49	\OE (Œ)	14, 223	\olddWinkey (⌚)	179
\nwsecurvearrow (↶)	76	\oe (œ)	14, 223	\oldGclef (⌚)	149
\nwseharpoonnesw (↖)	78	\oequal (⊖)	34	\oldstylenums	26
\nwseharpoonnesw (↖)	74	\Open (▣)	179	\oldWinkey (⌚)	179
\nwseharpoons (⤳)	78	\officialeuro (€)	25	\oleft (\oplus)	33
\nwseharpoons (⤳)	74	\offinterlineskip	211	\oleft (\oplus)	35
\nwseharpoonswe (⤴)	78	ogonek (package)	23, 226, 227	\olessthan (\ominus)	28
\nwseharpoonswe (⤴)	74	ogonek (■) <i>see accents</i>		\olessthan (\ominus)	35
\Nwseline (⤵)	49	\ogreaterthan (\ominus)	28	\olessthan (\ominus)	36
\nwseline (⤵)	49	\ogreaterthan (\ominus)	35	Olschok, Marc	209
\nwspoon (⤶)	84	\ogreaterthan (\ominus)	36	\OM (ω)	121
\nwVdash (⤷)	50	\ohill (⚐)	22	\Omega (Ω)	88
\nwvDash (⤸)	49	ohm <i>see \textohm</i>		\omega (ω)	88
O					
\Ø (Ø)	14	\ohm (Ω)	118	\omegaup (ω)	89
\ø (ø)	14	\Ohne (⌚)	149	\Omicron (Ο)	88
o (o)	88	\ohorn (σ)	15	\omicron (ο)	88
\oast (⊗)	34	\oiint (fff)	40	\ominus (⊖)	33
\oast (⊗)	34	\oiint (fff)	42	\ominus (⊖)	28
\oasterisk (⊗)	33	\oiint (fff)	46	\ominus (⊖)	35
\obackslash (⊗)	33	\oiint (fff)	43	\ominus (⊖)	34
\obackslash (⊗)	34	\oiintclockwise (fff)	40	\ominus (⊖)	34
\obackslash (⊗)	34	\oiintctrcclockwise (fff)	40	\onlymove (□)	169
\obar (⊕)	28	\oiintsl (fff)	44	\oo (oo)	171
\obar (⊕)	35	\oiintup (fff)	44	\oo (oo)	18
\obar (Φ)	36	\oint (ʃ)	39	\oalign	211
\Obelus (—)	171	\oint (ʃ)	38	\open (.)	23
\obelus (—)	171	\oint (ʃ)	40	open unit disk (𝔻) <i>see alphabets, math</i>	
\Obelus* (÷)	171	\oint (ʃ)	40	\openJoin (×)	48
\obelus* (÷)	171	\oint (ʃ)	42	\openo (ɔ)	18
\oblong (□)	28	\oint (ʃ)	46	\openo (ɔ)	18
\oblong (□)	35	\oint (ʃ)	41	\openo (ɔ)	18
\obot (⊕)	33	\oint (ʃ)	43	\opentimes (×)	48
\obot (⊕)	35	\ointclockwise (ʃ)	40	OpenType	147
\obot (⊕)	36	\ointctrcclockwise (ʃ)	40	operators	27–29, 32–34
\obrbrak (—)	114	\ointsl (ʃ)	44	binary	28–36
\obslash (⊗)	28	\ointup (ʃ)	44	logical	<i>see logical operators</i>
\obslash (⊗)	35	\oint (ʃ)	39	set	<i>see set operators</i>
\obslash (⊗)	35	\oint (ʃ)	38	unary	27
\obslash (⊗)	36	\oint (ʃ)	38	\operp (⊕)	36
\oc ()	27	\oint (ʃ)	38	\oplus (⊕)	33
\ocirc (◎)	33	\oint (ʃ)	37	\oplus (⊕)	27, 28, 209
\ocirc (◎)	34	\oint (ʃ)	42	\oplus (⊕)	35
\ocirc (◎)	34	\oint (ʃ)	41	\oplus (⊕)	34
\ocircle (○)	29	\oint (ʃ)	43	\oplus (⊕)	34
\ocoasterisk (⊗)	33	\ointclockwise (ʃ)	39	\oplus (⊕)	36
\ocommatopright (▮)	101	\ointclockwise (ʃ)	40	\opluslhrim (⊕)	32
\octagon (○)	132	\ointclockwise (ʃ)	43	\oplusrhrim (⊕)	32
octonions (𝕆) . <i>see alphabets, math</i>		\ointclockwise (ʃ)	46	\opposbishops (▣)	169
\Octosteele (●)	123	\ointctrcclockwise (ʃ)	39	\Opposition (¤)	120
\od (■)	22	\ointctrcclockwise (ʃ)	40	\opposition (○)	119
\odash (⊖)	34	\ointctrcclockwise (ʃ)	43	optical scaling	216
\odiv (⊕)	33	\ointctrcclockwise (ʃ)	46	options . <i>see package options</i>	
\odiv (⊕)	36	\ointctrcclockwise (ʃ)	43	\OR (∨)	121
\odot (◎)	33	\ointctrcclockwise (ʃ)	44	or . <i>see \vee</i>	
\odot (◎)	28	\ointctrcclockwisesl (ʃ)	44	OR gates	123
\odot (◎)	34	\ointctrcclockwiseup (ʃ)	44	\orbit (⌚)	125
\odot (◎)	34	\ointsl (ʃ)	44		
\odot (◎)	36	\ointup (ʃ)	44		
\odotslashdot (⊗)	36	\olcross (⊗)	36		

	\ORd (123
	\right (33
	\right (35
	\rigof (85
	\rigof (55
oriscus	see musixgre	
	\ORl (123
	\OrnamentDiamondSolid (137
ornaments	131, 132, 137, 191–192, 194–197	
	\ORr (123
orthogonal to	see \bot	
	\ORu (123
	\oslash (33
	\oslash (28
	\oslash (35
	\oslash (34
	\oslash (34
	\oslash (34
	\ostar (34
	\osum (42, 43
.otf files	147	
\Otimes (36	
\otimes (33	
\otimes (28	
\otimes (35	
\otimes (34	
\otimes (34	
\otimes (34	
\otimes (36	
\otimeshat (36	
\otimeslrim (32	
\otimesrhrim (32	
\otop (33	
\otop (35	
\triangle (35	
\triangle (34, 67	
\triangleup (33	
\turnedcomma (101	
outer joins	114	
ovals	135, 157–161, 186–187, 192, 202–203	
\ovee (28	
\ovee (35	
\Oven (178	
\oven (179	
\oven (179	
\overarc (22	
\overbrace (104	
\overbrace (103	
\overbrace (103	
\overbrace (104	
\overbrace (103	
\overbrace (103	
\overbrace (102	

\overbracket (104
\overbracket (103
\overbracket (214, 215
\overbridge (21
\overgroup (104
\overgroup (103
\overgroup (103
\overleftarrow (103
\overleftarrow (102
\overleftharp (84
\overleftharpdown (84
\overleftharpoon (103
\overleftharpoon (103
\overleftharpoon (103
\overleftrightharpoon (103
\overleftrightharpoon (102
\overline (27, 100, 102
\overlinesegment (103
\overlinesegment (103
\overparen (103
\overparenthesis (214, 215
\Overrightarrow (102
overrightarrow (package)	102, 226
\overrightarrow (103
\overrightarrow (102
\overightharp (84
\overightharpdown (84
\overightharpoon (103
\overightharpoon (103
\overightharpoon (103
\overring (23
\overset .	210
\overt (34
\overt (34
\ovhook (101
\void (33
\wedge (28
\wedge (35
\owns .	see \ni
\owns (91
\owns (52, 92
\owns (92
\owns (91
\owns (56
\ownsbar (91
P	
\P (14, 222
\P (14
\p ()	171
\p@	213
package options	
a (esvect)	104
arrows (boisik)	80
b (esvect)	104
bbgreekl (mathbbol)	117
c (esvect)	104
crescent (fge)	101
d (esvect)	104
e (esvect)	104
f (esvect)	104
g (esvect)	104
german (keystroke)	122
greek (babel)	14, 88, 89, 144
h (esvect)	104
heartctrbull (bullcntr)	168
integrals (wasysym)	38
largectrbull (bullcntr)	168
mathcal (euscript)	116
mathscr (euscript)	116
mathscr (urwchancal)	116
nointegrals (wasysym)	38
polotonikogreek (babel)	14, 88, 89
sans (dsfont)	116
scaled (CountriesOfEurope)	178
scr (rsfso)	116
smallctrbull (bullcntr)	168
smartctrbull (bullcntr)	168
upint (stix)	36, 37, 44, 45
utf8x (inputenc)	224
varg (txfonts/pxfonts)	90
packages	
abracess	105, 226, 227
accents	100, 214, 226, 227
actuarialangle	105, 214, 226
adforn	127, 131, 132, 137, 226, 227
adfsymbols	126, 129, 131, 136, 226
AMS	11, 14, 28, 38, 47, 59, 61, 66, 69, 87, 88, 90, 91, 93, 94, 100, 102, 105, 108, 111, 112, 117, 206, 207, 225
amsbsy	220
amsfonts	112, 116
amsmath	11, 87, 100, 210, 219
amssymb	11, 100, 112, 116, 144, 226
amstext	211, 213
apl	121, 226
ar	118, 226
arcs	22, 226
arev	127–130, 137, 147, 178, 226
ascii	122, 221, 226
astrosym	188, 226
babel	14, 88, 89, 144
bartel-chess-fonts	204, 205, 226
bding	126–129, 131, 135, 137, 207, 226
bbm	116, 226
bbold	116, 226
bclogo	180, 181, 226, 227
begriff	109, 226

bigints 41, 226, 227
 bm 220, 226, 227
 boisik 31, 35, 43,
 54, 60, 65, 68, 79, 80, 90,
 92, 93, 101, 111, 114, 133,
 136, 144, 147, 226
 braket 94
 bullcntr 168, 226, 227
 bulletnum 168
 calligra 116, 226, 227
 calrsfs 116
 cancel 102
 ccicons 26, 226, 227
 cclicenses 26, 226
 centernot 211
 chancery 226
 chemarr 106, 226
 chemarrow 84, 106, 226
 GNAe 25, 87, 117, 174,
 175
 china2e 116, 226, 227
 clock 167, 226
 cmll 27, 33, 46, 58, 93, 226
 colonequals 27, 58, 226
 combelow 23, 226, 227
 cookingsymbols 178, 226,
 227
 CountriesOfEurope 176,
 226, 227
 cryst 202, 226
 cypriot 143, 226, 227
 dancers 198, 226
 dblaccnt 214
 dice 203, 226
 dictsym 172, 226
 dingbat 128, 137, 194, 207,
 226
 DotArrow 107, 226, 227
 dozenal 110, 168, 226
 dsfont 116, 226
 epiolmec 144, 146, 226,
 227
 epsdice 167, 226
 esint 40, 226
 esvect 104, 226
 eufrek 116
 eurosym 25, 226
 euscript 116, 226
 extarrows 106, 226
 extpfeil 107, 226
 extraipa 21, 226
 fc 15, 19
 fclfont 226
 fdsymbol 30, 31,
 34, 42, 43, 51–53, 60, 64,
 68, 75–79, 85, 86, 90, 92,
 96, 97, 101, 103, 108, 111,
 113, 133, 136, 147, 226
 feyn 125, 226
 fge 84, 92, 101, 110, 115,
 226
 fixmath 220
 fontawesome 24, 25, 119, 124, 127–130,
 132, 136, 181, 184, 226,
 227
 fontenc 11, 14, 15, 19,
 221, 223
 fontspec 147, 224, 225
 fourier 25, 58, 89, 93, 99,
 104, 129, 132, 165, 226
 frege 110, 226, 227
 gensymb 118
 go 171, 226
 graphics 84, 209
 graphicx 23, 206, 209
 greenpoint 186, 226
 hands 186, 226
 harmony 149, 226
 harpoon 84, 226, 227
 hhcount 167, 168, 226, 227
 hieroglf 139, 226
 holtpolt 107, 226
 ifsym 118, 135, 166, 207,
 209, 226
 igo 170, 226
 inputenc 224
 isoent 223
 junicode 224, 226
 keystroke 122, 226
 knitting 176, 226, 227
 knot 194, 197, 226
 latexsym 28, 46, 58, 69,
 112, 206, 226
 lilyglyphs 147, 150–157,
 161–163
 lilyglyphs 226
 linearA 139, 226
 linearb 142, 143, 226, 227
 logic 123
 longdiv 102
 magic 204, 226
 manfnt 164, 226
 marvosym 24, 110, 119,
 121, 123, 124, 127, 130,
 164, 165, 175, 207
 mathabx 27, 29, 33, 38, 48,
 49, 59, 62, 66, 70, 71, 86,
 91, 93–95, 100, 104, 110,
 113, 120, 169, 206, 207,
 226
 mathbbol 116, 117
 mathcomp 110
 mathdesign 24, 32, 46, 92,
 98, 115, 226
 mathdots 100, 107, 109,
 213, 226
 mathrsfs 116, 226
 mathspec 88
 mathtools 27, 56, 104, 106,
 226
 mbboard 116, 117, 226
 mdwmath 105, 226, 227
 metre 22, 100, 171, 226
 milstd 123, 226, 227
 MnSymbol 27, 29, 30, 34,
 41, 42, 49–51, 60, 63, 67,
 71–74, 84, 85, 90, 91, 95,
 100, 102, 103, 108, 111,
 113, 132, 136, 147, 226
 moonphase 188, 226
 musixgre 149
 musixlit 149
 musixer 149
 musixtex 226, 227
 nath 93, 99, 226
 nicefrac 114, 226, 227
 niceframe 191–194, 197
 nkarta 186, 226
 ntheorem 112
 ogonek 23, 226, 227
 overrightarrow 102, 226
 phaistos 138, 226
 phonetic 18, 22, 209, 226
 pict2e 119
 pifont 15, 126–131, 136,
 137, 186, 191, 202, 209,
 226
 pigpen 174, 226
 pmboxdraw 173, 226
 polynom 102
 prodint 46, 226
 protosem 138, 226
 psnfss 130
 PSTricks 181
 pxfonts 27, 29, 39, 48,
 59, 62, 70, 86, 89–91, 112,
 116, 136, 206, 221
 recycle 175, 226
 relsize 22
 rotating 26, 122
 rsfso 116, 226
 rubikcube 185, 226, 227
 sarabian 144, 226, 227
 savesym 206
 semaphor 200, 202, 226
 semtrans 19, 23, 226
 shuffle 33, 226
 simplewick 215
 simpsons 172, 226
 skak 169, 170, 226
 skull 169, 226
 slashed 211
 soyombo 175, 226, 227
 starfont 120, 226, 227
 staves 173, 226
 steinmetz 119, 226, 227
 stix 32, 36, 37, 43,
 44, 55, 56, 61, 65, 66, 68,
 81–83, 87, 90–93, 97, 101,
 103, 109, 111, 112, 114,
 120, 121, 124, 133, 134,
 137, 147, 167, 226, 227
 stmaryrd 28, 38, 47,
 59, 66, 70, 86, 93, 94, 207,
 211, 225, 226
 svrsymbols 125, 226, 227
 t4phonet 19, 22, 226

teubner	25, 109, 144, 172, 226	\parallel ()	55
textcomp	11, 13, 14, 19, 23–26, 69, 99, 114, 118, 147, 164, 206, 221, 223, 226	\parallelogram (□)	134
textrightarrow	25, 226, 227	\parallelogramblack (■)	134
TikZ	179–181, 185	parallelograms	133–134, 202–203
tikzsymbols	179, 180, 226, 227	\ParallelPort (■■)	121
timing	118	\parallelslant (//)	58
tipa	16, 17, 19–22, 209, 226	\parr (❀)	33
tipx	17, 226	\parsim (#)	55
trfsigns	58, 92, 107, 226	\partial (∂)	91
trsym	58, 226	\partial (∂)	91
turnstile	57, 226	\partial (∂)	93
txfonts	27, 29, 39, 48, 59, 62, 70, 86, 89–91, 112, 116, 136, 206, 208, 221, 226	\partialmeetcontraction (≤)	66
type1cm	206	\partialslash (∅)	91
ucs	224	\partialvardint („)	113
ulsy	33, 86, 209, 226	\partialvardlanddownint (߂)	113
umranda	192, 226	\partialvardlandupint (߁)	113
umrandb	193, 226	\partialvardlcircleleftint (߃)	113
underscore	13	\partialvardlcircleleftint (߃)	71
undertilde	105, 226	\partialvardrcircleleftint (߃)	113
units	114	\partialvardrcirclearightint (߃)	113
universa	136, 165, 226	\partialvardrcirclerightint (߃)	71
upgreek	14, 89, 226	\partialvardstrokedint (߁)	113
upquote	221	\partialvardsumint (߂)	113
url	221	\partialvartint („)	113
urwchancal	116, 226	\partialvartlanddownint (߂)	113
ushort	105, 226, 227	\partialvartlandupint (߁)	113
vietnam	226	\partialvartlcircleleftint (߃)	113
vntex	15, 19	\partialvartlcirclearightint (߃)	113
wasysym	18, 24, 26, 29, 38, 47, 59, 62, 108, 112, 118, 119, 121, 123, 130, 132, 147, 164, 207, 226	\partialvartrcircleleftint (߃)	71
webomints	191, 226	\partialvartrcirclearightint (߃)	71
wsipa	18, 21, 23, 207, 209, 214, 226	\partialvardstrokedint (߁)	113
xfrac	114	\partialvardsumint (߂)	113
yfonts	116, 117, 226	\partialvartint („)	113
ymath	101, 102, 105, 109, 213, 226	\partialvartlanddownint (߂)	113
\PackingWaste (⌚)	175	\partialvartlandupint (߁)	113
Pakin, Scott .	1, 212, 214, 225	\partialvartlcircleleftint (߃)	113
\Pallas (❀)	120	\partialvartlcirclearightint (߃)	71
\pan (▬▬)	179	\partialvartlcirclearightint (߃)	113
\pan (▬▬)	179	\partialvartlcirclerightint (߃)	71
paperclip	180–181	\partialvartrcircleleftint (߃)	113
\PaperLandscape (▣)	166	\partialvartrcirclearightint (߃)	113
\PaperPortrait (▤)	166	\partialvartrcircleleftint (߃)	113
par	see \bindnasrepma, \invamp, and \parr	\partialvartrcirclearightint (߃)	113
paragraph mark	see \P	\partialvartrtcircleleftint (߃)	71
\parallel ()	46, 96	\partialvartrtcirclearightint (߃)	113
\parallel ()	52	\partialvartrtcirclerightint (߃)	113
\parallel ()	50		

\PHarrow (↑)	138
\phase (□)	119
phasor	119
\PHbee (🐝)	138
\PHbeehive (🐝)	138
\PHboomerang (➤)	138
\PHbow (🏹)	138
\PHbullLeg (🐂)	138
\PHcaptive (👤)	138
\PHcarpentryPlane (镱)	138
\PHcat (😺)	138
\PHchild (👶)	138
\PHclub (棒)	138
\PHcolumn (עמוד)	138
\PHcomb (鬘)	138
\PHdolium (kapsula)	138
\PHdove (🕊️)	138
\PHeagle (🦅)	138
\PHflute (笛)	138
\PHgauntlet (手套)	138
\PHgrater (🌽)	138
\PHhelmet (⛑)	138
\PHhide (隐身)	138
\PHhorn (🎺)	138
\Phi (Φ)	88
\phi (φ)	88
\phiip (φ)	89
\PHlid (👁)	138
\PHlily (百合)	138
\PHmanacles (手铐)	138
\PHmattock (锄)	138
\Phone (☎)	137
\phone (☎)	164
\PhoneHandset (📞)	137
phonetic (package)	18, 22, 209, 226
phonetic symbols	16–19
\phonon (𝓕)	125
\photon (f)	118, 125
photons	125
\PHoxBack (\$(\$)	138
\PHpapyrus (apyrus)	138
\PHpedestrian (🚶)	138
\PHplaneTree (🌳)	138
\PHplumedHead (羽毛)	138
\PHram (🐏)	138
\PHrosette (🏵)	138
\PHsaw (🪚)	138
\PHshield (🛡)	138
\PHship (⛵)	138
\PHsling (🗡)	138
\PHsmallAxe (🗡)	138
\PHstrainer (笊)	138
\PHtattooedHead (tatoo)	138
\PHtiara (มงกุฎ)	138
\PHtunny (🐰)	138
\PHvine (🌿)	138
\PHwavyBand (波)	138
\PHwoman (👩)	138
physical symbols	118
\Pi (Π)	88
\pi (π)	88
\pi (π)	89
“pi” fonts	209
piano (p)	152, 163
\Pickup (⦿)	123
pict2e (package)	119
pifont (package)	15, 126–131, 136, 137, 186, 191, 202, 209, 226
pigpen (package)	174, 226
pigpen cipher	174
{\pigpenfont A} (⤠)	174
{\pigpenfont B} (⤡)	174
{\pigpenfont C} (⤢)	174
{\pigpenfont D} (⤣)	174
{\pigpenfont E} (⤤)	174
{\pigpenfont F} (⤥)	174
{\pigpenfont G} (⤦)	174
{\pigpenfont H} (⤧)	174
{\pigpenfont I} (⤨)	174
{\pigpenfont J} (⤩)	174
{\pigpenfont K} (⤪)	174
{\pigpenfont L} (⤫)	174
{\pigpenfont M} (⤬)	174
{\pigpenfont N} (⤭)	174
{\pigpenfont O} (⤮)	174
{\pigpenfont P} (⤯)	174
{\pigpenfont Q} (⤰)	174
{\pigpenfont R} (⤱)	174
{\pigpenfont S} (⤲)	174
{\pigpenfont T} (⤳)	174
{\pigpenfont U} (⤴)	174
{\pigpenfont V} (⤵)	174
{\pigpenfont W} (⤶)	174
{\pigpenfont X} (⤷)	174
{\pigpenfont Y} (⤸)	174
{\pigpenfont Z} (⤹)	174
pilcrow	see \P
pipe	see \textpipe
\Pisces (♓)	119
\Pisces (♓)	120
\Pisces (♓)	119
\pisces (♓)	119
\Pisymbol	186–205, 209
\Pisymbol{astrosym}{0} (ଓ)	188
\Pisymbol{astrosym}{1} (ঘ)	188
\Pisymbol{astrosym}{2} (ঙ)	188
\Pisymbol{astrosym}{3} (ঁ)	188
\Pisymbol{astrosym}{4} (ঁ)	188
\Pisymbol{astrosym}{5} (ৰ)	188
\Pisymbol{astrosym}{6} (ঁ)	188
\Pisymbol{astrosym}{7} (ঁ)	188
\Pisymbol{astrosym}{8} (↑↑)	188
\Pisymbol{astrosym}{9} (ঁ)	188
\Pisymbol{astrosym}{10} (ঁ)	188
\Pisymbol{astrosym}{11} (ঁ)	188
\Pisymbol{astrosym}{12} (ঁ)	188
\Pisymbol{astrosym}{13} (ঁ)	188
\Pisymbol{astrosym}{14} (ঁ)	188
\Pisymbol{astrosym}{15} (ঁ)	188
\Pisymbol{astrosym}{16} (ঁ)	188
\Pisymbol{astrosym}{17} (ঁ)	188
\Pisymbol{astrosym}{18} (ঁ)	188
\Pisymbol{astrosym}{19} (ঁ)	188
\Pisymbol{astrosym}{20} (ঁ)	188
\Pisymbol{astrosym}{21} (ঁ)	188

\Pisymbol{astrosym}{22} (⌚)	188	\Pisymbol{astrosym}{50} (✿)	189	\Pisymbol{astrosym}{102}	190
\Pisymbol{astrosym}{23} (⌚)	188	\Pisymbol{astrosym}{51} (❀)	189	\Pisymbol{astrosym}{103}	190
\Pisymbol{astrosym}{24} (Ѱ)	188	\Pisymbol{astrosym}{52} (◆)	189	\Pisymbol{astrosym}{104}	190
\Pisymbol{astrosym}{25} (ButtonTitles)	188	\Pisymbol{astrosym}{53} (▣)	189	\Pisymbol{astrosym}{105}	190
\Pisymbol{astrosym}{26} (❀)	188	\Pisymbol{astrosym}{54} (❖)	189	\Pisymbol{astrosym}{106}	190
\Pisymbol{astrosym}{27} (♒)	188	\Pisymbol{astrosym}{55} (○)	189	\Pisymbol{astrosym}{107}	190
\Pisymbol{astrosym}{28} (♒)	188	\Pisymbol{astrosym}{56} (ヰ)	189	\Pisymbol{astrosym}{108}	190
\Pisymbol{astrosym}{29} (⊕)	188	\Pisymbol{astrosym}{57} (○)	189	\Pisymbol{astrosym}{109}	190
\Pisymbol{astrosym}{30} (♂)	188	\Pisymbol{astrosym}{58} (▽)	189	\Pisymbol{astrosym}{110}	190
\Pisymbol{astrosym}{31} (ᴾ)	188	\Pisymbol{astrosym}{59} (└)	189	\Pisymbol{astrosym}{111}	190
\Pisymbol{astrosym}{32} (〽)	188	\Pisymbol{astrosym}{60} (＊)	189	\Pisymbol{astrosym}{112}	190
\Pisymbol{astrosym}{33} (＊)	189	\Pisymbol{astrosym}{61} (△)	189	\Pisymbol{astrosym}{113}	190
\Pisymbol{astrosym}{34} (⚡)	189	\Pisymbol{astrosym}{62} (ButtonTitles)	189	\Pisymbol{astrosym}{114}	190
\Pisymbol{astrosym}{35} (↶)	189	\Pisymbol{astrosym}{63} (⤕)	189	\Pisymbol{astrosym}{115}	190
\Pisymbol{astrosym}{36} (⌚)	189	\Pisymbol{astrosym}{64} (❖)	189	\Pisymbol{astrosym}{116}	190
\Pisymbol{astrosym}{37} (ϙ)	189	\Pisymbol{astrosym}{65} (❀)	189	\Pisymbol{astrosym}{117}	190
\Pisymbol{astrosym}{38} (□)	189	\Pisymbol{astrosym}{66} (○)	189	\Pisymbol{astrosym}{118}	190
\Pisymbol{astrosym}{39} (○)	189	\Pisymbol{astrosym}{67} (Ⓛ)	189	\Pisymbol{astrosym}{119}	190
\Pisymbol{astrosym}{40} (●)	189	\Pisymbol{astrosym}{68} (ヰ)	189	\Pisymbol{astrosym}{120}	190
\Pisymbol{astrosym}{41} (⌚)	189	\Pisymbol{astrosym}{69} (＊)	189	\Pisymbol{astrosym}{121}	190
\Pisymbol{astrosym}{42} (🌙)	189	\Pisymbol{astrosym}{70} (⊛)	189	\Pisymbol{astrosym}{122}	190
\Pisymbol{astrosym}{43} (🌙)	189	\Pisymbol{astrosym}{91} (⊛)	189	\Pisymbol{astrosym}{123}	190
\Pisymbol{astrosym}{44} (⌚)	189	\Pisymbol{astrosym}{92} (⌚)	189	\Pisymbol{astrosym}{124}	190
\Pisymbol{astrosym}{45} (⌚)	189	\Pisymbol{astrosym}{93} (⌚)	189	\Pisymbol{astrosym}{125}	190
\Pisymbol{astrosym}{46} (🌙)	189	\Pisymbol{astrosym}{94} (⌚)	190	\Pisymbol{astrosym}{126}	190
\Pisymbol{astrosym}{47} (⌚)	189	\Pisymbol{astrosym}{95} (⌚)	190	\Pisymbol{astrosym}{127}	190
\Pisymbol{astrosym}{48} (ButtonTitles)	189	\Pisymbol{astrosym}{100}	190	\Pisymbol{astrosym}{128}	190
\Pisymbol{astrosym}{49} (ButtonTitles)	189	\Pisymbol{astrosym}{101}	190	\Pisymbol{astrosym}{129}	190

\Pisymbol{astrosym}{131}			\Pisymbol{astrosym}{160}		
()	190	(*)	188
\Pisymbol{astrosym}{132}			\Pisymbol{astrosym}{161}		
()	188	(Δ)	188
\Pisymbol{astrosym}{133}			\Pisymbol{astrosym}{162}		
(*)	188	(□)	188
\Pisymbol{astrosym}{134}			\Pisymbol{astrosym}{163}		
()	188	(Λ)	188
\Pisymbol{astrosym}{135}			\Pisymbol{astrosym}{164}		
()	188	(Ω)	188
\Pisymbol{astrosym}{136}			\Pisymbol{astrosym}{165}		
()	188	(Φ)	189
\Pisymbol{astrosym}{137}			\Pisymbol{astrosym}{166}		
(♂)	188	(κ)	189
\Pisymbol{astrosym}{138}			\Pisymbol{astrosym}{167}		
(□)	188	(λ)	189
\Pisymbol{astrosym}{139}			\Pisymbol{astrosym}{168}		
(○)	188	(♀)	189
\Pisymbol{astrosym}{140}			\Pisymbol{astrosym}{169}		
(●)	188	(*)	189
\Pisymbol{astrosym}{141}			\Pisymbol{astrosym}{178}		
(⌚)	188	(†)	189
\Pisymbol{astrosym}{142}			\Pisymbol{astrosym}{179}		
(⌚)	188	(☽)	189
\Pisymbol{astrosym}{143}			\Pisymbol{astrosym}{180}		
(⌚)	188	(▽)	189
\Pisymbol{astrosym}{144}			\Pisymbol{astrosym}{181}		
(⌚)	188	(└)	189
\Pisymbol{astrosym}{145}			\Pisymbol{astrosym}{182}		
(⌚)	188	(*)	189
\Pisymbol{astrosym}{146}			\Pisymbol{astrosym}{183}		
(⌚)	188	(△)	189
\Pisymbol{astrosym}{147}			\Pisymbol{astrosym}{184}		
(⌚)	188	(□)	189
\Pisymbol{astrosym}{148}			\Pisymbol{astrosym}{185}		
(⌚)	188	(Λ)	189
\Pisymbol{astrosym}{149}			\Pisymbol{astrosym}{186}		
(⌚)	188	(Ω)	189
\Pisymbol{astrosym}{150}			\Pisymbol{astrosym}{187}		
(*)	188	(Φ)	189
\Pisymbol{astrosym}{151}			\Pisymbol{astrosym}{188}		
(*)	188	(κ)	189
\Pisymbol{astrosym}{152}			\Pisymbol{astrosym}{189}		
(⌚)	188	(λ)	189
\Pisymbol{astrosym}{153}			\Pisymbol{astrosym}{190}		
(⌚)	188	(♀)	189
\Pisymbol{astrosym}{154}			\Pisymbol{astrosym}{191}		
(⌚)	188	(*)	189
\Pisymbol{astrosym}{155}			\Pisymbol{astrosym}{192}		
(⌚)	188	(○)	189
\Pisymbol{astrosym}{156}			\Pisymbol{astrosym}{193}		
(⌚)	188	(♀)	189
\Pisymbol{astrosym}{157}			\Pisymbol{astrosym}{194}		
(⌚)	188	(○)	189
\Pisymbol{astrosym}{158}			\Pisymbol{astrosym}{195}		
(⌚)	188	(†)	189
\Pisymbol{astrosym}{159}			\Pisymbol{astrosym}{196}		
(⌚)	188	(○)	189

\Pisymbol{astrosym}{234}		\Pisymbol{cryst}{25} (,	202	\Pisymbol{cryst}{102} (,	.		
()	190	\Pisymbol{cryst}{27} (,	202	202		
\Pisymbol{astrosym}{235}		\Pisymbol{cryst}{28} (,	202	\Pisymbol{cryst}{103} (^)	.		
()	190	\Pisymbol{cryst}{29} (,	202	202		
\Pisymbol{astrosym}{236}		\Pisymbol{cryst}{30} (^)	202	\Pisymbol{cryst}{104} (,	202		
()	190	\Pisymbol{cryst}{31} (^)	..	\Pisymbol{cryst}{105} (,	.		
\Pisymbol{astrosym}{237}		202	202		
()	190	\Pisymbol{cryst}{32} (^)	..	\Pisymbol{cryst}{107} (,	.		
\Pisymbol{astrosym}{238}		202	202		
()	190	\Pisymbol{cryst}{35} (,	202	\Pisymbol{cryst}{108} (,	.		
\Pisymbol{astrosym}{239}		\Pisymbol{cryst}{36} (^)	202	202		
()	190	\Pisymbol{cryst}{37} (,	202	\Pisymbol{cryst}{109} (,	.		
\Pisymbol{astrosym}{240}		\Pisymbol{cryst}{38} (,	202	\Pisymbol{cryst}{112} (,	.		
()	190	\Pisymbol{cryst}{39} (,	202	202		
\Pisymbol{astrosym}{241}		\Pisymbol{cryst}{40} (^)	202	\Pisymbol{cryst}{113} (^)	.		
()	190	\Pisymbol{cryst}{41} (^)	202		
\Pisymbol{astrosym}{242}		202	\Pisymbol{cryst}{120} (^)	.		
()	190	\Pisymbol{cryst}{42} (^)	202	202		
\Pisymbol{astrosym}{243}		\Pisymbol{cryst}{43} (^)	..	\Pisymbol{cryst}{121} (^)	.		
()	190	202	202		
\Pisymbol{astrosym}{244}		\Pisymbol{cryst}{44} (^)	203	\Pisymbol{cryst}{123} (^)	.		
()	190	\Pisymbol{cryst}{45} (^)	203	203		
\Pisymbol{astrosym}{245}		\Pisymbol{cryst}{47} (^)	203	\Pisymbol{cryst}{124} (^)	203		
()	190	\Pisymbol{cryst}{48} (^)	203	\Pisymbol{cryst}{125} (^)	..		
\Pisymbol{astrosym}{246}		\Pisymbol{cryst}{49} (^)	203	203		
()	190	\Pisymbol{cryst}{50} (^)	203	\Pisymbol{cryst}{127} (^)	.		
\Pisymbol{astrosym}{247}		\Pisymbol{cryst}{55} (^)	203	203		
()	190	\Pisymbol{cryst}{57} (^)	203	\Pisymbol{cryst}{128} (^)	..		
\Pisymbol{astrosym}{248}		\Pisymbol{cryst}{58} (^)	203	203		
()	190	\Pisymbol{cryst}{59} (^)	203	\Pisymbol{cryst}{129} (^)	.		
\Pisymbol{astrosym}{249}		\Pisymbol{cryst}{60} (^)	203	203		
()	190	\Pisymbol{cryst}{61} (^)	..	\Pisymbol{cryst}{130} (^)	.		
\Pisymbol{astrosym}{250}		203	203		
()	190	\Pisymbol{cryst}{62} (^)	..	\Pisymbol{cryst}{131} (^)	.		
\Pisymbol{astrosym}{251}		203	203		
()	190	\Pisymbol{cryst}{63} (^)	202	\Pisymbol{cryst}{132} (^)	.		
\Pisymbol{astrosym}{252}		\Pisymbol{cryst}{64} (^)	203		
()	190	202	\Pisymbol{cryst}{133} (^)	.		
\Pisymbol{astrosym}{253}		\Pisymbol{cryst}{65} (^)	203		
()	190	202	\Pisymbol{cryst}{135} (^)	..		
\Pisymbol{astrosym}{254}		\Pisymbol{cryst}{66} (^)	202	203		
()	190	\Pisymbol{cryst}{75} (^)	202	\Pisymbol{cryst}{136} (^)	.		
\Pisymbol{astrosym}{255}		\Pisymbol{cryst}{77} (^)	202	203		
()	190	\Pisymbol{cryst}{78} (^)	202	\Pisymbol{cryst}{137} (^)	.		
\Pisymbol{cryst}{0}	(,	202	\Pisymbol{cryst}{80} (^)	203	
\Pisymbol{cryst}{2}	(,	202	202	\Pisymbol{cryst}{138} (^)	.	
\Pisymbol{cryst}{3}	(^)	202	\Pisymbol{cryst}{81} (^)	202	
\Pisymbol{cryst}{4}	(◆)	202	202	\Pisymbol{cryst}{139} (^)	.	
\Pisymbol{cryst}{5}	(~)	202	\Pisymbol{cryst}{82} (^)	202	
\Pisymbol{cryst}{6}	(●)	202	202	\Pisymbol{cryst}{140} (^)	.	
\Pisymbol{cryst}{7}	(→)	202	\Pisymbol{cryst}{83} (^)	202	
\Pisymbol{cryst}{8}	(→)	202	202	\Pisymbol{cryst}{141} (^)	.	
\Pisymbol{cryst}{9}	(→)	202	\Pisymbol{cryst}{84} (^)	202	
\Pisymbol{cryst}{10}	(◦)	202	202	\Pisymbol{cryst}{142} (^)	.	
\Pisymbol{cryst}{12}	(()	202	\Pisymbol{cryst}{85} (^)	202	
\Pisymbol{cryst}{15}	(★)	202	202	\Pisymbol{cryst}{143} (^)	.	
\Pisymbol{cryst}{20}	(◊)	202	\Pisymbol{cryst}{87} (^)	202	
\Pisymbol{cryst}{21}	(♪)	202	202	\Pisymbol{cryst}{145} (^)	202	
\Pisymbol{cryst}{22}	(→)	202	\Pisymbol{cryst}{88} (^)	202	
\Pisymbol{cryst}{24}	(◆)	202	202	\Pisymbol{cryst}{147} (^)	.	
		\Pisymbol{cryst}{89} (^)	202	\Pisymbol{cryst}{148} (^)	202
		\Pisymbol{cryst}{95} (^)	..				
		\Pisymbol{cryst}{97} (^)	..				
		\Pisymbol{cryst}{98} (^)	..				
		\Pisymbol{cryst}{99} (^)	..				

\Pisymbol{cryst}{149} (✓) 202
\Pisymbol{cryst}{155} (↑) 202
\Pisymbol{cryst}{157} (↓) 202
\Pisymbol{cryst}{158} (↔) 202
\Pisymbol{cryst}{159} (↔) 202
\Pisymbol{cryst}{175} (↶) 202
\Pisymbol{cryst}{177} (↷) 202
\Pisymbol{cryst}{178} (↷) 202
\Pisymbol{cryst}{179} (↶) 202
\Pisymbol{cryst}{185} (↶) 202
\Pisymbol{cryst}{187} (↷) 202
\Pisymbol{cryst}{188} (↶) 202
\Pisymbol{cryst}{189} (↷) 202
\Pisymbol{cryst}{195} (↷) 202
\Pisymbol{cryst}{197} (↷) 202
\Pisymbol{cryst}{198} (↶) 202
\Pisymbol{cryst}{199} (↷) 202
\Pisymbol{cryst}{202} (⊕) 202
\Pisymbol{cryst}{203} (⊖) 202
\Pisymbol{cryst}{204} (⊖) 202
\Pisymbol{cryst}{210} (◐) 202
\Pisymbol{cryst}{212} (⊕) 202
\Pisymbol{cryst}{213} (⊖) 202
\Pisymbol{cryst}{220} (⊕) 203
\Pisymbol{cryst}{221} (⊖) 203
\Pisymbol{cryst}{223} (⊖) 203
\Pisymbol{cryst}{224} (⊖) 203
\Pisymbol{cryst}{230} (↗) 203
\Pisymbol{cryst}{231} (↖) 203
\Pisymbol{cryst}{232} (↗) 203
\Pisymbol{cryst}{233} (↖) 203
\Pisymbol{cryst}{236} (↗) 203
\\Pisymbol{cryst}{240} (❖) 203
\Pisymbol{cryst}{241} (▬) 203
\Pisymbol{cryst}{242} (▬) 203
\Pisymbol{cryst}{243} (▬) 203
\Pisymbol{dancers}{0} (⤒) 198
\Pisymbol{dancers}{1} (⤓) 198
\Pisymbol{dancers}{2} (⤔) 198
\Pisymbol{dancers}{3} (⤕) 198
\Pisymbol{dancers}{4} (⤖) 198
\Pisymbol{dancers}{5} (⤗) 198
\Pisymbol{dancers}{6} (⤘) 198
\Pisymbol{dancers}{7} (⤙) 198
\Pisymbol{dancers}{8} (⤚) 198
\Pisymbol{dancers}{9} (⤛) 198
\Pisymbol{dancers}{10} (⤜) 198
\Pisymbol{dancers}{11} (⤝) 198
\Pisymbol{dancers}{12} (⤞) 198
\Pisymbol{dancers}{13} (⤟) 198
\Pisymbol{dancers}{14} (⤠) 198
\Pisymbol{dancers}{15} (⤡) 198
\Pisymbol{dancers}{16} (⤢) 198
\Pisymbol{dancers}{17} (⤣) 198
\Pisymbol{dancers}{18} (⤤) 198
\Pisymbol{dancers}{19} (⤥) 198
\Pisymbol{dancers}{20} (⤦) 198
\Pisymbol{dancers}{21} (⤧) 198
\Pisymbol{dancers}{22} (⤨) 198
\Pisymbol{dancers}{23} (⤩) 198
\Pisymbol{dancers}{24} (⤪) 198
\Pisymbol{dancers}{25} (⤫) 198
\Pisymbol{dancers}{26} (⤬) 198
\Pisymbol{dancers}{27} (⤭) 198
\Pisymbol{dancers}{28} (⤮) 198
\Pisymbol{dancers}{29} (⤯) 198
\Pisymbol{dancers}{30} (⤰) 198
\Pisymbol{dancers}{31} (⤱) 198
\Pisymbol{dancers}{32} (⤲) 198
\Pisymbol{dancers}{33} (⤳) 198
\Pisymbol{dancers}{34} (⤴) 199
\Pisymbol{dancers}{35} (⤵) 199
\Pisymbol{dancers}{36} (⤶) 199
\Pisymbol{dancers}{37} (⤷) 199
\Pisymbol{dancers}{38} (⤸) 199
\Pisymbol{dancers}{39} (⤹) 199
\Pisymbol{dancers}{40} (⤺) 199
\Pisymbol{dancers}{41} (⤻) 199
\Pisymbol{dancers}{42} (⤼) 199
\Pisymbol{dancers}{43} (⤽) 199
\Pisymbol{dancers}{44} (⤾) 199
\Pisymbol{dancers}{45} (⤿) 199
\Pisymbol{dancers}{46} (⤿) 199
\Pisymbol{dancers}{47} (⤿) 199
\Pisymbol{dancers}{48} (⤿) 199
\Pisymbol{dancers}{49} (⤿) 199
\Pisymbol{dancers}{50} (⤿) 199
\Pisymbol{dancers}{51} (⤿) 199
\Pisymbol{dancers}{52} (⤿) 199
\Pisymbol{dancers}{53} (⤿) 199
\Pisymbol{dancers}{54} (⤿) 199
\Pisymbol{dancers}{55} (⤿) 199
\Pisymbol{dancers}{56} (⤿) 199
\Pisymbol{dancers}{57} (⤿) 199
\Pisymbol{dancers}{58} (⤿) 199
\Pisymbol{dancers}{59} (⤿) 199
\Pisymbol{dancers}{60} (⤿) 199
\Pisymbol{dancers}{61} (⤿) 199
\Pisymbol{dancers}{62} (⤿) 199

\Pisymbol{dancers}{249} (⌚) 200	\Pisymbol{dice3d}{113} (🎲) 203	\Pisymbol{dingbat}{102}	(└─) 194
\Pisymbol{dancers}{250} (⌚) 200	\Pisymbol{dice3d}{114} (🎲) 203	\Pisymbol{dingbat}{103}	(—) 194
\Pisymbol{dancers}{251} (⌚) 200	\Pisymbol{dice3d}{115} (🎲) 203	\Pisymbol{dingbat}{104}	(└─) 194
\Pisymbol{dancers}{252} (⌚) 200	\Pisymbol{dice3d}{116} (🎲) 203	\Pisymbol{fselch}{0} (🂠) 204	
\Pisymbol{dancers}{253} (⌚) 200	\Pisymbol{dice3d}{117} (🎲) 203	\Pisymbol{fselch}{1} (🂡) 204	
\Pisymbol{dancers}{254} (⌚) 200	\Pisymbol{dice3d}{118} (🎲) 203	\Pisymbol{fselch}{2} (🂢) 204	
\Pisymbol{dancers}{255} (⌚) 200	\Pisymbol{dice3d}{119} (🎲) 203	\Pisymbol{fselch}{3} (🂣) 204	
\Pisymbol{dice3d}{49} (▣) 203	\Pisymbol{dice3d}{120} (🎲) 203	\Pisymbol{fselch}{4} (🂤) 204	
\Pisymbol{dice3d}{50} (▣) 203	\Pisymbol{dingbat}{69}	(C)	\Pisymbol{fselch}{5} (🂥) 204	
\Pisymbol{dice3d}{51} (▣) 203	\Pisymbol{dingbat}{70}	(C)	\Pisymbol{fselch}{6} (🂦) 204	
\Pisymbol{dice3d}{52} (▣) 203	\Pisymbol{dingbat}{71}	(C)	\Pisymbol{fselch}{7} (🂧) 204	
\Pisymbol{dice3d}{53} (▣) 203	\Pisymbol{dingbat}{72}	(C)	\Pisymbol{fselch}{8} (🂨) 204	
\Pisymbol{dice3d}{54} (▣) 203	\Pisymbol{dingbat}{74}	(C)	\Pisymbol{fselch}{9} (🂩) 204	
\Pisymbol{dice3d}{97} (🎲) 203	\Pisymbol{dingbat}{75}	(C)	\Pisymbol{fselch}{10} (🂪) 204	
\Pisymbol{dice3d}{98} (🎲) 203	\Pisymbol{dingbat}{76}	(C)	\Pisymbol{fselch}{11} (🂫) 204	
\Pisymbol{dice3d}{99} (🎲) 203	\Pisymbol{dingbat}{77}	(C)	\Pisymbol{fselch}{12} (🂬) 204	
\Pisymbol{dice3d}{100} (🎲) 203	\Pisymbol{dingbat}{97}	(F)	\Pisymbol{fselch}{13} (🂭) 204	
\Pisymbol{dice3d}{101} (🎲) 203	\Pisymbol{dingbat}{98}	(—)	\Pisymbol{fselch}{14} (🂮) 204	
\Pisymbol{dice3d}{102} (🎲) 203	\Pisymbol{dingbat}{99}	(—)	\Pisymbol{fselch}{15} (🂯) 204	
\Pisymbol{dice3d}{103} (🎲) 203	\Pisymbol{dingbat}{100}	(—)	\Pisymbol{fselch}{16} (🂰) 204	
\Pisymbol{dice3d}{104} (🎲) 203	\Pisymbol{dingbat}{101}	(—)	\Pisymbol{fselch}{17} (🂱) 204	
\Pisymbol{dice3d}{105} (🎲) 203			\Pisymbol{fselch}{18} (🂲) 204	
\Pisymbol{dice3d}{106} (🎲) 203			\Pisymbol{fselch}{19} (🂳) 204	
\Pisymbol{dice3d}{107} (🎲) 203			\Pisymbol{fselch}{20} (🂴) 205	
\Pisymbol{dice3d}{108} (🎲) 203			\Pisymbol{fselch}{21} (🂵) 205	
\Pisymbol{dice3d}{109} (🎲) 203			\Pisymbol{fselch}{22} (🂶) 205	
\Pisymbol{dice3d}{110} (🎲) 203			\Pisymbol{fselch}{23} (🂷) 205	
\Pisymbol{dice3d}{111} (🎲) 203					
\Pisymbol{dice3d}{112} (🎲) 203					

\Pisymbol{fselch}{108} (⌚)	205	\Pisymbol{fselch}{136} (⌚)	205	\Pisymbol{hands}{66} (👤)	186
\Pisymbol{fselch}{109} (⌚)	205	\Pisymbol{fselch}{137} (⌚)	205	\Pisymbol{hands}{67} (👤)	186
\Pisymbol{fselch}{110} (⌚)	204	\Pisymbol{fselch}{138} (⌚)	205	\Pisymbol{hands}{68} (👤)	186
\Pisymbol{fselch}{111} (⌚)	204	\Pisymbol{fselch}{139} (⌚)	205	\Pisymbol{knot1}{48} (◻)	194
\Pisymbol{fselch}{112} (⌚)	204	\Pisymbol{fselch}{140} (⌚)	205	\Pisymbol{knot1}{49} (☒)	194
\Pisymbol{fselch}{113} (⌚)	204	\Pisymbol{fselch}{141} (⌚)	205	\Pisymbol{knot1}{50} (☒)	194
\Pisymbol{fselch}{114} (⌚)	204	\Pisymbol{fselch}{142} (⌚)	205	\Pisymbol{knot1}{51} (◆)	194
\Pisymbol{fselch}{115} (⌚)	204	\Pisymbol{fselch}{143} (⌚)	205	\Pisymbol{knot1}{52} (●)	194
\Pisymbol{fselch}{116} (⌚)	204	\Pisymbol{fselch}{144} (⌚)	205	\Pisymbol{knot1}{53} (☒)	194
\Pisymbol{fselch}{117} (⌚)	204	\Pisymbol{fselch}{145} (○)	205	\Pisymbol{knot1}{58} (☒)	194
\Pisymbol{fselch}{118} (⌚)	204	\Pisymbol{fselch}{151} (◐)	205	\Pisymbol{knot1}{59} (⤵)	194
\Pisymbol{fselch}{119} (⌚)	204	\Pisymbol{fselch}{157} (●)	205	\Pisymbol{knot1}{60} (⤵)	194
\Pisymbol{fselch}{120} (⌚)	204	\Pisymbol{fselch}{163} (▢)	205	\Pisymbol{knot1}{61} (⤵)	194
\Pisymbol{fselch}{121} (⌚)	204	\Pisymbol{fselch}{169} (▢)	205	\Pisymbol{knot1}{62} (⤵)	195
\Pisymbol{fselch}{122} (⌚)	204	\Pisymbol{fselch}{175} (●)	205	\Pisymbol{knot1}{63} (⤵)	195
\Pisymbol{fselch}{123} (⌚)	204	\Pisymbol{fselch}{180} (☒)	205	\Pisymbol{knot1}{64} (⤵)	195
\Pisymbol{fselch}{124} (⌚)	204	\Pisymbol{fselch}{186} (☒)	205	\Pisymbol{knot1}{65} (⤵)	195
\Pisymbol{fselch}{125} (⌚)	204	\Pisymbol{fselch}{192} (☒)	205	\Pisymbol{knot1}{66} (⤵)	195
\Pisymbol{fselch}{126} (⌚)	204	\Pisymbol{fselch}{198} (☒)	205	\Pisymbol{knot1}{67} (⤵)	195
\Pisymbol{fselch}{127} (⌚)	204	\Pisymbol{fselch}{204} (☒)	205	\Pisymbol{knot1}{68} (⤵)	194
\Pisymbol{fselch}{128} (⌚)	204	\Pisymbol{fselch}{210} (☒)	205	\Pisymbol{knot1}{69} (⤵)	194
\Pisymbol{fselch}{129} (⌚)	204	\Pisymbol{fselch}{216} (☒)	205	\Pisymbol{knot1}{70} (⤵)	194
\Pisymbol{fselch}{130} (⌚)	205	\Pisymbol{fselch}{222} (☒)	205	\Pisymbol{knot1}{71} (⤵)	194
\Pisymbol{fselch}{131} (⌚)	205	\Pisymbol{fselch}{228} (☒)	205	\Pisymbol{knot1}{72} (⤵)	194
\Pisymbol{fselch}{132} (⌚)	205	\Pisymbol{fselch}{234} (☒)	205	\Pisymbol{knot1}{73} (⤵)	194
\Pisymbol{fselch}{133} (⌚)	205	\Pisymbol{fselch}{240} (☒)	205			
\Pisymbol{fselch}{134} (⌚)	205	\Pisymbol{fselch}{246} (☒)	205			
\Pisymbol{fselch}{135} (⌚)	205	\Pisymbol{greenpoint}{71}	(●)			

\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
\Pisymbol{knot3}{76} (⤿) 195	\Pisymbol{knot4}{50} (⤿) 196	\Pisymbol{knot4}{79} (⤿) 196
\Pisymbol{knot3}{77} (⤿) 195	\Pisymbol{knot4}{51} (◆) 196	\Pisymbol{knot4}{80} (⤿) 196
\Pisymbol{knot3}{78} (⤿) 195	\Pisymbol{knot4}{52} (●) 196	\Pisymbol{knot4}{81} (⤿) 196
\Pisymbol{knot3}{79} (⤿) 195	\Pisymbol{knot4}{53} (◻) 196	\Pisymbol{knot4}{82} (⤿) 196

\Pisymbol{knot4}{83} (.	\Pisymbol{knot5}{61} (.	\Pisymbol{knot5}{86} (.
.....	196	196	196	.
\Pisymbol{knot4}{84} (.	\Pisymbol{knot5}{62} (.	\Pisymbol{knot5}{87} (.
.....	196	196	196	.
\Pisymbol{knot4}{85} (.	\Pisymbol{knot5}{63} (.	\Pisymbol{knot5}{88} (.
.....	196	196	196	.
\Pisymbol{knot4}{86} (.	\Pisymbol{knot5}{64} (.	\Pisymbol{knot5}{96} (.
.....	196	196	196	.
\Pisymbol{knot4}{87} (.	\Pisymbol{knot5}{65} (.	\Pisymbol{knot5}{97} (.
.....	196	196	196	.
\Pisymbol{knot4}{88} (.	\Pisymbol{knot5}{66} (.	\Pisymbol{knot5}{98} (.
.....	196	196	196	.
\Pisymbol{knot4}{96} (.	\Pisymbol{knot5}{67} (.	\Pisymbol{knot5}{99} (.
.....	196	196	196	.
\Pisymbol{knot4}{97} (.	\Pisymbol{knot5}{68} (.	\Pisymbol{knot5}{100} (.
.....	196	196	196	.
\Pisymbol{knot4}{98} (.	\Pisymbol{knot5}{69} (.	\Pisymbol{knot5}{101} (.
.....	196	196	196	.
\Pisymbol{knot4}{99} (.	\Pisymbol{knot5}{70} (.	\Pisymbol{knot5}{102} (.
.....	196	196	196	.
\Pisymbol{knot4}{100} (.	\Pisymbol{knot5}{71} (.	\Pisymbol{knot5}{103} (.
.....	196	196	196	.
\Pisymbol{knot4}{101} (.	\Pisymbol{knot5}{72} (.	\Pisymbol{knot5}{104} (.
.....	196	196	196	.
\Pisymbol{knot4}{102} (.	\Pisymbol{knot5}{73} (.	\Pisymbol{knot5}{105} (.
.....	196	196	196	.
\Pisymbol{knot4}{103} (.	\Pisymbol{knot5}{74} (.	\Pisymbol{knot6}{48} (.
.....	196	196	196	.
\Pisymbol{knot4}{104} (.	\Pisymbol{knot5}{75} (.	\Pisymbol{knot6}{49} (.
.....	196	196	196	.
\Pisymbol{knot4}{105} (.	\Pisymbol{knot5}{76} (.	\Pisymbol{knot6}{50} (.
.....	196	196	196	.
\Pisymbol{knot5}{48} (.	\Pisymbol{knot5}{77} (.	\Pisymbol{knot6}{51} (.
.....	196	196	196	.
\Pisymbol{knot5}{49} (.	\Pisymbol{knot5}{78} (.	\Pisymbol{knot6}{52} (.
.....	196	196	197	.
\Pisymbol{knot5}{50} (.	\Pisymbol{knot5}{79} (.	\Pisymbol{knot6}{53} (.
.....	196	196	197	.
\Pisymbol{knot5}{51} (.	\Pisymbol{knot5}{80} (.	\Pisymbol{knot6}{58} (.
.....	196	196	197	.
\Pisymbol{knot5}{52} (.	\Pisymbol{knot5}{81} (.	\Pisymbol{knot6}{59} (.
.....	196	196	197	.
\Pisymbol{knot5}{53} (.	\Pisymbol{knot5}{82} (.	\Pisymbol{knot6}{60} (.
.....	196	196	197	.
\Pisymbol{knot5}{58} (.	\Pisymbol{knot5}{83} (.	\Pisymbol{knot6}{61} (.
.....	196	196	197	.
\Pisymbol{knot5}{59} (.	\Pisymbol{knot5}{84} (.	\Pisymbol{knot6}{62} (.
.....	196	196	197	.
\Pisymbol{knot5}{60} (.	\Pisymbol{knot5}{85} (.	\Pisymbol{knot6}{63} (.
.....	196	196	197	.

\Pisymbol{knot7}{99} (⌚)	.	\Pisymbol{nkarta}{68} (▲)	.
..... 197	 187	
\Pisymbol{knot7}{100} (⌚)	.	\Pisymbol{nkarta}{69} (☆)	.
..... 197	 187	
\Pisymbol{knot7}{101} (⌚)	.	\Pisymbol{nkarta}{70} (⊗)	.
..... 197	 187	
\Pisymbol{knot7}{102} (⌚)	.	\Pisymbol{nkarta}{71} (■)	.
..... 197	 187	
\Pisymbol{knot7}{103} (⌚)	.	\Pisymbol{nkarta}{72} (〓)	.
..... 197	 187	
\Pisymbol{knot7}{104} (☰)	.	\Pisymbol{nkarta}{73} (□)	.
..... 197	 187	
\Pisymbol{knot7}{105} (☰)	.	\Pisymbol{nkarta}{74} (±)	.
..... 197	 187	
\Pisymbol{magic}{48} (◎)	.	\Pisymbol{nkarta}{75} (●)	187
..... 204		\Pisymbol{nkarta}{76} (□)	.
\Pisymbol{magic}{49} (①) 187	
..... 204		\Pisymbol{nkarta}{77} (▲)	.
\Pisymbol{magic}{50} (②) 187	
..... 204		\Pisymbol{nkarta}{78} (▼)	.
\Pisymbol{magic}{51} (③) 187	
..... 204		\Pisymbol{nkarta}{79} (○)	.
\Pisymbol{magic}{52} (④) 187	
..... 204		\Pisymbol{nkarta}{80} (▽)	.
\Pisymbol{magic}{53} (⑤) 187	
..... 204		\Pisymbol{nkarta}{81} (▲)	.
\Pisymbol{magic}{54} (⑥) 187	
..... 204		\Pisymbol{nkarta}{82} (⊗)	.
\Pisymbol{magic}{55} (⑦) 187	
..... 204		\Pisymbol{nkarta}{83} (▼)	.
\Pisymbol{magic}{56} (⑧) 187	
..... 204		\Pisymbol{nkarta}{84} (◎)	.
\Pisymbol{magic}{57} (⑨) 187	
..... 204		\Pisymbol{nkarta}{85} (▬)	.
\Pisymbol{magic}{66} (⊗) 187	
..... 204		\Pisymbol{nkarta}{86} (●)	.
\Pisymbol{magic}{71} (⌚) 187	
..... 204		\Pisymbol{nkarta}{87} (★)	.
\Pisymbol{magic}{82} (⌚) 187	
..... 204		\Pisymbol{nkarta}{88} (△)	.
\Pisymbol{magic}{84} (⊗) 187	
..... 204		\Pisymbol{nkarta}{89} (◐)	.
\Pisymbol{magic}{85} (◐) 187	
..... 204		\Pisymbol{nkarta}{90} (◑)	187
\Pisymbol{magic}{87} (⊗)	.	\Pisymbol{nkarta}{91} (λ)	.
..... 204	 187	
\Pisymbol{magic}{88} (⊗)	.	\Pisymbol{nkarta}{92} (⌚)	.
..... 204	 187	
\Pisymbol{magic}{90} (◐)	.	\Pisymbol{nkarta}{93} (⌚)	187
..... 204		\Pisymbol{nkarta}{94} (⊗)	.
\Pisymbol{moonphase}{0} (⌚) 187	
..... 188		\Pisymbol{nkarta}{95} (◐)	.
\Pisymbol{moonphase}{1} (⌚) 187	
..... 188		\Pisymbol{nkarta}{96} (◑)	.
	 186	
		\Pisymbol{nkarta}{97} (◐)	.
	 186	
		\Pisymbol{nkarta}{98} (◑)	.
	 186	
		\Pisymbol{nkarta}{99} (◐)	.
	 186	

\Pisymbol{nkarta}{100} (▲) 186	\Pisymbol{nkarta}{165} (→) 187
\Pisymbol{nkarta}{101} (★) 186	\Pisymbol{nkarta}{166} (↔) 187
\Pisymbol{nkarta}{102} (■) 186	\Pisymbol{nkarta}{167} (◐) 187
\Pisymbol{nkarta}{103} (↑) 186	\Pisymbol{nkarta}{168} (◎) 187
\Pisymbol{nkarta}{104} (↓) 186	\Pisymbol{nkarta}{169} (▲) 187
\Pisymbol{nkarta}{105} (○) 186	\Pisymbol{nkarta}{170} (■) 187
\Pisymbol{nkarta}{106} (▲) 186	\Pisymbol{nkarta}{171} (*) 187
\Pisymbol{nkarta}{107} (⊛) 186	\Pisymbol{nkarta}{172} (□) 187
\Pisymbol{nkarta}{108} (□) 186	\Pisymbol{nkarta}{173} (■) 187
\Pisymbol{nkarta}{109} (▤) 186	\Pisymbol{nkarta}{174} (+) 187
\Pisymbol{nkarta}{110} (⊛) 186	\Pisymbol{nkarta}{175} (○) 187
\Pisymbol{nkarta}{111} (○) 186	\Pisymbol{nkarta}{176} (●) 187
\Pisymbol{nkarta}{112} (◇) 186	\Pisymbol{nkarta}{177} (□) 187
\Pisymbol{nkarta}{113} (△) 187	\Pisymbol{nkarta}{178} (†) 187
\Pisymbol{nkarta}{114} (⊕) 187	\Pisymbol{nkarta}{179} (⊗) 187
\Pisymbol{nkarta}{115} (⊛) 187	\Pisymbol{nkarta}{180} (□) 187
\Pisymbol{nkarta}{116} (◎) 187	\Pisymbol{nkarta}{181} (■) 187
\Pisymbol{nkarta}{117} (▤) 187	\Pisymbol{nkarta}{182} (π) 187
\Pisymbol{nkarta}{118} (◐) 187	\Pisymbol{nkarta}{183} (*) 187
\Pisymbol{nkarta}{119} (▢) 187	\Pisymbol{nkarta}{184} (⊕) 187
\Pisymbol{nkarta}{120} (●) 187	\Pisymbol{nkarta}{185} (▷) 187
\Pisymbol{nkarta}{121} (○) 187	\Pisymbol{nkarta}{186} (§) 187
\Pisymbol{nkarta}{122} (i) 187	\Pisymbol{nkarta}{187} (◐) 187
\Pisymbol{nkarta}{123}	(—)	\Pisymbol{nkarta}{188} (†) 187
	187	\Pisymbol{nkarta}{189} (⊗) 187
\Pisymbol{nkarta}{124} (↗) 187	\Pisymbol{nkarta}{190} (×) 187
\Pisymbol{nkarta}{125} (↖) 187	\Pisymbol{nkarta}{191} (○) 187
\Pisymbol{nkarta}{126} (✳) 187	\Pisymbol{nkarta}{192} (*) 187
\Pisymbol{nkarta}{161} (♥) 187	\Pisymbol{nkarta}{193} (●) 186
\Pisymbol{nkarta}{162} (◆) 187	\Pisymbol{nkarta}{194} (□) 186
\Pisymbol{nkarta}{163} (▲) 187	\Pisymbol{nkarta}{195} (■) 186
\Pisymbol{nkarta}{164}	(—)	187	

\Pisymbol{nkarta}{227} (•) 187	\Pisymbol{smfpr10}{42} (❀) 200
\Pisymbol{nkarta}{228} (★) 187	\Pisymbol{smfpr10}{46} (ⓘ) 200
\Pisymbol{nkarta}{229} (☆) 187	\Pisymbol{smfpr10}{48} (ⓘ) 200
\Pisymbol{nkarta}{230} (○) 187	\Pisymbol{smfpr10}{49} (ⓘ) 200
\Pisymbol{nkarta}{231} (□) 187	\Pisymbol{smfpr10}{50} (ⓘ) 200
\Pisymbol{nkarta}{232} (▽) 187	\Pisymbol{smfpr10}{51} (ⓘ) 200
\Pisymbol{nkarta}{233} (✉) 187	\Pisymbol{smfpr10}{52} (ⓘ) 200
\Pisymbol{nkarta}{234} (♣) 187	\Pisymbol{smfpr10}{53} (ⓘ) 200
\Pisymbol{nkarta}{235} (✉) 187	\Pisymbol{smfpr10}{54} (ⓘ) 200
\Pisymbol{nkarta}{236} (↓) 187	\Pisymbol{smfpr10}{55} (ⓘ) 200
\Pisymbol{nkarta}{237} (՞) 187	\Pisymbol{smfpr10}{56} (ⓘ) 200
\Pisymbol{nkarta}{238} (՞) 187	\Pisymbol{smfpr10}{57} (ⓘ) 200
\Pisymbol{nkarta}{239} (՞) 187	\Pisymbol{smfpr10}{65} (ⓘ) 201
\Pisymbol{nkarta}{240} (█) 187	\Pisymbol{smfpr10}{66} (՞) 201
\Pisymbol{nkarta}{241} (⊗) 187	\Pisymbol{smfpr10}{67} (՞) 201
\Pisymbol{nkarta}{242} (◊) 187	\Pisymbol{smfpr10}{68} (՞) 201
\Pisymbol{nkarta}{243} (✖) 187	\Pisymbol{smfpr10}{69} (՞) 201
\Pisymbol{nkarta}{244} (+) 187	\Pisymbol{smfpr10}{70} (՞) 201
\Pisymbol{nkarta}{245} (†) 187	\Pisymbol{smfpr10}{71} (՞) 201
\Pisymbol{nkarta}{246} (▲) 187	\Pisymbol{smfpr10}{72} (՞) 201
\Pisymbol{nkarta}{247} (♦) 187	\Pisymbol{smfpr10}{73} (՞) 201
\Pisymbol{nkarta}{248} (☰) 187	\Pisymbol{smfpr10}{74} (՞) 201
\Pisymbol{nkarta}{249} (■) 187	\Pisymbol{smfpr10}{75} (՞) 201
\Pisymbol{nkarta}{250} (▬) 187	\Pisymbol{smfpr10}{76} (՞) 201
\Pisymbol{nkarta}{251} (❖) 187	\Pisymbol{smfpr10}{77} (՞) 201
\Pisymbol{nkarta}{252} (◤) 187	\Pisymbol{smfpr10}{78} (՞) 201
\Pisymbol{nkarta}{253} (▼) 187	\Pisymbol{smfpr10}{79} (՞) 201
\Pisymbol{nkarta}{254} (▶) 187	\Pisymbol{smfpr10}{80} (՞) 201
\Pisymbol{smfpr10}{34} () 200	\Pisymbol{smfpr10}{81} (՞) 201
\Pisymbol{smfpr10}{35} (՞) 200	\Pisymbol{smfpr10}{82} (՞) 201
\Pisymbol{smfpr10}{36} (՞) 200	\Pisymbol{smfpr10}{83} (՞) 201
		\Pisymbol{smfpr10}{84} (՞) 201
		\Pisymbol{smfpr10}{85} (՞) 201
		\Pisymbol{smfpr10}{86} (՞) 201
		\Pisymbol{smfpr10}{87} (՞) 201
		\Pisymbol{smfpr10}{88} (՞) 201
		\Pisymbol{smfpr10}{89} (՞) 201
		\Pisymbol{smfpr10}{90} (՞) 201
		\Pisymbol{smfpr10}{97} (՞) 201
		\Pisymbol{smfpr10}{98} (՞) 201
		\Pisymbol{smfpr10}{99} (՞) 201
		\Pisymbol{smfpr10}{100} (՞) 201
		\Pisymbol{smfpr10}{101} (՞) 201
		\Pisymbol{smfpr10}{102} (՞) 201
		\Pisymbol{smfpr10}{103} (՞) 201
		\Pisymbol{smfpr10}{104} (՞) 201
		\Pisymbol{smfpr10}{105} (՞) 201
		\Pisymbol{smfpr10}{106} (՞) 201
		\Pisymbol{smfpr10}{107} (՞) 201
		\Pisymbol{smfpr10}{108} (՞) 201
		\Pisymbol{smfpr10}{109} (՞) 201
		\Pisymbol{smfpr10}{110} (՞) 201
		\Pisymbol{smfpr10}{111} (՞) 201
		\Pisymbol{smfpr10}{112} (՞) 201
		\Pisymbol{smfpr10}{113} (՞) 201
		\Pisymbol{smfpr10}{114} (՞) 201
		\Pisymbol{smfpr10}{115} (՞) 201
		\Pisymbol{smfpr10}{116} (՞) 200
		\Pisymbol{smfpr10}{117} (՞) 200
		\Pisymbol{smfpr10}{118} (՞) 200
		\Pisymbol{smfpr10}{119} (՞) 200
		\Pisymbol{smfpr10}{120} (՞) 200

\Pisymbol{WebOMintsGD}{54}	
(✉)	191
\Pisymbol{WebOMintsGD}{55}	
(✉)	191
\Pisymbol{WebOMintsGD}{56}	
(✉)	191
\Pisymbol{WebOMintsGD}{57}	
(✉)	191
\Pisymbol{WebOMintsGD}{65}	
(✉)	191
\Pisymbol{WebOMintsGD}{66}	
(✉)	191
\Pisymbol{WebOMintsGD}{67}	
(✉)	191
\Pisymbol{WebOMintsGD}{68}	
(✉)	191
\Pisymbol{WebOMintsGD}{69}	
(✉)	191
\Pisymbol{WebOMintsGD}{70}	
(✉)	191
\Pisymbol{WebOMintsGD}{71}	
(✉)	191
\Pisymbol{WebOMintsGD}{72}	
(✉)	191
\Pisymbol{WebOMintsGD}{73}	
(✉)	191
\Pisymbol{WebOMintsGD}{74}	
(✉)	191
\Pisymbol{WebOMintsGD}{75}	
(✉)	191
\Pisymbol{WebOMintsGD}{76}	
(✉)	191
\Pisymbol{WebOMintsGD}{77}	
(✉)	191
\Pisymbol{WebOMintsGD}{78}	
(✉)	191
\Pisymbol{WebOMintsGD}{79}	
(✉)	191
\Pisymbol{WebOMintsGD}{80}	
(✉)	191
\Pisymbol{WebOMintsGD}{81}	
(✉)	191
\Pisymbol{WebOMintsGD}{82}	
(✉)	191
\Pisymbol{WebOMintsGD}{83}	
(✉)	191
\Pisymbol{WebOMintsGD}{84}	
(✉)	191
\Pisymbol{WebOMintsGD}{85}	
(✉)	191
\Pisymbol{WebOMintsGD}{86}	
(✉)	191
\Pisymbol{WebOMintsGD}{87}	
(✉)	191
\Pisymbol{WebOMintsGD}{88}	
(✉)	191
\Pisymbol{WebOMintsGD}{89}	
(✉)	191
\Pisymbol{WebOMintsGD}{90}	
(✉)	191
\Pisymbol{WebOMintsGD}{91}	
(✉)	191
\Pisymbol{WebOMintsGD}{93}	
(✉)	191
\Pisymbol{WebOMintsGD}{97}	
(✉)	191
\Pisymbol{WebOMintsGD}{98}	
(✉)	191
\Pisymbol{WebOMintsGD}{99}	
(✉)	191
\Pisymbol{WebOMintsGD}{100}	
(✉)	191
\Pisymbol{WebOMintsGD}{101}	
(✉)	191
\Pisymbol{WebOMintsGD}{102}	
(✉)	191
\Pisymbol{WebOMintsGD}{103}	
(✉)	191
\Pisymbol{WebOMintsGD}{104}	
(✉)	191
\Pisymbol{WebOMintsGD}{105}	
(✉)	191
\Pisymbol{WebOMintsGD}{106}	
(✉)	191
\Pisymbol{WebOMintsGD}{107}	
(✉)	191
\Pisymbol{WebOMintsGD}{108}	
(✉)	191
\Pisymbol{WebOMintsGD}{109}	
(✉)	191
\Pisymbol{WebOMintsGD}{110}	
(✉)	191
\Pisymbol{WebOMintsGD}{111}	
(✉)	191
\Pisymbol{WebOMintsGD}{112}	
(✉)	191
\Pisymbol{WebOMintsGD}{113}	
(✉)	191
\Pisymbol{WebOMintsGD}{114}	
(✉)	191
\Pisymbol{WebOMintsGD}{115}	
(✉)	191
\Pisymbol{WebOMintsGD}{116}	
(✉)	191
\Pisymbol{WebOMintsGD}{117}	
(✉)	191
\Pisymbol{WebOMintsGD}{118}	
(✉)	191
\Pisymbol{WebOMintsGD}{119}	
(✉)	191
\Pisymbol{WebOMintsGD}{120}	
(✉)	191
\Pisymbol{WebOMintsGD}{121}	
(✉)	191
\Pisymbol{WebOMintsGD}{122}	
(✉)	191
\pitchfork (↑)	113
\pitchfork (↑)	47
\pitchfork (↑)	54
\pitchfork (↑)	86
\pitchfork (↑)	84
\pitchfork (↑)	55
pitchfork symbols	47, 84, 86,
	113
Pitman's base 12 symbols	110, 168
\piup (π)	89
\planck (h)	18
\Plane (↗)	137
planets	119, 120, 188–190
\plasmon (↔)	125
playing cards	136, 137
Plimsoll line	211
\Plus (✚)	129
\plus (+)	30
\plus (+)	30
plus-or-minus sign	see \pm
\PlusCenterOpen (✚)	129
\pluscirc (⊕)	29
\pluscirc (⊕)	31
\plusdot (⊕)	31
\plusdot (⊕)	32
\plusseqq (±)	32
\plushat (†)	32
\PlusOutline (✚)	129
plusses	129, 186–187
\plussim (±)	32
\plussubtwo (±)	32
\PlusThinCenterOpen (✚)	129
\plustrif (★)	31
\plustrif (★)	32
\Pluto (♃)	120
\Pluto (♄)	119
\Pluto (♄)	120
\pluto (♃)	119
\pm (±)	28
\pm (±)	31
\pm (±)	31
\pm (±)	30
\pm (±)	32
\pm (-)	171
\pmb	220
\pmboxdraw (package)	173, 226
\pmod	87
\pod	87
\pointer (▷)	164
pointing finger	see fists
\PointingHand (☞)	165
\pointint (⌚)	43
\pointintsl (⌚)	45
\pointintup (⌚)	45
\pointright (☞)	129
\Poland (🇵🇱)	177
\polaron (ԑF)	125
\polishhook („)	23
\polter (████)	107
polutonikogreek (babel package option)	14, 88, 89
polygons	132–134, 157–161, 186–187, 202–203
\polynom (package)	102
polynomial division	102
polytonic Greek	14, 88, 89
\portato (♪)	152
\portatoDown (♩)	152

\Portugal (ι)	177	\precnsim (≈)	49	\PrtSc ([PrtSc])	122
\Poseidon (★)	120	\precnsim (≈)	47	\prurel (↝)	54
\positron (e ⁺)	125	\precnsim (≈)	54	\prurel (↝)	56
\postalmark (✉)	114	\precnsim (≈)	52	\ps (✉)	171
\Postbox (✉)	175	\precnsim (≈)	51	pseudographics	173
PostScript .	89, 117, 126, 209, 218	\precnsim (≈)	55	\Psi (Ψ)	88
PostScript fonts	126	\precsim (≾)	48	\psi (ψ)	88
\pot (✉)	179	\precsim (≾)	47	\psiup (ψ)	89
\pot (✉)	179	\precsim (≾)	54	psnfss (package)	130
\Pound (£)	25	\precsim (≾)	52	PSTricks (package)	181
\pounds	14	\precsim (≾)	50	\Psyche (Ψ)	120
\pounds (£)	222, 223	\precsim (≾)	56	\Pu (.)	149
power set	see alphabets, math	prescription	. see \textrecip	\pullback (⤏)	31
\powerset (℘)	91	present-value symbols	105, 214	\pullback (⤏)	56
\Pp (:)	171	\prime (′)	112	pullback diagrams	213
\pp („)	171	\prime (′)	113	pulse diagram symbols	118
\Ppp (‘)	171	\prime (′)	113	\PulseHigh (⊸)	118
\PPP (‘)	171	\prime (′)	111	\PulseLow (⊸)	118
\ppp (‘)	171	primes	111–114	punctuation	15
\Pffff (‘)	171	\Printer (🖨)	121	punctum	. see musixgre
\pppp (‘)	171	printer’s fist	. see fists	\Purierstab (¶)	179
\ppppp (‘)	171	printer’s flowers	. see fleurons and flowers	\pushout (⤏)	31
\Pr (Pr)	87	probabilistic independence	212	\pushout (⤏)	56
\Prec (≪)	55	probability limit (plim)	. see $n \rightarrow \infty$	pushout diagrams	213
\prec (≺)	46	\DeclareMathOperator		\pwedge (Δ)	18
\prec (≺)	52	\prod (Π)	37	\pxfonts (package)	27,
\prec (≺)	50	\prod (Π)	42	29, 39, 48, 59, 62, 70, 86, 89–91, 112, 116, 136, 206, 221	
\prec (≺)	55	\prod (Π)	41	\Pxp (:)	171
\precapprox (≈)	48	\prod (Π)	43	\pxp (:)	171
\precapprox (≈)	47	\PRODI	46		
\precapprox (≈)	54				
\precapprox (≈)	52	\PRODI (Π)	46		
\precapprox (≈)	50	\Prodi	46		
\precapprox (≈)	55	\Prodi (Π)	46		
\preccurlyeq (≤)	48	\prodi	46		
\preccurlyeq (≤)	47	\prodi (Π)	46		
\preccurlyeq (≤)	54	prodint (package)	46, 226		
\preccurlyeq (≤)	52	product integrals	46		
\preccurlyeq (≤)	50	\proffline (↷)	114		
\preccurlyeq (≤)	55	\profsurf (△)	114		
\precdot (◁)	48	Project Gutenberg	209		
\preceq (≤)	46	projective space (P)	. see alphabets, math		
\preceq (≤)	52	\projlim (proj lim)	87		
\preceq (≤)	50	pronunciation symbols	. see phonetic symbols		
\preceq (≤)	55	proof, end of	112		
\preceqq (≤)	48	proper subset/superset	. see \subsetneq/\supsetneq		
\preceqq (≤)	52	proper vertices	125		
\preceqq (≤)	55	\PropertyLine (PropertyParams)	114		
\precnapprox (≈)	49	\propfrom (∞)	52		
\precnapprox (≈)	47	\proto (∞)	113		
\precnapprox (≈)	54	\proto (∞)	46		
\precnapprox (≈)	52	\proto (∞)	52		
\precnapprox (≈)	51	\proto (∞)	50		
\precnapprox (≈)	55	\proto (∞)	56		
\precneq (≠)	49	proto-Semitic symbols	138		
\precneq (≠)	52, 53	\proton (p [*])	125		
\precneq (≠)	55	protosem (package)	. 138, 226		
\precneqq (≠)	48	\ProvidesPackage	225		
\precneqq (≠)	54				
\precneqq (≠)	52, 53				
\precneqq (≠)	55				

\quarternote (♩)	147
\quarterNoteDotted (♪)	150
\quarterNoteDottedDouble (♪..)	150
\quarterNoteDottedDoubleDown (♪..)	150
\quarterNoteDottedDown (♪..)	150
\quarterNoteDown (♪)	150
quasi-quotation marks („“)	.
... see \ulcorner and \urcorner	
quaternions (\mathbb{H})	see alphabets, math
quaver .	see musical symbols
\quaver (♪)	150
\quaverDotted (♪..)	150
\quaverDottedDouble (♪..)	150
\quaverDottedDoubleDown (♪..)	150
\quaverDottedDown (♪..)	150
\quaverDown (♪)	150
\quaverRest (♪)	151
\quaverRestDotted (♪..)	151
queen	170, 204–205
\questeq (≡)	56
\Question (??)	114
quilisma	see musixgre
\Quincunx (¶)	120
Quine corners („“)	... see \ulcorner and \urcorner
quotation marks	... 13, 15, 26, 178, 220, 223
\quotedblbase („)	15, 223
\quotesinglbase („)	15, 223
R	
\R (~)	171
\r (✉)	19
\r (~)	171
r (✉)	116
\Radiation (☢)	166
\radiation (☢)	178
radicals .	see \sqrt and \surd
\Radioactivity (☢)	124
\Radix (℞)	120
\Rain (🌧)	166
\RainCloud (🌧)	166
raindrop	204
raising .	see \textraising
\RaisingEdge (⤵)	118
\Range (⤶)	117
\rAngle (⤷)	99
\rAngle (⤸)	96
\rAngle (⤹)	98
\range ()	27, 94
\range ()	96
\rangle (>)	95
\rangle (})	98
\ranglebar (>)	96
\rangledot (>)	96
\rangledot (})	93
\rangledownzigzagarrow (⤷)	112
\RArrow (⤷)	122
\arrowfill	106
\ratio (:)	58
\RATIONAL (Q)	87
\Rational (Q)	87
rational numbers (Q)	... see alphabets, math
rationalized Planck constant	see \hbar
\RB ({})	121
\Rbag (ſ)	93
\rbag (ſ)	93
\rbag (ſ)	31
\rbag (ſ)	93
\rblackbowtie (¤)	31
\rblkbrbrak ()}	93
\rBrace ({})	98
\rbrace ({})	96
\rbrace ({})	97
\rbrace ({})	96
\rbrace ({})	98
\Rbrack (])	117
\rBrack (])	99
\rBrack (])	97
\rBrack (])	97
\rBrack (])	97
\rBrack (])	98
\rbrack (])	97
\rbrak (])	97
\recycle (♻)	178
	
\recycle (♻)	175
\Recycling (♻)	175
recycling symbols	... 174, 175, 178, 180–184, 186
reduced quadrupole moment	see \rqm
\reference (R)	125
\reflectbox	209
registered trademark	... 13, 25, 222
relational database symbols	114
relational symbols	... 46
binary	... 47–51, 54–66, 84–86
\rc (✉)	22
\rCeil (⤵)	99
\rceil (])	94
\rceil (])	97

negated binary	47–51, 53, 54, 56	
triangle	66–68	
\Relbar (=)	86, 210	
\Relbar (≡)	50	
\Relbar (≂)	87	
\relbar (–)	86, 210	
\relbar (–)	50	
\relbar (–)	87	
\relsize (package)	22	
\Request (?)	175	
\resizebox	84, 206	
\Respondens (~)	171	
\respondens (~)	171	
response (R)	224, 225	
\restoresymbol	206	
\restriction	see \upharpoonright	
\restriction (↑)	70	
\restriction (↑)	78	
\restriction (↑)	74	
\restriction (↑)	83	
rests ...	see musical symbols	
retracting	see \textr retracting	
\Retrograde (R _x)	120	
\Return (◀)	122	
return ...	see carriage return	
\revangle (Δ)	111	
\revangle (Δ)	112	
\revangleubar (Δ̄)	112	
\revaw (♪)	98	
\revD (D̄)	18	
\revddots (⋮)	213	
\reve (⠃)	18	
\reveject (⠃)	18	
\revemptyset (Q)	113	
\revemptyset (Q)	111	
\revepsilon (ʒ)	18	
\revepsilon (ʒ)	209	
reverse solidus	see \textr backslash	
\reverseallabreve (♪)	148	
\reverseC (C̄)	148	
reversed symbols	209	
\reversedvideobend (⤵)	164	
\revglotstop (⠁)	18	
\revmeasuredangle (Δ)	111	
\revnmid (⊄)	56	
\revsphericalangle (⤶)	111	
\Rewind (◀)	164	
\RewindToIndex (⏮)	164	
\RewindToStart (⏮)	164	
\rbowtie (⋈)	56	
\rfilet (♪)	95	
\rFloor (⌋)	99	
\rfloor (])	94	
\rfloor (])	97	
\rfloor (])	95	
\rfloor (])	97	
\rftimes (✖)	56	
\rgroup ()	94	
\rgroup ()	97	
\rgroup ()	95	
\rgroup ({)	97	
\RHD (▶)	29	
\rhd (▷)	28, 29	
\rhd (▷)	64	
\rhd (▷)	63, 67	
\rhd (▷)	32, 134	
\Rho (P)	88	
\rho (ρ)	88	
\rho (ρ)	89	
\rhook (⌢)	87	
\rhookdownarrow (↓)	76	
\rhookdownarrow (↓)	72	
\rhookleftarrow (↔)	76	
\rhookleftarrow (↔)	72	
\rhooknearrow (↗)	76	
\rhooknearrow (↗)	72	
\rhooknwarrow (↖)	76	
\rhooknwarrow (↖)	72	
\rhookrightarrow (→)	76	
\rhookrightarrow (→)	72	
\rhooksearrow (↘)	76	
\rhooksearrow (↘)	72	
\rhookswarrow (↙)	76	
\rhookswarrow (↙)	71	
\rhookuparrow (↑)	76	
\rhookuparrow (↑)	71	
\rhoup (ρ)	89	
\right ...	94, 98, 99, 206, 208	
\rightangle (∟)	111	
\rightangle (∟)	111	
\rightangle (∟)	115	
\rightangle (∟)	112	
\rightanglemdot (◐)	111	
\rightanglemdot (◐)	111	
\rightanglemdot (◐)	112	
\rightanglemdot (◐)	111	
\rightanglesqr (◐)	111	
\rightanglesqr (◐)	111	
\rightanglesqr (◐)	112	
\rightanglesquare (◐)	111	
\RIGHTArrow (▶)	164	
\Rightarrow (⇒)	27, 69	
\Rightarrow (⇒)	75	
\Rightarrow (⇒)	71	
\Rightarrow (⇒)	81	
\rightarrow (→)	70	
\rightarrow (→)	69	
\rightarrow (→)	75	
\rightarrow (→)	71	
\rightarrow (→)	81	
\rightarrowapprox (≈)	81	
\rightarrowbackapprox (≈)	81	
\rightarrowarrowbar (→)	79	
\rightarrowarrowbar (→)	81	
\rightarrowarrowbsimilar (↝)	81	
\rightarrowarrowcircle (⦿)	79	
\rightarrowarrowdiamond (⦿)	81	
\rightarrowarrowgtr (⤵)	66	
\rightarrowarrowonoplus (⊕)	81	
\rightarrowarrowplus (⤷)	81	
\rightarrowarrowshortleftarrow (⤴)	81	
\rightarrowsimilar (↝)	81	
\rightarrowsupset (⤸)	61	
\rightarrowarrowtail (⤠)	69	
\rightarrowarrowtail (⤠)	79	
\rightarrowarrowtail (⤠)	75	
\rightarrowarrowtail (⤠)	71	
\rightarrowarrowtail (⤠)	81	
\rightarrowarrowTriangle (⤠)	79	
\rightarrowarrowtriangle (⤠)	70	
\rightarrowarrowtriangle (⤠)	79	
\rightarrowarrowtriangle (⤠)	81	
\rightarrowarrowx (⤠)	81	
\rightAssert (⊧)	52	
\rightassert (⊧)	52	
\rightbarharpoon (⇒)	71	
\rightbkarrow (⤠)	75	
\rightbkarrow (⤠)	81	
\rightblackarrow (⤠)	79	
\rightblackspoon (⤠)	85	
\RIGHTCIRCLE (●)	132	
\RIGHTcircle (●)	132	
\Rightcircle (●)	132	
\rightcurvedarrow (⤠)	76	
\rightcurvedarrow (⤠)	81	
\rightdasharrow (⤠)	79	
\rightdasharrow (⤠)	81	
\rightdbltail (⤠)	56	
\RightDiamond (◆)	135	
\rightdotarrow (⤠)	81	
\rightdowncurvedarrow (⤠)	76	
\rightdowncurvedarrow (⤠)	81	
\rightevaw (♪)	98	
\rightfilledspoon (⤠)	84	
\rightfishtail (⤠)	55	
\rightfootline (⤠)	52	
\rightfootline (⤠)	50	
\rightfree (⤠)	50	
\righthalfcap (⠁)	30	
\righthalfcup (⠋)	30	
\righthand (⠁)	129	
\rightharpoonaccent (⠁)	101	
\rightharpoonccw (⤠)	74	
\rightharpooncw (⤠)	74	
\rightharpoondown (⤠)	71	
\rightharpoondown (⤠)	69	
\rightharpoondown (⤠)	80	
\rightharpoondown (⤠)	78	
\rightharpoondown (⤠)	83	

\rightharpoondownbar (\rightarrow)	83	\rightslice (\triangleright)	31	\rmoustache ($\Big\}$)	94
\rightharpoonsupdown (\Rightarrow)	83	\rightslice (\triangleright)	49	\rmoustache ($\Big\}$)	97
\rightharpoonup (\rightarrow) . . .	71	\rightspoon (\rightsquigarrow)	85	\rmoustache ($\Big\}$)	95
\rightharpoonup (\rightarrow) . . .	69	\rightspoon (\rightsquigarrow)	84	\rmoustache ($\Big\}$)	97
\rightharpoonup (\rightarrow) . . .	80	\rightsquigarrow (\rightsquigarrow)	70	\R0 (ρ)	121
\rightharpoonup (\rightarrow) . . .	78	\rightsquigarrow (\rightsquigarrow)	69	rock/paper/scissors	129
\rightharpoonup (\rightarrow) . . .	83	\rightsquigarrow (\rightsquigarrow)	79	Roman coins	25
\rightharpoonupbar (\rightarrow) .	83	\rightsquigarrow (\rightsquigarrow)	76	\Romania (\bullet)	177
\rightharpoonupdash (\Rightarrow)	83	\rightsquigarrow (\rightsquigarrow)	72	Romanian comma-belo accent („)	see accents
\rightimply (\Rightarrow)	55	\rightsquigarrow (\rightsquigarrow)	81, 82	rook	170, 204–205
\rightlcurvearrow (\rightsquigarrow) .	76	\righttt (\vdash)	23	roots	see \sqrt
\rightleftarrows (\rightleftarrows) .	70	\righttail (\leftarrowtail)	55	roshambo	129
\rightleftarrows (\rightleftarrows) .	69	\righttherefore (:.)	108	\rotatebox	23, 209
\rightleftarrows (\rightleftarrows) .	79	\righttherefore (:.)	29, 108	rotated symbols	16–18, 23, 209
\rightleftarrows (\rightleftarrows) .	75	\rightthreearrows (\exists)	79	rotating (package)	26, 122
\rightleftarrows (\rightleftarrows) .	71	\rightthreearrows (\exists)	81	\rotm (ui)	18
\rightleftarrows (\rightleftarrows) .	81	\rightthreetimes (\wedge)	113	\rotOmega (v)	18
\rightleftcurvearrow (\rightsquigarrow)	76	\rightthreetimes (\wedge)	28	\rotr (i)	18
\rightleftharpoon (\rightarrow) .	71	\rightthreetimes (\wedge)	31	\rotvara (v)	18
\rightleftharpoons (\rightleftharpoons)	71	\rightthreetimes (\wedge)	31	\rotw (M)	18
\rightleftharpoons (\rightleftharpoons)	69	\rightthreetimes (\wedge)	29	\roty (A)	18
\rightleftharpoons (\rightleftharpoons)	69	\rightthreethumbsdown ($\leftarrow\!\!\!\leftarrow$) .	128	\RoundedLsteel (L)	123
\rightleftharpoons (\rightleftharpoons)	80	\rightthreethumbsup ($\leftarrow\!\!\!\leftarrow$) .	128	\RoundedLsteel (L)	123
\rightleftharpoons (\rightleftharpoons)	78	\righttoleftarrow ($\leftarrow\!\!\!\leftarrow$) .	70	\RoundedTsteel (T)	123
\rightleftharpoons (\rightleftharpoons)	74	\righttoleftarrow ($\leftarrow\!\!\!\leftarrow$) .	79	\RoundedTsteel (T)	123
\rightleftharpoons (\rightleftharpoons)	83	\Righttorque (Q)	123	\RoundedTTsteel (I)	123
\rightleftharpoonsdown (\rightleftharpoons)	83	\rightturn (O)	164	\Rparen ()	117
\rightleftharpoonsdownfill .	106	\rightupcurvedarrow (\nearrow) .	76	\rParen ()	97
\rightleftharpoonsup (\rightleftharpoons)	83	\rightVDash (=)	51	\rparen ()	96
\rightleftsquigarrow (\rightleftsquigarrow)	76	\rightVdash (-)	51	\rparen ()	97
\rightlsquigarrow (\rightsquigarrow) .	76	\rightVdash (-)	49	\rparengtr (>)	93
\rightlsquigarrow (\rightsquigarrow) .	71	\rightvDash (=)	51	\Rparenless ()	93
\Rightmapsto (\Rightarrow)	75	\rightvdash (-)	51	\rppoint (f)	43
\Rightmapsto (\Rightarrow)	76	\rightvdash (-)	49	\rppoints (f)	45
\Rightmapsto (\Rightarrow)	71	\rightvdash (-)	49	\rppointup (f)	45
\rightModels (=)	50	\rightwave ()	98	\rqm (f)	211
\rightmodels (F)	51	\rightwavearrow (\rightsquigarrow)	75	\rrangle ()	95
\rightmodels (F)	50	\rightwavearrow (\rightsquigarrow)	81	\rrangle ()	93
\rightmoon (D)	120	\rightwhitearrow (\Rightarrow)	79	\rrbracket ()	94
\rightmoon (D)	120	\rightwhitearrow (\Rightarrow)	81	\rrbracket ()	99
\rightmoon (D)	119	\rightwhiteroundarrow (\Rightarrow)	79	\rrceil ()	93
\rightouterjoin (\bowtie)	114	\rightY (>)	31	\RRelbar ()	87
\rightp (>)	23	\rightY (>)	29	\Rrelbar ()	87
\rightpentagon (O)	134	rinforzando ()	152	\rrfloor ()	93
\rightpentagonblack (bullet)	134	\ring (o)	101	\rrhD ()	185
\rightpitchfork (\ni)	86	ring (o)	see accents	\rrhDa ()	185
\rightpitchfork (\ni)	84	ring equal to	see \circlearrowleft	\rrhDap ()	185
\rightpointleft ()	128	ring in equal to	see \eqcirc	\rrhDp ()	185
\rightpointright ()	128	\ringplus (f)	32	\rrhDs ()	185
\rightproto (\propto)	49	\riota (i)	114	\rrhDsp ()	185
\rightrcurvearrow (\rightsquigarrow) .	76	\riota (i)	18		
\rightrightarrows (\rightleftarrows) .	70	\rip (t)	169		
\rightrightarrows (\rightleftarrows) .	69	\risingdotseq (=)	48		
\rightrightarrows (\rightleftarrows) .	79	\risingdotseq (=)	47		
\rightrightarrows (\rightleftarrows) .	75	\risingdotseq (=)	54		
\rightrightarrows (\rightleftarrows) .	71	\risingdotseq (=)	51		
\rightrightarrows (\rightleftarrows) .	81	\risingdotseq (=)	49		
\rightrightharpoons (\rightleftharpoons) .	71	\risingdotseq (=)	55		
\rightrsquigarrow (\rightsquigarrow) .	76	\rJoin (x)	48		
\rightrsquigarrow (\rightsquigarrow) .	71	\rJoin (x)	31		
\RightScissors (\approx)	127	\RK (n)	121		
\rightslice (\triangleright)	28	\rlap	23, 24, 135, 212, 213		

\rrhDw (✉)	185	\Rightarrow (⇒)	79	\sA (✉)	175
\rrhDwp (✉)	185	\Rightarrow (⇒⇒)	75	\SAA (◦)	144
\rrhE (✉)	185	\Rightarrow (⇒⇒⇒)	71	\SAb (Π)	144
\rrhEp (✉)	185	\Rightarrow (⇒⇒⇒⇒)	81	\SAd (¶)	144
\rrhF (✉)	185	\rrparenthesis ()	93	\SAdb (Η)	144
\rrhFp (✉)	185	\rrparenthesis ()	93	\SAdd (Θ)	144
\rrhFw (✉)	185	\RS (▲)	122	\Sadey (⊖)	179
\rrhFwp (✉)	185	\rsem (][)]	97	\sadface (⊖)	178
\rrhL (✉)	185	\rsem (][])	95	\SAf (◊)	144
\rrhLa (✉)	185	\rsemantic	see \rdbrack	safety-related symbols	124
\rrhLap (✉)	185	rsfso (package)	116, 226	\Saftpresse (▲)	179
\rrhLp (✉)	185	\Rsh (↷)	70	\SAG (⊤)	144
\rrhLs (✉)	185	\Rsh (↶)	69	\SAGa (Π)	144
\rrhLsp (✉)	185	\Rsh (↷)	79	\Sagittarius (♐)	120
\rrhLw (✉)	185	\Rsh (↷)	75	\Sagittarius (♐)	119
\rrhLwp (✉)	185	\Rsh (↷)	71	\Sagittarius (♐)	119
\rrhM (✉)	185	\Rsh (↷)	82	\SAh (Υ)	144
\rrhMp (✉)	185	\rsolbar (✗)	32	\SAhd (Ψ)	144
\rrhR (✉)	185	\rsqhook (□)	55	\SAhu (Ϋ)	144
\rrhRa (✉)	185	\rsub (▷)	36	\SAk (ଫ)	144
\rrhRap (✉)	185	\rtborder (✚)	171	\SAl (ଠ)	144
\rrhRp (✉)	185	\rtbotcorner (└)	171	\SAlq (ଠ)	144
\rrhRs (✉)	185	\rtimes (×)	29	\SAM (ଡ)	144
\rrhRsp (✉)	185	\rtimes (×)	28	\samebishops (■)	169
\rrhRw (✉)	185	\rtimes (×)	31	\Sampi (ୟ)	144
\rrhRwp (✉)	185	\rtimesblack (×)	30, 31	\Sampi (ା)	144
\rrhSd (✉)	185	\rtimesblack (×)	29	\Sampi (ି)	144
\rrhSdp (✉)	185	\rtimesblack (×)	32	\SAN (ନ)	144
\rrhS1 (✉)	185	\rtimesblack (×)	31	sans (dsfont package option)	116
\rrhSlp (✉)	185	\rtimesblack (×)	31	\sansLmirrored (ଙ)	114
\rrhSr (✉)	185	\rtimesblack (×)	68	\sansLturned (ଞ)	114
\rrhSrp (✉)	185	\rtimesblack (×)	68	\SAo (ଠ)	144
\rrhSu (✉)	185	\rtimesblack (×)	99	\Sappho (ଡ଼)	120
\rrhSup (✉)	185	\rtimesblack (×)	99	\SAq (ଫ)	144
\rrhU (✉)	185	\rtimesblack (×)	99	\SAr (ଓ)	144
\rrhUa (✉)	185	\rvzigzag (❀)	93	\sarabfamily	144
\rrhUap (✉)	185	\rvzigzag (❀)	93	sarabian (package)	144, 226, 227
\rrhUp (✉)	185	\rWalley (ଓଡ଼)	179	\SAs (କ)	144
\rrhUs (✉)	185	\rwave (♪)	98	\SAsa (କ)	144
\rrhUsp (✉)	185	\rwave (♪)	95	\SAsd (କ)	144
\rrhUw (✉)	185	\rwave (♪)	95	\SAsv (ଠ)	144
\rrhUwp (✉)	185	\rwave (♪)	95	\SAT (କ)	144
\RRightarrow (⇒)	81	\S (§)	14, 222	\SATb (କ)	144
\Rrightarrow (⇒⇒)	70	\S (§)	14	\SATd (କଳ)	144

S

scaling	216, 218
mechanical	216, 218
optical	216
\scd (D)	18
\scg (G)	18
\Schaler (U)	179
\Schneebesen (I)	179
\Schussel (U)	179
\schwa (ə)	18
\schwa (ə)	18
Schwartz distribution spaces <i>see</i> alphabets, math	
\sci (i)	18
scientific symbols	118–125, 202–203
\ScissorHollowLeft (X)	127
\ScissorHollowRight (X)	127
\ScissorLeft (X)	127
\ScissorLeftBrokenBottom (X)	127
\ScissorLeftBrokenTop (X)	127
\ScissorRight (X)	127
\ScissorRightBrokenBottom (X)	127
\ScissorRightBrokenTop (X)	127
scissors	127, 181–184
\scn (N)	18
\scoh (˜)	58
\Scorpio (M)	120
\Scorpio (M)	119
\scorpio (M)	119
\scpolint (f)	43
\scpolintsl (f)	45
\scpolintup (f)	45
scr (rsfso package option)	116
\scr (R)	18
script letters <i>see</i> alphabets, math	
\scripta (a)	18
\scriptg (g)	18
\scriptscriptstyle	212
\scriptstyle	212
\scriptv (v)	18
\Scroll ([Scroll])	122
\scu (v)	18
\scurel (˜)	54
\scurel (˜)	55
\scy (Y)	18
\sddtstile (H)	57
\sDep (*)	148
\sdststile (H)	57
\sdtstile (H)	57
\sdttstile (H)	57
seagull <i>see</i> \textseagull	
\Searrow (N)	70
\Searrow (N)	79
\Searrow (N)	75
\Searrow (N)	71
\Searrow (N)	82
\searrow (N)	70
\searrow (N)	69, 213
\searrow (N)	75
\searrow (N)	71
\searrow (N)	82
\searrowtail (N)	75
\searrowtail (N)	71
\sebkarrow (N)	75
\sec (sec)	87
\Sech (N)	149
\SechBL (N)	149
\SechBl (N)	149
\SechBR (N)	149
\SechBr (N)	149
\second (n)	113
seconds, angular <i>see</i> \second	
\secstress (.)	23
section mark <i>see</i> \S	
\SectioningDiamond (N)	166
\sector (v)	113
sedenions (\$). <i>see</i> alphabets, math	
\sefilledspoon (o)	84
\sefootline (o)	49
\sefree (o)	49
segmented numerals	118
	
\Segno (N)	148
	
\segno (N)	148
\seharpoonccw (o)	74
\seharpooncw (o)	74
\seharpoonne (o)	78
\seharpoonsw (o)	78
\selcurvearrow (o)	76
\selectfont	11
\selsquigarrow (o)	71
semaf.fd (file)	202
semantic valuation	94, 95, 99
semaphor (package)	200, 202, 226
semaphore symbols	200–202
\semapsto (o)	71
semibreve <i>see</i> musical symbols	
\semibreve (o)	150
\semibreveDotted (o)	150
semidirect products	28, 29, 113
semiquaver <i>see</i> musical symbols	
\semiquaver (N)	150
\semiquaverDotted (N)	150
\semiquaverDottedDouble (N)	150
\semiquaverDottedDoubleDown (P)	150
\semiquaverDottedDown (P)	150
\semiquaverDown (P)	150
\semiquaverRest (N)	151
\semiquaverRestDotted (N)	151
\Semisextile (V)	120
\Semisquare (Z)	120
semitic transliteration	19, 23
\seModels (E)	49
\semmodels (E)	49
semtrans (package)	19, 23, 226
\senwarrows (S)	75
\senwarrows (S)	71
\senwcurvearrow (o)	76
\senwharpoons (N)	78
\senwharpoons (N)	74
\seovnearrow (X)	82
\SePa (Y)	149
\separated (O)	49
separation vector (s)	116
\sepitchfork (X)	84
\seppawns (O-O)	169
\Serbia (S)	177
\sercurvearrow (o)	76
\SerialInterface (W)	121
\SerialPort (E)	121
\sersquigarrow (o)	71
\sesearrows (S)	75
\sesearrows (S)	71
\sespoon (o)	84
\Sesquiquadrade (E)	120
set interior <i>see</i> \mathring{}	
set operators	
intersection <i>see</i> \cap	
membership <i>see</i> \in	
union <i>see</i> \cup	
\setminus (O)	28
\setminus (O)	30
\setminus (O)	30
\setminus (O)	32
\seVdash (X)	49
\sevdash (X)	49
\Sextile (X)	120
\Sey (O)	179
SGML	223
sha (III)	209
\Shake (W)	148
\shake (W)	148
\Shakel (W)	148
\Shakene (W)	148
\Shaken (W)	148
\Shakesw (W)	148
\sharp (#)	147
\sharp (#)	147
\sharp (#)	147
\sharp (#)	147
\sharp (#)	151
\sharp (#)	147
\sharp (#)	147
\sharpArrowboth (D)	151
\sharpArrowdown (D)	151
\sharpArrowup (D)	151
Sharpe, Michael	22
\sharpSlashslashslashstem (#)	151

\sharpSlashslashslashstem	151	\simeq (\approx)	49	slashed.sty (file)	211
(#)	151	\simeq (\simeq)	55	\slashu ($\backslash\!u$)	18
\sharpSlashslashstem (\$)	151	\simgE ($\widetilde{\geq}$)	66	\Sleet (\S)	166
\sharpSlashslashstemstem	151	\simgtr ($\widetilde{>}$)	66	\sliding (\square)	21
(#)	151	\similarleftarrow (\leftrightharpoonup)	82	\Slovakia (.)	177
\shfermion (()	125	\similarrightarrow (\rightharpoonup)	82	\Slovenia (.)	177
\Shift ([Shift Up])	122	\simlE ($\widetilde{\leq}$)	66		
\shift (\$)	27	\simless ($\widetilde{<}$)	66		
\Shilling (β)	24	\simminussim ($\widetilde{\approx}$)	55		
\shneg (^)	27	\simneqq ($\widetilde{\not\equiv}$)	53		
\shortcastling (O-O)	169	\simneqq ($\widetilde{\not\equiv}$)	55		
\shortdownarrow (↓)	70	\simperp (\perp)	58		
\shortdowntack (τ)	52	simplewick (package)	215		
\shortdowntack (τ')	55	\simpplus ($\tilde{+}$)	32		
\ShortFifty ($\underline{\underline{50}}$)	165	simpsons (package)	172, 226	\smallbassclef ($\text{B}:$)	148
\ShortForty ($\underline{\underline{40}}$)	165	Simpsons characters	172	\smallblackcircle (\bullet)	34
\shortleftarrow (\leftarrow)	70	\simrdots ($\widetilde{\dots}$)	54	\smallblackdiamond (\blacklozenge)	34
\shortlefttack (\vdash)	52	\simrdots ($\widetilde{\dots}$)	55	\smallblacklozenge (\blacklozenge)	133
\shortlefttack (\dashv)	55	\sin (sin)	87	\smallblacksquare (\blacksquare)	34
\shortmid ()	47	\sincoh (sinh)	58	\smallblackstar (\star)	34
\shortmid ()	54	\sinewave ($\widetilde{\sim}$)	114	\smallblacktriangledown (\blacktriangledown)	34, 68
\shortmid ()	51	\sinewave ($\widetilde{\sim}$)	114	\smallblacktriangleleft (\blacktriangleleft)	34, 68
\shortmid ()	30	\sinh (sinh)	87	\smallblacktriangleleft (\blacktriangleleft)	134
\shortmid ()	55	\SixFlowerAlternate (*)	131	\smallblacktriangleleft	
\ShortNinetyFive ($\underline{\underline{95}}$)	165	\SixFlowerAltPetal (*)	131	\smallblacktriangleleft	
\shortparallel ()	47	\SixFlowerOpenCenter (*)	131	\smallblacktriangleleft	
\shortparallel ()	54	\SixFlowerPetalDotted ($\text{*\!\!\!\circlearrowright}$)	131	\smallblacktriangleleft	
\shortparallel ()	52	\SixFlowerPetalRemoved (*)	131	\smallblacktriangleleft	
\shortparallel ()	49	\SixFlowerRemovedOpenPetal		\smallblacktriangleleft	
\shortparallel ()	55	(*)	131	\smallblacktriangleleft	
\ShortPulseHigh (L)	118	\SixStar (*)	131	\smallblacktriangleleft	
\ShortPulseLow (T)	118	\SixteenStarLight (*\!\!\!\odot)	131	\smallblacktriangleleft	
\shortrightarrow (\rightarrow)	70	sixteenth note	see musical	\smallblacktriangleleft	
\shortrightarrowleftarrow		symbols		\smallblacktriangleleft	
(\leftrightarrow)	82	\sixteenthNote ($\text{*\!\!\!\text{♪}}$)	150	\SmallCircle (\textcircled{O})	135
\shortrightarrowtack (\vdash)	52	\sixteenthnote ($\text{*\!\!\!\text{♪}}$)	147	\smallcircle (\textcircled{o})	34
\ShortSixty ($\underline{\underline{60}}$)	165	\sixteenthNoteDotted ($\text{*\!\!\!\text{♪}}$)	150	\smallcirlfnint (f)	36
\ShortThirty ($\underline{\underline{30}}$)	165	\sixteenthNoteDottedDouble		\smallcirlfnintsl (f)	37
\shortuparrow (\uparrow)	70	($\text{*\!\!\!\text{♪}}$)	150	\smallcirlfnintup (f)	37
\shortuptack (\perp)	52	\sixteenthNoteDottedDoubleDown		\SmallCross (\times)	135
\shortuptack (\perp)	55	($\text{*\!\!\!\text{♪}}$)	150	smallctrbull (bullcntr package op-	
\showclock	166	\sixteenthNoteDottedDown		tion)	168
\shpos (↓)	27	($\text{*\!\!\!\text{♪}}$)	150	\smallctrbull	168
shuffle (package)	33, 226	\sixteenthNoteDown ($\text{*\!\!\!\text{♪}}$)	150	\smalldiamond (\diamond)	34
\shuffle (w)	32	skak (package)	169, 170, 226	\smalldiamond (\diamond)	34
\shuffle (w)	33	skull (package)	169, 226	\SmallDiamondshape (\diamond)	135
shuffle product (w)	33	\skull ($\text{*\!\!\!\text{skull}}$)	178	\smalldivslash (/)	31
\SI (*)	122	\skull ($\text{*\!\!\!\text{skull}}$)	169	\smallfint (f)	36
\Sieb ($\text{*\!\!\!\text{S}}$)	179	skulls	169, 178, 204	\smallfintsl (f)	37
\sieve ($\text{*\!\!\!\text{S}}$)	179	\slash (/)	221	\smallfintup (f)	37
\sieve ($\text{*\!\!\!\text{S}}$)	179	\slashb ($\text{*\!\!\!\text{S}}$)	18	\smallfrown ($\text{*\!\!\!\text{frown}}$)	47
\Sigma (Σ)	88	\slashc ($\text{*\!\!\!\text{S}}$)	18	\smallfrown ($\text{*\!\!\!\text{frown}}$)	54
\sigma (σ)	88	\slashd ($\text{*\!\!\!\text{S}}$)	18	\smallfrown ($\text{*\!\!\!\text{frown}}$)	52, 86
\sigmaup (σ)	89	\slashdiv ($\text{*\!\!\!\text{S}}$)	29	\smallfrown ($\text{*\!\!\!\text{frown}}$)	85
\sim (~)	46, 211, 221	\slashd (d)	18	\smallfrown ($\text{*\!\!\!\text{frown}}$)	55
\sim (~)	52	\slashdiv (z)	29	\SmallHBar (=)	135
\sim (~)	49	\slashd (d)	18	\smalliiint ($\text{*\!\!\!\text{I}}$)	36
\sim (~)	55	\slashdiv (z)	29	\smalliiintsl ($\text{*\!\!\!\text{I}}$)	37
\simbot (L)	93	\slashd (d)	18	\smalliiintup ($\text{*\!\!\!\text{I}}$)	37
\simcolon (~:)	58	\slashdiv (z)	29	\smalliiint ($\text{*\!\!\!\text{I}}$)	36
\simcoloncolon (~::)	58	slashed (package)	211	\smalliiintsl ($\text{*\!\!\!\text{I}}$)	37
\simeq (~)	46	\slashed	211	\smalliiintup ($\text{*\!\!\!\text{I}}$)	37
\simeq (~)	52	slashed letters	211		

\smalliint (\iint)	36	\smallrppoint ($\textcolor{blue}{f}$)	36	smartctrbull (bulletcnt package option)	168
\smalliintsl (\iint)	37	\smallrppointsl ($\textcolor{blue}{f}$)	37	\smartctrbull	168
\smalliintup (\iint)	37	\smallrppointup ($\textcolor{blue}{f}$)	37	\smashtimes (\divideontimes)	31
\smallin (ϵ)	92	\smallscpoint ($\textcolor{blue}{f}$)	36	\smashtimes (\divideontimes)	32
\smallin (ϵ)	55	\smallscpointsl ($\textcolor{blue}{f}$)	37	\smbblkcircle (\bullet)	35
\smallint ($\textcolor{brown}{f}$)	113	\smallscpointup ($\textcolor{blue}{f}$)	37	\smbblkcircle (\bullet)	36
\smallint ($\textcolor{brown}{f}$)	113	\smallsetminus (\setminus)	28	\smbldiamond (\blacklozenge)	35
\smallint ($\textcolor{brown}{f}$)	36	\smallsetminus (\setminus)	31	\smbldiamond (\blacklozenge)	133
\smallintBar (f)	36	\smallsetminus (\setminus)	31	\smblklozenge (\blacklozenge)	133
\smallintbar (f)	36	\smallsetminus (\setminus)	30	\smblklozenge (\blacklozenge)	133
\smallintBarsl (f)	37	\smallsetminus (\setminus)	32	\smbllksquare (\blacksquare)	35
\smallintbarsl (f)	37	\smallsmile ($\textcolor{brown}{c}$)	47	\smbllksquare (\blacksquare)	133
\smallintBarup (f)	37	\smallsmile ($\textcolor{brown}{c}$)	54	\smeparsl ($\#$)	55
\smallintbarup (f)	37	\smallsmile ($\textcolor{brown}{c}$)	52, 86	\smile ($\textcolor{brown}{c}$)	46
\smallintcap (f)	36	\smallsmile ($\textcolor{brown}{c}$)	85	\smile ($\textcolor{brown}{c}$)	54
\smallintcapsl (f)	37	\smallsmile ($\textcolor{brown}{c}$)	55	\smile ($\textcolor{brown}{c}$)	52, 86
\smallintcapup (f)	37	\smallsqint ($\textcolor{blue}{f}$)	36	\smile ($\textcolor{brown}{c}$)	85
\smallintclockwise (f)	36	\smallsqintsl ($\textcolor{blue}{f}$)	37	\smile ($\textcolor{brown}{c}$)	55
\smallintclockwisesl (f)	37	\smallsqintup ($\textcolor{blue}{f}$)	37	smile symbols	85, 86
\smallintclockwiseup (f)	37	\SmallSquare (\square)	135	\smileeq (\cong)	52, 86
\smallintcup (f)	36	\smallsquare (\square)	34	\smileeq (\approx)	85
\smallintcupsl (f)	37	\smallsquare (\square)	34	\smileeqfrown ($\not\cong$)	85
\smallintcupup (f)	37	\smallstar (\star)	34	\smileface (\odot)	178
\smallintlarhk (f)	36	\smallsumint ($\textcolor{blue}{f}$)	36	\smilefrown ($\textcolor{brown}{z}$)	52, 86
\smallintlarhksl (f)	37	\smallsumints1 ($\textcolor{blue}{f}$)	37	\smilefrown ($\textcolor{brown}{z}$)	85
\smallintlarhkup (f)	37	\smallsumintup ($\textcolor{blue}{f}$)	37	\smilefrowneq ($\not\cong$)	85
\smallints1 (f)	37	\smalltrebleclef ($\textcolor{brown}{G}$)	148	\Smiley (\odot)	165, 179
\smallintup (f)	37	\SmallTriangleDown (∇)	135	\smiley (\odot)	164
\smallintx (f)	36	\smalltriangledown (∇)	33	smiley faces	114, 122, 164, 165, 174, 178–184, 188–190
\smallintxsl (f)	37	\smalltriangledown (∇)	34,		
\smallintxup (f)	37	68	\smt (\lessdot)	66	
\SmallLowerDiamond (\blacklozenge)	135	\smalltriangledown (∇)	34, 67	\smte (\leq)	66
\smalllowint (f)	36	\smalltriangleleft (\triangleleft)	135	\smwhitestar (\star)	35
\smalllowintsl (f)	37	\smalltriangleleft (\triangleleft)	33	\smwhitestar (\star)	133
\smalllowintup (f)	37	\smalltriangleleft (\triangleleft)	34,		
\smalllozenge (\diamond)	133	68	\smwhtcircle (\circ)	35	
\smalllozenge (\diamond)	132	\smalltriangleleft (\triangleleft)	34,		
\smalllni (\ni)	55	67	\smwhtdiamond (\diamond)	35	
\smallnpoint ($\textcolor{blue}{f}$)	36	\smalltriangleleft (\triangleleft)	34, 67	\smwhtdiamond (\diamond)	133, 134
\smallnpoints1 ($\textcolor{blue}{f}$)	37	\smalltriangleleft (\triangleleft)	133	\smwhtlozenge (\diamond)	133
\smallnpointup ($\textcolor{blue}{f}$)	37	\SmallTriangleLeft (\triangleleft)	135	\smwhtlozenge (\diamond)	133
\smalloint ($\textcolor{brown}{f}$)	36	\smalltriangleleft (\triangleleft)	33	\smwhtsquare (\square)	35
\smallointsl ($\textcolor{brown}{f}$)	37	\smalltriangleleft (\triangleleft)	34,		
\smallointup ($\textcolor{brown}{f}$)	37	68	\smwhtsquare (\square)	133	
\smalloint ($\textcolor{brown}{f}$)	36	\smalltriangleright (\triangleright)	34,		
\smallointctrcclockwise (f)	36	67	snakes	192	
\smallointctrcclockwisesl (f)	37	\smalltriangleright (\triangleright)	133	\sntststile ($\boxed{\parallel}$)	57
\smallointctrcclockwiseup (f)	37	\SmallTriangleUp (\triangle)	135	\Snow (\divideontimes)	166
\smalloints1 (f)	37	\smalltriangleup (\triangle)	33	\SnowCloud (\divideontimes)	166
\smallointup (f)	37	\smalltriangleup (\triangle)	34,		
\smallowns (\ni)	92	68	\Snowflake (\divideontimes)	131	
\smallpencil ($\textcolor{brown}{pencil}$)	128	\smalltriangleright (\triangleright)	34,		
\smallpointint (f)	36	67	\SnowflakeChevron (\divideontimes)	131	
\smallpointints1 (f)	37	\SmallTriangleRight (\triangleright)	135	\SnowflakeChevronBold (\divideontimes)	131
\smallpointintup (f)	37	\smalltriangleup (\triangle)	33		
\smallprod (Π)	29	\smalltriangleup (\triangle)	34,		
\SmallRightDiamond (\blacklozenge)	135	68	snowflakes	131	
		\smalltriangleup (\triangle)	34,		
		67	\Snowman (\mathbb{S})	180	
		\smalltriangleup (\triangle)	34,		
		68	\SNPP ($\textcolor{brown}{S}$)	172	
		\smalltriangleup (\triangle)	34,		
		67	\snststile ($\boxed{\parallel}$)	57	
		\smalltriangleup (\triangle)	34,		
		68	\sntstile ($\boxed{\parallel}$)	57	
		\smalltriangleup (\triangle)	34,		
		67	\snttstile ($\boxed{\parallel}$)	57	
		\smalltriangleup (\triangle)	34,		
		68	\SO (\circ)	121, 122	
		\smalltriangleup (\triangle)	34,		
		67	\sO (\mathbb{I})	175	
		\smalltriangleup (\triangle)	34,		
		68	\SOH ($\textcolor{brown}{S}$)	122	
		\smalltriangleup (\triangle)	34,		
		67	\SOH ($\textcolor{brown}{S}$)	122	

\solid (■)	125
South Arabian alphabet	144
\SouthNode (⌚)	120
	175
soyombo (package)	175, 226, 227
Soyombo (font)	175
Soyombo symbols	175
space	219
thin	219
visible	see \textvisiblespace
\Spacebar (█)	122
spades	136, 137, 180–181
\spadesuit (♠)	136
\spadesuit (♦)	136
\spadesuit (♣)	136
\spadesuit (♥)	136
\spadesuit (♠)	137
\Spain (🇪🇸)	178
\Sparkle (✿)	131
\SparkleBold (✿)	131
sparkles	131
“special” characters	13
\SpecialForty (㉚)	165
\sPed (₱)	148
\sphericalangle (⦶)	113
\sphericalangle (⦵)	111
\sphericalangle (⦴)	111
\sphericalangle (⦳)	111
\sphericalangle (⦲)	111
\sphericalangle (⦱)	112
\sphericalangledown (⦰)	111
\sphericalangleleft (⦷)	111
\sphericalangleup (⦸)	111
\sphericalangleup (⦹)	112
\spin (⚡)	125
\SpinDown ()↓	135
\spindown (⚡)	125
\SpinUp (↑)	135
spirals	192
\spirituslenis (̄)	101
\spirituslenis (̄)	101
\splitvert (⋮)	122
\Spoon (ⓘ)	178
spoon symbols	84, 85
\spreadlips (👄)	21
\Springtree (🌳)	179
\sqbullet (■)	29
\Sqcap (█)	31
\Sqcap (█)	32
\sqcap (Π)	29
\sqcap (Π)	28
\sqcap (Π)	30
\sqcap (Π)	29
\sqcap (Π)	32
\sqcapdot (▣)	30
\sqcapdot (▣)	29
\sqcapplus (▣)	29
\sqcapplus (▣)	30
\sqcapplus (▣)	29
\sqcapplus (▣)	30
\sqcapplus (▣)	29
\sqcup (⊎)	29
\sqcup (⊎)	31
\sqcup (⊎)	32
\sqcup (⊎)	29
\sqcup (⊎)	27, 28
\sqcup (⊎)	30
\sqcup (⊎)	29
\sqcup (⊎)	32
\sqcupdot (⊎)	30
\sqcupdot (⊎)	30
\sqcupplus (⊎)	29
\sqcupplus (⊎)	30
\sqcupplus (⊎)	30
\sqdoublecap (████)	29
\sqdoublecup (███)	29
\sqdoublefrown (߂)	85
\sqdoublefrownEQ (߂)	85
\sqdoublesmile (߁)	85
\sqdoublesmileEQ (߁)	85
\sEqfrown (߂)	85
\sEqsmile (߁)	85
\sqfrown (߁)	85
\sqfrownEQ (߁)	85
\sqfrownEqsmile (߁)	85
\sqfrownsmile (߁)	85
\sqiiint (ffff)	39
\sqint (fff)	39
\sqint (fff)	40
\sqint (ƒ)	39
\sqint (ƒ)	40
\sqint (ƒ)	43
\sqintsL (ƒ)	45
\sqintup (ƒ)	45
\sqlozenge (□)	133
\sqrt (✓)	103
\sqrt (✓)	102, 212–213
\sqrt* (✓)	105
\sqsmile (߁)	85
\sqsmileEQ (߁)	85
\sqsmilefrown (߂)	85
\sqsmilefrown (߂)	85
\Sqsubset (⊏)	60
\Sqsubset (⊏)	60
\sqSubset (⊏)	59
\sqSubset (⊏)	60
\sqsubsetset (⊏)	59
\sqsubsetset (⊏)	59
\sqsubsetset (⊏)	60
\square (□)	120
\square (□)	130
\square (□)	135
\square (□ vs. □ vs. □)	207
\square (□)	29
\square (□)	112
\square (□)	133
\square (□)	35
\square (□)	171
\square (□)	34
\square (□)	134
square impulse	118
square root	see \sqrt hooked
\squarebotblack (█)	133
\SquareCastShadowBottomRight (█)	135
\SquareCastShadowTopLeft (█)	135
\SquareCastShadowTopRight (█)	135
\squarecrossfill (■)	133
\squaredots (⋮⋮)	108
\squaredots (⋮⋮)	30, 108
\squarehfill (▀)	133
\squarehvfill (▀▀)	133
\squareleftblack (█)	133
\squarellblack (█)	133
\squarellquad (█)	133

\square	133	
\squarerlblack	(133
\squarerlquad	(133
\squareneswfill	(133
\squarenwsefill	(133
\Squarepipe	(123
\squarerightblack	(134
squares	132–137, 157–161, 170, 171, 186–187, 192, 202–203	
\SquareShadowA	(135
\SquareShadowB	(135
\SquareShadowBottomRight	(135
\SquareShadowC	(135
\SquareShadowTopLeft	(135
\SquareShadowTopRight	(135
\SquareSolid	(135
\Squaresteel	(123
\squaretopblack	(134
\squareulblack	(134
\squareulquad	(134
\squareurblack	(134
\squareurquad	(134
\squarevfill	(134
\squarewithdots	(137
\squeezers	(179
\squeezers	(179
\squigarrowdownup	(71
\squigarrowleftright	(71
\squigarrownesw	(71
\squigarrownwse	(71
\squigarrowrightleft	(71
\squigarrowsenw	(71
\squigarrowswne	(71
\squigarrowupdown	(71
\squaoval	(134
\squplus	(29
\squplus	(31
\SS	(14, 121
\ss	(14
\ssdtstile	(57
\ssearrow	(70
\ssearrow	(80
\sslash	(28
\sslash	(31
\sslash	(32
\ssststile	(57
\sststile	(57
\sstdtstile	(57
\sswarrows	(70
\sswarrows	(80
\staccatissimo	(152
\stackrel	27, 210, 214	
standard state	211	
\star	28, 214	
\star	35, 133	
\star	35	
\star	34	
\star	36	
Star of David	130, 131	
\stareq	(52
\stareq	(55
starfont	(package)	120, 226, 227
\starofdavid	(133
\starredbullet	(132
stars	112, 120, 130–134, 186–187	
\stater	(25
\Station	(120
statistical independence	212	
\staveI	(173
\staveII	(173
\staveIII	(173
\staveIV	(173
\staveIX	(173
\staveL	(173
\staveL	(174
\staveLI	(173
\staveLII	(173
\staveLIII	(173
\staveLIV	(173
\staveLIX	(174
\staveLV	(173
\staveLVI	(173
\staveLVII	(173
\staveLVIII	(174
\staveLX	(174
\staveLXI	(174
\staveLXII	(174
\staveLXIII	(174
\staveLXIV	(174
\staveLXV	(174
\staveLXVI	(174
\staveLXVII	(174
\staveLXVIII	(174
staves	173	
staves	(package)	173, 226
\staveV	(173
\staveVI	(173
\staveVII	(173
\staveVIII	(173
\staveX	(173
\staveXI	(173
\staveXII	(174
\staveXIII	(174
\staveXIV	(174
\staveXIX	(174
\staveXL	(174
\staveXLI	(174
\staveXLII	(174
\staveXLIII	(174
\staveXLIV	(174
\staveXLIX	(173
\staveXLV	(174
\staveXLVI	(174
\staveXLVII	(173
\staveXLVIII	(173
\staveXV	(174
\staveXVI	(174
\staveXVII	(174
\staveXVIII	(174
\staveXX	(174
\staveXXI	(174
\staveXXII	(174
\staveXXIII	(174
\staveXXIV	(173
\staveXXIX	(173
\staveXXV	(173
\staveXXVI	(173
\staveXXVII	(173
\staveXXVIII	(173
\staveXXX	(173
\staveXXXI	(173
\staveXXXII	(173
\staveXXXIII	(173
\staveXXXIV	(173
\staveXXXIX	(174
\staveXXXV	(174
\staveXXXVI	(174
\staveXXXVII	(174
\staveXXXVIII	(174
\stdtstile	(57
\steaming	(178

steinmetz (package)	119, 226, 227	\Subset (\Subset)	59	\succseq (\succeq)	46
Steinmetz phasor notation	119	\Subset (\Subset)	60	\succseq (\succeq)	52
sterling	see \pounds	\Subset (\Subset)	60	\succseq (\succeq)	49
stick figures	138, 180, 198–202	\Subset (\Subset)	60	\succseq (\succeq)	55
\Stigma (ζ)	144	\Subset (\Subset)	61	\succseqq (\succeqq)	48
\Stigma (Γ)	144	\subset (\subset)	59	\succseqq (\succeqq)	52
\stigma (ζ)	144	\subset (\subset)	58	\succseqq (\succeqq)	55
\stigma (τ)	144	\subset (\subset)	60	\succcnapprox (\gtrapprox)	49
stix (package)	32, 36, 37, 43, 44, 55, 56, 61, 65, 66, 68, 81–83, 87, 90–93, 97, 101, 103, 109, 111, 112, 114, 120, 121, 124, 133, 134, 137, 147, 167, 226, 227	\subset (\subset)	60	\succcnapprox (\gtrapprox)	47
stmaryrd (package)	28, 38, 47, 59, 66, 70, 86, 93, 94, 207, 211, 225, 226	\subset (\subset)	61	\succcnapprox (\gtrapprox)	54
stochastic independence	see \bot	\subsetapprox (\subsetapprox)	61	\succcnapprox (\gtrapprox)	53
\StoneMan (\blacktriangle)	166	\subsetcirc (\subsetcirc)	61	\succcnapprox (\gtrapprox)	51
\Stopsign ($\text{\textcircled{S}}$)	124	\subsetdot (\subsetdot)	61	\succcnapprox (\gtrapprox)	55
\StopWatchEnd ($\text{\textcircled{E}}$)	166	\subsepeq (\subseteq)	59	\succneq (\succneq)	49
\StopWatchStart ($\text{\textcircled{C}}$)	166	\subsequeq (\subseteq)	58	\succneq (\succneq)	53
\stress ()	23	\subsequeq (\subseteq)	60	\succneqq (\succneqq)	55
\Strichmaxerl ($\text{\textcircled{S}}$)	180	\subsequeq (\subseteq)	60	\succneqq (\succneqq)	48
\strictfi (\vdash)	48	\subsequeq (\subseteq)	60	\succneqq (\succneqq)	54
\strictfi (\dashv)	54	\subsequeq (\subseteq)	61	\succneqq (\succneqq)	53
\strictif (\dashv)	48	\subsequeqq (\subseteqq)	59	\succneqq (\succneqq)	55
\strictif (\dashv)	48	\subsequeqq (\subseteqq)	59	\succnsim (\succnsim)	49
\strictiff ($\dashv\dashv$)	48	\subsequeqq (\subseteqq)	60	\succnsim (\succnsim)	47
\StrikingThrough ()	24	\subsequeqq (\subseteqq)	60	\succnsim (\succnsim)	54
\strns (—)	114	\subsetneqq (\subsetneqq)	59	\succnsim (\succnsim)	53
\strokedint (f)	42	\subsetneqqq (\subsetneqqq)	59	\succnsim (\succnsim)	53
\StrokeFive ($\text{\textcircled{H}}$)	166	\subsetneqqq (\subsetneqqq)	60	\succnsim (\succnsim)	51
\StrokeFour ($\text{\textcircled{M}}$)	166	\subsetneqqq (\subsetneqqq)	60	\succnsim (\succnsim)	55
\StrokeOne ($\text{\textcircled{I}}$)	166	\subsetneqqq (\subsetneqqq)	60	\succcsim (\succcsim)	48
\StrokeThree ($\text{\textcircled{L}}$)	166	\subsetneqqq (\subsetneqqq)	60	\succcsim (\succcsim)	47
\strokethrough ($\text{\textcircled{P}}$)	101	\subsetneqqq (\subsetneqqq)	60	\succcsim (\succcsim)	54
\StrokeTwo ($\text{\textcircled{J}}$)	166	\subsetneqqq (\subsetneqqq)	60	\succcsim (\succcsim)	52
\stst ($^\circ$)	211	\subsetneqqq (\subsetneqqq)	60	\succcsim (\succcsim)	49
\stststile ($\text{\textcircled{H}}$)	57	\subsetneqqq (\subsetneqqq)	60	\succcsim (\succcsim)	55
\sttstile ($\text{\textcircled{H}}$)	57	\subsetneqqq (\subsetneqqq)	60	such that	209, 211
\stttstile ($\text{\textcircled{H}}$)	57	\subsetneqqq (\subsetneqqq)	60	\suchthat (\ni)	211
\STX ($\text{\textcircled{E}}$)	122	\subsetneqqq (\subsetneqqq)	60	\sum (\sum)	37
.sty files	11	\subsetneqqq (\subsetneqqq)	61	\sum (\sum)	42
\SUB (→)	122	\subsetplus (\subsetplus)	59	\sum (\sum)	42
subatomic particles	125	\subsetplus (\subsetplus)	60	\sum (\sum)	43
\subcorner ($\text{\textcircled{D}}$)	21	\subsetplus (\subsetplus)	61	\sumint (\oint)	42
\subdoublebar ($\text{\textcircled{D}}$)	21	\subsetplusq (\subsetplusq)	59	\sumint (\oint)	42
\subdoublevert ($\text{\textcircled{D}}$)	21	\subsetplusq (\subsetplusq)	60	\sumint (\oint)	43
\subdot ($\dot{\subseteq}$)	61	\subsetplusq (\subsetplusq)	54	\sumintsl (\oint)	45
\sublptr ($\text{\textcircled{D}}$)	21	\subsetplusq (\subsetplusq)	52	\sumintup (\oint)	45
\submult ($\text{\textcircled{C}}$)	61	\subsetplusq (\subsetplusq)	49	\Summtree ($\text{\textcircled{P}}$)	179
\subrarr ($\text{\textcircled{S}}$)	61	\succapprox (\succapprox)	48	\Summit (\blacktriangle)	166
\subrptra ($\text{\textcircled{S}}$)	21	\succapprox (\succapprox)	47	\SummitSign ($\text{\textcircled{T}}$)	166
subscripts		\succapprox (\succapprox)	54	\Sun (\odot)	120
new symbols used in	212	\succapprox (\succapprox)	52	\Sun (\odot)	120
\Subset (\Subset)	59	\succapprox (\succapprox)	49	\Sun (\odot)	119
		\succcurlyeq (\succcurlyeq)	48	\Sun (\odot) vs. \odot vs. \odot	166
		\succcurlyeq (\succcurlyeq)	47	sun	119, 120, 137, 164, 166, 180–181, 204, 207
		\succcurlyeq (\succcurlyeq)	54	\sun ($\text{\textcircled{S}}$)	120
		\succcurlyeq (\succcurlyeq)	52	\sun ($\text{\textcircled{S}}$)	164
		\succcurlyeq (\succcurlyeq)	49	\SunCloud ($\text{\textcircled{S}}$)	166
		\succcurlyeq (\succcurlyeq)	55	\SunshineOpenCircled ($\text{\textcircled{G}}$)	137
		\succdot (\succdot)	48	\sup (sup)	87
		\succdot (\succdot)	48	\supdsup ($\text{\textcircled{C}}$)	61
		\succdot (\succdot)	48	\supedot ($\dot{\subseteq}$)	61

superscripts	
new symbols used in	212
supersets	58–61
\suphsol (⌚)	61
\suphsub (⌚⌚)	61
\suplarr (⌚)	61
\supmult (⌚)	61
supremum	see \sup
\Supset (⌚)	59
\Supset (⌚)	59
\Supset (⌚)	60
\Supset (⌚)	60
\Supset (⌚)	60
\Supset (⌚)	61
\supset (⌚)	59
\supset (⌚)	58
\supset (⌚)	60
\supset (⌚)	60
\supset (⌚)	61
\supset (⌚)	61
\supsetapprox (⌚⌚)	61
\supsetcirc (⌚)	61
\supsetdot (⌚)	61
\supseteq (⌚)	59
\supseteq (⌚)	58
\supseteq (⌚)	60
\supseteq (⌚)	60
\supseteq (⌚)	61
\supseteqq (⌚)	59
\supseteqq (⌚)	59
\supseteqq (⌚)	60
\supseteqq (⌚)	60
\supseteqq (⌚)	61
\supseteqq (⌚)	60
\supseteqq (⌚)	61
\supsetneq (⌚)	59
\supsetneq (⌚)	59
\supsetneq (⌚)	60
\supsetneq (⌚)	60
\supsetneq (⌚)	61
\supsetneqq (⌚)	59
\supsetneqq (⌚)	59
\supsetneqq (⌚)	59
\supsetneqq (⌚)	60
\supsetneqq (⌚)	60
\supsetneqq (⌚)	60
\supsetneqq (⌚)	61
\supsetneqq (⌚)	61
\supsetneqq (⌚)	60
\supsetneqq (⌚)	61
\supsetneqq (⌚)	60
\supsetneqq (⌚)	61
\supsetneqq (⌚)	61
\supsetneqq (⌚)	60
\supsetneqq (⌚)	61
\supsetneqq (⌚)	61
\supsetneqq (⌚)	60
\supsetneqq (⌚)	61
\supsetneqq (⌚)	61
\supsetplus (⌚)	59
\supsetplus (⌚)	60
\supsetplus (⌚)	61
\supsetplus (⌚)	61
\supsetplus (⌚)	60
\supsetplus (⌚)	60
\supsetplus (⌚)	61
\supsetplus (⌚)	61
\supsim (⌚)	61
\supsub (⌚)	61
\supsup (⌚)	61
\surd (✓)	112
\surface (Ѱ)	125
\SurveySign (ߡ)	166
svrsymbols (package)	125, 226, 227
\Swallow (ѿ)	70
\Swallow (ѿ)	80
\Swallow (ѿ)	75
\Swallow (ѿ)	71
\Swallow (ѿ)	82
\swarrow (↖)	70
\swarrow (↖)	69, 213
\swarrow (↖)	75
\swarrow (↖)	71
\swarrow (↖)	82
\swarrowtail (↗)	75
\swarrowtail (↗)	71
\swbkarrow (↴)	75
\Sweden (🇸)	178
\swfilledspoon (✓)	84
\swfootline (✓)	49
\swfree (✓)	49
\swharpoonccw (↘)	74
\swharpooncw (✓)	74
\swharpoonnw (✓)	78
\swharpoonse (↙)	78
\Switzerland (שווי)	178
\swcurvearrow (↗)	76
\swsquigarrow (↗)	71
\swmapsto (↗)	71
\swModels (≈)	49
\swmodels (≈)	49
\swnearrows (↗)	75
\swnearrows (↗)	71
\swnecurvearrow (↗)	76
\swneharpoons (↘)	78
\swneharpoons (↘)	74
swords	165
\swords (✕)	178
\swpitchfork (✕)	84
\swrcurvearrow (↗)	76
\swrsquigarrow (↗)	71
\swspoon (↗)	84
\swswallows (↗)	75
\swswallows (↗)	71
swung dash	see \sim
\swVdash (≈)	49
\swdash (≈)	49
\syl (█)	22
\syllabic (,)	23
\symA (Ⓐ)	116
\symAE (Ӑ)	117
\symB (Ⓑ)	116
\symbishop (皇)	170
Symbol (font)	89, 209
symbols	13–138, 147–186, 188, 203, 204, 206, 208, 214, 219–220, 222
actuarial	105, 214
alpine	166
ancient language	138–146
annuity	105, 214
APL	55–56, 121
astrological	119, 120, 188–190
astronomical	119, 120, 174, 188–190
Begriffsschrift	109, 110
biological	124
block-element	173
body-text	13–26
bold	219–220
box-drawing	173
chess	169, 170, 204–205
cipher	174
clock	164–167, 180–181
communication	123
computer	181–184
computer hardware	121
contradiction	27, 86
cooking	178, 179, 181–184
countries	176
crystallography	202–203
currency	24, 25, 114, 117
dangerous bend	164
database	114
definition	27, 214
dictionary	16–19, 172
dingbat	126–137
dot	13, 107–109, 213
electrical	118
engineering	114, 118, 123
Epi-Olmec	144–146
extensible	84, 102–107, 119, 208, 214–215
Feynman diagram	125
file	181–184
Frege logic	84, 92, 109, 110, 115
frown	85, 86
game-related	136, 137, 166, 167, 169–171, 181–184, 203–205
gates, digital logic	123
genealogical	164
general	164
Go stones	170, 171
information	165
informer	169
inverted	16–18, 23, 209
Isthmian	144–146
keyboard	122
knitting	176
Knuth's	164
laundry	165
legal	13, 14, 25, 26, 222
letter-like	91–93, 181–184
life insurance	105, 214
linear logic	27–29, 33, 34, 37, 41–43, 46, 58, 91, 92
linguistic	16–19
log-like	87, 219
logic	123
<i>Magic: The Gathering</i>	204
magical signs	173
map	186–187
maps	176
mathematical	27–117
media control	164, 181–184
METAFONTbook	164
metrical	171, 172
miscellaneous	112–115, 137, 164–181, 185
monetary	24, 25, 117

musical	26, 147–163, 180–184	\tailed (d)	18	TeXbook, The	. 210, 212, 213, 215, 219
non-commutative division	107	\tailinrvr (t)	18	symbols from	164
particle physics	125	\taill (l)	18	\text	27, 211, 213
Phaistos disk	138	\tailn (n)	18	\textacutedbl (")	23
phonetic	16–19	\tailr (r)	18	\textacutemacron (ˇ)	20
physical	118	\tails (s)	18	\textacutee wedge (ˇ)	20
pitchfork	47, 84, 86, 113	\tailt (t)	18	\textadvancing („)	20
Pitman’s base	12 110, 168	\tailz (z)	18	\textAlpha (A)	14
present value	105, 214	\Takt	149	\textalpha (α)	14
proto-Semitic	138	\talloblong ([])	28	\textaolig (œ)	17
pulse diagram	118	\talloblong ([])	35	\textasciacute (ˊ)	23, 222
recycling	. 174, 175, 178, 180–184, 186	\talloblong ([])	36	\textascibreve (ˇ)	23
relational	46	\tally (L U □ ▯)	168	\textascicaron (ˇ)	23
relational database	. 114	tally markers	. 142, 166, 168	\textascicircum (ˇ)	13
reversed	209	\tan (tan)	87	\textascicircum (ˇ)	13, 221, 223
rotated	. 16–18, 23, 209	\tanh (tanh)	87	\textasciidieresis (ˇ)	. 23, 222
safety-related	124	\Tape (⌚)	137	\textasciigrave (ˋ)	23
scientific	. 118–125, 202–203	\Taschenuhr (⌚)	166	\textasciimacron (ˇ)	221
semaphore	200–202	Tate-Shafarevich group	<i>see</i> sha	\textasciimacron (ˇ)	23, 222
Simpsons characters	. 172	\Tau (T)	88	\textasciitilde (ˇ)	13
smile	. 85, 86	\tauau (τ)	88	\textasciitilde (ˇ)	. 13, 221, 223
Soyombo	. 175	\Taurus (♉)	120	\textasteriskcentered (*)	13
spoon	. 84, 85	\Taurus (♉)	120	\textasteriskcentered (*)	13
staves	. 173	\Taurus (♉)	119	\textbackslash (＼)	220, 221
subset and superset	58–61	\taurus (♉)	119	\textbackslash (＼)	. 220, 221
technological	. 118–125	tautology	. <i>see</i> \top	\textbackslash (＼)	24
TeXbook	. 164	\taupup (τ)	89	\textbar ()	. 220, 221
transliteration	. 19	\tcenitgrade (°C)	110	\textbar ()	16
upside-down	. 16–18, 23, 209, 221	\tcmu (μ)	110	\textbarc (€)	16
variable-sized	37–46, 206, 208	\tcohm (Ω)	110	\textbard (đ)	16
weather	. 166, 180–181	\tcpertenthousand (‰)	110	\textbardbl ()	13
Web	. 181–184	\tcpethousand (‰)	110	\textbardbl ()	13
yin-yang	. 165, 178, 180–181, 192	\tdtststile (=)	57	\textbardotlessj (ƒ)	16
zodiacal	119, 120, 188–190	\tdststile (=)	57	\textbarg (₪)	16
symbols.tex (file)	. 206, 225, 226	\tdtstile (=)	57	\textbarglotstop (?)	16
\symC (C)	. 116	\tdttstile (=)	57	\textbari (í)	16
\symking (₩)	. 170	\tent (▲)	166	\textbarl (ł)	16
\symknight (♘)	. 170	\tenuto (.)	152	\textbaro (ø)	16
\symOE (Ӯ)	. 117	\Terminus (⊗)	171	\textbarrevglotstop (ȝ)	16
\sympawn (♙)	. 170	\terminus (⊗)	171	\textbaru (✉)	16
\symqueen (♕)	. 170	\Terminus* (⊕)	171	\textbeltl (‡)	16
\symrook (♖)	. 170	\Terminus* (⊕)	171	\textbentailyogh (ȝ)	17
\symUE (Ӱ)	. 117	\Terra (⊕)	120	\textBeta (B)	14
\SYN (▬)	. 122	\tesh (ѓ)	18	\textbeta (β)	. 14, 16
T		testfont.dvi (file)	. 218	\textbigcircle (○)	13
\T	. 15	testfont.tex (file)	. 216, 218	\textbigcircle (○)	. 13
\T (▀)	. 23	\tetartemorion (ɔ)	. 25	\textbktailgamma (γ)	. 17
\T (⊗)	. 171	teubner (package)	. 25, 109, 144, 172, 226	\textblank (b)	. 26
\t (▀)	. 19	TeX	. 11, 67, 68, 84, 108, 119, 173, 206, 209– 216, 218, 219, 221, 223, 224, 228	\textblock (█)	. 173
\t (⊗)	. 171	\tex files	. 223, 224	\textborn (★)	. 164
t4phonet (package)	. 19, 22, 226			\textbottomtiebar (▀)	. 20
\Tab (☒)	. 122			\textbraceleft	. 13
\tabcolsep	. 210			\textbraceright	. 13
tacks	. 46, 91			\textbrevemacron (ˇ)	. 20

\textbullseye (O) 16
 \textcelsius (°C) 118, 224
 \textceltpal (') 16
 \textcent (¢) 24, 222
 \textcentoldstyle (¢) .. 24
 \textChi (X) 14
 \textchi (χ) 14, 16
 \textcircled (◎) 19
 \textcircledP 25
 \textcircledP (®) 25
 \textcircumacute (˜) ... 20
 \textcircumdot (ˆ) 20
 \textcloseepsilon (ε) ... 16
 \textcloseomega (ω) 16
 \textcloserevepsilon (϶) 16
 \textcolonmonetary (₵) . 24
 \textcommatailz (z) 16
 textcomp (package) ... 11, 13,
 14, 19, 23–26, 69, 99, 114,
 118, 147, 164, 206, 221,
 223, 226
 \textcopyrightleft 25
 \textcopyrightleft (©) 25
 \textcopyrightright (©) .. 13, 25
 \textcopyrightright (©) .. 13, 25,
 222
 \textcorner (‘) 16
 \textcrb (b) 16
 \textcrd (đ) 19
 \textcrd (đ) 16
 \textcrg (g) 16
 \textcrh (ḥ) 19
 \textcrh (ḥ) 16
 \textcrinvglotstop (§) .. 16
 \textcrlambda (λ) 16
 \textcrtwo (²) 16
 \textctc (c) 16
 \textctd (d) 16
 \textctdctzlig (ǳ) 16
 \textctesht (ƒ) 16
 \textctinvglotstop (§) .. 17
 \textctj (j) 16
 \textctjvar (j) 17
 \textctn (n) 16
 \textctstretchc (ℓ) 17
 \textctstretchcvar (ç) .. 17
 \textctt (t) 16
 \textcttctclig (ȝ) 16
 \textctturnt (ȝ) 17
 \textctyogh (ȝ) 16
 \textctz (z) 16
 \textcurrency (ؔ) ... 24, 222
 \textcypr 143
 \textdagger (†) 13
 \textdagger (†) 13
 \textdaggerdbl (‡) 13
 \textdaggerdbl (‡) 13
 \textdbend (ڙ) 164
 \textdblhyphen (₌) 26
 \textdblhyphenchar (₌) .. 26
 \textdblig (ڏ) 17
 \textdctzlig (ǳ) 16

\textdegree (°) 114, 222
 \textDelta (Δ) 14
 \textdelta (δ) 14
 \textdied (†) 164
 \textdiscount (٪) 26
 \textdiv (÷) 114
 \textdivorced (۾) 164
 \textdkshade (█) 173
 \textdnblock (█) 173
 \textdollar (\$) 13
 \textdollar (\$) 13, 24
 \textdollaroldstyle (\$) .. 24
 \textdong (ද) 24
 \textdotacute (ܵ) 20
 \textdotbreve (ܴ) 20
 \textdoublebaresh (ܶ) .. 16
 \textdoublebarpipe (ܷ) .. 16
 \textdoublebarpipevar (ܷ) 17
 \textdoublebarslash (ܷ) .. 16
 \textdoublegrave (ܸ) ... 20
 \textdoublegrave (ܹ) ... 22
 \textdoubleletpipe (ܻ) .. 16
 \textdoubleletpipevar (ܻ) .. 17
 \textdoublebaraccent (ܻ) .. 20
 \textdoublebaraccent (ܹ) .. 22
 \textdoublevertline (ܻ) .. 16
 \textdownarrow (↓) 69
 \textdownfullarrow (↓) .. 17
 \textdownstep (߂) 16
 \textdyoghlig (ܼ) 16
 \textdzlig (ܼ) 16
 \texteightoldstyle (߈) .. 26
 \textellipsis 13
 \textemdash 13
 \textendash 13
 \textEpsilon (ܾ) 14
 \textepsilon (ܰ) 19
 \textepsilon (ܰ) 14, 16
 \textesh (ܺ) 19
 \textesh (ܺ) 16
 \textestimated (ܾ) 26
 \textEta (ܻ) 14
 \texteta (ܻ) 14
 \texteuro (ܻ) 25
 \texteuro (ܻ) 24
 \texteuro (ܻ) 24, 223
 \textexcldown 13
 \textfallrise (ܵ) 20
 \textfemale (ܰ) 17
 \textfishhookr (ܰ) 16
 \textfiveoldstyle (߈) .. 26
 \textfjlig (ܺ) 19
 \textflorin (ܻ) 24
 \textfouroldstyle (߈) .. 26
 \textfractionsolidus (/) 114
 \textfrak 116
 \textfrbarn (ܻ) 17
 \textfrhookd (ܻ) 17
 \textfrhookdvar (ܻ) .. 17
 \textfrhookt (ܻ) 17
 \textfrtailgamma (ܻ) ... 17
 \textg (g) 17
 \textGamma (ܻ) 14

\textgamma (ܻ) 14, 17
 \textglobfall (ܲ) 17
 \textglobrise (ܳ) 17
 \textglotstop (ܲ) 16
 \textglotstopvari (ܲ) .. 17
 \textglotstopvarii (ܲ) .. 17
 \textglotstopvariii (ܲ) .. 17
 \textgoth 116
 \textgravecircum (ܵ) ... 20
 \textgravedbl (ܲ) 23
 \textgravedot (ܵ) 20
 \textgravemacron (ܵ) .. 20
 \textgravemid (ܵ) 20
 \textgreater 13
 \textgreater (>) .. 220, 221
 textgreek (package) 14, 89, 226,
 227
 \textgrrgamma (ܻ) 17
 \textguarani (ܻ) 24
 \texthalflength (ܲ) 16
 \texthardsign (ܻ) 16
 \textheng (ܻ) 17
 \texthighrise (ܵ) 20
 \texthmlig (ܻ) 17
 \texthooktop (ܲ) 16
 \texthtb (ܻ) 19
 \texthtb (ܻ) 16
 \texthtbardotlessj (ܻ) .. 16
 \texthtbardotlessjvar (ܻ) .. 17
 \texthtc (ܻ) 19
 \texthtc (ܻ) 16
 \texthtd (ܻ) 19
 \texthtd (ܻ) 16
 \texthtd (ܻ) 16
 \texthtg (ܻ) 16
 \textth (ܻ) 16
 \textthheng (ܻ) 16
 \texthtk (ܻ) 19
 \texthtk (ܻ) 16
 \texthttp (ܻ) 19
 \texthttp (ܻ) 16
 \texthtq (ܻ) 16
 \texthtrailed (ܻ) 16
 \texthtscg (ܻ) 16
 \texthtt (ܻ) 19
 \texthtt (ܻ) 16
 \texthvlig (ܻ) 16
 \textifsym 118
 \textinterrobang (ܲ) .. 26
 \textinterrobangdown (ܲ) .. 26
 \textinvglotstop (ܻ) .. 16
 \textinvomega (ܻ) 17
 \textinvasca (ܻ) 17
 \textinvscr (ܻ) 16
 \textinvscripta (ܻ) .. 17
 \textinvsubbridge (ܻ) .. 20
 \textIota (ܻ) 14
 \textiota (ܻ) 19
 \textiota (ܻ) 14, 16
 \textKappa (ܻ) 14
 \textkappa (ܻ) 14
 \textknit 176
 \textknit{2} (ܲ) 176
 \textknit{3} (ܲ) 176

\textknit{4} (↗)	176	\textLambda (Λ)	14	\textopenbullet (◦)	26
\textknit{5} (↖)	176	\textlambda (λ)	14, 16	\textopencorner (⌜)	16
\textknit{6} (⤏)	176	\textlangle (⟨)	99, 221	\textopeno (օ)	19
\textknit{7} (⤐)	176	\textlbrackdbl (ǁ)	99	\textopeno (օ)	16
\textknit{8} (⤑)	176	\textleaf (ȝ)	164	\textordfeminine (ª)	13
\textknit{9} (⤒)	176	\textleftarrow (←)	69	\textordfeminine (ª)	13, 222
\textknit{"}	(⤓)	\textlengthmark (:)	16	\textordmasculine (º)	13
\textknit{()}	(⤔)	\textless	13	\textordmasculine (º)	13, 222
\textknit{*}	(⤕)	\textless (⟨)	220, 221	\textovercross (⤖)	20
\textknit{-}	(⤖)	\textlfblock (▮)	173	\textoverw (⤗)	20
\textknit{:}	(⤗)	\textlfhooklig (һ)	17	\textpalhook ()	16
\textknit{;}	(⤘)	\textlhd (⤙)	164	\textpalhooklong („)	17
\textknit{<}	(⤙)	\texthookfour (⤚)	17	\textpalhookvar (⤙)	17
\textknit{@}	(⤚)	\texthookp (⤛)	17	\textparagraph (¶)	13
\textknit{[]}	(⤛)	\texthookt (⤜)	16	\textparagraph (¶)	13
\textknit{()}	(⤜)	\textlhti (ឃ)	17	\textperiodcentered (·)	13
\textknit{()}	(⤝)	\textlhtlongi (ឃ)	16	\textperiodcentered (·)	13, 222
\textknit{()}	(⤞)	\textlhtlongy (ឃ)	16	\textpertenthousand (%)	13
\textknit{A}	(⤟)	\textlinb	142, 143	\textpertenthousand (%)	13
\textknit{a}	(⤠)	\textlira (៥)	24	\textperthousand (%)	13
\textknit{B}	(⤡)	\textlnot (¬)	114, 222	\textperthousand (%)	13, 223
\textknit{b}	(⤢)	\textlonglegr (រ)	16	\textpeso (₱)	24
\textknit{E}	(⤣)	\textlooptoprevesh (ឃ)	17	\textPhi (Φ)	14
\textknit{F}	(⤤)	\textlowering (៥)	20	\textphi (φ)	14, 16
\textknit{f}	(⤥)	\textlp (៥)	16	\textPi (Π)	14
\textknit{H}	(⤦)	\textlquill (៥)	99	\textpi (π)	14
\textknit{h}	(⤧)	\textltailm (ឃ)	16	\textpilcrow (¶)	26
\textknit{I}	(⤨)	\textltailn (ឃ)	19	\textpipe ()	19
\textknit{i}	(⤩)	\textltailn (ឃ)	16	\textpipe ()	16
\textknit{J}	(⤪)	\textltilde (៥)	16	\textpipevar (ឃ)	17
\textknit{j}	(⤪)	\textltshade (៥)	173	\textpm (±)	114, 222
\textknit{L}	(⤫)	\textlyoghlig (៥)	16	\textpmhg	139
\textknit{l}	(⤬)	\textmarried (ឈ)	164	\textpolhook (⤖)	20
\textknit{M}	(⤭)	\textmho (៥)	118	\textprimstress (՚)	16
\textknit{m}	(⤮)	\textmicro (ᝅ)	14	\textproto	138
\textknit{m}	(⤯)	\textmidacute (ᝅ)	20	\textPsi (Ψ)	14
\textknit{O}	(⤰)	\textminus (−)	114	\textpspsi (ᝅ)	14
\textknit{Q}	(⤱)	\textMu (ᝅ)	14	\textqplig (ᝅ)	17
\textknit{q}	(⤲)	\textmu (ᝅ)	118, 222	\textquestiondown	13
\textknit{R}	(⤳)	\textmu (ᝅ)	14	\textquotedbl (")	15, 221
\textknit{r}	(⤴)	\textmugreek (ᝅ)	14	\textquotedblleft	13
\textknit{S}	(⤵)	\textmusicalnote (♪)	147	\textquotedblright	13
\textknit{s}	(⤶)	\textnaira (ᝅ)	24	\textquoteleft	13
\textknit{t}	(⤷)	\textnineoldstyle (ᝅ)	26	\textquoteright	13
\textknit{U}	(⤸)	\textnrleg (ឃ)	17	\textquotesingle (')	26, 221
\textknit{u}	(⤹)	\textNu (ᝅ)	14	\textquotestraightbase („)	26
\textknit{V}	(⤺)	\textnu (ᝅ)	14	\textquotestraightdblbase („)	26
\textknit{v}	(⤻)	\textnumero (ᝅ)	26	\textraiseglotstop (՞)	16
\textknit{W}	(⤼)	\textobardotlessj (ᝅ)	16	\textraisevibyi (ឃ)	16
\textknit{w}	(⤽)	\textbullseye (○)	17	\textraising (ᝅ)	20
\textknit{X}	(⤾)	\textohm (Ω)	118	\textramshorns (ᝅ)	16
\textknit{x}	(⤿)	\textOyoghlig (ᝅ)	16	\texttriangle (△)	99, 221
\textknit{Y}	(⤿)	\textOmega (Ω)	14	\textrbrackdbl (ǁ)	99
\textknit{y}	(⤿)	\textomega (ω)	14, 16	\textrecipe (R)	26, 208
\textknit{Z}	(⤿)	\textOmicron (O)	14	\textrectangle (□)	17
\textknit{z}	(⤿)	\textomikron (o)	14	\textreferencemark (※)	26, 27
		\textonehalf (៥)	114, 222	\textregistered (®)	13, 25
		\textoneoldstyle	26		
		\textoneoldstyle (᠁)	26		
		\textonequarter (᠁)	114, 222		
		\textonesuperior (᠁)	114, 222		

\textregistered (®)	13, 25, 222	\textscq (q)	17	\textstretchc (C)	16
\textretracting (¤)	20	\textscr (r)	16	\textstretchcvar (c)	17
\textretractingvar (¤)	17	\textscripta (a)	16	\textstyle	212, 213, 219
\textrevapostrophe (‘)	16	\textscriptg (g)	16	\textsubacute (¤)	20
\textreve (ø)	16	\textscriptf (f)	19	\textsubarch (¤)	20
\textrevespsilon (ø)	16, 209	\textscriptv (v)	16	\textsubbar (¤)	20
\textreversedvideobend (¤)	164	\textscu (u)	16	\textsubbridge (¤)	20
\textrevglotstop (ػ)	16	\textscy (y)	16	\textsubcircum (¤)	20
\textrevscl (ػ)	17	\textseagull (¤)	20	\textsubdot (¤)	20
\textrevscl (ػ)	17	\textsecstress (.)	16	\textsubdoublearrow (↔)	17
\textrevscl (ػ)	17	\textsection (§)	13	\textsubgrave (¤)	20
\textrevscl (ػ)	17	\textsection (§)	13	\textsubhalfring (¤)	20
\textrevyogh (ȝ)	16	\textservicemark	25	\textsubplus (¤)	20
\textRho (P)	14	\textservicemark (SM)	25	\textsubhalfring (¤)	20
\textrho (ρ)	14	\textsevenoldstyle (7)	26	\textsubbrightarrow (→)	17
\textrhooka (ɑ)	17	\textSFi (r)	173	\textsubring (¤)	20
\textrhooke (e)	17	\textSFii (l)	173	\textsubsquare (¤)	21
\textrhookepsilon (ε)	17	\textSFiii (l)	173	\textsubtilde (¤)	21
\textrhookepsilon (ε)	17	\textSFiv (l)	173	\textsubumlaut (¤)	21
\textrhopeno (ω)	17	\textSFix (f)	173	\textsubw (¤)	21
\textrhorevepsilon (ȝ)	16	\textSFl (l)	173	\textsubwedge (¤)	21
\textrhookschwa (ə̄)	16	\textSFl (f)	173	\textsuperimpostilde (¤)	21
\textrhoticity (ػ)	17	\textSFl (l)	173	\textsuperscript	22
\textrightarrow (→)	69	\textSFl (l)	173	\textsurd (√)	114
\textringmacron (¤)	20	\textSFliv (‡)	173	\textswab	116
\textrisefall (¤)	20	\textSFv (þ)	173	\textsyllabic (¤)	21
\textroundcap (¤)	20	\textSFvi (τ)	173	\textTau (T)	14
\textrptr (ػ)	17	\textSFvii (l)	173	\texttau (τ)	14
\textrquill (ػ)	99	\textSFviii (h)	173	\texttctclig (tc)	16
\textrtaild (d)	19	\textSFx (–)	173	\textteshlig (tf)	19
\textrtaild (d)	17	\textSFxi (j)	173	\textteshlig (tf)	16
\textrtailhth (fi)	17	\textSFxix (h)	173	\textTheta (Θ)	14
\textrtaill (l)	17	\textSFxl (l)	173	\texttheta (θ)	14, 16
\textrtailn (n)	16	\textSFxli (l)	173	\textthing (ػ)	165
\textrtailr (r)	16	\textSFxlii (l)	173	\textthorn (þ)	16
\textrtails (s)	16	\textSFxlii (l)	173	\textthornvari (þ)	17
\textrtailt (t)	19	\textSFxliv (l)	173	\textthornvari (þ)	17
\textrtailt (t)	16	\textSFxlix (l)	173	\textthornvarii (þ)	17
\textrtailz (z)	16	\textSFxlv (l)	173	\textthornvariv (þ)	17
\textrtblock (¤)	173	\textSFxlvi (l)	173	\textthreeoldstyle (3)	26
\textrthook (.)	16	\textSFxlvi (l)	173	\textthreequarters (¾)	114, 222
\textrthooklong (.)	17	\textSFxlvii (l)	173	\textthreequartersemdash (—)	26
\textRubikUa (Ua ¯)	185	\textSFxlviii (l)	173	\textthreesuperior (³)	114, 222
\textsarab	144	\textSFxxi (l)	173	\texttildedot (¤)	21
\textsc (A)	16	\textSFxxii (l)	173	\texttildelow (~)	26, 221
\textsc (æ)	17	\textSFxxiii (l)	173	\texttimes (×)	114
\textscb (B)	16	\textSFxxiv (l)	173	\textttoneletterstem (l)	16
\textscdelta (Δ)	17	\textSFxxv (l)	173	\texttoptiebar (¤)	21
\textscce (E)	16	\textSFxxvi (l)	173	\texttrademark (TM)	13, 25
\textscf (F)	17	\textSFxxvii (l)	173	\texttrademark (™)	13, 25, 223
\textscg (G)	16	\textSFxxviii (l)	173	\texttslig (ts)	16
\textsch (H)	16	\textSFxxxix (l)	173	\textturna (v)	16
\textschwa (d̪)	19	\textSFxxxxi (l)	173	\textturncelig (œ)	16
\textschwa (ø)	16	\textSFxxxxii (l)	173	\textturnglotstop (ɛ)	17
\textsci (i)	16	\textSFxxxxiii (l)	173	\textturnh (u)	16
\textscj (j)	16	\textshade (¤)	173	\textturnk (ȝ)	16
\textscck (k)	17	\textSigma (Σ)	14	\textturnlongegr (I)	16
\textscsl (l)	16	\textsigma (σ)	14	\textturnnm (uu)	16
\textscm (M)	17	\textsixoldstyle (6)	26	\textturnnrmrleg (uŋ)	16
\textscn (N)	16	\textsoftsign (b)	16		
\textcoelig (æ)	16	\textspleftarrow (↑)	17		
\textcomega (Ω)	16	\textsterling (£)	13		
\textscp (P)	17	\textsterling (£)	13, 24		

\textturnr (ι)	16	\thicksim (~)	54
\textturnrrtail (ι)	16	\thicksim (~)	52
\textturnsck (ϡ)	17	\thicksim (~)	55
\textturnscripta (ϙ)	16	\thickvert ()	95
\textturnscu (ϙ)	17	thin space	219
\textturnt (Ϙ)	16	\ThinFog (Ϣ)	166
\textturnthree (ϙ)	17	\thinstar (★)	34
\textturntwo (Ϛ)	17	\third (///)	113
\textturnv (Ϛ)	16	thirty-second note <i>see</i> musical symbols	
\textturnw (Ϛ)	16	\thirtysecondNote (♪)	150
\textturny (Ϛ)	16	\thirtysecondNoteDotted (♪.)	150
\texttwelveudash (—)	26	\thirtysecondNoteDottedDouble (♪..)	150
\texttwooldstyle	26	\thirtysecondNoteDottedDoubleDown (❀)	150
\texttwooldstyle (2)	26	\thirtysecondNoteDottedDown (❀)	150
\texttwosuperior (²)	114, 222	\thirtysecondNoteDown (❀)	150
\textuncrfemale (ϙ)	17	\Thorn (Þ)	18
\textunderscore	13	\thorn (þ)	18
\textuparrow (↑)	69	\thorn (þ)	18
\textupblock (■)	173	\thorn (þ)	18
\textupfullarrow (↑)	17	thousandths <i>see</i> \textperthousand	
\textUpsilon (Υ)	14	\threeBeamedQuavers (♪♪♪)	150
\textupsilon (υ)	14, 16	\threeBeamedQuaversI (♪♪♪)	150
\textupstep (↑)	16	\threeBeamedQuaversII (♪♪♪)	150
\textvbaraccent (֍)	21	\threeBeamedQuaversIII (♪♪♪)	150
\textvbaraccent (֍)	22	\threeangle (⌞)	112
\textvertline ()	16	\threedotcolon (:).	32
\textvibyi (֍)	16	\threesim (≋)	211
\textvibyy (֍)	17	thumb pizzicato <i>see</i> \lilyThumb	
\textvisiblespace	13	tick <i>see</i> check marks	
\textwon (₩)	24	\tieinfty (ꝝ)	111
\textwynn (ƿ)	17	TikZ (package)	179–181, 185
\textXi (Ξ)	14	tikzsymbols (package)	179, 180, 226, 227
\textxi (ξ)	14	tilde	13, 16, 18, 20–21, 23, 26, 100, 102, 105, 214, 221
\textxswdown (☒)	165	extensible	102, 105
\textxswup (☒)	165	vertically centered	221
\textyen (¥)	24, 222	\tilde (˜)	101
\textyogh (ȝ)	19	\tilde (˜)	100, 214
\textyogh (ȝ)	17	\tildel (†)	18
\textzerooldstyle (օ)	26	time of day	166, 167
\textZeta (Ζ)	14	time signatures	151
\textzeta (ζ)	14	\timelimit (⊕)	169
.tfm files	11, 186, 206, 224	\times (×)	28
tfrupee (package)	25, 226, 227	\times (×)	31
\TH (Þ)	14, 222	\times (×)	30
\th (þ)	14, 222	\times (×)	30
Thành, Hàn Thé	214	\times (×)	32
\therefore (∴)	48	Times Roman (font)	24, 208
\therefore (∴)	47, 108	\timesesbar (☒)	30
\therefore (∴)	54	\timesesbar (☒)	32
\therefore (∴)	108	timing (package)	118
\therefore (∴)	108	tipa (package)	16, 17, 19–22, 209, 226
\therefore (∴)	109	\tipx (package)	17, 226
\Thermo	166	\tnminus (⊖)	32
\thermod (‡)	114	\tndststile ()	57
\Theta (Θ)	88	\tnnststile ()	57
\theta (θ)	88	\tnststile ()	57
\thetaetaup (θ)	89	\tnntstile ()	57
\thething (Ϻ)	165	\to <i>see</i> \rightarrow	
\thickapprox (≈)	47	\to (→)	76
\thickapprox (≈)	54	\ToBottom (☒)	164
\thickapprox (≋)	52	\toea (☒)	82
\thickapprox (≋)	55	\tone	17
\thicksim (~)	47	\Tongey (⌚)	179

\triangle (\triangle)	36, 134
triangle relations	66–68
\triangledot (\triangle)	134
\TriangleDown (\blacktriangledown)	135
\TriangleDown (∇)	135
\TriangleDown (\blacktriangledown vs. ∇)	207
\triangledown (∇)	112
\triangledown (∇)	133
\triangledown (∇)	35, 68
\triangledown (∇)	67
\triangledown (∇)	134
\triangleeq (\triangleq)	68
\triangleeq (\triangleq)	67
\TriangleLeft (\triangleleft)	135
\triangleleft (\triangleleft)	66
\triangleleft (\triangleleft)	28
\triangleleft (\triangleleft)	68, 133
\triangleleft (\triangleleft)	35, 68
\triangleleft (\triangleleft)	67
\triangleleftblack (\blacktriangleleft)	134
\trianglelefteq (\trianglelefteq)	66
\trianglelefteq (\trianglelefteq)	66
\trianglelefteq (\trianglelefteq)	68
\trianglelefteq (\trianglelefteq)	68
\trianglelefteq (\trianglelefteq)	68
\trianglelefteq (\trianglelefteq)	68
\trianglelefteqslant (\trianglelefteqslant)	66
\trianglelefteqslant (\trianglelefteqslant)	68
\triangleminus (\triangle)	36
\triangleodot (\triangleodot)	134
\triangleplus (\triangleplus)	36
\triangleq (\triangleq)	27, 66
\triangleq (\triangleq)	54
\triangleq (\triangleq)	68
\triangleq (\triangleq)	67
\triangleq (\triangleq)	68
\TriangleRight (\triangleright)	135
\triangleright (\triangleright)	66
\triangleright (\triangleright)	28
\triangleright (\triangleright)	68, 133
\triangleright (\triangleright)	35, 68
\triangleright (\triangleright)	67
\trianglerightblack (\blacktriangleright)	134
\trianglerighteq (\trianglerighteq)	66
\trianglerighteq (\trianglerighteq)	66
\trianglerighteq (\trianglerighteq)	68
\trianglerighteq (\trianglerighteq)	68
\trianglerighteq (\trianglerighteq)	68
\trianglerighteq (\trianglerighteq)	68
\trianglerighteqslant (\trianglerighteqslant)	66
\trianglerighteqslant (\trianglerighteqslant)	68
triangles	112, 120, 123, 132–136, 157–161, 170, 171, 186–187, 202–203
\triangles (\triangle)	134
\triangleriserns (\triangle)	36
\triangletimes (\triangle)	36
\triangleubar (\triangle)	134
\TriangleUp (\blacktriangleup)	135
\TriangleUp (\triangleup)	135
\TriangleUp (\blacktriangleup vs. \triangleup)	207
\Tribar (\trianglebar)	180
\trident (\triangleright)	179
\trident (\triangleright)	179
\trill (\sim)	148
\Trine (\triangle)	120
\triple	99
\triplefrown (\approx)	85
\tripleplus ($\#$)	32
\triplesim (\approx)	52
\triplesim (\approx)	49
\triplesmile (\asymp)	85
\trprime ($\prime\prime$)	111
\trslash ($\prime\prime\prime$)	32
trsym (package)	58, 226
\tsbm (\lrcorner)	171
\tsdtstile ($\parallel\parallel\parallel$)	57
\tsmb (\lrcorner)	171
\tsmm (\lrcorner)	171
\tsststile ($\parallel\parallel\parallel$)	57
\Tsteel (\textbf{T})	123
\tststile ($\parallel\parallel$)	57
\tststile ($\parallel\parallel\parallel$)	57
\ttdtstile ($\parallel\parallel\parallel$)	57
\ttimes (\times)	31
\TTsteel (\textbf{I})	123
\ttststile ($\parallel\parallel\parallel$)	57
\tttstile ($\parallel\parallel\parallel$)	57
\ttttstile ($\parallel\parallel\parallel\parallel$)	57
TUGboat	102, 228
\Tumbler (\square)	165
\turn (\curvearrowright)	148
\turnangle (\curvearrowright)	112
\turnedbackneg (\curvearrowleft)	113
\turneddiota (\circlearrowleft)	90
\turnedneg (\curvearrowleft)	113
\turnednot (\curvearrowleft)	114
turnstile (package)	57, 226
\TwelveStar (\star)	131
twiddle	see tilde
\twoBeamedQuavers (\textbf{J})	150
\twocaps (\textbf{M})	32
\twocups (\textbf{W})	32
\twoheaddownarrow (\Downarrow)	80
\twoheaddownarrow (\Downarrow)	75
\twoheaddownarrow (\Downarrow)	71
\twoheaddownarrow (\Downarrow)	82
\twoheadleftarrow (\Leftarrow)	69
\twoheadleftarrow (\Leftarrow)	80
\twoheadleftarrow (\Leftarrow)	75
\twoheadleftarrow (\Leftarrow)	72
\twoheadleftarrow (\Leftarrow)	82
\twoheadleftarrowtail (\Leftarrow)	82
\twoheadleftdbkarrow ($\Leftarrow\Leftarrow$)	82
\twoheadmapsfrom (\Leftarrow)	82
\twoheadmapsto (\Rightarrow)	82
\twoheadnearrow (\nearrow)	75
\twoheadnearrow (\nearrow)	72
\twoheadnarrow (\nwarrow)	75
\twoheadnarrow (\nwarrow)	72
\twoheadrightarrowtail (\rightarrow)	82
\twoheadrightarrowtail (\rightarrow)	80
\twoheadrightarrowtail (\rightarrow)	75
\twoheadrightarrowtail (\rightarrow)	72
\twoheadrightarrowtail (\rightarrow)	82
\twoheadrightarrowtail (\rightarrow)	82
\twoheadsearrow (\searrow)	75
\twoheadsearrow (\searrow)	72
\twoheadswarrow (\swarrow)	75
\twoheadswarrow (\swarrow)	72
\twoheaduparrow (\uparrow)	80
\twoheaduparrow (\uparrow)	75
\twoheaduparrow (\uparrow)	72
\twoheaduparrow (\uparrow)	82
\twoheaduparrowcircle (\uparrow)	82
\twoheadwhiteuparrow (\uparrow)	80
\twoheadwhiteuparrowpedestal (\uparrow)	80
\twoheadnotes (\textbf{J})	147
\twoheadnotes (\textbf{J})	147
txfonts (package)	27, 29, 39, 48, 59, 62, 70, 86, 89–91, 112, 116, 136, 206, 208, 221, 226
type1cm (package)	206
\typecolon ($:$)	32
Type 1 (font)	218
U	
\U (\textbf{U})	23
\U (\textbf{U})	19
\U (\textbf{U})	19
\u (\textbf{u})	19
\UA (\textbf{U})	121
\UArrow ($\textbf{\LARGE U}$)	122
\UB (\textbf{A})	149
\ubar (\textbf{u})	18
\ubarbbrevis ($\textbf{\texttt{u}}$)	172
\ubarbrevis ($\textbf{\texttt{u}}$)	172
\barsbrevis ($\textbf{\texttt{u}}$)	172
\ubrbrak ($\textbf{\texttt{u}}$)	114
\ubrevislonga ($\textbf{\texttt{u}}$)	172
ubulb.fd (file)	218
ucs (package)	224
\udesc (\textbf{y})	18
udingbat.fd (file)	194
\udot (\cdot)	29
\udotdot ($\cdot\cdot$)	30, 108
\udotdot ($\cdot\cdot$)	30, 108
\udots ($\cdot\cdot\cdot$)	108
\udots ($\cdot\cdot\cdot$)	108
\udtimes (\times)	32
\UHORN (\textbf{U}')	15
\uhorn (\textbf{u}')	15
\ularc ($\textbf{\texttt{C}}$)	114
\ulblacktriangle ($\textbf{\texttt{P}}$)	134
\ulcorner ($\textbf{\texttt{r}}$)	93
\ulcorner ($\textbf{\texttt{r}}$)	93
\ulcorner ($\textbf{\texttt{r}}$)	93
\ulcorner ($\textbf{\texttt{r}}$)	96

\ulcorner (95
\ulcorner (93
\ullcorner ()	96
\ullcorner ()	95
\ulrcorner ()	96
\ulrcorner ()	95
\ulcorner (package)	33, 86, 209, 226
\ultriangle (134
\Umd (149
\uminus (32
umlaut (see accents
umranda (package)	192, 226
umrandb (package)	193, 226
unary operators	27
\unclear (169
\underaccent	214
\underarc (22
\underarch (21
\underbrace (104
\underbrace (103
\underbrace (103
\underbrace (104
\underbrace (103
\underbrace (102
\underbracket (104
\underbracket (103
\underbracket (214, 215
\underdots (23
\undergroup (104
\undergroup (103
\undergroup (103
\underleftarrow (103
\underleftarrow (102
\underleftharp (84
\underleftharpoons (84
\underleftharpoon (103
\underleftarrow (103
\underleftarrow (102
underline	13, 27, 102, 105
\underline (102
\underlinesegment (103
\underlinesegment (103
\underparen (103
\underparenthesis (214, 215
\underrightarrow (103
\underrightarrow (102
\underrightharp (84
\underrightharpoon (84
\underrightharpoon (210
\underriting (23
underscore	see underline
underscore (package)	13
\underset	210
\undertilde (package)	105, 226
\undertilde (23
\underwedge (23
Unicode	11, 173, 223–225
union	see \cup
unit disk (see alphabets, math
\unitedpawns (169
units (package)	114
unity (see alphabets, math
\universa (package)	136, 165, 226
\unlhd (28, 29
\unlhd (65
\unlhd (63, 67
\unlhd (32
\unrhd (28, 29
\unrhd (65
\unrhd (63, 67
\unrhd (32
\upalpha (89
\upand (32
\UParrow (164
\Uparrow (69, 94
\Uparrow (75
\Uparrow (96
\Uparrow (72
\Uparrow (82
\Updownarrowbar (80
\Updownarrowbar (82
\Updownarrows (70
\Updownarrows (75
\Updownarrows (72
\Updownarrows (82
\Updownblackarrow (80
\Updowncurvearrow (76
\Updownharpoonleftleft (1) 83
\Updownharpoonleftright (1) 78
\Updownharpoonleftright (1) 74
\Updownharpoonleftright (1) 83
\Updownharpoonleftright (1) 83
\Updownharpoonrightleft (1) 78
\Updownharpoonrightleft (1) 74
\Updownharpoonrightleft (1) 83
\Updownharpoonrightright (1) 83
\Updownharpoons (71
\Updownharpoons (78
\Updownharpoons (74
\Updownharpoonsleftright ((1) 78
\Updownharpoonsleftright ((1) 83
\Updownline (50
\updownline (49
\updownsquigarrow (76
\updownwavearrow (75
\updownwhitearrow (80
\upepsilon (89
\upeta (89
\upfilledspoon (84
\upfishtail (55
\upfootline (50
\upfree (50
\Upgamma (89
\upgamma (89
upgreek (package)	14, 89, 226

\upharpoonccw (↑)	74	\uprsquigarrow (⤤)	76	\urcorner (⤗)	93
\upharpooncw (↓)	74	\uprsquigarrow (⤥)	72	url (package)	221
\upharpoonleft (↓)	71	upside-down symbols	221	\urtriangle (⤙)	134
\upharpoonleft (↓)	69	upside-down symbols	16–18,	urwchancal (package)	116, 226
\upharpoonleft (↓)	80	23, 209		\US (_)	121, 122
\upharpoonleft (↓)	78	\Upsilonigma (Σ)	89	\US (_)	122
\upharpoonleft (↓)	83	\upsigma (σ)	89	\usepackage	11
\upharpoonleftbar (↓)	83	\Upsilonilon (Υ)	88	\usf (⤓)	148
\upharpoonright (↑)	71	\upsilon (ν)	88	\usfz (⤔)	148
\upharpoonright (↑)	69	\upsilonup (ν)	89	ushort (package)	105, 226, 227
\upharpoonright (↑)	80	\upslice (⤳)	34	\ushort (⤒)	105
\upharpoonright (↑)	78	\upspoon (⤠)	85	\ushortdw (⤒)	105
\upharpoonright (↑)	83	\upspoon (⤡)	84	\ushortw (⤒)	105
\upharpoonrightbar (↓)	83	\upt (⤑)	23	\ut (⤒)	22
\upharpoonsleftright (⤠)	83	\uptau (τ)	89	UTF-8	224
\upin (⤣)	55	\uptherefore (∴)	108	utf8x (inputenc package option)	224
upint (stix package option)	36, 37, 44, 45	\uptherefore (∴)	30, 108		
\upint (⤓)	44	\Uptheta (Θ)	89	\utilde (⤒)	105
\upintsl (⤓)	45	\uptheta (θ)	89	\utimes (⤓)	30, 31
\upintup (⤓)	45	\uptodownarrow (⤓)	70	\utimes (⤓)	32
\upiota (⤣)	89	\uptodownarrow (⤓)	80	Utopia (font)	24, 46
\upkappa (κ)	89	\upuparrows (⤰⤱)	70	\UU (⤣)	121
\Uplambda (Λ)	89	\upuparrows (⤰⤱)	69	\UUparrow (⤪⤪)	82
\uplambda (λ)	89	\upuparrows (⤰⤱)	80	\UUparrow (⤪⤪)	98
\uplcurvearrow (⤰)	76	\upuparrows (⤰⤱)	75	\Uuparrow (⤪⤪)	75
\upleftcurvedarrow (⤲)	76	\upuparrows (⤰⤱)	72	\Uuparrow (⤪⤪)	82
\uplett	22	\upuparrows (⤰⤱)	82	\upupharpoons (⤰⤱)	71
\uplsquigarrow (⤤)	76	\Upupsilon (Υ)	89	\Upupsilon (Υ)	89
\uplsquigarrow (⤥)	72	\upupsilon (ν)	89	\Upuparrow (⤪⤪)	82
\uplus (⤣)	29	\upvarepsilon (ε)	89	\Upuparrow (⤪⤪)	98
\uplus (⤣)	28	\upvarphi (φ)	89	uwebo.fd (file)	191
\uplus (⤣)	31	\upvarpi (ϖ)	89		
\uplus (⤣)	31	\upvarrho (ρ)	89		
\uplus (⤣)	30	\upvarsigma (σ)	89		
\uplus (⤣)	32	\upvartheta (ϑ)	89		
\Upmapsto (⤪⤪)	75	\upVDash (⤒⤒)	52		
\upmapsto (↑)	75	\upVdash (⤒)	52		
\upmapsto (↑)	72	\upVdash (⤒)	50		
\upModels (⤒⤒)	50	\upvDash (⤒)	52		
\upmodels (⤒⤒)	52	\upvdash (⊥)	52		
\upmodels (⤒⤒)	50	\upvdash (⊥)	50		
\upmu (μ)	89	\upwavearrow (⤤)	75		
\upnu (ν)	89	\upwhitearrow (⤰)	80		
\Upomega (Ω)	89	\upwhitearrow (⤰)	82		
\upomega (ω)	89	\Upxi (Ξ)	89		
\upp (⤣)	23	\upxi (ξ)	89		
\upparentfill	215	\upY (⤠)	30		
\Upphi (Φ)	89	\upY (⤠)	30		
\upphi (ϕ)	89	\upzeta (ζ)	89		
\Uppi (Π)	89	\Uranus (⤁)	120		
\uppi (π)	89	\Uranus (⤁)	120		
\uppitchfork (⤠)	86	\Uranus (⤁)	119		
\uppitchfork (⤠)	84	\uranus (⤁)	119		
\upproto (⤣)	50	\urarc (⤠)	114		
\Uppsi (Ψ)	89	\urblacktriangle (⤙)	134		
\uppsi (ψ)	89	\urcorner (⤗)	93		
upquote (package)	221	\urcorner (⤗)	93		
\uprcurvearrow (⤤)	76	\urcorner (⤗)	93		
\prho (ρ)	89	\urcorner (⤗)	97		
upright Greek letters	14, 89	\urcorner (⤗)	95		
\uprightcurvearrow (⤤)	76				
\uprightcurvearrow (⤤)	82				

\varepsilon	90	\varnotin (≠)	91	\varrightwavearrow (↝)	75
\varepsilon	90	\varnotowner (≠)	91	\Varsampi (Ϣ)	144
\varepsilon	89	\varoast (⊗)	28	\varsampi (Ϣ)	144
\VarFlag (¶)	166	\varobar (◑)	28	\varsigma (ς)	88
varg (txfonts/pxfonts package option)	90	\varobslash (⊗)	28	\varsigma (ς)	90
\varg (g)	90	\varocircle (◎)	28	\varsigma (ς)	90
\varg (g)	90	\varodot (⊙)	28	\varsigmaup (ς)	89
\varg (g)	18	\varogreaterthan (⊗)	28	\varspade (♠)	137
\vageq (≥)	62	\varoiintclockwise (fff)	40	\varspadesuit (diamondsuit)	136
\varhash (#)	113	\varoiintctrcclockwise (fff)	40	\varspadesuit (♦)	137
\varhash (#)	54	\varoint (∮)	38	\varsqcap (⊓)	31
\varheart (♥)	137	\varointclockwise (∮)	40	\varsqcup (⊔)	31
\varheartsuit (♥)	136	\varointclockwise (∮)	40	\varsqsubsetneq (⊕)	59
\varheartsuit (♥)	136	\varointctrcclockwise (∮)	40	\varsqsubsetneqq (⊖)	59
\varheartsuit (♥)	137	\varoint (∮)	38	\varsqsupsetneq (⊖)	59
\varhexagon (◇)	134	\varointclockwise (∮)	40	\varstar (*)	29
\varhexagon (◇)	132	\varointclockwise (∮)	40	\varstar (*)	134
\varhexagonblack (◆)	134	\varointclockwise (∮)	43	\varstigma (Ϛ)	144
\varhexagonrbonds (◇)	134	\varointclockwise (∮)	44	\varsubsetneq (⊏)	59
\varhexstar (*)	130	\varointclockwisesl (∮)	44	\varsubsetneq (⊏)	59
\varhookdownarrow (↓)	75	\varointclockwiseup (∮)	44	\varsubsetneq (⊏)	60
\varhookleftarrow (↔)	75	\varointctrcclockwise (∮)	40	\varsubsetneq (⊏)	60
\varhooknearrow (↗)	75	\varointctrcclockwise (∮)	40	\varsubsetneq (⊏)	60
\varhooknarrow (↖)	75	\varointctrcclockwise (∮)	43	\varsubsetneqq (⊖)	59
\varhookrightarrow (↔)	75	\varolessthan (⊖)	28	\varsubsetneqq (⊖)	59
\varhooksearrow (↘)	75	\varomega (϶)	18	\varsubsetneqq (⊖)	60
\varhookswarrow (↙)	75	\varominus (⊖)	28	\varsubsetneqq (⊖)	60
\varhookuparrow (↑)	75	\varopeno (϶)	18	\varsubsetneqq (⊖)	60
\vari (i)	18	\varoplus (⊕)	28	\varsubsetneqq (⊖)	61
variable-sized symbols	37–46, 206, 208	\varoslash (⊘)	28	\varsum (Σ)	42
\VarIceMountain (▲)	166	\varosum (Σ)	42, 43	\varsumint (⨍)	42
\varinjlim (lim)	87	\varotimes (⊗)	28	\VarSummit (△)	166
\varint (ʃ)	38	\varovee (◊)	28	\varsupsetneq (⊕)	59
\varintercal (⊤)	31	\varowedge (⊗)	28	\varsupsetneq (⊕)	59
\various (R)	169	\varparallel (//)	48	\varsupsetneq (⊕)	60
\varisinobar (Ē)	55	\varparallelinv (\\)	48	\varsupsetneq (⊕)	60
\varisins (ε)	54	\varpartialdiff (∂)	93	\varsupsetneq (⊕)	60
\varisins (ε)	55	\varphi (φ)	88	\varsupsetneq (⊕)	60
\varkappa (κ)	88	\varphi (φ)	90	\varsupsetneq (⊕)	61
\varkappa (κ)	90	\varphi (φ)	90	\varsupsetneqq (⊖)	59
\varkappa (κ)	90	\varphiup (φ)	89	\varsupsetneqq (⊖)	59
\varleftrightwavearrow (↝)	75	\varphoton (f)	125	\varsupsetneqq (⊖)	60
\varleftwavearrow (↝)	75	\varpi (ϖ)	88	\varsupsetneqq (⊖)	60
\varleq (≤)	62	\varpi (ϖ)	90	\varsupsetneqq (⊖)	60
\varliminf (lim)	87	\varpiup (ϖ)	89	\varsupsetneqq (⊖)	60
\varlimsup (lim)	87	\varPluto (♃)	120	\varsupsetneqq (⊖)	61
\varltriangle (Δ)	134	\varprod (×)	40	\vartheta (ϑ)	88
\varltriangle (Δ)	68, 133	\varprod (Π)	42	\vartheta (ϑ)	90
\varmathbb	116	\varprojlim (lim)	87	\vartheta (ϑ)	90
\varmodtwosum (Σ)	43	\varpropto (∞)	47	\varthetaup (ϑ)	89
\varMoon (Ҫ)	120	\varpropto (∞)	54	\vartimes (X)	28
\VarMountain (▲)	166	\varpropto (∞)	52	\vartimes (x)	31
\varniobar (Ξ)	55	\varpropto (∞)	50	\vartriangle (Δ)	112
\varnis (϶)	54	\varpropto (∞)	55	\vartriangle (Δ)	68
\varnis (϶)	55	\varrho (ϱ)	88	\vartriangle (Δ)	35, 68
\varnothing	27, 112	\varrho (ϱ)	90	\vartriangle (Δ)	67
\varnothing	114	\varrho (ϱ)	89	\vartriangle (Δ)	68
\varnothing	113	\varrho (ϱ)	90	\vartriangleleft (⟨)	66
\varnothing	113	\varrho (ϱ)	89	\vartriangleleft (⟨)	66
\varnothing	111	\varrhoup (ϱ)	89	\vartriangleleft (⟨)	68

\vartriangleleft (\triangleleft)	68	\vec (\vec{v})	101
\vartriangleleft (\triangleleft) .	63, 67	\vec (\vec{v}) .	100
\vartriangleleft (\triangleleft) .	68, 134	\vec (\vec{v}) .	101
\vartriangleright (\triangleright) .	66	\vec (\vec{v}) .	100
\vartriangleright (\triangleright) .	66	\vectimes (\times)	32
\vartriangleright (\triangleright) .	68	\Vee (\vee)	31
\vartriangleright (\triangleright) .	68	\Vee (\vee)	32
\vartriangleright (\triangleright) .	63, 67	\vee (\vee)	29
\vartriangleright (\triangleright) .	68,	\vee (\vee)	28
134		\vee (\vee)	31
\varupdownwavearrow (\$)	75	\vee (\vee) .	30, 31
\varupwavearrow (?) .	75	\vee (\vee) .	30
\varUranus (\oplus) .	120	\vee (\vee) .	32
\varv (v) .	90	\veebar (\veebar)	29
\varvarpi (ϖ) .	89	\veebar (\veebar)	28
\varvarrho (ϱ) .	89	\veebar (\veebar)	31
\varVdash (\Vdash) .	55	\veebar (\veebar)	30
\varveebar (\veebar) .	32	\veebar (\veebar)	32
\varw (w) .	90	\veedot (\veedot)	31
\vary (y) .	90	\veedot (\veedot)	30
\VBar (\mid) .	135	\veedot (\veedot)	32
\Vbar (\ll) .	52	\veedoublebar (\veedoublebar)	29
\Vbar (\ll) .	55	\veedoublebar (\veedoublebar)	31
\vBar (\pm) .	52	\veedoublebar (\veedoublebar)	32
\vBar (\pm) .	55	\veeeeq (\veeeeq)	54
\vBarv (\neq) .	55	\veeeeq (\veeeeq)	52
\vbiproto (8) .	30	\veeeeq (\veeeeq)	56
\vbrtri (\triangleright) .	68	\veemidvert (\veemidvert)	32
\vcntcolon (:)	56	\veeodot (\veeodot)	32
\vcenter .	210, 211	\veeonvee (\veeonvee)	31
\vcrossing (\times) .	50	\veeonvee (\veeonvee)	31
\VDash (\Vdash) .	48	\veeonvee (\veeonvee)	32
\VDash (\Vdash) .	54	\veeonwedge (\veeonwedge)	56
\VDash (\Vdash) .	52	\Venus (\Venus)	120
\VDash (\Vdash) .	50	\Venus (\Venus)	120
\VDash (\Vdash) .	56	\Venus (\Venus)	119
\Vdash (\Vdash) .	48	\venus (\venus)	119
\Vdash (\Vdash) .	47	\vernal (\vernal)	119
\Vdash (\Vdash) .	54	versicle (\versicle)	224, 225
\Vdash (\Vdash) .	52	\VERT (\VERT)	99
\Vdash (\Vdash) .	50	\Vert (\Vert)	94, 96
\Vdash (\Vdash) .	55	\Vert (\Vert)	97
\vDash (\Vdash) .	48	\Vert (\Vert)	97
\vDash (\Vdash) .	47	\Vert (\Vert)	98
\vDash (\Vdash) .	54	\vert (\mid)	94, 96
\vDash (\Vdash) .	52	\vert (\mid)	97
\vDash (\Vdash) .	50	\vert (\mid)	97
\vDash (\Vdash) .	56	\vert (\mid)	98
\vdash (\vdash) .	46	\vertbowtie (\vdash)	30
\vdash (\vdash) .	52	\vertdiv (\vdash)	30
\vdash (\vdash) .	50	\Vertex (∇)	120
\vdash (\vdash) .	55	\vertoverlay ()	56
\vDdash (\Vdash) .	52	\Vesta (\Vesta)	120
\vDdash (\Vdash) .	56	\VHF (\approx)	118
\vdottdot (:)	30, 108	\Vier (\bullet)	149
\vdottdot (:)	30, 108	vietnam (package)	226
\vdots .	109	\viewdata (#)	114
\vdots .	107	\Village ($\triangleup\triangleup$)	166
\vdots .	30		
\vdots .	108		
\vdots .	56		
\vec (\vec{v}) .	101		
		\vin (\sqcup)	93
		vinculum	see \overline
		\ViPa (\wp)	149
		virga	see musixgre
		\Virgo (\wp)	120
		\Virgo (\wp)	119
		\virgo (\wp)	119
		\vlongdash (—)	52
		\vlongdash (—)	56
		\VM (>)	149
		\vntex (package)	15, 19
		\vod (\wp)	18
		\voicedh (\textit{fi})	18
		\Vomey (\wp)	179
		\vppm (\pm)	171
		\vpppm (\pm)	171
		\vrectangle (□)	134
		\vrectangleblack (■)	134
		\vrule	173
		\VT (σ)	122
		\Vulkanus (Δ)	120
		\vv (\textit{v})	104
		\VvDash (\Vdash)	48
		\VvDash (\Vdash)	48
		\VvDash (\Vdash)	47
		\VvDash (\Vdash)	54
		\VvDash (\Vdash)	52
		\VvDash (\Vdash)	50
		\VvDash (\Vdash)	56
		\Vvert ()	97
		\Vvert ()	98
		\Vvvert ()	95
		\vysmbblkcircle (•)	36
		\vysmbblksquare (•)	134
		\vysmwhtcircle (◦)	36
		\vysmwhtsquare (◦)	134
		\vzigzag ()	114
		W	
		\Walley (\wp)	179
		\warning (Δ)	178
		\WashCotton (\textit{w})	165
		\WashSynthetics (\textit{w})	165
		\WashWool (\textit{w})	165
		\wasyllozenge (□)	164
		\wasypyproto (∞)	47
		wasysym (package)	18, 24,
			26, 29, 38, 47, 59, 62, 108,
			112, 118, 119, 121, 123,
			130, 132, 147, 164, 207,
			226
		\wasytherefore (..)	108
		\Water (∇)	120
		\water (•)	125
		wavy-line delimiters	95–98
		\wbetter (\pm)	169
		\wdecisive (+-)	169
		\weakpt (×)	169
		\WeakRain (,,,)	166
		\WeakRainCloud (\wp)	166
		weather symbols	166, 180–181

Web symbols 181–184
 webomints (package) 191, 226
 \Wecker (⌚) 166
 \Wedge (\wedge) 31
 \Wedge (\wedge) 32
\wedge (\wedge) 29
\wedge (\wedge) 28
\wedge (\wedge) 31
\wedge (\wedge) 31
\wedge (\wedge) 30
\wedge (\wedge) 32
\wedgebar (Δ) 32
\wedgedot (\wedge) 31
\wedgedot (\wedge) 30
\wedgedot (\wedge) 32
\wedgedoublebar (Δ) 32
\wedgemidvert (\wedge) 32
\wedgeodot (\wedge) 32
\wedgeonwedge (\wedge) 31
\wedgeonwedge (\wedge) 32
\wedgeq (\wedge) 52
\wedgeq (\wedge) 56
Weierstrass \wp function *see* \wp
\westcross (\ddagger) 129
\wfermion (\swarrow) 125
\Wheelchair (\mathcal{S}) 165
\whfermion (\equiv) 125
\whistle (\square) 21
\white 171
\whitearrowupfrombar ($\hat{\square}$) 80
\whitearrowupfrombar ($\hat{\square}$) 82
\whitearrowuppedestal ($\hat{\square}$) 80
\whitearrowuppedestalhbar
($\hat{\square}$) 80
\whitearrowuppedestalvbar
($\hat{\square}$) 80
 \WhiteBishopOnBlack ($\hat{\square}$) 170
 \WhiteBishopOnWhite ($\hat{\square}$) 170
\whiteblackspoon ($\circ\bullet$) 85
\WhiteEmptySquare () 170
\whiteinwhitetriangle (\triangle) 134
 \WhiteKingOnBlack ($\hat{\square}$) 170
 \WhiteKingOnWhite ($\hat{\square}$) 170
 \WhiteKnightOnBlack ($\hat{\square}$) 170
 \WhiteKnightOnWhite ($\hat{\square}$) 170
 \WhitePawnOnBlack ($\hat{\square}$) 170
 \WhitePawnOnWhite ($\hat{\square}$) 170
\whitepointerleft (\triangleleft) 134
\whitepointerright (\triangleright) 134

 \WhiteQueenOnBlack ($\hat{\square}$) 170
 \WhiteQueenOnWhite ($\hat{\square}$) 170
 \WhiteRookOnBlack ($\hat{\square}$) 170
 \WhiteRookOnWhite ($\hat{\square}$) 170
\whitesquaretickeleft (\square) 36
\whitesquaretickeight (\square) 36
\whitestone 170
whole note *see* musical symbols
\wholeNote (\bullet) 150
\wholeNoteDotted (\bullet) 150
\wholeNoteRest ($\overline{\square}$) 151
\wholeNoteRestDotted ($\overline{\square}$) 151
\wholeof (ξ) 209
\whthorzoval (\circ) 134
\whtvertoval (0) 134
Wick contractions 215
\wideangledown (\sqcup) 112
\wideangleup (\sqcap) 112
\widearc (\square) 104
\widearrow (\square) 104
\widebar (\square) 104
\widebridgeabove (\square) 101
\widecheck (\square) 104
\widecheck (\square) 103
\widehat (\square) 103
\widehat (\square) 103
\widehat (\square) 103
\widehat (\square) 102
\widehat (\square) 102
\wideOarc (\square) 104
\wideparen (\square) 104
\wideparen (\square) 103
\wideparen (\square) 104
\wideparen (\square) 103
\wideparen (\square) 102
\widering (\square) 104
\widering (\square) 104
\widering (\square) 102
\wideting (\square) 103
\wideting (\square) 103
\wideting (\square) 103
\wideting (\square) 102
\wideting (\square) 102
\wideting (\square) 105
\widetriangle (\square) 102
\wind 166
Windows® 223
\Winkey (\odot) 179
\wInnocey (\odot) 179
\Wintertree (\oplus) 179
\with (&) 33
\with (\sqcup) 169
\withattack (\rightarrow) 169
\withidea (\triangle) 169

\withinit (\uparrow) 169
\without (\sqcup) 169
Wizards of the Coast 204
\wn (?) 27
woman 138, 165
\WomanFace (\mathcal{A}) 165
won *see* \textwon
world 165
\WorstTree (\mathcal{G}) 179
\wp (\wp) 91
\wp (\wp) 92
\wp (\wp) 92
\wp (\wp) 91
\wp (\wp) 92
\wq (\mathbb{Q}) 148
\wqq ($\mathbb{Q}\mathbb{Q}$) 148
\wr (\wr) 28
\wr (\wr) 31
\wr (\wr) 30
\wr (\wr) 32
\wreath (\wr) 31
\wreath (\wr) 30
wreath product *see* \wr
\WritingHand (\mathcal{A}) 165
wsipa (package) 18, 21, 23,
207, 209, 214, 226
\wupperhand (\pm) 169

X

\x (ζ) 110
\x (:,:) 171
\XBox (\boxtimes) 130
\xbsol (\backslash) 44
Xdvi 84, 209
X_EL_AT_EX 88, 147, 224
X_ET_EX 22
\Key (\odot) 179
\xfrac (package) 114
\hookleftarrow (\leftarrowtail) 106
\hookrightarrow (\rightarrowtail) 106
\Xi (Ξ) 88
\xi (ξ) 88
\xiup (ξ) 89
\xLeftarrow (\Leftarrow) 106
\xleftarrow (\overleftarrow) 105
\xleftharpoondown ($\overleftarrow{\square}$) 106
\xleftharpoonup ($\overleftarrow{\square}$) 106
\xLeftrightarrow (\Leftrightarrow) 106
\xleftrightarrow ($\overleftrightarrow{\square}$) 106
\xleftrightarrow ($\overleftrightarrow{\square}$) 106
\xleftrightarrow ($\overleftrightarrow{\square}$) 106
\xleftrightarrow ($\overleftrightarrow{\square}$) 106
\xleftrightharpoons ($\overleftrightarrow{\square}$) 106
\xlongequal ($\overline{\square}$) 107
\xlongequal ($\overline{\square}$) 106
\xLongleftarrow ($\overleftarrow{\square}$) 106
\xLongleftarrow ($\overleftarrow{\square}$) 106
\xLongleftrightarrow ($\overleftrightarrow{\square}$) 106

\xlongleftarrowrightarrow (\longleftrightarrow)	106	\Ydown (⌚)	31	
\xLongrightarrowrightarrow ($\overrightarrow{\overleftarrow{}}$)	106	yen see \textyen	114	
\xlongrightarrowarrow ($\overrightarrow{\rightarrow}$)	106	\yen (¥)	114	
\xmapsto ($\xrightarrow{}$)	106	yfonts (package)	116, 117, 226	
\xmapsto ($\xrightarrow{}$)	107	yhmath (package)	101, 102, 105, 109, 213, 226	
XML	223	yin-yang symbols	165, 178, 180–181, 192	
\XQ (⌚)	121	\Yinyang (⌚⌚)	165	
\xRightarrowrightarrow ($\overrightarrow{\Rightarrow}$)	106	\yinyang (⌚⌚)	178	
\xrightarrowrightarrow ($\overrightarrow{\rightarrow}$)	105	\Yleft (\leftarrow)	28	
\xrightarrowspace ($\overrightarrow{}$)	106	\Yleft (\leftarrow)	31	
\xrightarpoonspace ($\overrightarrow{}$)	106	\yogh (ȝ)	18	
\xrightleftharpoonspace ($\overleftrightarrow{}$)	106	\yogh (ȝ)	18	
Xs	129, 130, 165	\Yright (\rightarrow)	28	
\xsol (/)	44	\Yright (\rightarrow)	31	
\XSolid (☒)	129	Yu, Billy	214	
\XSolidBold (☒☒)	129	\Yup (ѧ)	28	
\XSolidBrush (☒)	129	\Yup (ѧ)	31	
\xswordsdown (☒)	165	\Yup (ѧ)	92	
\xswordsup (☒)	165	\Zbar (Ζ)	92	
\xtofrom ($\overleftarrow{\overrightarrow{}}$)	107	\Zborder (Ξ)	137	
\xtwoheadleftarrow ($\overleftarrow{\overleftarrow{}}$)	107	\ZC (Ҫ)	121	
\xtwoheadrightarrow ($\overrightarrow{\overrightarrow{\overleftarrow{}}}$)	107	\zcmp (ȝ)	114	
XY-pic	213	\ZD (Ԭ)	121	
Y				
\Ydown (⌚)	28	\ZE (Ӗ)	121	
Z				
\ZA (Ԇ)	121	\Zeta (Ζ)	88	
Zapf Chancery (font)	116	\zeta (ζ)	88	
Zapf Dingbats (font)	126, 130	\zetaup (ζ)	89	
\ZB (ܭ)	121			
\Zbar (Ζ)	92			
\Zborder (Ξ)	137			
\ZC (Ҫ)	121			
\zcmp (ȝ)	114			
\ZD (Ԭ)	121			
\ZE (Ӗ)	121			
\Zeta (Ζ)	88			
\zeta (ζ)	88			
\zetaup (ζ)	89			
\Ztransf (●↔○)				58
\Ztransf (↔○)				54
\ztransf (○↔●)				58
\ztransf (○↔○)				54
\ZU (Ӯ)				121
\zugzwang (○)				169
\ZV (Ӯ)				121
\ZW (Ӯ)				121
\Zwdr (♪)				149
\ZwPa (ӵ)				149
\ZX (Ӱ)				121
\ZY (Ӱ)				121
\ZZ (Ӱ)				121