

The Comprehensive L^AT_EX Symbol List

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Abstract

This document lists 14599 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	13
1.1 Document Usage	13
1.2 Frequently Requested Symbols	14
2 Body-text symbols	15
Table 1: L ^A T _E X 2 _{ε} Escapable “Special” Characters	15
Table 2: Predefined L ^A T _E X 2 _{ε} Text-mode Commands	15
Table 3: L ^A T _E X 2 _{ε} Commands Defined to Work in Both Math and Text Mode	16
Table 4: <i>AMS</i> Commands Defined to Work in Both Math and Text Mode	16
Table 5: Non-ASCII Letters (Excluding Accented Letters)	16
Table 6: <i>textgreek</i> Upright Greek Letters	17
Table 7: Letters Used to Typeset African Languages	17
Table 8: Letters Used to Typeset Vietnamese	17
Table 9: Punctuation Marks Not Found in OT1	18
Table 10: <i>pifont</i> Decorative Punctuation Marks	18
Table 11: <i>tipa</i> Phonetic Symbols	18
Table 12: <i>tipx</i> Phonetic Symbols	19
Table 13: <i>wsuipa</i> Phonetic Symbols	20
Table 14: <i>wasysym</i> Phonetic Symbols	21
Table 15: <i>phonetic</i> Phonetic Symbols	21
Table 16: <i>t4phonet</i> Phonetic Symbols	21
Table 17: <i>semtrans</i> Transliteration Symbols	21
Table 18: Text-mode Accents	22
Table 19: <i>tipa</i> Text-mode Accents	22
Table 20: <i>extraipa</i> Text-mode Accents	24
Table 21: <i>wsuipa</i> Text-mode Accents	24
Table 22: <i>phonetic</i> Text-mode Accents	24
Table 23: <i>metre</i> Text-mode Accents	25

^{*}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 255 for more information about who did what.

Table 24:	t4phonet Text-mode Accents	25
Table 25:	arcs Text-mode Accents	25
Table 26:	semtrans Accents	25
Table 27:	ogonek Accents	25
Table 28:	combelow Accents	26
Table 29:	wsuipa Diacritics	26
Table 30:	textcomp Diacritics	26
Table 31:	marvosym Diacritics	26
Table 32:	textcomp Currency Symbols	27
Table 33:	marvosym Currency Symbols	27
Table 34:	fontawesome Currency Symbols	27
Table 35:	wasysym Currency Symbols	27
Table 36:	GfNA2e Currency Symbols	27
Table 37:	teubner Currency Symbols	28
Table 38:	tfrupee Currency Symbols	28
Table 39:	eurosym Euro Signs	28
Table 40:	fourier Euro Signs	28
Table 41:	textcomp Legal Symbols	28
Table 42:	fontawesome Legal Symbols	28
Table 43:	cclicenses Creative Commons License Icons	29
Table 44:	ccicons Creative Commons License Icons	29
Table 45:	textcomp Old-style Numerals	29
Table 46:	Miscellaneous textcomp Symbols	29
Table 47:	Miscellaneous wasysym Text-mode Symbols	30

3 Mathematical symbols

Table 48:	Math-mode Versions of Text Symbols	31
Table 49:	cml Unary Operators	31
Table 50:	Binary Operators	32
Table 51:	<i>AMS</i> Binary Operators	32
Table 52:	stmaryrd Binary Operators	33
Table 53:	wasysym Binary Operators	33
Table 54:	txfonts/pxfonts Binary Operators	33
Table 55:	mathabx Binary Operators	34
Table 56:	MnSymbol Binary Operators	34
Table 57:	fdsymbol Binary Operators	35
Table 58:	boisik Binary Operators	36
Table 59:	stix Binary Operators	37
Table 60:	mathdesign Binary Operators	38
Table 61:	cml Binary Operators	38
Table 62:	shuffle Binary Operators	38
Table 63:	ulsy Geometric Binary Operators	38
Table 64:	mathabx Geometric Binary Operators	38
Table 65:	MnSymbol Geometric Binary Operators	39
Table 66:	fdsymbol Geometric Binary Operators	39
Table 67:	boisik Geometric Binary Operators	40
Table 68:	stix Geometric Binary Operators	41
Table 69:	halloweenmath Halloween-Themed Math Operators	41
Table 70:	stix Small Integrals	42
Table 71:	stix Small Integrals with Explicit Slant	42
Table 72:	Variable-sized Math Operators	43
Table 73:	<i>AMS</i> Variable-sized Math Operators	43
Table 74:	stmaryrd Variable-sized Math Operators	43
Table 75:	wasysym Variable-sized Math Operators	44

Table 76:	mathabx Variable-sized Math Operators	44
Table 77:	txfonts/pxfonts Variable-sized Math Operators	45
Table 78:	esint Variable-sized Math Operators	46
Table 79:	bigints Variable-sized Math Operators	47
Table 80:	MnSymbol Variable-sized Math Operators	47
Table 81:	fdsymbol Variable-sized Math Operators	48
Table 82:	boisik Variable-sized Math Operators	49
Table 83:	stix Variable-sized Math Operators	49
Table 84:	stix Integrals with Explicit Slant	51
Table 85:	cmupint Variable-sized Upright Integrals	52
Table 86:	mathdesign Variable-sized Math Operators	54
Table 87:	prodint Variable-sized Math Operators	54
Table 88:	cml Large Math Operators	54
Table 89:	Binary Relations	54
Table 90:	<i>AMS</i> Binary Relations	55
Table 91:	<i>AMS</i> Negated Binary Relations	55
Table 92:	stmaryrd Binary Relations	55
Table 93:	wasysym Binary Relations	55
Table 94:	txfonts/pxfonts Binary Relations	56
Table 95:	txfonts/pxfonts Negated Binary Relations	56
Table 96:	mathabx Binary Relations	56
Table 97:	mathabx Negated Binary Relations	57
Table 98:	MnSymbol Binary Relations	57
Table 99:	MnSymbol Negated Binary Relations	58
Table 100:	fdsymbol Binary Relations	60
Table 101:	fdsymbol Negated Binary Relations	61
Table 102:	boisik Binary Relations	62
Table 103:	boisik Negated Binary Relations	63
Table 104:	stix Binary Relations	63
Table 105:	stix Negated Binary Relations	65
Table 106:	mathtools Binary Relations	65
Table 107:	turnstile Binary Relations	65
Table 108:	trsym Binary Relations	66
Table 109:	trfsigns Binary Relations	67
Table 110:	cml Binary Relations	67
Table 111:	colonequals Binary Relations	67
Table 112:	fourier Binary Relations	67
Table 113:	Subset and Superset Relations	67
Table 114:	<i>AMS</i> Subset and Superset Relations	67
Table 115:	stmaryrd Subset and Superset Relations	68
Table 116:	wasysym Subset and Superset Relations	68
Table 117:	txfonts/pxfonts Subset and Superset Relations	68
Table 118:	mathabx Subset and Superset Relations	68
Table 119:	MnSymbol Subset and Superset Relations	68
Table 120:	fdsymbol Subset and Superset Relations	69
Table 121:	boisik Subset and Superset Relations	69
Table 122:	stix Subset and Superset Relations	69
Table 123:	Inequalities	70
Table 124:	<i>AMS</i> Inequalities	70
Table 125:	wasysym Inequalities	70
Table 126:	txfonts/pxfonts Inequalities	70
Table 127:	mathabx Inequalities	71
Table 128:	MnSymbol Inequalities	72
Table 129:	fdsymbol Inequalities	73

Table 130: boisik Inequalities	74
Table 131: stix Inequalities	74
Table 132: <i>AMS</i> Triangle Relations	75
Table 133: stmaryrd Triangle Relations	75
Table 134: mathabx Triangle Relations	76
Table 135: MnSymbol Triangle Relations	76
Table 136: fdsymbol Triangle Relations	77
Table 137: boisik Triangle Relations	77
Table 138: stix Triangle Relations	77
Table 139: Arrows	78
Table 140: Harpoons	78
Table 141: textcomp Text-mode Arrows	78
Table 142: <i>AMS</i> Arrows	78
Table 143: <i>AMS</i> Negated Arrows	78
Table 144: <i>AMS</i> Harpoons	79
Table 145: stmaryrd Arrows	79
Table 146: txfonts/pxfonts Arrows	79
Table 147: mathabx Arrows	79
Table 148: mathabx Negated Arrows	79
Table 149: mathabx Harpoons	80
Table 150: MnSymbol Arrows	80
Table 151: MnSymbol Negated Arrows	82
Table 152: MnSymbol Harpoons	83
Table 153: MnSymbol Negated Harpoons	84
Table 154: fdsymbol Arrows	84
Table 155: fdsymbol Negated Arrows	86
Table 156: fdsymbol Harpoons	88
Table 157: fdsymbol Negated Harpoons	88
Table 158: boisik Arrows	89
Table 159: boisik Negated Arrows	90
Table 160: boisik Harpoons	90
Table 161: stix Arrows	90
Table 162: stix Negated Arrows	93
Table 163: stix Harpoons	93
Table 164: harpoon Extensible Harpoons	94
Table 165: chemarrow Arrows	94
Table 166: fge Arrows	94
Table 167: old-arrows Arrows	95
Table 168: old-arrows Harpoons	95
Table 169: esrelation Restrictions	95
Table 170: MnSymbol Spoons	96
Table 171: MnSymbol Pitchforks	96
Table 172: MnSymbol Smiles and Frowns	97
Table 173: fdsymbol Spoons	97
Table 174: fdsymbol Pitchforks	98
Table 175: fdsymbol Smiles and Frowns	98
Table 176: halloweenmath Brooms and Pitchforks	98
Table 177: ulsy Contradiction Symbols	98
Table 178: Extension Characters	98
Table 179: stmaryrd Extension Characters	98
Table 180: txfonts/pxfonts Extension Characters	98
Table 181: mathabx Extension Characters	99
Table 182: stix Extension Characters	99
Table 183: Log-like Symbols	99

Table 184: <i>AMS</i> Log-like Symbols	99
Table 185: mismatch Log-like Symbols	100
Table 186: mismatch Asymptotic Notation	100
Table 187: <i>GNA</i> 2e Number Sets	100
Table 188: Greek Letters	101
Table 189: <i>AMS</i> Greek Letters	101
Table 190: txfonts/pxfonts Upright Greek Letters	102
Table 191: upgreek Upright Greek Letters	102
Table 192: fourier Variant Greek Letters	102
Table 193: txfonts/pxfonts Variant Latin Letters	103
Table 194: boisik Variant Greek Letters	103
Table 195: boisik Variant Latin Letters	103
Table 196: stix Variant Greek Letters	103
Table 197: stix Transformed Greek Letters	103
Table 198: <i>AMS</i> Hebrew Letters	103
Table 199: MnSymbol Hebrew Letters	103
Table 200: fdsymbol Hebrew Letters	103
Table 201: boisik Hebrew Letters	104
Table 202: stix Hebrew Letters	104
Table 203: Letter-like Symbols	104
Table 204: <i>AMS</i> Letter-like Symbols	104
Table 205: txfonts/pxfonts Letter-like Symbols	104
Table 206: mathabx Letter-like Symbols	104
Table 207: MnSymbol Letter-like Symbols	104
Table 208: fdsymbol Letter-like Symbols	105
Table 209: boisik Letter-like Symbols	105
Table 210: stix Letter-like Symbols	105
Table 211: trfsigns Letter-like Symbols	105
Table 212: mathdesign Letter-like Symbols	105
Table 213: fge Letter-like Symbols	106
Table 214: fourier Letter-like Symbols	106
Table 215: cmlt Letter-like Symbols	106
Table 216: <i>AMS</i> Delimiters	106
Table 217: stmaryrd Delimiters	106
Table 218: mathabx Delimiters	106
Table 219: boisik Delimiters	106
Table 220: stix Delimiters	107
Table 221: nath Delimiters	107
Table 222: Variable-sized Delimiters	107
Table 223: Large, Variable-sized Delimiters	108
Table 224: <i>AMS</i> Variable-sized Delimiters	108
Table 225: stmaryrd Variable-sized Delimiters	108
Table 226: mathabx Variable-sized Delimiters	108
Table 227: MnSymbol Variable-sized Delimiters	109
Table 228: fdsymbol Variable-sized Delimiters	110
Table 229: stix Variable-sized Delimiters	111
Table 230: mathdesign Variable-sized Delimiters	112
Table 231: nath Variable-sized Delimiters (Double)	113
Table 232: nath Variable-sized Delimiters (Triple)	113
Table 233: fourier Variable-sized Delimiters	113
Table 234: textcomp Text-mode Delimiters	114
Table 235: metre Text-mode Delimiters	114
Table 236: Math-mode Accents	114
Table 237: <i>AMS</i> Math-mode Accents	114

Table 238: MnSymbol Math-mode Accents	115
Table 239: fdsymbol Math-mode Accents	115
Table 240: boisik Math-mode Accents	115
Table 241: stix Math-mode Accents	115
Table 242: fge Math-mode Accents	115
Table 243: yhmath Math-mode Accents	116
Table 244: halloweenmath Halloween-Themed Math-mode Accents	116
Table 245: realhats Math-mode Hat Accents	116
Table 246: Extensible Accents	117
Table 247: overrightarrow Extensible Accents	117
Table 248: yhmath Extensible Accents	117
Table 249: <i>AMS</i> Extensible Accents	118
Table 250: MnSymbol Extensible Accents	118
Table 251: fdsymbol Extensible Accents	118
Table 252: stix Extensible Accents	119
Table 253: mathtools Extensible Accents	119
Table 254: mathabx Extensible Accents	119
Table 255: fourier Extensible Accents	120
Table 256: esvect Extensible Accents	120
Table 257: braces Extensible Accents	120
Table 258: undertilde Extensible Accents	120
Table 259: ushort Extensible Accents	121
Table 260: mdwmath Extensible Accents	121
Table 261: actuarialangle Extensible Accents	121
Table 262: <i>AMS</i> Extensible Arrows	121
Table 263: mathtools Extensible Arrows	121
Table 264: chemarr Extensible Arrows	121
Table 265: chemarrow Extensible Arrows	122
Table 266: extarrows Extensible Arrows	122
Table 267: extpfeil Extensible Arrows	122
Table 268: DotArrow Extensible Arrows	122
Table 269: halloweenmath Extensible Arrows	123
Table 270: trfsigns Extensible Transform Symbols	123
Table 271: esrelation Extensible Relations	123
Table 272: halloweenmath Extensible Brooms and Pitchforks	123
Table 273: halloweenmath Extensible Witches	124
Table 274: halloweenmath Extensible Ghosts	124
Table 275: halloweenmath Extensible Bats	124
Table 276: holtpolt Non-commutative Division Symbols	125
Table 277: Dots	125
Table 278: <i>AMS</i> Dots	125
Table 279: wasysym Dots	125
Table 280: MnSymbol Dots	126
Table 281: fdsymbol Dots	126
Table 282: stix Dots	126
Table 283: mathdots Dots	126
Table 284: yhmath Dots	127
Table 285: teubner Dots	127
Table 286: begriff Begriffsschrift Symbols	127
Table 287: frege Begriffsschrift Symbols	127
Table 288: mathcomp Math Symbols	127
Table 289: marvosym Math Symbols	128
Table 290: marvosym Digits	128
Table 291: fge Digits	128

Table 292: dozenal Base-12 Digits	128
Table 293: mathabx Mayan Digits	128
Table 294: stix Infinities	128
Table 295: stix Primes	128
Table 296: stix Empty Sets	129
Table 297: <i>AMS</i> Angles	129
Table 298: MnSymbol Angles	129
Table 299: fdsymbol Angles	129
Table 300: boisik Angles	129
Table 301: stix Angles	129
Table 302: Miscellaneous L ^A T _E X 2 _ε Math Symbols	130
Table 303: Miscellaneous <i>AMS</i> Math Symbols	130
Table 304: Miscellaneous wasysym Math Symbols	130
Table 305: Miscellaneous txfonts/pfxfonts Math Symbols	130
Table 306: Miscellaneous mathabx Math Symbols	130
Table 307: Miscellaneous MnSymbol Math Symbols	131
Table 308: Miscellaneous Internal MnSymbol Math Symbols	131
Table 309: Miscellaneous fdsymbol Math Symbols	131
Table 310: Miscellaneous boisik Math Symbols	131
Table 311: Miscellaneous stix Math Symbols	132
Table 312: endofproofwd End-of-Proof Symbols	132
Table 313: Miscellaneous textcomp Text-mode Math Symbols	133
Table 314: Miscellaneous fge Math Symbols	133
Table 315: Miscellaneous mathdesign Math Symbols	133
Table 316: Math Alphabets	134
4 Science and technology symbols	136
Table 317: gensymb Symbols Defined to Work in Both Math and Text Mode	136
Table 318: wasysym Electrical and Physical Symbols	136
Table 319: ifsym Pulse Diagram Symbols	136
Table 320: ar Aspect Ratio Symbol	136
Table 321: textcomp Text-mode Science and Engineering Symbols	136
Table 322: steinmetz Extensible Phasor Symbol	137
Table 323: emf Electromotive Force Symbols	137
Table 324: wasysym Astronomical Symbols	137
Table 325: marvosym Astronomical Symbols	138
Table 326: fontawesome Astronomical Symbols	138
Table 327: mathabx Astronomical Symbols	138
Table 328: stix Astronomical Symbols	138
Table 329: starfont Astronomical Symbols	139
Table 330: wasysym APL Symbols	139
Table 331: stix APL Symbols	140
Table 332: apl APL Symbols	140
Table 333: marvosym Computer Hardware Symbols	140
Table 334: keystroke Computer Keys	140
Table 335: ascii Control Characters (CP437)	141
Table 336: logic Logic Gates	141
Table 337: marvosym Communication Symbols	142
Table 338: marvosym Engineering Symbols	142
Table 339: wasysym Biological Symbols	142
Table 340: stix Biological Symbols	142
Table 341: marvosym Biological Symbols	142
Table 342: fontawesome Biological Symbols	142
Table 343: marvosym Safety-related Symbols	142

Table 344: <code>feyn</code> Feynman Diagram Symbols	143
Table 345: <code>svrsymbols</code> Physics Ideograms	143
5 Dingbats	145
Table 346: <code>bbdng</code> Arrows	145
Table 347: <code>pifont</code> Arrows	145
Table 348: <code>adfsymbols</code> Arrows	146
Table 349: <code>adforn</code> Arrows	146
Table 350: <code>arev</code> Arrows	146
Table 351: <code>fontawesome</code> Arrows	146
Table 352: <code>fontawesome</code> Chevrons	147
Table 353: <code>marvosym</code> Scissors	147
Table 354: <code>bbdng</code> Scissors	147
Table 355: <code>pifont</code> Scissors	147
Table 356: <code>dingbat</code> Pencils	147
Table 357: <code>arev</code> Pencils	147
Table 358: <code>fontawesome</code> Pencils	147
Table 359: <code>bbdng</code> Pencils and Nibs	147
Table 360: <code>pifont</code> Pencils and Nibs	148
Table 361: <code>dingbat</code> Fists	148
Table 362: <code>bbdng</code> Fists	148
Table 363: <code>pifont</code> Fists	148
Table 364: <code>fourier</code> Fists	148
Table 365: <code>arev</code> Fists	148
Table 366: <code>fontawesome</code> Fists	148
Table 367: <code>bbdng</code> Crosses and Plusses	149
Table 368: <code>pifont</code> Crosses and Plusses	149
Table 369: <code>adfsymbols</code> Crosses and Plusses	149
Table 370: <code>arev</code> Crosses	149
Table 371: <code>bbdng</code> Xs and Check Marks	149
Table 372: <code>pifont</code> Xs and Check Marks	149
Table 373: <code>wasysym</code> Xs and Check Marks	149
Table 374: <code>marvosym</code> Xs and Check Marks	149
Table 375: <code>arev</code> Xs and Check Marks	150
Table 376: <code>fontawesome</code> Xs and Check Marks	150
Table 377: <code>pifont</code> Circled Numerals	150
Table 378: <code>wasysym</code> Stars	150
Table 379: <code>bbdng</code> Stars, Flowers, and Similar Shapes	151
Table 380: <code>pifont</code> Stars, Flowers, and Similar Shapes	151
Table 381: <code>adfsymbols</code> Stars, Flowers, and Similar Shapes	151
Table 382: <code>adforn</code> Stars	151
Table 383: <code>fontawesome</code> Stars	152
Table 384: <code>fourier</code> Fleurons and Flowers	152
Table 385: <code>adforn</code> Fleurons and Flowers	152
Table 386: <code>wasysym</code> Geometric Shapes	152
Table 387: <code>MnSymbol</code> Geometric Shapes	153
Table 388: <code>fdsymbol</code> Geometric Shapes	153
Table 389: <code>boisik</code> Geometric Shapes	153
Table 390: <code>stix</code> Geometric Shapes	154
Table 391: <code>ifsym</code> Geometric Shapes	155
Table 392: <code>bbdng</code> Geometric Shapes	156
Table 393: <code>pifont</code> Geometric Shapes	156
Table 394: <code>universa</code> Geometric Shapes	156
Table 395: <code>adfsymbols</code> Geometric Shapes	156

Table 396: fontawesome Geometric Shapes	157
Table 397: oplotsymb1 Geometric Shapes	157
Table 398: L ^A T _E X 2 _{&} Playing-Card Suits	158
Table 399: txfonts/pxfonts Playing-Card Suits	158
Table 400: MnSymbol Playing-Card Suits	158
Table 401: fdsymbol Playing-Card Suits	158
Table 402: boisik Playing-Card Suits	158
Table 403: stix Playing-Card Suits	158
Table 404: arev Playing-Card Suits	158
Table 405: adforn Flourishes	159
Table 406: Miscellaneous oplotsymb1 Symbols	159
Table 407: Miscellaneous dingbat Dingbats	159
Table 408: Miscellaneous bbding Dingbats	159
Table 409: Miscellaneous pifont Dingbats	159
Table 410: Miscellaneous adforn Dingbats	159
6 Ancient languages	160
Table 411: phaistos Symbols from the Phaistos Disk	160
Table 412: protosem Proto-Semitic Characters	160
Table 413: hieroglf Hieroglyphics	161
Table 414: linearA Linear A Script	161
Table 415: linearb Linear B Basic and Optional Letters	164
Table 416: linearb Linear B Numerals	164
Table 417: linearb Linear B Weights and Measures	164
Table 418: linearb Linear B Ideograms	165
Table 419: linearb Unidentified Linear B Symbols	165
Table 420: cypriot Cypriot Letters	165
Table 421: sarabian South Arabian Letters	166
Table 422: teubner Archaic Greek Letters and Greek Numerals	166
Table 423: boisik Archaic Greek Letters and Greek Numerals	166
Table 424: epiolmec Epi-Olmec Script	167
Table 425: epiolmec Epi-Olmec Numerals	168
Table 426: allrunes Runes	169
Table 427: allrunes Rune Separators	169
7 Musical symbols	170
Table 428: L ^A T _E X 2 _{&} Musical Symbols	170
Table 429: textcomp Musical Symbols	170
Table 430: wasysym Musical Symbols	170
Table 431: MnSymbol Musical Symbols	170
Table 432: fdsymbol Musical Symbols	170
Table 433: boisik Musical Symbols	170
Table 434: stix Musical Symbols	170
Table 435: arev Musical Symbols	171
Table 436: MusiXT _E X Musical Symbols	171
Table 437: MusiXT _E X Alternative Clefs	172
Table 438: harmony Musical Symbols	172
Table 439: musicography Musical Symbols	173
Table 440: musicography Time Signatures	173
Table 441: harmony Musical Accents	174
Table 442: lily glyphs Single Notes	174
Table 443: lily glyphs Beamed Notes	175
Table 444: lily glyphs Clefs	175

Table 445: <i>lilyglyphs</i> Time Signatures	175
Table 446: <i>lilyglyphs</i> Accidentals	176
Table 447: <i>lilyglyphs</i> Rests	176
Table 448: <i>lilyglyphs</i> Dynamics Letters	176
Table 449: <i>lilyglyphs</i> Dynamics Symbols	176
Table 450: <i>lilyglyphs</i> Articulations	176
Table 451: <i>lilyglyphs</i> Scripts	177
Table 452: <i>lilyglyphs</i> Accordion Notation	177
Table 453: <i>lilyglyphs</i> Named Time Signatures	177
Table 454: <i>lilyglyphs</i> Named Scripts	177
Table 455: <i>lilyglyphs</i> Named Rests	179
Table 456: <i>lilyglyphs</i> Named Pedals	179
Table 457: <i>lilyglyphs</i> Named Flags	180
Table 458: <i>lilyglyphs</i> Named Custodes	180
Table 459: <i>lilyglyphs</i> Named Clefs	181
Table 460: <i>lilyglyphs</i> Named Noteheads	182
Table 461: <i>lilyglyphs</i> Named Accordion Symbols	187
Table 462: <i>lilyglyphs</i> Named Accidentals	187
Table 463: <i>lilyglyphs</i> Named Arrowheads	188
Table 464: <i>lilyglyphs</i> Named Alphanumerics and Punctuation	188
Table 465: Miscellaneous <i>lilyglyphs</i> Named Musical Symbols	189
8 Other symbols	190
Table 466: <i>textcomp</i> Genealogical Symbols	190
Table 467: <i>wasysym</i> General Symbols	190
Table 468: <i>manfnt</i> Dangerous Bend Symbols	190
Table 469: Miscellaneous <i>manfnt</i> Symbols	190
Table 470: <i>marvosym</i> Media Control Symbols	191
Table 471: <i>marvosym</i> Laundry Symbols	191
Table 472: <i>marvosym</i> Information Symbols	191
Table 473: Other <i>marvosym</i> Symbols	191
Table 474: Miscellaneous <i>universa</i> Symbols	191
Table 475: Miscellaneous <i>fourier</i> Symbols	191
Table 476: <i>ifsym</i> Weather Symbols	192
Table 477: <i>ifsym</i> Alpine Symbols	192
Table 478: <i>ifsym</i> Clocks	192
Table 479: Other <i>ifsym</i> Symbols	192
Table 480: <i>clock</i> Clocks	193
Table 481: <i>epsdice</i> Dice	193
Table 482: <i>hhcount</i> Dice	193
Table 483: <i>stix</i> Dice	193
Table 484: <i>bullcntr</i> Tally Markers	194
Table 485: <i>hhcount</i> Tally Markers	194
Table 486: <i>dozenal</i> Tally Markers	194
Table 487: <i>skull</i> Symbols	195
Table 488: Non-Mathematical <i>mathabx</i> Symbols	195
Table 489: <i>skak</i> Chess Informator Symbols	195
Table 490: <i>skak</i> Chess Pieces and Chessboard Squares	196

Table 491: <code>igo</code> Go Symbols	196
Table 492: <code>go</code> Go Symbols	197
Table 493: <code>metre</code> Metrical Symbols	197
Table 494: <code>metre</code> Small and Large Metrical Symbols	197
Table 495: <code>teubner</code> Metrical Symbols	198
Table 496: <code>dictsym</code> Dictionary Symbols	198
Table 497: <code>simpsons</code> Characters from <i>The Simpsons</i>	198
Table 498: <code>pmboxdraw</code> Box-Drawing Symbols	199
Table 499: <code>staves</code> Magical Staves	199
Table 500: <code>pigpen</code> Cipher Symbols	200
Table 501: <code>GnA2e</code> Phases of the Moon	200
Table 502: <code>GnA2e</code> Recycling Symbols	201
Table 503: <code>marvosym</code> Recycling Symbols	201
Table 504: <code>recycle</code> Recycling Symbols	201
Table 505: Other <code>GnA2e</code> Symbols	201
Table 506: <code>soyombo</code> Soyombo Symbols	202
Table 507: <code>knitting</code> Knitting Symbols	202
Table 508: <code>countriesofeurope</code> Country Maps	203
Table 509: <code>euflag</code> European Union flag	205
Table 510: Miscellaneous <code>arev</code> Symbols	205
Table 511: <code>cookingsymbols</code> Cooking Symbols	205
Table 512: <code>tikzsymbols</code> Cooking Symbols	205
Table 513: <code>tikzsymbols</code> Emoticons	206
Table 514: <code>tikzsymbols</code> 3D Emoticons	206
Table 515: <code>tikzsymbols</code> Trees	206
Table 516: Miscellaneous <code>tikzsymbols</code> Symbols	206
Table 517: <code>scsnowman</code> Snowmen	207
Table 518: Miscellaneous <code>bclogo</code> Symbols	207
Table 519: <code>fontawesome</code> Web-Related Icons	208
Table 520: <code>rubikcube</code> Rubik's Cube Rotations	212
9 Fonts with minimal L^AT_EX support	213
Table 521: <code>hands</code> Fists	213
Table 522: <code>greenpoint</code> Recycling Symbols	213
Table 523: <code>nkarta</code> Map Symbols	213
Table 524: <code>moonphase</code> Astronomical Symbols	215
Table 525: <code>astrosym</code> Astronomical Symbols	215
Table 526: <code>webomints</code> Decorative Borders	218
Table 527: <code>umranda</code> Decorative Borders	219
Table 528: <code>umrandb</code> Decorative Borders	220
Table 529: <code>dingbat</code> Decorative Borders	222
Table 530: <code>knot</code> Celtic Knots	222
Table 531: <code>dancers</code> Dancing Men	226
Table 532: <code>semaphor</code> Semaphore Alphabet	229
Table 533: <code>cryst</code> Crystallography Symbols	231
Table 534: <code>dice</code> Dice	232
Table 535: <code>magic</code> Trading Card Symbols	233
Table 536: <code>bartel-chess-fonts</code> Chess Pieces and Chessboard Squares	233

10 Additional Information	235
10.1 Symbol Name Clashes	235
10.2 Resizing symbols	235
10.3 Where can I find the symbol for ...?	238
10.4 Math-mode spacing	249
10.5 Bold mathematical symbols	250
10.6 ASCII and Latin 1 quick reference	250
10.7 Unicode characters	252
10.8 About this document	255
10.9 Copyright and license	257
References	258
Index	259

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 _{ε} 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 14599 symbols—quite a large number. 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. See <http://www.tex.ac.uk/FAQ-installthings.html> 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.

A companion document, Raw Font Tables, also presents a large number of symbols but with a very different structure from this document. Raw Font Tables includes only symbols produced via a font file, while this document also includes composite symbols (combinations of two or more glyphs) and symbols drawn as pictures (using, e.g., TikZ). This document sorts symbols by category while Raw Font Tables sorts symbols by underlying font file. The two documents are intended to complement each other. It is usually easier to find a desired symbol in The Comprehensive L^AT_EX Symbol List, but Raw Font Tables is helpful for identifying related symbols, for finding symbols that exist in some font but are not exposed to the user via a L^AT_EX package (or that this document inadvertently overlooked), and for the font name and character position needed to typeset a single symbol in isolation. The last of those is especially important for math symbols. T_EX imposes a limitation of at most 16 math alphabets per document, but symbols typeset with `\font` and `\char` are text symbols and do not consume a math alphabet. (They are less convenient to use within a mathematical expression, however.)

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.”	15	$\cdot\cdot\cdot$	126
\bar{i} , \tilde{i} , \ddot{i} , \check{i} , \breve{i} , etc. (versus $\bar{\mathfrak{i}}$, $\tilde{\mathfrak{i}}$, $\ddot{\mathfrak{i}}$, $\check{\mathfrak{i}}$, and $\breve{\mathfrak{i}}$)	22	$^{\circ}$, as in “180 $^{\circ}$ ” or “15 $^{\circ}\text{C}$ ”	133
\textcent	27	\mathcal{L} , \mathcal{F} , etc.	134
\texteuro	27	\mathbb{N} , \mathbb{Z} , \mathbb{R} , etc.	134
$\text{\textcircled{C}}$, $\text{\textcircled{R}}$, and TM	28	\mathbf{z}	134
\textperthousand	29	f	241
\textpounds	45	\acute{a} , \grave{e} , etc. (i.e., several accents per character)	243
\therefore	55	$<$, $>$, and $ $ (instead of \mathfrak{j} , \mathfrak{z} , and —)	250
\coloneqq and \coloneqq	56	$\hat{}$ and $\tilde{}$ (or \sim)	251
\lesssim and \gtrsim	70		

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: $\text{\LaTeX} 2\epsilon$ 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 $\text{\LaTeX} 2\epsilon$ Text-mode Commands

<code>^</code>	<code>\textasciicircum*</code>	<code><</code>	<code>\textless</code>
<code>~</code>	<code>\textasciitilde*</code>	<code>a</code>	<code>\textordfeminine</code>
<code>*</code>	<code>\textasteriskcentered</code>	<code>o</code>	<code>\textordmasculine</code>
<code>\</code>	<code>\textbackslash</code>	<code>\P</code>	<code>\textparagraph†</code>
<code> </code>	<code>\textbar</code>	<code>.</code>	<code>\textperiodcentered</code>
<code> </code>	<code>\textbardbl</code>	<code>%oo</code>	<code>\textpertenthousand</code>
<code>○</code>	<code>\textbigcircle</code>	<code>%o</code>	<code>\textperthousand</code>
<code>{</code>	<code>\textbraceleft†</code>	<code>¿</code>	<code>\textquestiondown</code>
<code>}</code>	<code>\textbraceright†</code>	<code>“</code>	<code>\textquotedblleft</code>
<code>•</code>	<code>\textbullet</code>	<code>”</code>	<code>\textquotedblright</code>
<code>©</code>	<code>\textcopyright†</code>	<code>‘</code>	<code>\textquotel</code>
<code>†</code>	<code>\textdagger†</code>	<code>,</code>	<code>\textquoteright</code>
<code>‡</code>	<code>\textdaggerdbl†</code>	<code>(R)</code>	<code>\textregistered</code>
<code>\$</code>	<code>\textdollar†</code>	<code>§</code>	<code>\textsection†</code>
<code>...</code>	<code>\textellipsis†</code>	<code>£</code>	<code>\textsterling†</code>
<code>—</code>	<code>\textemdash</code>	<code>TM</code>	<code>\texttrademark</code>
<code>–</code>	<code>\textendash</code>	<code>-</code>	<code>\textunderscore†</code>
<code>¡</code>	<code>\textexclamdown</code>	<code>—</code>	<code>\textvisiblespace</code>
<code>></code>	<code>\textgreater</code>		

The first symbol column represents the—sometimes “faked”—symbol that $\text{\LaTeX} 2\epsilon$ provides by default. The second symbol column represents the symbol as redefined by `textcomp` (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 251.

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

TABLE 3: L^AT_EX 2 _{ε} Commands Defined to Work in Both Math and Text Mode

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

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

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

✓ \checkmark ® \circledR ✕ \maltese

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

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

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

TABLE 6: `textgreek` Upright Greek Letters

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

* 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 191 on page 102), `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 `poltonikogreek`) option—and, of course, a font that provides the glyphs for the Greek alphabet.

TABLE 7: Letters Used to Typeset African Languages

D	<code>\B{D}</code>	đ	<code>\m{c}</code>	f	<code>\m{f}</code>	ķ	<code>\m{k}</code>	t	<code>\M{t}</code>	ڇ	<code>\m{Z}</code>
đ	<code>\B{d}</code>	D	<code>\m{D}</code>	F	<code>\m{F}</code>	ڏ	<code>\m{N}</code>	T	<code>\M{T}</code>	ڦ	<code>\T{E}</code>
H	<code>\B{H}</code>	ڏ	<code>\M{d}</code>	ڙ	<code>\m{G}</code>	ڻ	<code>\m{n}</code>	ڻ	<code>\m{t}</code>	ڦ	<code>\T{e}</code>
ڻ	<code>\B{h}</code>	D	<code>\M{D}</code>	ڙ	<code>\m{g}</code>	ڻ	<code>\m{o}</code>	T	<code>\m{T}</code>	ڦ	<code>\T{O}</code>
t	<code>\B{t}</code>	ڏ	<code>\m{d}</code>	ڻ	<code>\m{I}</code>	ڻ	<code>\m{O}</code>	v	<code>\m{u}</code> *	ڻ	<code>\T{o}</code>
T	<code>\B{T}</code>	ڦ	<code>\m{E}</code>	ڻ	<code>\m{i}</code>	ڦ	<code>\m{P}</code>	U	<code>\m{U}</code> *		
ڻ	<code>\m{b}</code>	ڦ	<code>\m{e}</code>	N	<code>\m{J}</code>	ڦ	<code>\m{p}</code>	Y	<code>\m{Y}</code>		
ڦ	<code>\m{B}</code>	ڦ	<code>\M{E}</code>	n	<code>\m{j}</code>	ڦ	<code>\m{s}</code>	y	<code>\m{y}</code>		
C	<code>\m{C}</code>	ڦ	<code>\M{e}</code>	K	<code>\m{K}</code>	ڦ	<code>\m{s}</code>	ڦ	<code>\m{z}</code>		

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

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

TABLE 8: Letters Used to Typeset Vietnamese

Ӧ `\OHORN` Ӧ `\ohorn` Ӧ `\UHORN` Ӧ `\uhorn`

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

TABLE 9: Punctuation Marks Not Found in OT1

```
< \guillemetleft* < \guilsinglleft „ \quotedblbase " \textquotedbl
» \guillemetright* > \guilsinglright , \quotesinglbase
```

* Older versions of L^AT_EX misspelled these as \guillemotleft and \guillemotright. The older names are still retained for backward compatibility.

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

؂	\textbabygamma	؃	\textglotstop	؄	\textrtailn
؁	\textbarb	؅	\texthalflength	؆	\textrtailr
؇	\textbarc	؈	\texthardsign	؉	\textrtails
؉	\textbard	؊	\texthooktop	؋	\textrtailt
،	\textbardotlessj	؍	\texthtb	؎	\textrtailz
؏	\textbarg	؏	\texthtbardotlessj	؏	\textrthook
ؐ	\textbarglotstop	ؑ	\texthtc	ؐ	\textsca
ؒ	\textbari	ؓ	\texthtd	ؒ	\textscb
ؔ	\textbarl	ؔ	\texthtg	ؔ	\textscce
ؕ	\textbaro	ؕ	\texthtt	ؕ	\textscg
ؖ	\textbarrevglotstop	ؖ	\texthtcheng	ؖ	\textsch
ؗ	\textbaru	ؗ	\texthtk	ؗ	\textschwa
ؘ	\textbeltl	ؘ	\texthtp	ؘ	\textsci
ؙ	\textbeta	ؙ	\texthtq	ؙ	\textscj
ؚ	\textbullseye	ؚ	\texthtrrtaild	ؚ	\textscl
؛	\textceltpal	؛	\texthtscg	؛	\textscn
؜	\textchi	؜	\texthtt	؜	\textcoelig
؝	\textcloseepsilon	؝	\texthvlig	؝	\textcomega
؞	\textcloseomega	؞	\textinvglotstop	؞	\textscr
؟	\textcloserevepsilon	؟	\textinvscr	؟	\textscripta
ؠ	\textcommatailz	ؠ	\texttiota	ؠ	\textscriptg
ء	\textcorner	ء	\textlambda	ء	\textscriptv
آ	\textcrb	آ	\textlengthmark	آ	\textscu
أ	\textcrd	أ	\textlhookt	أ	\textscy
ؤ	\textcrg	ؤ	\textlhtlongi	ؤ	\textsecstress
إ	\textcrh	إ	\textlhtlongy	إ	\textsoftsign

(continued on next page)

(continued from previous page)

đ	\textcrinvglotstop	ř	\textlonglegr	č	\textstretchc
њ	\textcrlambda	њ	\textlptr	ћ	\texttctclig
Ѡ	\textcrtwo	ѡ	\textltailm	Ѡ	\textteshlig
Ѡ	\textctc	ѡ	\textltailn	Ѡ	\texttheta
Ѡ	\textctd	Ѡ	\textltilde	Ѡ	\textthorn
Ѡ	\textctdctzlig	Ѡ	\textlyoghlig	Ѡ	\texttoneletterstem
Ѡ	\textctesh	Ѡ	\textObardotlessj	Ѡ	\textttslig
Ѡ	\textctj	Ѡ	\textOlyoghlig	Ѡ	\textturna
Ѡ	\textctn	Ѡ	\textomega	Ѡ	\textturncelig
Ѡ	\textctt	Ѡ	\textopencorner	Ѡ	\textturnh
Ѡ	\textcttctclig	Ѡ	\textopeno	Ѡ	\textturnk
Ѡ	\textctyogh	Ѡ	\textpalhook	Ѡ	\textturnlonglegr
Ѡ	\textctz	Ѡ	\textphi	Ѡ	\textturnnm
Ѡ	\textdctzlig	Ѡ	\textpipe	Ѡ	\textturnmrleg
Ѡ	\textdoublebaresh	Ѡ	\textprimstress	Ѡ	\textturnr
Ѡ	\textdoublebarpipe	Ѡ	\textraiseglotstop	Ѡ	\textturnrrtail
Ѡ	\textdoublebarslash	Ѡ	\textraisevibyi	Ѡ	\textturnscripta
Ѡ	\textdoubleepipe	Ѡ	\textramshorns	Ѡ	\textturnnt
Ѡ	\textdoublevertline	Ѡ	\textrevapostrophe	Ѡ	\textturnv
Ѡ	\textdownstep	Ѡ	\textreve	Ѡ	\textturnw
Ѡ	\textdyoghlig	Ѡ	\textrevespsilon	Ѡ	\textturny
Ѡ	\textdzlig	Ѡ	\textrevglotstop	Ѡ	\textupsilon
Ѡ	\textepsilon	Ѡ	\textrevyogh	Ѡ	\textupstep
Ѡ	\textesh	Ѡ	\textrhookrevespsilon	Ѡ	\textvertline
Ѡ	\textfishhookr	Ѡ	\textrhookschwa	Ѡ	\textvibyi
Ѡ	\textg	Ѡ	\textrhoticity	Ѡ	\textvibyy
Ѡ	\textgamma	Ѡ	\textrptr	Ѡ	\textwynn
Ѡ	\textglobfall	Ѡ	\textrtaild	Ѡ	\textyogh
Ѡ	\textglobrise	Ѡ	\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

ѡ	\textaolig	Ѡ	\texttbardotlessjvar	ւ	\textrthooklong
չ	\textbenttailyogh	օ	\textinvomega	Ճ	\textscalpha
Շ	\textbktailgamma	Վ	\textinvasca	Ճ	\textscdelta
Ծ	\textctinvglotstop	Օ	\textinvscripta	Ւ	\textscf
Ջ	\textctjvar	Ւ	\textlfishhookrlig	Կ	\textscsck
Ը	\textctstetchc	Գ	\textlhookfour	Մ	\textscsm
Ը	\textctstetchcvar	Ո	\textlhookp	Պ	\textscp

(continued on next page)

(continued from previous page)

‡	\textctturnt	ı	\textlhti	q	\textscq
đ	\textdblig	ł	\textlooptoprevesh	„	\textspleftarrow
‡	\textdoublebarpipevar	η	\textnrleg	č	\textstretchcvar
	\textdoublepipevar	○	\textObullseye	↔	\textsubdoublearrow
↓	\textdownfullarrow	„	\textpalhooklong	→	\textsubrightarrow
♀	\textfemale	„	\textpalhookvar	þ	\textthornvari
n	\textfrbarn	ı	\textpipevar	þ	\textthornvarii
d	\textfrhookd	ç	\textqlig	þ	\textthornvariii
d	\textfrhookdvar	º	\textrectangle	þ	\textthornvariv
t	\textfrhookt	¬	\textretractingvar	ł	\textturnglotstop
γ	\textfrtailgamma	ı	\textrevscl	¤	\textturnsck
?	\textglotstopvari	ѧ	\textrevscr	՞	\textturnscu
?	\textglotstopvarii	ѧ	\textrhooka	ξ	\textturnthree
?	\textglotstopvariii	ѧ	\textrhooke	Շ	\textturntwo
γ	\textgrgamma	է	\textrhookepsilon	՞	\textuncrfemale
հ	\textheng	՞	\textrhookopeno	↑	\textupfullarrow
hm	\texthmlig	Ւ	\textrtailhth		

TABLE 13: wsipa Phonetic Symbols

γ	\babygamma	յ	\eng	յ	\labdentalnas	ə	\schwa
բ	\barb	Յ	\er	ֆ	\latfric	ի	\sci
Ժ	\bard	ժ	\esh	պ	\legm	ն	\scn
ի	\bari	օ	\eth	ր	\legr	ր	\scr
՚	\barl	ր	\flapr	զ	\lz	ա	\scripta
՛	\baro	՛	\glotstop	ռ	\nialpha	ց	\scriptg
՚	\barp	՛	\hookb	Ծ	\nibeta	ւ	\scriptv
՚	\barsci	՛	\hookd	չ	\nichi	Ս	\scu
Ռ	\barscu	Ռ	\hookg	Շ	\niepsilon	Յ	\scy
՚	\baru	Ւ	\hookh	Շ	\nigamma	՚	\slashb
Օ	\clickb	Ւ	\hookheng	ւ	\niota	Շ	\slashc
Ը	\clickc	Յ	\hookrevepsilon	Ն	\nilambda	Ճ	\slashd
՚	\clickt	Խ	\hv	Ո	\niomega	Կ	\slashshu
Ո	\closedniomega	Ե	\inva	Փ	\niph	Ճ	\taild
Ց	\closedrevepsilon	Յ	\invf	Ծ	\nisigma	Լ	\tailinvr
՚	\crossb	Յ	\invglotstop	Թ	\nitheta	Լ	\taill
Ծ	\crossd	Պ	\invh	Վ	\niupsilon	Ն	\tailn
՚	\crossh	Լ	\invlegr	Ջ	\nj	Ր	\tailr
Ճ	\crossnilambda	Ա	\invvm	Ո	\oo	Տ	\tails
Ը	\curlyc	Ր	\invr	Յ	\openo	Ւ	\tailt
՚	\curlyesh	Բ	\invscr	Շ	\reve	Զ	\tailz
Ց	\curlyyogh	Ո	\invscrip	Ր	\reveject	Ւ	\tesh
՚	\curlyz	Ա	\invvv	Ց	\revepsilon	Ց	\thorn

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\dlbari	\invw	\revglotstop	\tildel
\dz	\invy	\scd	\yogh
\ejective	\ipagamma	\scg	

TABLE 14: `wasysym` Phonetic Symbols

\dh	\dh	\inve	\roundz	\thorn
\DH	\DH	\openo	\P	\Thorn

TABLE 15: `phonetic` Phonetic Symbols

\barj	\flap	\ibar	\rotvara	\vari
\barlambda	\glottal	\openo	\rotw	\varomega
\emgma	\hausaB	\planck	\roty	\varopeno
\engma	\hausab	\pwedge	\schwa	\vod
\enya	\hausad	\revD	\thorn	\voicedh
\epsi	\hausaD	\riota	\ubar	\yogh
\esh	\hausak	\rotm	\udesc	
\eth	\hausaK	\rotOmega	\vara	
\fj	\hookd	\rotr	\varg	

TABLE 16: `t4phonet` Phonetic Symbols

\textcrd	\texthtd	\textpipe
\textcrh	\texthtk	\textrtaild
\textepsilon	\texthtp	\textrtailt
\textesh	\texthtt	\textschwa
\textfjlig	\textiota	\textscriptv
\texthtb	\textltailn	\textteshlig
\texthtc	\textopeno	\textyogh

The idea behind the `t4phonet` package's phonetic symbols is to provide an interface to some of the characters in the T4 font encoding (Table 7 on page 17) but using the same names as the `tipa` characters presented in Table 11 on page 18.

TABLE 17: `semtrans` Transliteration Symbols

\Alif	\Ayn
-------	------

TABLE 18: Text-mode Accents

$\ddot{A}a$	$\\"{}{A}\\"{}{a}$	$\dot{A}a$	$\\"{}{A}\\"{}{\dot{a}}$	$\hat{A}a$	$\\"{}{f}{A}\\"{}{f}{a}$	$\bar{A}a$	$\\"{}{t}{A}\\"{}{t}{a}$
$\acute{A}a$	$\\"{}{A}\\"{}{\acute{a}}$	$\tilde{A}a$	$\\"{}{\sim}{A}\\"{}{\sim}{a}$	$\ddot{A}a$	$\\"{}{G}{A}\\"{}{G}{a}$	$\check{A}a$	$\\"{}{u}{A}\\"{}{u}{a}$
$\grave{A}a$	$\\"{}{A}\\"{}{\grave{a}}$	$\underline{A}a$	$\\"{}{b}{A}\\"{}{b}{a}$	$\acute{A}a$	$\\"{}{h}{A}\\"{}{h}{a}$	$\ddot{A}a$	$\\"{}{U}{A}\\"{}{U}{a}$
$\breve{A}a$	$\\"{}{A}\\"{}{\breve{a}}$	$\underline{A}\dot{a}$	$\\"{}{c}{A}\\"{}{c}{a}$	$\grave{A}a$	$\\"{}{H}{A}\\"{}{H}{a}$	$\check{A}a$	$\\"{}{U}{A}\\"{}{U}{a}$
$\dot{A}a$	$\\"{}{A}\\"{}{\dot{a}}$	$\tilde{A}a$	$\\"{}{C}{A}\\"{}{C}{a}$	$\acute{A}\dot{a}$	$\\"{}{k}{A}\\"{}{k}{a}$	$\check{A}\dot{a}$	$\\"{}{v}{A}\\"{}{v}{a}$
$\grave{A}\dot{a}$	$\\"{}{A}\\"{}{\grave{a}}$	$\underline{A}\dot{a}$	$\\"{}{d}{A}\\"{}{d}{a}$	$\acute{A}\grave{a}$	$\\"{}{r}{A}\\"{}{r}{a}$		
				$\hat{A}a$	$\\"{}{newtie}{A}\\"{}{newtie}{a}$ *	$\textcircled{A}\textcircled{a}$	$\\"{}{textcircled}{A}\\"{}{textcircled}{a}$

* Requires the `textcomp` package.

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

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

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

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

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

$\acute{A}a$	$\text{textacutemacron}{A}\text{textacutemacron}{a}$
$\acute{A}\dot{a}$	$\text{textacutewedge}{A}\text{textacutewedge}{a}$
$\dot{A}a$	$\text{textadvancing}{A}\text{textadvancing}{a}$
$\underline{A}a$	$\text{textbottomtiebar}{A}\text{textbottomtiebar}{a}$
$\breve{A}a$	$\text{textbrevemacron}{A}\text{textbrevemacron}{a}$
$\breve{A}\dot{a}$	$\text{textcircumacute}{A}\text{textcircumacute}{a}$
$\hat{A}a$	$\text{textcircumdot}{A}\text{textcircumdot}{a}$
$\acute{A}\dot{a}$	$\text{textdotacute}{A}\text{textdotacute}{a}$
$\grave{A}\dot{a}$	$\text{textdotbreve}{A}\text{textdotbreve}{a}$
$\grave{A}a$	$\text{textdoublegrave}{A}\text{textdoublegrave}{a}$
$\grave{A}\grave{a}$	$\text{textdoublebaraccent}{A}\text{textdoublebaraccent}{a}$

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Ãœ \textfallrise{A}\textfallrise{a}
Ãœ \textgravecircum{A}\textgravecircum{a}
Ãœ \textgravedot{A}\textgravedot{a}
Ãœ \textgravemacron{A}\textgravemacron{a}
Ãœ \textgravemid{A}\textgravemid{a}
Ãœ \texthighrise{A}\texthighrise{a}
Ãœ \textinvsubbridge{A}\textinvsubbridge{a}
Ãœ \textlowering{A}\textlowering{a}
Ãœ \textlowrise{A}\textlowrise{a}
Ãœ \textmidacute{A}\textmidacute{a}
Ãœ \textovercross{A}\textovercross{a}
Ãœ \textoverw{A}\textoverw{a}
Ãœ \textpolhook{A}\textpolhook{a}
Ãœ \textraising{A}\textraising{a}
Ãœ \textretracting{A}\textretracting{a}
Ãœ \textringmacron{A}\textringmacron{a}
Ãœ \textrisefall{A}\textrisefall{a}
Ãœ \textroundcap{A}\textroundcap{a}
Ãœ \textseagull{A}\textseagull{a}
Ãœ \textsubacute{A}\textsubacute{a}
Ãœ \textsubarch{A}\textsubarch{a}
Ãœ \textsubbar{A}\textsubbar{a}
Ãœ \textsubbridge{A}\textsubbridge{a}
Ãœ \textsubcircum{A}\textsubcircum{a}
Ãœ \textsubdot{A}\textsubdot{a}
Ãœ \textsubgrave{A}\textsubgrave{a}
Ãœ \textsublhalfing{A}\textsublhalfing{a}
Ãœ \textsubplus{A}\textsubplus{a}
Ãœ \textsubrhalfing{A}\textsubrhalfing{a}
Ãœ \textsubring{A}\textsubring{a}
Ãœ \textsubsquare{A}\textsubsquare{a}
Ãœ \textsubtilde{A}\textsubtilde{a}
Ãœ \textsubumlaut{A}\textsubumlaut{a}
Ãœ \textsubw{A}\textsubw{a}
Ãœ \textsubwedge{A}\textsubwedge{a}
Ãœ \textsuperimpostilde{A}\textsuperimpostilde{a}
Ãœ \textsyllabic{A}\textsyllabic{a}
Ãœ \texttildedot{A}\texttildedot{a}
Ãœ \texttoptiebar{A}\texttoptiebar{a}

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```
\AA \textvbaraccent{A}\textvbaraccent{a}
```

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

TABLE 20: extraipa Text-mode Accents

$\hat{\AA}$	<code>\bibridge{A}\bibridge{a}</code>	$\hat{\AA}$	<code>\partvoiceless{A}\partvoiceless{a}</code>
$\check{\AA}$	<code>\crttilde{A}\crttilde{a}</code>	$\check{\AA}$	<code>\sliding{A}\sliding{a}</code>
$\ddot{\AA}$	<code>\dottedtilde{A}\dottedtilde{a}</code>	$\ddot{\AA}$	<code>\spreadlips{A}\spreadlips{a}</code>
$\tilde{\AA}$	<code>\doubletilde{A}\doubletilde{a}</code>	$\tilde{\AA}$	<code>\subcorner{A}\subcorner{a}</code>
\aa	<code>\finpartvoice{A}\finpartvoice{a}</code>	\aa	<code>\subdoublebar{A}\subdoublebar{a}</code>
\aa	<code>\finpartvoiceless{A}\finpartvoiceless{a}</code>	\aa	<code>\subdoublevert{A}\subdoublevert{a}</code>
\aa	<code>\inipartvoice{A}\inipartvoice{a}</code>	\aa	<code>\sublptr{A}\sublptr{a}</code>
\aa	<code>\inipartvoiceless{A}\inipartvoiceless{a}</code>	\aa	<code>\subrptr{A}\subrptr{a}</code>
\AA	<code>\overbridge{A}\overbridge{a}</code>	\AA	<code>\whistle{A}\whistle{a}</code>
\aa	<code>\partvoice{A}\partvoice{a}</code>		

TABLE 21: wsuipa Text-mode Accents

\aa	<code>\dental{A}\dental{a}</code>
\aa	<code>\underarch{A}\underarch{a}</code>

TABLE 22: phonetic Text-mode Accents

\aa	<code>\hill{A}\hill{a}</code>	\aa	<code>\rc{A}\rc{a}</code>	\aa	<code>\ut{A}\ut{a}</code>
\aa	<code>\od{A}\od{a}</code>	\aa	<code>\syl{A}\syl{a}</code>		
\aa	<code>\ohill{A}\ohill{a}</code>	\aa	<code>\td{A}\td{a}</code>		

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

TABLE 23: metre Text-mode Accents

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

TABLE 24: t4phonet Text-mode Accents

Äää	\textdoublegrave{A}\textdoublegrave{a}
Áå	\textvbaraccent{A}\textvbaraccent{a}
Ãä	\textdoublevbaraccent{A}\textdoublevbaraccent{a}

The idea behind the `t4phonet` package’s text-mode accents is to provide an interface to some of the accents in the T4 font encoding (accents marked with “†” in Table 18 on page 22) but using the same names as the `tipa` accents presented in Table 19 on page 22.

TABLE 25: `arcs` Text-mode Accents

Āā	\overarc{A}\overarc{a}	Āā	\underarc{A}\underarc{a}
----	------------------------	----	--------------------------

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

At the time of this writing (2015/11/12), there exists an incompatibility between the `arcs` package and the `relsize` package, upon which `arcs` depends. As a workaround, one should apply the patch proposed by Michael Sharpe on the 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, “5.0ptĀ” when “Ā” is expected).

TABLE 26: `semtrans` Accents

Āā	\D{A}\D{a}	Āā	\U{A}\U{a}
Āā		\T{A}\T{a}*	

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

TABLE 27: `ogonek` Accents

Āā	\k{A}\k{a}
----	------------

TABLE 28: `combelow` Accents

`\A\`a` `\cb{A}\cb{a}`

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

TABLE 29: `wsipa` Diacritics

‘	<code>\ain</code>	‘	<code>\leftp</code>	°	<code>\overring</code>	’	<code>\stress</code>	˘	<code>\underwedge</code>
˘	<code>\corner</code>	˘	<code>\leftt</code>	˘	<code>\polishhook</code>	˘	<code>\syllabic</code>	^	<code>\upp</code>
˘	<code>\downp</code>	˘	<code>\length</code>	˘	<code>\rightp</code>	˘	<code>\underdots</code>	˘	<code>\upt</code>
˘	<code>\downt</code>	˘	<code>\midtilde</code>	˘	<code>\rightt</code>	˘	<code>\underring</code>		
˘	<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 “å”, and `\diaunder[\underdots|a]` produces “ä”. See the `wsipa` documentation for more information.

TABLE 30: `textcomp` Diacritics

”	<code>\textacutedbl</code>	˘	<code>\textasciicaron</code>	˘	<code>\textasciimacron</code>
˘	<code>\textasciiacute</code>	˘	<code>\textasciidieresis</code>	˘	<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 242 for more information.

TABLE 31: `marvosym` Diacritics

˘	<code>\arrowOver</code>	˘	<code>\barOver</code>	/	<code>\StrikingThrough</code>
˘	<code>\ArrowOver</code>		<code>\BarOver</code>		

The `marvosym` package defines all of the above as ordinary characters, not as accents. You can use `\llap` or `\rlap` to combine them with other characters. See the discussion of `\llap` and `\rlap` on page 242 for more information.

TABLE 32: `textcomp` Currency Symbols

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

* It's generally preferable to use the corresponding symbol from Table 3 on page 16 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 290 (`\EURdig`). The `mathdesign` package redefines `\texteuro` to be visually compatible with one of three additional fonts: `Utopia` (\texteuro), `Charter` (\texteuro), or `Garamond` (\texteuro).

TABLE 34: `fontawesome` Currency Symbols

\faBtc	\faILS	\faKrw	\faUsd
\faEur	\faINR	\faRub	\faViacoin
\faGbp	\faJPY	\faTRY	

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

TABLE 35: `wasysym` Currency Symbols

\cent	\currency	\wasyeuro^*
----------------	--------------------	----------------------

* `\wasyeuro` is also available as `\euro` unless you specify the `noeuro` package option.

TABLE 36: `GrNAA2e` Currency Symbols

\Euro	\Pound
----------------	-----------------

TABLE 37: teubner Currency Symbols

\times	<code>\denarius</code>	c	<code>\hemiobelion</code>	\circ	<code>\tetartemorion</code>
\vdash	<code>\dracma</code>	$\not\vdash$	<code>\stater</code>		

TABLE 38: tfrupee Currency Symbols

₹ `\rupee`

TABLE 39: eurosym Euro Signs

€ `\geneuro` € `\geneuronarrow` € `\geneurowide` € `\official euro`

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

TABLE 40: fourier Euro Signs

€ `\eurologo` € `\textteuro`

TABLE 41: textcomp Legal Symbols

\textcircled{P}	<code>\textcircledP</code>	\textcircled{C}	<code>\textcopyright</code>	$\textcircled{S}\text{M}$	<code>\textservicemark</code>
\textcircled{R}	<code>\textcopyleft</code>	\textcircled{R}	<code>\textregistered</code>	$\textcircled{T}\text{M}$	<code>\texttrademark</code>

The first symbol column represents the—sometimes “faked”—symbol that L^AT_EX 2_E 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/FAQ-tradesyms.html> for solutions to common problems that occur when using these symbols (e.g., getting a “ \textcircled{R} ” when you expected to get a “ $\textcircled{\text{R}}$ ”).

TABLE 42: fontawesome Legal Symbols

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

TABLE 43: *cclicenses* Creative Commons License Icons

	\cc		\ccnc*		\ccsa*
	\ccbby		\ccnd		

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

TABLE 44: *ccicons* Creative Commons License Icons

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

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

TABLE 45: *textcomp* Old-style Numerals

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

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

TABLE 46: Miscellaneous *textcomp* Symbols

b	\textblank	¶	\textpilcrow
'	\textbrokenbar	'	\textquotesingle
=	\textdblhyphen	,	\textquotestraightbase
=	\textdblhyphenchar	"	\textquotestraightdblbase
%	\textdiscount	R	\textrecipe
E	\textestimated	*	\textreferencemark
?	\textinterrobang	—	\textthreequartersemdash
‡	\textinterrobangdown	~	\texttildelow
Nº	\textnumero	—	\texttwelveudash
o	\textopenbullet		

TABLE 47: Miscellaneous `\wasysym` Text-mode Symbols
f \longs % \permil § \wasyparagraph*

* `\wasysym` defines `\Paragraph` as a synonym for `\wasyparagraph`.

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 316 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 “ \dashv ” (`\blitza`), “ $\Rightarrow\Leftarrow$ ” (`\Rightarrow\Leftarrow`), “ \perp ” (`\bot`), “ \leftrightarrow ” (`\nleqrightarrow`), and “ \divideontimes ” (`\textreferencemark`). Because of the lack of notational consensus, it is probably better to spell out “Contradiction!” than to use a symbol for this purpose. Similarly, discussions on `comp.text.tex` have revealed that there are a variety of ways to indicate the mathematical notion of “is defined as”. Common candidates include “ \triangleq ” (`\triangleq`), “ \equiv ” (`\equiv`), “ \coloneqq ” (*various*¹), and “ $\stackrel{\text{def}}{=}$ ” (`\stackrel{\text{def}}{=}`). See also the example of `\equalsfill` on page 244. Depending upon the context, disjoint union may be represented as “ \coprod ”, “ \sqcup ” (`\sqcup`), “ \dotcup ” (`\dotcup`), “ \oplus ” (`\oplus`), or any of a number of other symbols.² Finally, the average value of a variable x is written by some people as “ \overline{x} ” (`\overline{x}`), by some people as “ $\langle x \rangle$ ” (`\langle x \rangle`), and by some people as “ $\mathcal{O}x$ ” or “ $\mathcal{D}x$ ” (`\mathcal{O}x` or `\mathcal{D}x`). The moral of the story is that you should be careful always to explain your notation to avoid confusing your readers.

TABLE 48: Math-mode Versions of Text Symbols

<code>\$</code>	<code>\mathdollar</code>	<code>\P</code>	<code>\mathparagraph</code>	<code>\£</code>	<code>\mathsterling</code>
<code>...</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 16 because the symbols in that table work properly in both text mode and math mode.

TABLE 49: cml|| Unary Operators

<code>!</code>	<code>\oc*</code>	<code>\uparrow</code>	<code>\shneg</code>	<code>?</code>	<code>\wn*</code>
<code>\ddagger</code>	<code>\shift</code>	<code>\downarrow</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 `\coloneqqq`. In `mathabx` and `MnSymbol` it’s called `\coloneqq`. 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	▷	\triangleleft
▽	\bigtriangledown	◊	\diamond	±	\pm	⊓	\unlhd*
△	\bigtriangleup	÷	\div	▷	\rhd*	⊔	\unrhd*
•	\bullet	◁	\lhd*	＼	\setminus	⊕	\uplus
∩	\cap	⊠	\mp	⊓	\sqcap	∨	\vee
·	\cdot	⊙	\odot	⊓	\sqcup	∧	\wedge
◦	\circ	⊖	\ominus	★	\star	⌚	\wr

* Not predefined by the 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^\intercal ”. (See the May 2009 `comp.text.tex` thread, “raising math symbols”, for suggestions about altering the height of the superscript.) `\top` (Table 203 on page 104), `T`, and `\mathsf{T}` are other popular choices: “ A^\top ”, “ A^T ”, “ A^T ”.

TABLE 52: `stmaryrd` Binary Operators

ϕ	<code>\baro</code>	\parallel	<code>\interleave</code>	\otimes	<code>\varoast</code>
$\backslash\!\backslash$	<code>\bbslash</code>	\lhd	<code>\leftslice</code>	\odot	<code>\varobar</code>
$\&$	<code>\binampersand</code>	\amalg	<code>\merge</code>	\oslash	<code>\varobslash</code>
\wp	<code>\bindnasrepma</code>	\ominus	<code>\minuso</code>	\odot	<code>\varocircle</code>
\blacksquare	<code>\boxast</code>	\pm	<code>\moo</code>	\odot	<code>\varodot</code>
\blacksquare	<code>\boxbar</code>	\oplus	<code>\nplus</code>	\oslash	<code>\varogreaterthan</code>
\blacksquare	<code>\boxbox</code>	\ominus	<code>\obar</code>	\oslash	<code>\varolessthan</code>
\blacksquare	<code>\boxbslash</code>	\square	<code>\oblong</code>	\ominus	<code>\varominus</code>
\blacksquare	<code>\boxcircle</code>	\oslash	<code>\obslash</code>	\oplus	<code>\varoplus</code>
\blacksquare	<code>\boxdot</code>	\oslash	<code>\ogreaterthan</code>	\oslash	<code>\varoslash</code>
\blacksquare	<code>\boxempty</code>	\oslash	<code>\olessthan</code>	\otimes	<code>\varotimes</code>
\blacksquare	<code>\boxslash</code>	\oslash	<code>\ovee</code>	\oslash	<code>\varovee</code>
\Downarrow	<code>\curlyveedownarrow</code>	\oslash	<code>\owedge</code>	\oslash	<code>\varowedge</code>
\Uparrow	<code>\curlyveeuparrow</code>	\triangleright	<code>\rightslice</code>	\times	<code>\vartimes</code>
\nwarrow	<code>\curlywedgedownarrow</code>	\parallel	<code>\sslash</code>	γ	<code>\Ydown</code>
\nearrow	<code>\curlywedgeuparrow</code>	\parallel	<code>\talloblong</code>	\prec	<code>\Yleft</code>
$\backslash\!\backslash$	<code>\fatbslash</code>	\circ	<code>\varbigcirc</code>	\succ	<code>\Yright</code>
\circ	<code>\fatsemi</code>	γ	<code>\varcurlyvee</code>	\curlywedge	<code>\Yup</code>
\parallel	<code>\fatslash</code>	\curlywedge	<code>\varcurlywedge</code>		

TABLE 53: `wasysym` Binary Operators

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

TABLE 54: `txfonts/pxfonts` Binary Operators

\circledcirc	<code>\circledbar</code>	\circledcirc	<code>\circledwedge</code>	\circ	<code>\medcirc</code>
\circledcirc	<code>\circledbslash</code>	\wp	<code>\invamp</code>	\boxplus	<code>\sqcapplus</code>
\circledcirc	<code>\circledvee</code>	\bullet	<code>\medbullet</code>	\boxplus	<code>\sqcupplus</code>

TABLE 55: mathabx Binary Operators

*	\ast	∧	\curlywedge	□	\sqcap
*	\Asterisk	÷	\divdot	□	\sqcup
⊓	\barwedge	∗	\divideontimes	⊑	\sqdoublecap
★	\bigstar	÷	\dotdiv	⊒	\sqdoublecup
★	\bigvarstar	+	\dotplus	□	\square
◆	\blackdiamond	×	\dottimes	田	\squplus
⊓	\cap	⊔	\doublebarwedge	·	\udot
†	\circplus	⊑	\doublecap	⊕	\uplus
*	\coasterisk	⊓	\doublecup	*	\varstar
*	\coAsterisk	⊓	\ltimes	▽	\vee
*	\convolution	⊕	\pluscirc	⊓	\veebar
⊓	\cup	⊓	\rtimes	⊓	\veedoublebar
▽	\curlyvee	■	\sqbullet	△	\wedge

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

TABLE 56: MnSymbol Binary Operators

⊟	\amalg	⊑	\doublesqcup	∴	\righttherefore
*	\ast	⊓	\doublevee	×	\rightthreetimes
⊓	\backslash slashdiv	⊓	\doublewedge	⊓	\rightY
⊓	\bowtie	∴	\downtherefore	×	\rtimes
•	\bullet	⊓	\downY	×	\slashdiv
□	\cap	⊓	\dtimes	Π	\smallprod
□	\capdot	∴	\fivedots	□	\sqcap
⊓	\capplus	∞	\hbiopropto	□	\sqcapdot
·	\cdot	..	\hddotdot	□	\sqcapplus
○	\circ	⊓	\lefthalfcap	□	\sqcup
▽	\closedcurlyvee	⊓	\lefthalfcup	□	\sqcupdot
△	\closedcurlywedge	∴	\lefttherefore	田	\sqcupplus
⊓	\cup	⊓	\leftthreetimes	::	\squaredots
⊓	\cupdot	⊓	\leftY	×	\times
⊓	\cupplus	⊓	\ltimes	·	\udotdot
▽	\curlyvee	⊓	\medbackslash	∴	\uptherefore
▽	\curlyveedot	○	\medcircle	∧	\upY
△	\curlywedge	⊓	\medslash	×	\utimes
△	\curlywedgedot		\medvert	8	\vbipropto
·	\ddotdot	⊓	\medvertdot	:	\vdotdot
·	\diamondddots	-	\minus	▽	\vee
÷	\div	-	\minusdot	▽	\veedot

(continued on next page)

(continued from previous page)

\cdot	<code>\dotmedvert</code>	\mp	<code>\mp</code>	\bowtie	<code>\vertbowtie</code>
\div	<code>\dotminus</code>	\wp	<code>\neswbipropto</code>	\div	<code>\vertdiv</code>
\cap	<code>\doublecap</code>	\nwarrow	<code>\nwsebipropto</code>	\wedge	<code>\wedge</code>
\cup	<code>\doublecup</code>	\oplus	<code>\plus</code>	\wedge	<code>\wedgedot</code>
\wr	<code>\doublecurlyvee</code>	\pm	<code>\pm</code>	\wreath	<code>\wreath</code>
\wedge	<code>\doublecurlywedge</code>	\neg	<code>\righthalfcap</code>		
\sqcap	<code>\doublesqcap</code>	\sqcup	<code>\righthalfcup</code>		

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	<code>\amalg</code>	\vee	<code>\doublevee</code>	\rtimes	<code>\rtimes</code>
\ast	<code>\ast</code>	\wedge	<code>\doublewedge</code>	\setminus	<code>\setminus</code>
\barwedge	<code>\barwedge</code>	\Downarrow	<code>\downY</code>	\sqcap	<code>\sqcap</code>
\cap	<code>\cap</code>	\times	<code>\dtimes</code>	\sqcapdot	<code>\sqcapdot</code>
\cdot	<code>\cdot</code>	\cdots	<code>\hcdotdot</code>	\sqcapplus	<code>\sqcapplus</code>
\cdot	<code>\cdot</code>	\top	<code>\intercal</code>	\sqcup	<code>\sqcup</code>
\cdot	<code>\cdot</code>	\rightarrow	<code>\intprod</code>	\sqcupdot	<code>\sqcupdot</code>
\cdot	<code>\centerdot</code>	\leftarrow	<code>\intprodR</code>	\sqcupplus	<code>\sqcupplus</code>
\cup	<code>\cup</code>	\times	<code>\leftthreetimes</code>	\times	<code>\times</code>
\cupdot	<code>\cupdot</code>	\leftarrow	<code>\leftY</code>	\times	<code>\timesbar</code>
\cupplus	<code>\cupplus</code>	\bowtie	<code>\ltimes</code>	$\cdot\cdot$	<code>\udotdot</code>
\curlyvee	<code>\curlyvee</code>	\swarrow	<code>\medbackslash</code>	\bowtie	<code>\upbowtie</code>
\curlywedge	<code>\curlywedge</code>	\swarrow	<code>\medslash</code>	\upY	<code>\upY</code>
$\ddot{\cdot}$	<code>\ddot{\cdot}</code>	$-$	<code>\minus</code>	\times	<code>\utimes</code>
\div	<code>\div</code>	$-$	<code>\minusdot</code>	\varamalg	<code>\varamalg</code>
\divideontimes	<code>\divideontimes</code>	\div	<code>\minusfdots</code>	\vdotdot	<code>\vdotdot</code>
\divslash	<code>\divslash</code>	\div	<code>\minusrdots</code>	\vdots	<code>\vdots</code>
\dotminus	<code>\dotminus</code>	\mp		\vee	<code>\vee</code>
\dotplus	<code>\dotplus</code>	$+$	<code>\plus</code>	\veebar	<code>\veebar</code>
\dottimes	<code>\dottimes</code>	$+$	<code>\plusdot</code>	\veedot	<code>\veedot</code>
\doublebarwedge	<code>\doublebarwedge</code>	\pm	<code>\pm</code>	\veebar	<code>\veebar</code>
\doublecap	<code>\doublecap</code>	\sqcup	<code>\pullback</code>	\wedge	<code>\wedge</code>
\doublecup	<code>\doublecup</code>	\sqcap	<code>\pushout</code>	\wedge	<code>\wedgedot</code>
\doublesqcap	<code>\doublesqcap</code>	\times	<code>\rightthreetimes</code>	\wr	<code>\wreath</code>
\doublesqcup	<code>\doublesqcup</code>	\times	<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>	\blacktriangleleft	<code>\rtimesblack</code>
ϕ	<code>\baro</code>	$\bar{\wedge}$	<code>\doublebarwedge</code>	\smallsetminus	<code>\smallsetminus</code>
\barwedge	<code>\barwedge</code>	$:$	<code>\fatsemi</code>	\divideontimes	<code>\smashtimes</code>
\barwedge	<code>\bbslash</code>	$>$	<code>\gtrdot</code>	\sqcup	<code>\squplus</code>
$\&$	<code>\binampersand</code>	\top	<code>\intercal</code>	\parallel	<code>\sslash</code>
\wp	<code>\bindnasrepma</code>	\setminus	<code>\lbag</code>	\times	<code>\times</code>
\blacktriangleright	<code>\blackbowtie</code>	\blacktriangleleft	<code>\lblackbowtie</code>	\uplus	<code>\uplus</code>
\bowtie	<code>\bowtie</code>	\triangleleft	<code>\leftslice</code>	\cap	<code>\varcap</code>
\cap	<code>\cap</code>	\times	<code>\leftthreetimes</code>	\cup	<code>\varcup</code>
\Cap	<code>\Cap</code>	\triangleleft	<code>\lessdot</code>	\top	<code>\varintercal</code>
\cdot	<code>\cdot</code>	\times	<code>\ltimes</code>	\square	<code>\varsqcap</code>
\cdot	<code>\centerdot</code>	\blacktriangleleft	<code>\ltimesblack</code>	\square	<code>\varsqcup</code>
\circ	<code>\circplus</code>	\wedge	<code>\merge</code>	\times	<code>\vartimes</code>
$*$	<code>\coAsterisk</code>	\ominus	<code>\minuso</code>	\vee	<code>\vee</code>
$*$	<code>\convolution</code>	\pm	<code>\moo</code>	\wp	<code>\Vee</code>
\cup	<code>\cup</code>	\mp	<code>\mp</code>	\veebar	<code>\veebar</code>
\Cup	<code>\Cup</code>	\mp	<code>\nplus</code>	\veeonvee	<code>\veeonvee</code>
\curlywedge	<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>
\dag	<code>\dagger</code>	\int	<code>\rbag</code>	\prec	<code>\Yleft</code>
\ddag	<code>\ddagger</code>	\blacktriangleleft	<code>\rblackbowtie</code>	\succ	<code>\Yright</code>
\div	<code>\div</code>	\triangleright	<code>\rightslice</code>	\prec	<code>\Yup</code>
$*$	<code>\divideontimes</code>	\times	<code>\rightthreetimes</code>		
\dotplus	<code>\dotplus</code>	\times	<code>\rtimes</code>		

TABLE 59: stix Binary Operators

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

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

TABLE 60: `mathdesign` Binary Operators
 $\times \ \backslash dtimes \quad \times \ \backslash udtimes \quad \times \ \backslash utimes$

The `mathdesign` package additionally provides versions of each of the binary operators shown in Table 51 on page 32.

TABLE 61: `cml` Binary Operators
 $\divideontimes \ \backslash parr^* \quad \& \ \backslash with^\dagger$

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

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

TABLE 62: `shuffle` Binary Operators
 $\boxplus \ \backslash cshuffle \quad \boxminus \ \backslash shuffle$
TABLE 63: `ulsy` Geometric Binary Operators
 $\oplus \ \backslash odplus$
TABLE 64: `mathabx` Geometric Binary Operators

▼	<code>\blacktriangledown</code>	□	<code>\boxright</code>	⊖	<code>\ominus</code>
◀	<code>\blacktriangleleft</code>	☒	<code>\boxslash</code>	⊕	<code>\oplus</code>
▶	<code>\blacktriangleright</code>	☒	<code>\boxtimes</code>	⊕	<code>\oright</code>
▲	<code>\blacktriangleup</code>	□	<code>\boxtop</code>	⊖	<code>\oslash</code>
✳	<code>\boxasterisk</code>	□	<code>\boxtriangleup</code>	⊗	<code>\otimes</code>
☒	<code>\boxbackslash</code>	□	<code>\boxvoid</code>	⊕	<code>\otop</code>
▣	<code>\boxbot</code>	✳	<code>\oasterisk</code>	Ⓐ	<code>\otriangleup</code>
○	<code>\boxcirc</code>	✳	<code>\backslash</code>	○	<code>\ovoid</code>
✳	<code>\boxcoasterisk</code>	⊕	<code>\obot</code>	▽	<code>\smalltriangledown</code>
▢	<code>\boxdiv</code>	◎	<code>\ocirc</code>	◀	<code>\smalltriangleleft</code>
■	<code>\boxdot</code>	✳	<code>\ocoasterisk</code>	▶	<code>\smalltriangleright</code>
▢	<code>\boxleft</code>	÷	<code>\odiv</code>	△	<code>\smalltriangleup</code>
▢	<code>\boxminus</code>	○	<code>\odot</code>		
▢	<code>\boxplus</code>	⊕	<code>\oleft</code>		

TABLE 65: MnSymbol Geometric Binary Operators

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

(continued on next page)

(continued from previous page)

●	\medblackcircle	⊖	\odash	◀	\smalltriangleleft
◆	\medblackdiamond	⊙	\odot	▷	\smalltriangleright
■	\medblacksquare	≡	\oequal	△	\smalltriangleup
★	\medblackstar	⊖	\ominus	☆	\smallwhitestar

fdsymbol defines synonyms for most of the preceding symbols:

◆	\blackdiamond	◊	\diamond	•	\smbblkcircle
▲	\blacktriangle	◊	\Diamond	◆	\smbblkdiamond
▼	\blacktriangledown	◊	\diamonddbslash	■	\smbblksquare
◀	\blacktriangleleft	◊	\diamondcdot	☆	\smwhitestar
▶	\blacktriangleright	◆	\mdblkdiamond	○	\smwhtcircle
□	\Box	■	\mdblksquare	◊	\smwhtdiamond
□	\boxbar	●	\mdlgbkcircle	□	\smwhtsquare
□	\boxbslash	◆	\mdlgbkdiamond	□	\square
□	\boxdiag	■	\mdlgbksquare	★	\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

\blacksquare	<code>\blackhourglass</code>	\diamond	<code>\concavediamondtickleleft</code>	\oplus	<code>\oplus</code>
\boxast	<code>\boxast</code>	\diamond	<code>\concavediamondtickright</code>	\oslash	<code>\oslash</code>
\boxbar	<code>\boxbar</code>	\diamond	<code>\diamond</code>	\otimes	<code>\otimes</code>
\boxbox	<code>\boxbox</code>	\triangleleft	<code>\dsub</code>	\otimes	<code>\otimes</code>
\boxbslash	<code>\boxbslash</code>	\boxtimes	<code>\hourglass</code>	$\hat{\otimes}$	<code>\otimeshat</code>
\boxcircle	<code>\boxcircle</code>	\lozenge	<code>\lozengeminus</code>	\triangleright	<code>\rsub</code>
\boxdiag	<code>\boxdiag</code>	\blacklozenge	<code>\mdlgbklozenge</code>	\bullet	<code>\smbblkcircle</code>
\boxdot	<code>\boxdot</code>	\circ	<code>\mdlwgwtcircle</code>	\star	<code>\star</code>
\boxminus	<code>\boxminus</code>	\ominus	<code>\obar</code>	\parallel	<code>\talloblong</code>
\boxplus	<code>\boxplus</code>	\oplus	<code>\obot^*</code>	\triangle	<code>\triangle</code>
\boxtimes	<code>\boxtimes</code>	\oslash	<code>\obslash</code>	\triangleleft	<code>\triangleminus</code>
\circledast	<code>\circledast</code>	\oplus	<code>\odiv</code>	\triangleup	<code>\triangleplus</code>
\circledcirc	<code>\circledcirc</code>	\odot	<code>\odot</code>	\triangletriangle	<code>\trianglerightserials</code>
\circleddash	<code>\circleddash</code>	\oslash	<code>\odotslashdot^*</code>	\triangletriangleleft	<code>\triangletimes</code>
\circledeq	<code>\circledeq</code>	\oslash	<code>\ogreaterthan</code>	\bullet	<code>\vysmblkcircle^\dagger</code>
\circledparallel	<code>\circledparallel</code>	\boxtimes	<code>\olcross^*</code>	\circ	<code>\vysmwhtcircle</code>
\circledvert	<code>\circledvert</code>	\oslash	<code>\olessthan</code>	\square	<code>\whitesquaretickleleft</code>
\circlearrowleft	<code>\circlearrowleft</code>	\ominus	<code>\ominus</code>	\square	<code>\whitesquaretickleright</code>
\diamond	<code>\concavediamond</code>	\circledcirc	<code>\operp</code>		

* Defined as an ordinary character, not as a binary relation. However, these symbols more closely resemble the other symbols in this table than they do the geometric shapes presented in Table 390, which is why they are included here.

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

TABLE 69: halloweenmath Halloween-Themed Math Operators

\pumpkin	<code>\bigpumpkin</code> [‡]	\ghost	<code>\mathleftghost</code>	\cloud	<code>\reversemathcloud</code>
\skull	<code>\bigskull</code>	\bat	<code>\mathrightbat</code>	\witch	<code>\reversemathwitch</code> [†]
\mathbat	<code>\mathbat</code>	\ghost	<code>\mathrightghost</code>	\witch	<code>\reversemathwitch*</code> [†]
\cloud	<code>\mathcloud</code>	\witch	<code>\mathwitch^*</code> [†]	\skull	<code>\skull</code>
\ghost	<code>\mathghost</code>	\witch	<code>\mathwitch^*</code> [†]		
\mathleftbat	<code>\mathleftbat</code>	\pumpkin			

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

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

in display mode.

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

TABLE 70: stix Small Integrals

\smallawint	\smallawintcap	\smalloint
\smallcirlfnint	$\text{\smallcirlfnintclockwise}$	$\text{\smallointctrcclockwise}$
\smallfint	\smallfintcup	\smallpointint
\smalliiiiint	\smalliiilarhk	\smallrppoint
\smalliiint	\smallintx	\smallscpolint
\smalliiint	\smalllowint	\smallsqint
\smallint	\smallnpoint	\smallsumint
\smallintbar	\smalloioint	\smallupoint
\smallintBar	\smalloint	$\text{\smallvarointclockwise}$

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 71.

TABLE 71: stix Small Integrals with Explicit Slant

\smallawintsl	\smallawintup
\smallcirlfnintsl	\smallcirlfnintup
\smallfintsl	\smallfintup
\smalliiiiintsl	\smalliiiiintup
\smalliiintsl	\smalliiintup
\smalliiintsl	\smalliiintup
\smallintsl	\smallintup
\smallintbarsl	\smallintBarup
\smallintBarsl	\smallintbarup
\smallintcapsl	\smallintcapup
$\text{\smallintclockwisesl}$	$\text{\smallintclockwiseup}$
\smallintcupsl	\smallintcupup
\smallintlarhksl	\smallintlarhkup
\smallintsl	\smallintup
\smallintxsl	\smallintxup
\smalllowintsl	\smalllowintup
\smallnpointsl	\smallnpointup
\smalloiointsl	\smalloiointup
\smallointsl	\smallointup
$\text{\smallointctrcclockwisesl}$	$\text{\smallointctrcclockwiseup}$
\smallointsl	\smallointup
\smallpointintsl	\smallpointintup
\smallrppointsl	\smallrppointup
\smallscpolintsl	\smallscpolintup
\smallsqintsl	\smallsqintup
\smallsumintsl	\smallsumintup
\smallupintsl	\smallupintup
$\text{\smallvarointclockwisesl}$	$\text{\smallvarointclockwiseup}$

Instead of using the preceding symbols directly, it is generally preferable to use the symbols listed in Table 70 either with or without the `upint` package option. Specifying `upint` selects each integral's upright (`up`) variant, while omitting `upint` selects each integral's slanted (`s1`) variant. Use the symbols shown in Table 71 only when you need to include both upright and slanted variations of a symbol in the same document.

TABLE 72: Variable-sized Math Operators

$\cap \cap$	<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 73: *AMS* Variable-sized Math Operators

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

TABLE 74: *stmaryrd* Variable-sized Math Operators

$\square \square$	<code>\bigbox</code>	$\ \ \ \ $	<code>\biginterleave</code>	$\square \square$	<code>\bigsqcap</code>
$\curlyvee \curlyvee$	<code>\bigcurlyvee</code>	$\oplus \oplus$	<code>\bignplus</code>	$\nabla \nabla$	<code>\bigtriangledown</code>
$\curlywedge \curlywedge$	<code>\bigcurlywedge</code>	$\parallel \parallel$	<code>\bigparallel</code>	$\Delta \Delta$	<code>\bigtriangleup</code>

TABLE 75: `wasysym` Variable-sized Math Operators

$\int \int \ \backslash int$	$\iint \iint \ \backslash iint$	$\iiint \iiint \ \backslash iiint$
$\oint \oint \ \backslash oint$	$\oint \oint \ \backslash oint$	

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

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

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

 TABLE 76: `mathabx` Variable-sized Math Operators

\curlyvee	<code>\bigcurlyvee</code>	$\boxslash \boxslash$	<code>\bigboxslash</code>	$\oplus \oplus$	<code>\bigoright</code>
$\sqcap \sqcap$	<code>\bigsqcap</code>	$\boxtimes \boxtimes$	<code>\bigboxtimes</code>	$\oslash \oslash$	<code>\bigoslash</code>
$\wedge \wedge$	<code>\bigcurlywedge</code>	$\boxdot \boxdot$	<code>\bigboxtop</code>	$\ominus \ominus$	<code>\bigotop</code>
$\boxast \boxast$	<code>\bigboxasterisk</code>	$\triangle \triangle$	<code>\bigboxtriangleup</code>	$\triangleleft \triangleleft$	<code>\bigotriangleup</code>
$\boxbackslash \boxbackslash$	<code>\bigboxbackslash</code>	$\square \square$	<code>\bigboxvoid</code>	$\circ \circ$	<code>\bigovoid</code>
$\boxbot \boxbot$	<code>\bigboxbot</code>	$\complement \complement$	<code>\bigcomplementtop</code>	$++$	<code>\bigplus</code>
$\boxcirc \boxcirc$	<code>\bigboxcirc</code>	$\boxast \boxast$	<code>\bigoasterisk</code>	$\boxplus \boxplus$	<code>\bigsqplus</code>
$\boxcoasterisk \boxcoasterisk$	<code>\bigboxcoasterisk</code>	$\oslash \oslash$	<code>\bigbackslash</code>	$\times \times$	<code>\bigtimes</code>
$\boxdiv \boxdiv$	<code>\bigboxdiv</code>	$\ominus \oplus$	<code>\bigobot</code>	$\iiint \iiint$	<code>\iiint</code>
$\boxdot \boxdot$	<code>\bigboxdot</code>	$\odot \odot$	<code>\bigocirc</code>	$\iint \iint$	<code>\iint</code>

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$\boxed{\boxed{}}$	<code>\bigboxleft</code>	$\circledast \circledast$	<code>\bigocoasterisk</code>	$\int \int$	<code>\int</code>
$\boxed{-}$	<code>\bigboxminus</code>	$\odot \odot$	<code>\bigodiv</code>	$\oint \oint$	<code>\oiint</code>
$\boxed{+}$	<code>\bigboxplus</code>	$\ominus \oplus$	<code>\bigoleft</code>	$\oint \oint$	<code>\oint</code>
$\boxed{\boxed{}}$	<code>\bigboxright</code>	$\ominus \ominus$	<code>\bigominus</code>		

TABLE 77: `txfonts/pxfonts` Variable-sized Math Operators

\sqcup	\sqcap	<code>\bigsqcapplus</code>	$\oint \oint$	<code>\ointclockwise</code>
\sqcup	\sqcup	<code>\bigsqcupplus</code>	$\oint \oint$	<code>\ointctrcclockwise</code>
f	f	<code>\fint</code>	$\oint \oint \oint$	<code>\sqiint</code>
$\int \cdots \int$	$\int \cdots \int$	<code>\idotsint</code>	$\oint \oint \oint$	<code>\sqaint</code>
$\oint \oint \oint$	$\oint \oint \oint$	<code>\iiint</code>	$\oint \oint \oint$	<code>\sqint</code>
$\oint \oint \oint$	$\oint \oint \oint$	<code>\iiint</code>	$\oint \oint \oint$	<code>\varoiintclockwise</code>
$\oint \oint$	$\oint \oint$	<code>\iint</code>	$\oint \oint \oint$	<code>\varoiintctrcclockwise</code>
$\oint \oint \oint$	$\oint \oint \oint$	<code>\oiintclockwise</code>	$\oint \oint$	<code>\varoiintclockwise</code>
$\oint \oint \oint$	$\oint \oint \oint$	<code>\oiintctrcclockwise</code>	$\oint \oint$	<code>\varoiintctrcclockwise</code>
$\oint \oint \oint$	$\oint \oint \oint$	<code>\oiint</code>	$\oint \oint$	<code>\varointclockwise</code>

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\oint	$\oint\oint$	<code>\oiintclockwise</code>	\oint	$\oint\oint$	<code>\varointctrcclockwise</code>
\oint	$\oint\oint$	<code>\oiintctrcclockwise</code>	\times	\times	<code>\varprod</code>
\oint	$\oint\oint$	<code>\oiint</code>			

TABLE 78: esint Variable-sized Math Operators

$\int \cdots \int$	$\int \cdots \int$	<code>\dotsint</code>	\oint	\oint	<code>\ointclockwise</code>
f	f	<code>\fint</code>	\oint	\oint	<code>\ointctrcclockwise</code>
\iiint	\iiint	<code>\iiint</code>	$\oint\oint$	$\oint\oint$	<code>\sqiint</code>
\iiint	\iiint	<code>\iiint</code>	\oint	\oint	<code>\sqint</code>
\iint	\iint	<code>\iint</code>	$\oint\oint$	$\oint\oint$	<code>\varoiint</code>
f	f	<code>\landdownint</code>	\oint	\oint	<code>\varointclockwise</code>
f	f	<code>\landupint</code>	\oint	\oint	<code>\varointctrcclockwise</code>
\oint	$\oint\oint$	<code>\oiint</code>			

TABLE 79: `bigints` Variable-sized Math Operators

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

 TABLE 80: `MnSymbol` Variable-sized Math Operators

\cap	\bigcap	<code>\bigcap</code>	\ominus	\bigominus	<code>\bigominus</code>	\complement	\bigcomplement	<code>\complement</code>
\capdot	\bigcapdot	<code>\bigcapdot</code>	\oplus	\bigoplus	<code>\bigoplus</code>	\coprod	\bigcoprod	<code>\coprod</code>
\capplus	\bigcapplus	<code>\bigcapplus</code>	\oslash	\bigoslash	<code>\bigoslash</code>	$\cdots\int$	$\cdots\int$	<code>\cdotsint</code>
\circ	\bigcirc	<code>\bigcircle</code>	\circledast	\bigcircledast	<code>\bigcircledast</code>	\iiint	\iiint	<code>\iiint</code>
\cup	\bigcup	<code>\bigcup</code>	\otimes	\bigotimes	<code>\bigotimes</code>	\iiint	\iiint	<code>\iiint</code>
\cupdot	\bigcupdot	<code>\bigcupdot</code>	\triangleleft	\bigtriangleleft	<code>\bigtriangleleft</code>	\iint	\iint	<code>\iint</code>
\cupplus	\bigcupplus^*	<code>\bigcupplus^*</code>	\circledcirc	\bigcircledcirc	<code>\bigcircledcirc</code>	\int	\int	<code>\int</code>
\curlyvee	\bigcurlyvee	<code>\bigcurlyvee</code>	$+$	\bigplus	<code>\bigplus</code>	\landdownint	\landdownint	<code>\landdownint</code>
\curlyveedot	\bigcurlyveedot	<code>\bigcurlyveedot</code>	\sqcap	\bigsqcap	<code>\bigsqcap</code>	\landupint	\landupint	<code>\landupint</code>
\curlywedge	\bigcurlywedge	<code>\bigcurlywedge</code>	\sqcapdot	\bigsqcapdot	<code>\bigsqcapdot</code>	\lcircleleftint	\lcircleleftint	<code>\lcircleleftint</code>
\curlywedgedot	\bigcurlywedgedot	<code>\bigcurlywedgedot</code>	\sqcapplus	\bigsqcapplus	<code>\bigsqcapplus</code>	\lcirclerightint	\lcirclerightint	<code>\lcirclerightint</code>
\doublecurlyvee	\bigdoublecurlyvee	<code>\bigdoublecurlyvee</code>	\sqcup	\bigsqcup	<code>\bigsqcup</code>	\oiint	\oiint	<code>\oiint</code>
\doublecurlywedge	\bigdoublecurlywedge	<code>\bigdoublecurlywedge</code>	\sqcupdot	\bigsqcupdot	<code>\bigsqcupdot</code>	\oint	\oint	<code>\oint</code>

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\mathbb{W}	\mathbb{V}	<code>\bigdoublevee</code>	\sqcup	\sqplus	<code>\bigsqcupplus</code>	\prod	\prod	<code>\prod</code>
\mathbb{A}	\mathbb{A}	<code>\bigdoublewedge</code>	\times	\times	<code>\bigtimes</code>	\oint	\oint	<code>\rcircleleftint</code>
\otimes	\otimes	<code>\bigoast</code>	\vee	\vee	<code>\bigvee</code>	\oint	\oint	<code>\rcirclerightint</code>
\ominus	\ominus	<code>\bigobackslash</code>	\forall	\forall	<code>\bigveedot</code>	\oint	\oint	<code>\strokedint</code>
\odot	\odot	<code>\bigocirc</code>	\wedge	\wedge	<code>\bigwedge</code>	\sum	\sum	<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 81: `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	<code>\oiint</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>	\sum	\sum	<code>\osum</code>
\curlywedge	\curlywedge	<code>\bigcurlywedge</code>	\wedge	\wedge	<code>\bigwedgedot</code>	\prod	\prod	<code>\prod</code>
\mathbb{W}	\mathbb{W}	<code>\bigdoublevee</code>	\coprod	\coprod	<code>\coprod</code>	\oint	\oint	<code>\rcircleleftint</code>
\mathbb{A}	\mathbb{A}	<code>\bigdoublewedge</code>	\fint	\fint	<code>\fint</code>	\oint	\oint	<code>\rcirclerightint</code>
\otimes	\otimes	<code>\bigoast</code>	$\int\dots\int$	$\int\dots\int$	<code>\idotsint</code>	\sum	\sum	<code>\sum</code>
\odot	\odot	<code>\bigodot</code>	\iiint	\iiint	<code>\iiint</code>	\oint	\oint	<code>\sumint</code>
\oplus	\oplus	<code>\bigoplus</code>	\iiint	\iiint	<code>\iiint</code>	\varcoprod	\varcoprod	<code>\varcoprod</code>

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\otimes	\otimes	<code>\bigotimes</code>	\iint	\iint	<code>\iint</code>	Σ	Σ	<code>\varosum</code>
$+$	$+$	<code>\bigplus</code>	\int	\int	<code>\int</code>	\prod	\prod	<code>\varprod</code>
\sqcap	\sqcap	<code>\bigsqcap</code>	\oint	\oint	<code>\intbar</code>	\sum	\sum	<code>\varsum</code>
\sqdot	\sqdot	<code>\bigsqcapdot</code>	\oint	\oint	<code>\intBar</code>	\oint	\oint	<code>\varsumint</code>
\sqcup	\sqcup	<code>\bigsqcupplus</code>	\oint	\oint	<code>\landdownint</code>			

* `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`, `\intctr-clockwise` as a synonym for `\landdownint`, `\modtwosum` as a synonym for `\osum`, `\ointclockwise` as a synonym for `\lcircleleftint`, `\ointctr-clockwise` as a synonym for `\rcirclerightint`, `\varmodtwosum` as a synonym for `\varosum`, `\varointclockwise` as a synonym for `\lcirclerightint`, and `\varointctr-clockwise` as a synonym for `\rcircleleftint`.

TABLE 82: `boisik` Variable-sized Math Operators

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

`boisik` additionally provides all of the symbols in Table 72.

TABLE 83: `stix` Variable-sized Math Operators

\oint	\oint	<code>\awint</code>	\coprod	\coprod	<code>\coprod</code>	$\oint\!\oint$	$\oint\!\oint$	<code>\oiint</code>
Σ	Σ	<code>\Bbbsum</code>	\mathbb{W}	\mathbb{W}	<code>\disjquant</code>	\oint	\oint	<code>\oint</code>
\cap	\cap	<code>\bigcap</code>	\oint	\oint	<code>\fint</code>	\oint	\oint	<code>\oint</code>
\cup	\cup	<code>\bigcup</code>	$\oint\!\oint\!\oint$	$\oint\!\oint\!\oint$	<code>\iiint</code>	\oint	\oint	<code>\ointctr-clockwise</code>

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\cup	\bigcup	$\backslash bigcupdot$	\iiint	\iiiiint	$\backslash iiint$	\oint	\oint	$\backslash pointint$
\odot	\bigodot	$\backslash bigodot$	\iint	\iiiiint	$\backslash iint$	\prod	\prod	$\backslash prod$
\oplus	\bigoplus	$\backslash bigoplus$	\int	\int	$\backslash int$	\oint	\oint	$\backslash rppointint$
\otimes	\bigotimes	$\backslash bigotimes$	\int	\int	$\backslash intbar$	\oint	\oint	$\backslash scpointint$
\sqcap	\bigcap	$\backslash bigsqcap$	\int	\int	$\backslash intBar$	\oint	\oint	$\backslash sqint$
\sqcup	\bigcup	$\backslash bigsqcup$	\oint	\oint	$\backslash intcap$	\sum	\sum	$\backslash sum$
\parallel	\bigparallel	$\backslash bigtalloblong$	\int	\int	$\backslash intclockwise$	\oint	\oint	$\backslash sumint$
\times	\bigtimes	$\backslash bigtimes$	\oint	\oint	$\backslash intcup$	\int	\int	$\backslash upint$
\uplus	\biguplus	$\backslash biguplus$	\oint	\oint	$\backslash intlarhk$	\oint	\oint	$\backslash varointclockwise$
\vee	\bigvee	$\backslash bigvee$	\oint	\oint	$\backslash intx$	\backslash	\backslash	$\backslash xbsol$
\wedge	\bigwedge	$\backslash bigwedge$	\int	\int	$\backslash lowint$	$/$	$/$	$\backslash xsol$
\oint	\oint	$\backslash cirfnint$	Σ	Σ	$\backslash modtwosum$			
$\wedge\wedge$	$\bigwedge\wedge$	$\backslash conjquant$	\oint	\oint	$\backslash npointint$			

By default, each of the integral-producing commands in Table 83 points to a slanted version of the glyph, as shown. The `upint` package option typesets each integral instead as an upright version. Slanted and upright integrals can be mixed, however, by explicitly using the commands shown in Table 84.

TABLE 84: stix Integrals with Explicit Slant

\int	\int	<code>\inttsl</code>	\int	\int	<code>\intup</code>
\iint	\iint	<code>\iinttsl</code>	\iint	\iint	<code>\iintup</code>
\iiint	\iiint	<code>\iiinttsl</code>	\iiint	\iiint	<code>\iiintup</code>
\oint	\oint	<code>\ointtsl</code>	\oint	\oint	<code>\ointup</code>
\oiint	\oiint	<code>\ointtsl</code>	\oiint	\oiint	<code>\ointup</code>
\oiint	\oiint	<code>\oiinttsl</code>	\oiint	\oiint	<code>\oiintup</code>
\intclockwise	\intclockwise	<code>\intclockwisesl</code>	\intclockwise	\intclockwise	<code>\intclockwiseup</code>
\varointclockwise	\varointclockwise	<code>\varointclockwisesl</code>	\varointclockwise	\varointclockwise	<code>\varointclockwiseup</code>
$\ointctr-clockwise$	$\ointctr-clockwise$	<code>\ointctr-clockwisesl</code>	$\ointctr-clockwise$	$\ointctr-clockwise$	<code>\ointctr-clockwiseup</code>
\sumbar	\sumbar	<code>\sumintsl</code>	\sumbar	\sumbar	<code>\sumintup</code>
\iiintbar	\iiintbar	<code>\iiinttsl</code>	\iiintbar	\iiintbar	<code>\iiintup</code>
\intbar	\intbar	<code>\intbarsl</code>	\intbar	\intbar	<code>\intbarup</code>
\intBar	\intBar	<code>\intBarsl</code>	\intBar	\intBar	<code>\intBarup</code>
\fint	\fint	<code>\fintsl</code>	\fint	\fint	<code>\fintup</code>
$\circ\!\!\!\int$	$\circ\!\!\!\int$	<code>\cirfnintsl</code>	$\circ\!\!\!\int$	$\circ\!\!\!\int$	<code>\cirfnintup</code>
\awint	\awint	<code>\awintsl</code>	\awint	\awint	<code>\awintup</code>
\rppolint	\rppolint	<code>\rppolintsl</code>	\rppolint	\rppolint	<code>\rppolintup</code>
\scpolint	\scpolint	<code>\scpolintsl</code>	\scpolint	\scpolint	<code>\scpolintup</code>

(continued on next page)

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\oint	$\int \circlearrowleft$	<code>\npolintsl</code>	\oint	$\int \circlearrowright$	<code>\npolintup</code>
\oint	$\int \circlearrowright$	<code>\pointintsl</code>	\oint	$\int \circlearrowleft$	<code>\pointintup</code>
\oint	$\int \squareleftarrow$	<code>\sqintsl</code>	\oint	$\int \squarerightarrow$	<code>\sqintup</code>
\oint	$\int \squareleftarrow$	<code>\intlarhksl</code>	\oint	$\int \squarerightarrow$	<code>\intlarhkup</code>
\oint	$\int \squareleftarrow$	<code>\intxsl</code>	\oint	$\int \squarerightarrow$	<code>\intxup</code>
\oint	$\int \squareleftarrow$	<code>\intcapsl</code>	\oint	$\int \squarerightarrow$	<code>\intcapup</code>
\oint	$\int \squareleftarrow$	<code>\intcupsl</code>	\oint	$\int \squarerightarrow$	<code>\intcupup</code>
$\overline{\int}$	$\overline{\int}$	<code>\upintsl</code>	$\overline{\int}$	$\overline{\int}$	<code>\upintup</code>
$\underline{\int}$	$\underline{\int}$	<code>\lowintsl</code>	$\underline{\int}$	$\underline{\int}$	<code>\lowintup</code>

Instead of using the preceding symbols directly, it is generally preferable to use the symbols listed in Table 83 either with or without the `upint` package option. Specifying `upint` selects each integral's upright (`up`) variant, while omitting `upint` selects each integral's slanted (`sl`) variant. Use the symbols shown in Table 84 only when you need to include both upright and slanted variations of a symbol in the same document.

TABLE 85: `cmupint` Variable-sized Upright Integrals

\oint	$\int \squareleftarrow$	<code>\awint</code>	\oint	$\int \squarerightarrow$	<code>\npolint</code>
\oint	$\int \squareleftarrow$	<code>\barint</code>	$\oint\oint\oint$	$\int\int\int$	<code>\oiint</code>
\oint	$\int \squareleftarrow$	<code>\cirfnint</code>	$\oint\oint$	$\int\int$	<code>\oiint</code>

(continued on next page)

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\int	\int	<code>\doublebarint</code>	\oint	\oint	<code>\oint</code>
\int	\int	<code>\downint</code>	\oint	\oint	<code>\ointclockwise</code>
\int	\int	<code>\fint</code>	\oint	\oint	<code>\ointctrcclockwise</code>
$\int \cdots \int$	$\int \cdots \int$	<code>\idotsint^*</code>	\oint	\oint	<code>\pointint</code>
\iiint	\iiint	<code>\iiint</code>	\oint	\oint	<code>\rppolint</code>
\iiint	\iiint	<code>\iiint</code>	\oint	\oint	<code>\scpolint</code>
\iint	\iint	<code>\iint</code>	\oint	\oint	<code>\sqaint</code>
\int	\int	<code>\int</code>	\oint	\oint	<code>\sqint</code>
\intcap	\intcap	<code>\intcap</code>	\oint	\oint	<code>\sumint</code>
\int	\int	<code>\intclockwise</code>	\int	\int	<code>\upint</code>
\intcup	\intcup	<code>\intcup</code>	$\int \cdots \int$	$\int \cdots \int$	<code>\varidotsint^*</code>
\intlarhk	\intlarhk	<code>\intlarhk</code>	\oint	\oint	<code>\varointclockwise</code>
\intdown	\intdown	<code>\intdown</code>	\oint	\oint	<code>\varointctrcclockwise</code>
\intup	\intup	<code>\intup</code>	\oint	\oint	<code>\xint</code>

`cmupint` additionally provides `\longint`, `\longiint`, `\longiint`, and `\longoiint` commands that stretch arbitrarily tall. See the `cmupint` documentation for more information.

* `\varidotsint` is always drawn as is. `\idotsint` is drawn identically to `\varidotsint` when `amsmath` is not loaded or with more space surrounding each dot when `amsmath` is loaded.

TABLE 86: `mathdesign` Variable-sized Math Operators

\oint	\ointclockwise	\oint	\ointclockwise
\iiint	\oiint	\oint	\ointctrcclockwise
\oint	\oiint	\oint	\oint

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 87: `prodint` Variable-sized Math Operators

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

`prodint` currently requires the author to manually specify `\prodi` for inlined expressions (\dots), `\Prodi` for displayed math (\dots), and `\PRODI` for displayed math involving tall integrands. The package does not define a product integral command that scales automatically akin to the symbols in Table 72.

TABLE 88: `cml` Large Math Operators

\bowtie	\bigparr^*	\bowtie	\bigwidth
-----------	--------------	-----------	-------------

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

TABLE 89: Binary Relations

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

* Not predefined by the L^AT_EX 2_< 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, L^AT_EX 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 90: \mathcal{AM} S Binary Relations

\approx	<code>\approxeq</code>	$=$	<code>\eqcirc</code>	\succapprox	<code>\succapprox</code>
\backepsilon	<code>\backepsilon</code>	\vdash	<code>\fallingdotseq</code>	\succcurlyeq	<code>\succcurlyeq</code>
\backsimeq	<code>\backsimeq</code>	\multimap		\succsim	<code>\succsim</code>
\backsimeq	<code>\backsimeq</code>	\pitchfork		\therefore	<code>\therefore</code>
\because	<code>\because</code>	\approx	<code>\precapprox</code>	\approx	<code>\thickapprox</code>
\between	<code>\between</code>	\succcurlyeq		\thicksim	<code>\thicksim</code>
\bowtie	<code>\Bumpeq</code>	\succsim	<code>\precsim</code>	\propto	<code>\varpropto</code>
\simeq	<code>\bumpeq</code>	$\exists\!\!\!.$	<code>\risingdotseq</code>	\Vdash	<code>\Vdash</code>
\circeq	<code>\circeq</code>	\mid	<code>\shortmid</code>	\vDash	<code>\vDash</code>
\curlyeqsucc	<code>\curlyeqsucc</code>	\parallel	<code>\shortparallel</code>	\Vvdash	<code>\Vvdash</code>
\curlyeqsucc	<code>\curlyeqsucc</code>	\sim	<code>\smallfrown</code>		
\doteqdot	<code>\doteqdot</code>	\curvearrowleft	<code>\smallsmile</code>		

TABLE 91: \mathcal{AM} S Negated Binary Relations

$\not\approx$	<code>\ncong</code>	$\not\parallel$	<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>	$\not\succ$	<code>\nsucc</code>	$\not\approx$	<code>\precnsim</code>
$\not\prec$	<code>\nprec</code>	$\not\succceq$	<code>\nsuccceq</code>	$\not\approx$	<code>\succnapprox</code>
$\not\preceq$	<code>\preceq</code>	$\not\Vdash$	<code>\nvDash</code>	$\not\approx$	<code>\succnsim</code>
$\not\mid$	<code>\nshortmid</code>	$\not\vdash$	<code>\nvdash</code>		

TABLE 92: stmaryrd Binary Relations

$\in \setminus \inplus \ni \niplus$

TABLE 93: wasysym Binary Relations

$\neg \setminus \invneg \leadsto \leadsto \Join \otimes \logof \wasypropto \wasypropto$

TABLE 94: txfonts/pfxfonts Binary Relations

\ominus	\circledgtr	\ltimes	\lJoin	\times	\opentimes
\oslash	\circledless	\bowtie	\lRtimes	\nparallel	\Perp
\approx	$\colon\!\!\!:\!\!\!\approx$	\multimap	\multimap	\trianglelefteq	\preceqq
$\approx\approx$	\Colonapprox	\multimap	\multimapboth	$\triangleleft\!\!\!\triangleleft$	\precneqq
\vdash	$\colon\!\!\!\vdash$	$\circ\circ$	\multimapbothvert	\bowtie	\rJoin
\vdash	$\colon\!\!\!\vdash$	\circ	\multimapdot	\triangleleft	\strictfi
\vdash	$\colon\!\!\!\vdash$	$\bullet\bullet$	\multimapdotboth	\exists	\strictif
\vdash	$\colon\!\!\!\vdash^*$	$\circ\bullet$	\multimapdotbothA	$\exists\exists$	\strictiff
$\approx\approx$	$\colon\!\!\!\approx$	\circ	\multimapdotbothAvert	\geq	\succeqq
$\approx\approx$	$\colon\!\!\!\approx$	\bullet	\multimapdotbothB	$\geq\geq$	\succneqq
\vdash	\Eqcolon	$\bullet\circ$	\multimapdotbothBvert	\parallel	\varparallel
\vdash	\eqcolon	$\bullet\bullet$	\multimapdotbothvert	$\parallel\parallel$	\varparallelinv
\vdash	\eqqcolon	\bullet	\multimapdotinv	\nparallel	\VvDash
\vdash	\Eqqcolon	\circ	\multimapinv		
\approx	\eqsim	\times	\openJoin		

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

TABLE 95: txfonts/pfxfonts Negated Binary Relations

$\not\equiv$	\napproxeq	$\not\approx$	\npreccurlyeq	$\not\approx$	\nthickapprox
$\not\equiv$	\nasmp	$\not\approx$	\npreceqq	\nleftrightarrow	\ntwoheadleftarrow
$\not\vdash$	\nbacksimeq	$\not\approx$	\nprecsm	\nleftrightarrow	\ntwoheadrightarrow
$\not\vdash$	\nbacksimeq	$\not\approx$	\nsimeq	\nparallel	\nvarparallel
$\not\vdash$	\nbumppeq	$\not\approx$	\nsuccapprox	\nparallel	\nvarparallelinv
$\not\vdash$	\nBumppeq	$\not\approx$	\nsucccurlyeq	\nparallel	\nVdash
$\not\vdash$	\nequiv	$\not\approx$	\nsuccceqq		
$\not\vdash$	\nprecapprox	$\not\approx$	\nsuccsim		

TABLE 96: mathabx Binary Relations

\between	\between	$ $	\divides	\doteq	\risingdotseq
\botdoteq	\botdoteq	\div	\dotseq	\approx	\succapprox
\Bumpedeq	\Bumpedeq	\sqsupseteq	\eqbumped	\approx	\succcurlyeq
\bumpedeq	\bumpedeq	\equiv	\eqcirc	\triangleright	\succdot
\circeq	\circeq	\equiv	\eqcolon	\asymp	\succsim
\coloneq	\coloneq	\equiv	\fallingdotseq	\therefore	\therefore
\corresponds	\corresponds	\ggcurlyeq		\doteq	\topdoteq
\curlyeqprec	\curlyeqprec	\llcurlyeq		\vdash	\vDash
\curlyeqsucc	\curlyeqsucc	\approx	\precapprox	\vdash	\Vdash
\DashV	\DashV	\approx	\preccurlyeq	\vdash	\VDash
\Dashv	\Dashv	\lessdot	\precdot	\vdash	\Vvdash
\dashVv	\dashVv	\lessdot	\precsim		

TABLE 97: `mathabx` Negated Binary Relations

$\not\approx$	<code>\napprox</code>	$\not\trianglelefteq$	<code>\notperp</code>	$\not\models$	<code>\nvDash</code>
$\not\cong$	<code>\ncong</code>	$\not\prec$	<code>\notprec</code>	$\not\models$	<code>\nVdash</code>
$\not\curlyeqprec$	<code>\ncurlyeqprec</code>	$\not\approx$	<code>\nprecapprox</code>	$\not\models$	<code>\nVdash</code>
$\not\curlyeqsucc$	<code>\ncurlyeqsucc</code>	$\not\#$	<code>\npreccurlyeq</code>	$\not\models$	<code>\nvdash</code>
$\not\dashv$	<code>\nDashv</code>	$\not\trianglelefteq$	<code>\npreceq</code>	$\not\models$	<code>\nVdash</code>
$\not\dashv$	<code>\ndashv</code>	$\not\trianglelefteq$	<code>\nprecsim</code>	$\not\models$	<code>\precnapprox</code>
$\not\dashv$	<code>\ndashv</code>	$\not\asymp$	<code>\nsim</code>	$\not\models$	<code>\precneq</code>
$\not\dashv$	<code>\nDashv</code>	$\not\approx$	<code>\nsimeq</code>	$\not\models$	<code>\precnsim</code>
$\not\dashv$	<code>\ndashVv</code>	$\not\triangleright$	<code>\nsucc</code>	$\not\models$	<code>\succnapprox</code>
$\not=$	<code>\neq</code>	$\not\approx$	<code>\nsuccapprox</code>	$\not\models$	<code>\succneq</code>
$\not\asymp$	<code>\notasymp</code>	$\not\#$	<code>\nsucccurlyeq</code>	$\not\models$	<code>\succnsim</code>
$\not\divides$	<code>\notdivides</code>	$\not\trianglelefteq$	<code>\nsucceq</code>		
$\not\equiv$	<code>\notequiv</code>	$\not\asymp$	<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 “ $a \not\models b$ ” or “ $a \not\models b$ ”.

 TABLE 98: `MnSymbol` Binary Relations

\approx	<code>\approx</code>	\trianglelefteq	<code>\hateq</code>	∞	<code>\rightpropto</code>
\approx	<code>\approxeq</code>	\times	<code>\hcrossing</code>	\triangleright	<code>\rightslice</code>
\asymp	<code>\backapprox</code>	\vdash	<code>\leftfootline</code>	\Vdash	<code>\rightVdash</code>
\asymp	<code>\backapproxeq</code>	\vdash	<code>\leftfree</code>	\vdash	<code>\rightvdash</code>
\asymp	<code>\backcong</code>	\sqcap	<code>\leftmodels</code>	\therefore	<code>\risingdotseq</code>
\asymp	<code>\backeqsim</code>	\exists	<code>\leftModels</code>	\swarrow	<code>\sefootline</code>
\asymp	<code>\backsim</code>	\propto	<code>\leftpropto</code>	\swarrow	<code>\sefree</code>
\asymp	<code>\backsimeq</code>	\mid	<code>\leftrightline</code>	\Re	<code>\seModels</code>
\asymp	<code>\backtriplesim</code>	$=$	<code>\Leftrightline</code>	\Re	<code>\semmodels</code>
\between	<code>\between</code>	\diamond	<code>\leftslice</code>	\between	<code>\separated</code>
\bumpeq	<code>\bumpeq</code>	\dashv	<code>\leftVdash</code>	\between	<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>
\triangleleft	<code>\closedprec</code>	\Re	<code>\neModels</code>	\simeq	<code>\simeq</code>
\triangleright	<code>\closedsucc</code>	\Re	<code>\nemodels</code>	\succ	<code>\succ</code>
\coloneq	<code>\coloneq</code>	\diagup	<code>\neswline</code>	\approx	<code>\succapprox</code>
\cong	<code>\cong</code>	$\Re\Re$	<code>\Neswline</code>	\approx	<code>\succcurlyeq</code>
\curlyeqprec	<code>\curlyeqprec</code>	$\Re\Re$	<code>\nevDash</code>	\simeq	<code>\succeq</code>
\curlyeqsucc	<code>\curlyeqsucc</code>	\swarrow	<code>\nevDash</code>	\approx	<code>\succsim</code>
\doteq	<code>\Doteq</code>	\swarrow	<code>\nwfootline</code>	\checkmark	<code>\swfootline</code>
\doteq	<code>\doteq</code>	\swarrow	<code>\nwfree</code>	\checkmark	<code>\swfree</code>
\downarrow	<code>\downfootline</code>	$\Re\Re$	<code>\nwmodels</code>	$\Re\Re$	<code>\swModels</code>

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\downarrow	<code>\downfree</code>	\gg	<code>\nwModels</code>	\triangleright	<code>\swmodels</code>
$\overline{\sqcap}$	<code>\downmodels</code>	\dotplus	<code>\nwsecrossing</code>	$\overline{\sqcap}$	<code>\swVdash</code>
$\overline{\sqcup}$	<code>\downModels</code>	$\overline{\parallel}$	<code>\Nwsepline</code>	$\overline{\sqcap}$	<code>\swvDash</code>
\circlearrowleft	<code>\downproto</code>	\backslash	<code>\nwseline</code>	\approx	<code>\triplesim</code>
\top	<code>\downvDash</code>	\succ	<code>\nwvDash</code>	\mid	<code>\updownline</code>
\top	<code>\downVdash</code>	\gg	<code>\nwvDash</code>	\parallel	<code>\Updownline</code>
\asymp	<code>\eqbump</code>	\prec	<code>\prec</code>	\top	<code>\upfootline</code>
\approx	<code>\eqcirc</code>	\gtrapprox	<code>\precapprox</code>	\uparrow	<code>\upfree</code>
\doteq	<code>\eqdot</code>	\lessapprox	<code>\preccurlyeq</code>	$\perp\!\!\!\perp$	<code>\upModels</code>
\approx	<code>\eqsim</code>	\leq	<code>\preceq</code>	$\perp\!\!\!\perp$	<code>\upmodels</code>
$=$	<code>\equal</code>	\gtrapprox	<code>\precsim</code>	\approx	<code>\upproto</code>
\square	<code>\equalclosed</code>	\dashv	<code>\rightfootline</code>	\perp	<code>\upvDash</code>
\equiv	<code>\equiviv</code>	\rightarrow	<code>\rightfree</code>	$\perp\!\!\!\perp$	<code>\upVdash</code>
\blacksquare	<code>\equivvclosed</code>	\models	<code>\rightmodels</code>	\times	<code>\vcrossing</code>
\doteq	<code>\fallingdotseq</code>	\Vdash	<code>\rightModels</code>	\Vdash	<code>\VvDash</code>

MnSymbol additionally defines synonyms for some of the preceding symbols:

\dashv	<code>\dashv</code>	(same as <code>\leftvDash</code>)
\searrow	<code>\diagdown</code>	(same as <code>\nwseline</code>)
\nearrow	<code>\diagup</code>	(same as <code>\neseline</code>)
\swarrow	<code>\divides</code>	(same as <code>\updownline</code>)
\nwarrow	<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>\proto</code>	(same as <code>\leftproto</code>)
$\bar{-}$	<code>\relbar</code>	(same as <code>\leftrightline</code>)
\equiv	<code>\Relbar</code>	(same as <code>\Leftrightline</code>)
\varpropto	<code>\varproto</code>	(same as <code>\leftproto</code>)
\vdash	<code>\vDash</code>	(same as <code>\rightmodels</code>)
\Vdash	<code>\VDash</code>	(same as <code>\rightModels</code>)
\vdash	<code>\vdash</code>	(same as <code>\rightvDash</code>)
\Vdash	<code>\Vdash</code>	(same as <code>\rightVdash</code>)

TABLE 99: MnSymbol Negated Binary Relations

$\not\approx$	<code>\napprox</code>	$\not\dashv$	<code>\nleftfootline</code>	\neq	<code>\nrisingdotseq</code>
$\not\approx$	<code>\napproxeq</code>	$\not\dashv$	<code>\nleftfree</code>	\times	<code>\nsefootline</code>
$\not\approx$	<code>\nbackapprox</code>	$\not\dashv$	<code>\nleftmodels</code>	\times	<code>\nsefree</code>
$\not\approx$	<code>\nbackapproxeq</code>	$\not\dashv$	<code>\nleftModels</code>	$\not\approx$	<code>\nseModels</code>
$\not\approx$	<code>\nbackcong</code>	$\not\dashv$	<code>\nleftrightline</code>	$\not\approx$	<code>\nsemmodels</code>
$\not\approx$	<code>\nbackeqsim</code>	$\not\dashv$	<code>\nLeftrightline</code>	\times	<code>\nsevdash</code>
$\not\approx$	<code>\nbacksim</code>	$\not\dashv$	<code>\nleftvDash</code>	$\not\approx$	<code>\nseVdash</code>

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$\not\equiv$	<code>\nbacksimeq</code>	$\not\approx$	<code>\nleftVdash</code>	$\not\sim$	<code>\nshortmid</code>
$\not\asymp$	<code>\nbacktriplesim</code>	$\not\asymp$	<code>\nnefootline</code>	$\not\asymp$	<code>\nshortparallel</code>
$\not\approx$	<code>\nbumppeq</code>	$\not\approx$	<code>\nnefree</code>	$\not\approx$	<code>\nsim</code>
$\not\approx$	<code>\nBumppeq</code>	$\not\approx$	<code>\nnmodels</code>	$\not\approx$	<code>\nsimeq</code>
$\not\approx$	<code>\ncirceq</code>	$\not\approx$	<code>\nneModels</code>	$\not\approx$	<code>\nsucc</code>
$\not\approx$	<code>\nclosedeq</code>	$\not\approx$	<code>\nneswline</code>	$\not\approx$	<code>\nsuccapprox</code>
$\not\approx$	<code>\ncong</code>	$\not\approx$	<code>\nNeswline</code>	$\not\approx$	<code>\nsucccurlyeq</code>
$\not\approx$	<code>\ncurlyeqprec</code>	$\not\approx$	<code>\nneVdash</code>	$\not\approx$	<code>\nsucceq</code>
$\not\approx$	<code>\ncurlyeqsucc</code>	$\not\approx$	<code>\nnevDash</code>	$\not\approx$	<code>\nsuccsim</code>
$\not\approx$	<code>\ndoteq</code>	$\not\approx$	<code>\nnwfootline</code>	$\not\approx$	<code>\nswfootline</code>
$\not\approx$	<code>\Doteq</code>	$\not\approx$	<code>\nnwfree</code>	$\not\approx$	<code>\nswfree</code>
$\not\approx$	<code>\downfootline</code>	$\not\approx$	<code>\nnwmodels</code>	$\not\approx$	<code>\nswModels</code>
$\not\approx$	<code>\downfree</code>	$\not\approx$	<code>\nnwModels</code>	$\not\approx$	<code>\nswmodels</code>
$\not\approx$	<code>\downModels</code>	$\not\approx$	<code>\nNweline</code>	$\not\approx$	<code>\nswdash</code>
$\not\approx$	<code>\downmodels</code>	$\not\approx$	<code>\nNweline</code>	$\not\approx$	<code>\nswVdash</code>
$\not\approx$	<code>\downVdash</code>	$\not\approx$	<code>\nnwvDash</code>	$\not\approx$	<code>\ntriplesim</code>
$\not\approx$	<code>\downvdash</code>	$\not\approx$	<code>\nmwVdash</code>	$\not\approx$	<code>\nUpdownline</code>
$\not\approx$	<code>\neqbump</code>	$\not\approx$	<code>\nprec</code>	$\not\approx$	<code>\nupdownline</code>
$\not\approx$	<code>\neqcirc</code>	$\not\approx$	<code>\nprecapprox</code>	$\not\approx$	<code>\nupfootline</code>
$\not\approx$	<code>\neqdot</code>	$\not\approx$	<code>\npreccurlyeq</code>	$\not\approx$	<code>\nupfree</code>
$\not\approx$	<code>\neqsim</code>	$\not\approx$	<code>\npreceq</code>	$\not\approx$	<code>\nupModels</code>
$\not\approx$	<code>\nequal</code>	$\not\approx$	<code>\nprecsim</code>	$\not\approx$	<code>\nupmodels</code>
$\not\approx$	<code>\nequalsclosed</code>	$\not\approx$	<code>\nrightfootline</code>	$\not\approx$	<code>\nupVdash</code>
$\not\approx$	<code>\nequiv</code>	$\not\approx$	<code>\nrightfree</code>	$\not\approx$	<code>\nupvdash</code>
$\not\approx$	<code>\nequivclosed</code>	$\not\approx$	<code>\nrightModels</code>	$\not\approx$	<code>\precapprox</code>
$\not\approx$	<code>\newcrossing</code>	$\not\approx$	<code>\nrightmodels</code>	$\not\approx$	<code>\precnsim</code>
$\not\approx$	<code>\nfallingdotseq</code>	$\not\approx$	<code>\nrightvDash</code>	$\not\approx$	<code>\succapprox</code>
$\not\approx$	<code>\nhateq</code>	$\not\approx$	<code>\nrightVdash</code>	$\not\approx$	<code>\succnsim</code>

MnSymbol additionally defines synonyms for some of the preceding symbols:

$\not\equiv$	<code>\ndashv</code>	(same as <code>\nleftvDash</code>)
$\not\asymp$	<code>\ndiagdown</code>	(same as <code>\nnweline</code>)
$\not\asymp$	<code>\ndiagup</code>	(same as <code>\nneswline</code>)
$\not\approx$	<code>\ndivides</code>	(same as <code>\nupdownline</code>)
$\not\approx$	<code>\ne</code>	(same as <code>\nequal</code>)
$\not\approx$	<code>\neq</code>	(same as <code>\nequal</code>)
$\not\approx$	<code>\nmid</code>	(same as <code>\nupdownline</code>)
$\not\approx$	<code>\nmodels</code>	(same as <code>\nrightmodels</code>)
$\not\approx$	<code>\nparallel</code>	(same as <code>\nUpdownline</code>)
$\not\approx$	<code>\nperp</code>	(same as <code>\nupvdash</code>)
$\not\approx$	<code>\nrelbar</code>	(same as <code>\nleftrightline</code>)
$\not\approx$	<code>\nRelbar</code>	(same as <code>\nLeftrightline</code>)
$\not\approx$	<code>\nvDash</code>	(same as <code>\nrightmodels</code>)
$\not\approx$	<code>\nvDash</code>	(same as <code>\nrightvDash</code>)
$\not\approx$	<code>\nVdash</code>	(same as <code>\nrightVdash</code>)
$\not\approx$	<code>\nVDash</code>	(same as <code>\nrightModels</code>)

TABLE 100: `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>
\lessapprox	<code>\backcong</code>	\succsim	<code>\frown</code>	\Vdash	<code>\rightVDash</code>
\succapprox	<code>\backpropto</code>	\equiv	<code>\frownseq</code>	\vdash	<code>\rightvdash</code>
\sim	<code>\backsimeq</code>	\circ	<code>\frownsmile</code>	\models	<code>\rightvDash</code>
\lessapprox	<code>\backsimeq</code>	\in	<code>\in</code>	\doteq	<code>\risingdotseq</code>
\between	<code>\between</code>	\dashv	<code>\leftassert</code>	\mid	<code>\shortmid</code>
\bowtie	<code>\bowtie</code>	\dashv	<code>\leftAssert</code>	\parallel	<code>\shortparallel</code>
\simeq	<code>\bumpeq</code>	\vdash	<code>\leftfootline</code>	\sim	<code>\sim</code>
\simeq	<code>\Bumpeq</code>	\dashv	<code>\leftmodels</code>	\approx	<code>\simeq</code>
\lessapprox	<code>\bumpeqq</code>	\dashv	<code>\leftvDash</code>	\sim	<code>\smile</code>
\succapprox	<code>\circeq</code>	\dashv	<code>\leftvDash</code>	\approx	<code>\smileeq</code>
\approx	<code>\coloneq</code>	\dashv	<code>\leftVdash</code>	\asymp	<code>\smilefrown</code>
\approx	<code>\cong</code>	\dashv	<code>\leftVDash</code>	\ast	<code>\stareq</code>
\times	<code>\crossing</code>	\dashv	<code>\longleftfootline</code>	$>$	<code>\succ</code>
\approx	<code>\curlyeqprec</code>	\dashv	<code>\Longmapsfrom</code>	\approx	<code>\succapprox</code>
\approx	<code>\curlyeqsucc</code>	\dashv	<code>\longmapsfrom</code>	\approx	<code>\succcurlyeq</code>
\dashv	<code>\dashVv</code>	\dashv	<code>\longrightfootline</code>	\succeq	<code>\succeq</code>
\equiv	<code>\Ddashv</code>	\mid	<code>\mid</code>	\geq	<code>\succeqq</code>
\approx	<code>\dotcong</code>	\ni	<code>\owns</code>	\gtrapprox	<code>\succcsim</code>
\doteq	<code>\doteq</code>	\parallel	<code>\parallel</code>	\approx	<code>\thickapprox</code>
\doteq	<code>\Doteq</code>	\prec	<code>\prec</code>	\sim	<code>\thicksim</code>
\approx	<code>\dotsminusdots</code>	\approx	<code>\precapprox</code>	\approx	<code>\triplesim</code>
\vdash	<code>\downAssert</code>	\asymp	<code>\preccurlyeq</code>	\perp	<code>\upassert</code>
\vdash	<code>\downassert</code>	\asymp	<code>\preceq</code>	\perp	<code>\upAssert</code>
\vdash	<code>\downmodels</code>	\asymp	<code>\preceqq</code>	\perp	<code>\upmodels</code>
\vdash	<code>\downvDash</code>	\asymp	<code>\precnapprox</code>	\perp	<code>\upvDash</code>
\vdash	<code>\downVdash</code>	\asymp	<code>\precneq</code>	\perp	<code>\upvDash</code>
\vdash	<code>\downnvDash</code>	\asymp	<code>\precneqq</code>	\perp	<code>\upvDash</code>
\vdash	<code>\downVDash</code>	\asymp	<code>\precnsim</code>	\perp	<code>\upVDash</code>
\models	<code>\eqcirc</code>	\approx	<code>\precsim</code>	\equiv	<code>\vDash</code>
\models	<code>\eqcolon</code>	\propto	<code>\proto</code>	\asymp	<code>\veeeq</code>
\models	<code>\eqdot</code>	\vdash	<code>\rightassert</code>	\dashv	<code>\Vdash</code>
\models	<code>\eqsim</code>	\dashv	<code>\rightAssert</code>	\trianglelefteq	<code>\wedgeq</code>
$=$	<code>\equal</code>	\dashv	<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>	\doteq	<code>\doteqdot</code>	\perp	<code>\shortuptack</code>
\models	<code>\Assert</code>	\coloneq	<code>\eqcolon</code>	\sim	<code>\smallfrown</code>
\vdash	<code>\assert</code>	\trianglelefteq	<code>\hateq</code>	\sim	<code>\smallsmile</code>
\asymp	<code>\asymp</code>	\bowtie	<code>\Join</code>	\propto	<code>\varproto</code>
\vdash	<code>\Barv</code>	\dashv	<code>\longdashv</code>	\perp	<code>\vBar</code>
\vdash	<code>\barV</code>	\models	<code>\models</code>	\perp	<code>\Vbar</code>
\circ	<code>\closure</code>	\ni	<code>\ni</code>	\models	<code>\vDash</code>
\coloneqq	<code>\coloneqq</code>	\perp	<code>\perp</code>	\models	<code>\VDash</code>

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\dashv	<code>\dashv</code>	∞	<code>\propfrom</code>	\Vdash	<code>\Vdash</code>
\nexists	<code>\DashV</code>	\top	<code>\shortdowntack</code>	\vdash	<code>\vdash</code>
$\not\exists$	<code>\Dashv</code>	\dashv	<code>\shortlefttack</code>	\vDash	<code>\vDash</code>

TABLE 101: `fdsymbol` Negated Binary Relations

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

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

#	\napproxident	//	\ndashV	#	\nshortrighttack
#	\narceq	#	\ne	#	\nshortuptack
//	\nAssert	#	\neq	#	\nsime
#	\nassert	#	\nhateq	#	\nvBar
*	\nasymp	-+→	\nlongdashv	#	\nVbar
⤔	\nBarv	#	\nmodels	//	\nVdash
⤖	\nbarV	#	\nni	#	\nvDash
#	\nclosure	#	\notin	//	\nVDash
#	\nDashV	#	\nperp	#	\nvdash
#	\nDashv	#	\nshortdowntack	-+→	\nvlongdash
#	\ndashv	#	\nshortlefttack		

TABLE 102: boisik Binary Relations

?	\ac	//	\fatslash	⤒	\scurel
≈	\approxeq	∩	\forkv		\shortmid
⤒	\arceq)	\frown	//	\shortparallel
⤢	\backsim	⤣	\ggcurly	⤓	\simrdots
⤤	\backsimeq	#	\hash	⤦	\smallfrown
⤥	\bagmember	€	\inplus	⤦	\smallsmile
⤧	\because	⤧	\kernelcontraction	⤨	\smile
⤩	\between	⤪	\llcurly	⤩	\strictfi
⤪	\bumpeq	⤠	\multimap	⤪	\strictif
⤪	\Bumpeq	⤠	\multimapboth	⤪⤧	\succapprox
⤪	\circeq	⤠	\multimapbothvert	⤪⤧	\succcurlyeq
⤩	\CircledEq	⤠	\multimapdot	⤪⤧⤧	\succnapprox
⤪	\cong	⤠	\multimapdotboth	⤪⤧⤧	\succneqq
⤪	\corresponds	⤠	\multimapdotbothA	⤪⤧⤧	\succnsim
⤪	\curlyeqprec	⤠	\multimapdotbothAvert	⤪⤧⤧	\succsim
⤪	\curlyeqsucc	⤠	\multimapdotbothB	⤧	\therefore
⤪	\dashV	⤠	\multimapdotbothBvert	⤪	\thickapprox
⤪	\DashV	⤠	\multimapdotbothvert	⤧	\thicksim
⤪	\dashVv	⤠	\multimapdotinv	⤠	\topfork
⤪	\dfourier	⤠	\multimapinv	⤪	\triangleq
⤪	\Dfourier	⤠	\niplus	#	\varhash
⤪	\disin	⤠	\nisd	€	\varisins
⤪	\doteq	⤠	\Perp	⤠	\varnis
⤪	\doteqdot	⤠	\pitchfork	⤠	\varproto
⤪	\dotminus	⤧	\precapprox	⤠	\Vdash
⤪	\dotsim	⤧	\preccurlyeq	⤠	\vDash
⤪	\eqbumped	⤧	\precnapprox	⤠	\VDash
⤪	\eqcirc	⤧	\precneqq	⤧	\veeeq
⤪	\eqsim	⤧	\precnsim	⤠	\Vvdash
#	\equalparallel	⤧	\precsim	⤧	\ztransf

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$\doteq \backslash fallingdotseq$	$\preceq \backslash prurel$		$\rightsquigarrow \backslash Ztransf$
$\backslash \backslash \backslash fatbslash$	$\doteq \backslash risingdotseq$		

TABLE 103: boisik Negated Binary Relations

$\not\equiv \backslash ncong$	$\not\preceq \backslash npreceq$	$\not\models \backslash nVDash$
$\not\neq \backslash neq$	$\not\models \backslash nshortmid$	$\not\models \backslash nVdash$
$\not\equiv \backslash nequiv$	$\not\models \backslash nshortparallel$	$\not\models \backslash nvDash$
$\not\models \backslash nmid$	$\not\sim \backslash nsim$	$\not\models \backslash nvDash$
$\not\models \backslash nparallel$	$\not\models \backslash nsucc$	
$\not\models \backslash nprec$	$\not\models \backslash nsuccq$	

TABLE 104: stix Binary Relations

$\approx \backslash approx$	$\# \backslash eqvparsl$	$\rightarrow \backslash rightfishetail$
$\approx \backslash approxeq$	$\doteq \backslash fallingdotseq$	$\Rightarrow \backslash rightimply$
$\approx \backslash approxeqq$	$\blacktriangleright \backslash fbowtie$	$\succ \backslash righttail$
$\approx \backslash approxident$	$\downarrow \backslash forksnot$	$\doteq \backslash risingdotseq$
$\sqsupseteq \backslash arceq$	$\cap \backslash forkv$	$\sqsupset \backslash rsqhook$
$\vdash \backslash assert$	$\frown \backslash frown$	$\rightarrow \backslash ruledelayed$
$\ast \backslash asteq$	$\H \backslash gleichstark$	$\simeq \backslash scurel$
$\asymp \backslash asymp$	$\approx \backslash hatapprox$	$\top \backslash shortdowntack$
$\leq \backslash backcong$	$\bullet \circ \backslash imageof$	$\dashv \backslash shortlefttack$
$\sim \backslash backsim$	$\in \backslash in$	$\vdash \backslash shortmid$
$\leq \backslash backsimeq$	$\dot{\in} \backslash isindot$	$\parallel \backslash shortparallel$
$\sqsubseteq \backslash bagmember$	$\in \backslash isinE$	$\perp \backslash shortuptack$
$\neq \backslash Barv$	$\in \backslash isinobar$	$\sim \backslash sim$
$\neq \backslash barV$	$\in \backslash isins$	$\simeq \backslash simeq$
$\between \backslash between$	$\in \backslash isinvb$	$\approx \backslash simminussim$
\mathbf{bNot}	$\approx \backslash kernelcontraction$	$\not\equiv \backslash simneqq$
$\bowtie \backslash bowtie$	$\nwarrow \backslash leftdbltail$	$\simeq \backslash simrdots$
$\simeq \backslash Bumpeq$	$\leftarrow \backslash leftfishetail$	$\frown \backslash smallfrown$
$\simeq \backslash bumpeq$	$\leftarrow \backslash lefttail$	$\in \backslash smallin$
$\simeq \backslash bumpeqq$	$\blacktriangleright \backslash lfbowtie$	$\exists \backslash smallni$
$\circlearrowleft \backslash cirbot$	$\blacktriangleright \backslash lftimes$	$\cup \backslash smallsmile$
$\circlearrowright \backslash circeq$	$\longrightarrow \backslash longdashv$	$\# \backslash smeparsl$
$\circlearrowleft \backslash cirmid$	$\sqsupset \backslash lsqhook$	$\smile \backslash smile$
$\circlearrowright \backslash closure$	$\equiv \backslash measeq$	$\ast \backslash stareq$
$\coloneqq \backslash Coloneq$	$\mid \backslash mid$	$\succ \backslash succ$

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\coloneqq	<code>\coloneq</code>	\midcirc	<code>\midcir</code>	\succcurlyeq	<code>\succcurlyeq</code>
\cong	<code>\cong</code>	\mlcp	<code>\mlcp</code>	\approxapprox	<code>\approxapprox</code>
\congdot	<code>\congdot</code>	\models	<code>\models</code>	\succapprox	<code>\succapprox</code>
\curlyeqsucc	<code>\curlyeqsucc</code>	\multimap	<code>\multimap</code>	\succceq	<code>\succceq</code>
\curlyeqsucc	<code>\curlyeqsucc</code>	\multimapinv	<code>\multimapinv</code>	\succceqq	<code>\succceqq</code>
\dashcolon	<code>\dashcolon</code>	\ni	<code>\ni</code>	\succnapprox	<code>\succnapprox</code>
\dashv	<code>\dashv</code>	\niobar	<code>\niobar</code>	\succneq	<code>\succneq</code>
\dashv	<code>\dashv</code>	\nis	<code>\nis</code>	\succneqq	<code>\succneqq</code>
\Dashv	<code>\Dashv</code>	\nisd	<code>\nisd</code>	\succnsim	<code>\succnsim</code>
\DashV	<code>\DashV</code>	\Not	<code>\Not</code>	\succsim	<code>\succsim</code>
\DashVDash	<code>\DashVDash</code>	$/$	<code>\notchar</code>	\thickapprox	<code>\thickapprox</code>
\dashv	<code>\dashv</code>	\bullet	<code>\origof</code>	\thicksim	<code>\thicksim</code>
$\ddot{\cdot}$	<code>\ddot{\cdot}</code>	$=$	<code>\parallel</code>	\topfork	<code>\topfork</code>
\disin	<code>\disin</code>	$\#$	<code>\parsim</code>	\upfishtail	<code>\upfishtail</code>
\doteq	<code>\Doteq</code>	\perp	<code>\perp</code>	\upin	<code>\upin</code>
\doteq	<code>\doteq</code>	\pitchfork	<code>\pitchfork</code>	\varisino	<code>\varisino</code>
\dotequiv	<code>\dotequiv</code>	\prec	<code>\prec</code>	\varisins	<code>\varisins</code>
\dotsim	<code>\dotsim</code>	$\mathcal{P}rec$	<code>\Prec</code>	\varniob	<code>\varniob</code>
\dotsminusdots	<code>\dotsminusdots</code>	\precapprox	<code>\precapprox</code>	\varnis	<code>\varnis</code>
\downfishtail	<code>\downfishtail</code>	\preccurlyeq	<code>\preccurlyeq</code>	\varpropto	<code>\varpropto</code>
\dualmap	<code>\dualmap</code>	\preceq	<code>\preceq</code>	\varVdash	<code>\varVdash</code>
\eparsl	<code>\eparsl</code>	\preceqq	<code>\preceqq</code>	\vBar	<code>\vBar</code>
\eqcirc	<code>\eqcirc</code>	\precnapprox	<code>\precnapprox</code>	\vbar	<code>\vbar</code>
\eqcolon	<code>\eqcolon</code>	\precneq	<code>\precneq</code>	\vBarv	<code>\vBarv</code>
\eqdef	<code>\eqdef</code>	\precneqq	<code>\precneqq</code>	\vDash	<code>\vDash</code>
\eqdot	<code>\eqdot</code>	\precnsim	<code>\precnsim</code>	\vdash	<code>\vdash</code>
\eqeq	<code>\eqeq</code>	\precsim	<code>\precsim</code>	\vDash	<code>\vDash</code>
\eqeqeq	<code>\eqeqeq</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>	\sqsubseteq	<code>\pullback</code>	\vdots	<code>\vdots</code>
\equalparallel	<code>\equalparallel</code>	\sqsupset	<code>\pushout</code>	\veeeq	<code>\veeeq</code>
\equiv	<code>\equiv</code>	$\stackrel{?}{=}$	<code>\questeq</code>	\veeonwedge	<code>\veeonwedge</code>
\Equiv	<code>\Equiv</code>	\dashv	<code>\revnmid</code>	\vert	<code>\vert</code>
\equiv	<code>\equiv</code>	\blacktriangleright	<code>\rfbowtie</code>	$\overline{\rule{1pt}{1ex}}$	<code>\vlongdash</code>
\equiv	<code>\equiv</code>	\blacktriangleleft	<code>\rftimes</code>	$\overline{\rule{1pt}{1ex}}$	<code>\vvdash</code>
\equiv	<code>\equiv</code>	\rightarrowtail	<code>\rightdbltail</code>	\trianglelefteq	<code>\wedgeeq</code>

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

TABLE 105: stix Negated Binary Relations

$\not\approx$	<code>\forks</code>	\nparallel	<code>\nhpar</code>	$\not\simeq$	<code>\nsime</code>
$\not\approx$	<code>\napprox</code>	\nmid	<code>\nmid</code>	$\not\succ$	<code>\nsucc</code>
$\not\approx$	<code>\napproxeqq</code>	$\not\exists$	<code>\nni</code>	$\not\succcurlyeq$	<code>\nsucccurlyeq</code>
$\not\approx$	<code>\nasym</code>	$\not\in$	<code>\notin</code>	$\not\succeq$	<code>\nsucceq</code>
$\not\approx$	<code>\nBumpeq</code>	\nparallel	<code>\nparallel</code>	$\not\inbar$	<code>\nvarisobar</code>
$\not\approx$	<code>\nbumpeq</code>	$\not\prec$	<code>\nprec</code>	$\not\inbar$	<code>\nvarniobar</code>
$\not\approx$	<code>\ncong</code>	$\not\preccurlyeq$	<code>\preccurlyeq</code>	$\not\dash$	<code>\nvDash</code>
$\not\approx$	<code>\ncongdot</code>	$\not\preceq$	<code>\preceq</code>	$\not\dash$	<code>\nvDash</code>
\neq	<code>\ne</code>	\nshortmid	<code>\nshortmid</code>	$\not\Vdash$	<code>\nVDash</code>
\neq	<code>\neqsim</code>	\nshortparallel	<code>\nshortparallel</code>	$\not\Vdash$	<code>\nVdash</code>
\neq	<code>\nequiv</code>	\nsim	<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 106: mathtools Binary Relations

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

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

$$\text{=:} \quad \text{vs.} \quad \text{=:}$$

“=:” “=\vcentcolon=”

TABLE 107: turnstile Binary Relations

$\begin{array}{c} def \\ \parallel abc \end{array}$	<code>\dddtstile{abc}{def}</code>	$\begin{array}{c} def \\ abc \end{array}$	<code>\nntstile{abc}{def}</code>	$\begin{array}{c} def \\ \parallel abc \end{array}$	<code>\stdtstile{abc}{def}</code>
$\begin{array}{c} def \\ \parallel abc \end{array}$	<code>\ddststile{abc}{def}</code>	$\begin{array}{c} def \\ \parallel abc \end{array}$	<code>\nnttstile{abc}{def}</code>	$\begin{array}{c} def \\ \parallel abc \end{array}$	<code>\stststile{abc}{def}</code>
$\begin{array}{c} def \\ \parallel abc \end{array}$	<code>\ddtstile{abc}{def}</code>	$\begin{array}{c} def \\ \parallel abc \end{array}$	<code>\nsdtstile{abc}{def}</code>	$\begin{array}{c} def \\ \parallel abc \end{array}$	<code>\sttstile{abc}{def}</code>
$\begin{array}{c} def \\ \parallel abc \end{array}$	<code>\ddttstile{abc}{def}</code>	$\begin{array}{c} def \\ \parallel abc \end{array}$	<code>\nsststile{abc}{def}</code>	$\begin{array}{c} def \\ \parallel abc \end{array}$	<code>\stttstile{abc}{def}</code>
$\begin{array}{c} def \\ \parallel abc \end{array}$	<code>\dndtstile{abc}{def}</code>	$\begin{array}{c} def \\ abc \end{array}$	<code>\nststile{abc}{def}</code>	$\begin{array}{c} def \\ \parallel abc \end{array}$	<code>\tddtstile{abc}{def}</code>

(continued on next page)

(continued from previous page)

$\ ^{def}_{abc} $	<code>\dnststile{abc}{def}</code>	$\overset{def}{\overline{abc}} $	<code>\nstattstile{abc}{def}</code>	$\overset{def}{\overline{\overline{abc}}} $	<code>\tdststile{abc}{def}</code>
$\ ^{def}_{abc} $	<code>\dntstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{abc}}}} $	<code>\ntdtstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{abc}}}}} $	<code>\tdtstile{abc}{def}</code>
$\ ^{def}_{abc} $	<code>\dnttstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{abc}}}}}} $	<code>\nttstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}} $	<code>\tdttstile{abc}{def}</code>
$\ ^{def}_{abc} $	<code>\dsdtstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}} $	<code>\nttstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\tndtstile{abc}{def}</code>
$\ ^{def}_{abc} $	<code>\dsststile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\ntttstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\tnststile{abc}{def}</code>
$\ ^{def}_{abc} $	<code>\dststile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{abc}}}}}} $	<code>\sddtstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}} $	<code>\tnststile{abc}{def}</code>
$\ ^{def}_{abc} $	<code>\dttstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\sdststile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\tnntstile{abc}{def}</code>
$\ ^{def}_{abc} $	<code>\dtbstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\sdtstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\tsdtstile{abc}{def}</code>
$\ ^{def}_{abc} $	<code>\dtbstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\sdttstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\tsststile{abc}{def}</code>
$\ ^{def}_{abc} $	<code>\dtbstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\sndtstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\tststile{abc}{def}</code>
$\ ^{def}_{abc} $	<code>\dtbstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\snststile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\tsttstile{abc}{def}</code>
$\ ^{def}_{abc} $	<code>\nddtstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}} $	<code>\sntstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\ttdtstile{abc}{def}</code>
$\ ^{def}_{abc} $	<code>\ndststile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\snttstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}}}} $	<code>\ttststile{abc}{def}</code>
$\ ^{def}_{abc} $	<code>\ndtstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}} $	<code>\ssdtstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}}}} $	<code>\tttstile{abc}{def}</code>
$\ ^{def}_{abc} $	<code>\ndttstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}}}} $	<code>\ssststile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}}}} $	<code>\ttttstile{abc}{def}</code>
$\ ^{def}_{abc} $	<code>\nndtstile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}}}} $	<code>\sststile{abc}{def}</code>		
$\ ^{def}_{abc} $	<code>\nnststile{abc}{def}</code>	$\overset{def}{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{abc}}}}}}}}}} $	<code>\ssststile{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 108: `trsystyle` Binary Relations

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

TABLE 109: `trfsigns` Binary Relations

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

TABLE 110: `cml` Binary Relations

\circ	<code>\coh</code>	\curvearrowleft	<code>\scoh</code>
\asymp	<code>\incoh</code>	\curvearrowright	<code>\sincoh</code>
$\perp\!\!\!\perp$	<code>\Perp</code>	$\perp\!\!\!\perp$	<code>\simperp</code>
$\circ\circ$	<code>\multimapboth</code>		

TABLE 111: `colonequals` Binary Relations

$\approx:$	<code>\approxcolon</code>	$::-$	<code>\coloncolonminus</code>	$=::$	<code>\equalscoloncolon</code>
$\approx::$	<code>\approxcoloncolon</code>	$::\sim$	<code>\coloncolon\sim</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>\colon\sim</code>	$\sim:$	<code>\simcolon</code>
$::=:$	<code>\coloncolon\colonequals</code>	$::=$	<code>\colonequalscolon</code>	$\sim::$	<code>\simcoloncolon</code>

TABLE 112: `fourier` Binary Relations

`\nparallelslant` // `\parallelslant`

TABLE 113: 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>	\subsetneq	<code>\subsetneq</code>

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

TABLE 114: `AMS` Subset and Superset Relations

$\not\sqsubset$	<code>\nsqsubseteq</code>	\sqsubseteq	<code>\subseteq</code>	\supsetneqq	<code>\supsetneqq</code>
$\not\sqsupset$	<code>\nsupseteq</code>	\sqsupseteq	<code>\supseteq</code>	\varsubsetneqq	<code>\varsubsetneqq</code>
$\not\sqsupseteq$	<code>\nsupseteqq</code>	\sqsupseteqq	<code>\supseteqq</code>	\varsubsetneqq	<code>\varsubsetneqq</code>
\sqsubset	<code>\sqsubset</code>	\sqsupset	<code>\Supset</code>	\varsupsetneq	<code>\varsupsetneq</code>
\sqsupset	<code>\sqsupset</code>	\sqsupseteq	<code>\supseteq</code>	\varsupsetneqq	<code>\varsupsetneqq</code>
\sqsubseteq	<code>\Subset</code>	\sqsupseteqq	<code>\supseteqq</code>	\varsupsetneq	<code>\varsupsetneq</code>

TABLE 115: stmaryrd Subset and Superset Relations

\Subset	<code>\subsetplus</code>	\Supset	<code>\supsetplus</code>
\subseteqq	<code>\subsetpluseq</code>	\supseteqq	<code>\supsetpluseq</code>

TABLE 116: wasysym Subset and Superset Relations

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

TABLE 117: txfonts/pxfonts Subset and Superset Relations

\nsubseteq	<code>\nsqsubset</code>	\nsubseteqq	<code>\nsqsubseteq</code>	\nexists	<code>\nsupseteqq</code>
\nsubseteqq	<code>\nsqsubseteq</code>	\nsubseteqq	<code>\nsqsubseteqq</code>	\nexists	<code>\nsupseteqq</code>
\nexists	<code>\nsqsupset</code>	\nexists	<code>\nsqsupseteqq</code>	\nexists	<code>\nsupseteqq</code>

TABLE 118: mathabx Subset and Superset Relations

\sqsubset	<code>\nsqsubset</code>	\sqsupset	<code>\nsupset</code>	\sqsupseteq	<code>\sqsupseteq</code>
\sqsupset	<code>\nsqSupset</code>	\sqsupseteq	<code>\nsupseteq</code>	\sqsupseteqq	<code>\sqsupseteqq</code>
\sqsupseteq	<code>\nsqsubseteq</code>	\sqsupseteqq	<code>\nsqsubseteqq</code>	\sqsubsetneq	<code>\sqsubsetneq</code>
\sqsupseteqq	<code>\nsqsubseteqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\sqsubsetneqq</code>
\sqsubset	<code>\nsqsupset</code>	\sqsubsetneq	<code>\nsqsubsetneq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>
\sqsupset	<code>\nsqSupset</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>
\sqsupseteq	<code>\nsqsupseteq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>
\sqsupseteqq	<code>\nsqsupseteqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>
\sqsubset	<code>\nsqsubsetneq</code>	\sqsubsetneq	<code>\nsqsubsetneq</code>	\sqsubsetneq	<code>\nsqsubsetneq</code>
\sqsupset	<code>\nsqsubsetneqq</code>	\sqsubsetneq	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>
\sqsupseteq	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>
\sqsupseteqq	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>
\sqsubset	<code>\nsqsubsetneqq</code>	\sqsubsetneq	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>
\sqsupset	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>
\sqsupseteq	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>
\sqsupseteqq	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>	\sqsubsetneqq	<code>\nsqsubsetneqq</code>

TABLE 119: MnSymbol Subset and Superset Relations

\nsubseteq	<code>\nSqsubset</code>	\subseteq	<code>\nsubseteq</code>	\nsubseteqq	<code>\nsubseteqq</code>
\nsubseteqq	<code>\nsqsubset</code>	\subseteqq	<code>\nsubseteqq</code>	\nsubseteqq	<code>\nsubseteqqq</code>
\nexists	<code>\nsqsubseteq</code>	\nexists	<code>\nsupset</code>	\nexists	<code>\Sqsupset</code>
\nexists	<code>\nsqsubseteqq</code>	\nexists	<code>\nsupset</code>	\nexists	<code>\nsupset</code>
\nexists	<code>\nSqsupset</code>	\nexists	<code>\nsupseteq</code>	\nexists	<code>\nsupseteq</code>
\nexists	<code>\nsqsupset</code>	\nexists	<code>\nsupseteqq</code>	\nexists	<code>\nsupseteqq</code>
\nexists	<code>\nSqsupseteq</code>	\nexists	<code>\nsupseteqq</code>	\nexists	<code>\nsupseteqqq</code>
\nexists	<code>\nsqsupseteq</code>	\nexists	<code>\nsupseteqq</code>	\nexists	<code>\nsupseteqqq</code>
\nexists	<code>\nSqsupseteqq</code>	\nexists	<code>\nsupseteqq</code>	\nexists	<code>\nsupseteqqq</code>
\nexists	<code>\nsqsupseteqq</code>	\nexists	<code>\nsupseteqq</code>	\nexists	<code>\nsupseteqqq</code>
\nexists	<code>\nSqsubset</code>	\nexists	<code>\nsqsubset</code>	\nexists	<code>\nsqsubset</code>
\nexists	<code>\nsqsubset</code>	\nexists	<code>\nsqsubset</code>	\nexists	<code>\nsqsubset</code>
\nexists	<code>\nSqsubseteq</code>	\nexists	<code>\nsqsubseteq</code>	\nexists	<code>\nsqsubseteq</code>
\nexists	<code>\nsqsubseteq</code>	\nexists	<code>\nsqsubseteq</code>	\nexists	<code>\nsqsubseteq</code>
\nexists	<code>\nSqsubseteqq</code>	\nexists	<code>\nsqsubseteqq</code>	\nexists	<code>\nsqsubseteqq</code>
\nexists	<code>\nsqsubseteqq</code>	\nexists	<code>\nsqsubseteqq</code>	\nexists	<code>\nsqsubseteqq</code>

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

TABLE 120: *fdsymbol* Subset and Superset Relations

$\not\subseteq$	<code>\nsqsubset</code>	$\not\subseteq$	<code>\nsubseteq</code>	$\not\sqsubseteq$	<code>\sqsubsetneq</code>	\subseteq	<code>\subsetneq</code>
$\not\models$	<code>\nSqsubset</code>	$\not\models$	<code>\nsubseteqq</code>	$\not\models$	<code>\sqsubsetneqq</code>	\sqsubseteq	<code>\subsetneqq</code>
$\not\models$	<code>\nsqsubseteq</code>	$\not\models$	<code>\nsubseteq</code>	$\not\models$	<code>\sqsubsetsetneq</code>	\sqsubseteq	<code>\subsetsetneq</code>
$\not\models$	<code>\nsqsubseteqq</code>	$\not\models$	<code>\nsubseteqq</code>	$\not\models$	<code>\sqsubsetsetneqq</code>	\sqsubseteq	<code>\subsetsetneqq</code>
$\not\models$	<code>\nsqsupset</code>	$\not\models$	<code>\nSupset</code>	$\not\models$	<code>\sqsupset</code>	\sqsupseteq	<code>\supseteq</code>
$\not\models$	<code>\nSqsupset</code>	$\not\models$	<code>\nSupset</code>	$\not\models$	<code>\sqsupseteqq</code>	\sqsupseteq	<code>\supseteqq</code>
$\not\models$	<code>\nsqsupseteq</code>	$\not\models$	<code>\nSupseteq</code>	$\not\models$	<code>\sqsupseteq</code>	\sqsupseteqq	<code>\supseteqq</code>
$\not\models$	<code>\nsqsupseteqq</code>	$\not\models$	<code>\nSupseteqq</code>	$\not\models$	<code>\sqsupseteqq</code>	\sqsupseteqq	<code>\supseteqqq</code>
$\not\models$	<code>\nsubset</code>	$\not\models$	<code>\sqsubset</code>	$\not\models$	<code>\subset</code>	\sqsupseteq	<code>\supseteq</code>
$\not\models$	<code>\nSubset</code>	$\not\models$	<code>\sqsubseteqq</code>	$\not\models$	<code>\subsetneq</code>	\sqsupsetneq	<code>\supsetneq</code>

fdsymbol additionally defines `\varssubsetneqq` as a synonym for `\subsetneqq`, `\varssubsetneq` as a synonym for `\subsetneq`, `\varsupsetneqq` as a synonym for `\supsetneqq`, and `\varsupsetneq` as a synonym for `\supsetneq`.

TABLE 121: *boisik* Subset and Superset Relations

$\not\models$	<code>\nsubset</code>	\equiv	<code>\sqsubset</code>	\in	<code>\subsetplus</code>	\supseteq	<code>\supsetplus</code>
$\not\models$	<code>\nsubseteq</code>	\equiv	<code>\sqsubseteq</code>	\in	<code>\subsetplus</code>	\supsetneq	<code>\supsetneq</code>
$\not\models$	<code>\nsubseteqq</code>	\sqsubset	<code>\sqsubset</code>	\supseteq	<code>\supset</code>	\supsetneqq	<code>\supsetneqq</code>
$\not\models$	<code>\nsupset</code>	\equiv	<code>\Subset</code>	\supseteq	<code>\supseteqq</code>	\supsetneq	<code>\supsetneq</code>
$\not\models$	<code>\nsupseteq</code>	\subseteq	<code>\subseteqq</code>	\supseteq	<code>\supsetneq</code>	\supsetneqq	<code>\supsetneqq</code>
$\not\models$	<code>\nsupseteqq</code>	\sqsubset	<code>\subsetneq</code>	\supseteq	<code>\supsetneqq</code>	\supsetneqq	<code>\supsetneqq</code>
\sqsubset	<code>\sqsubset</code>	\sqsubset	<code>\subsetneqq</code>	\supseteq	<code>\supsetplus</code>		

TABLE 122: *stix* Subset and Superset Relations

\sqsubset	<code>\bsolhsub</code>	\sqsupset	<code>\sqsupseteq</code>	\supset	<code>\suphsub</code>
\sqsubset	<code>\csub</code>	\sqsupset	<code>\sqsupsetneq</code>	\supset	<code>\suplarr</code>
\sqsubset	<code>\csube</code>	\sqsupset	<code>\subdot</code>	\supset	<code>\supmult</code>
\sqsubset	<code>\csup</code>	\sqsupset	<code>\submult</code>	\supset	<code>\Supset</code>
\sqsubset	<code>\csupe</code>	\sqsupset	<code>\subrarr</code>	\supset	<code>\supset</code>
\sqsubset	<code>\leftarrowsubset</code>	\sqsubset	<code>\Subset</code>	\approx	<code>\supsetapprox</code>
$\not\models$	<code>\nsqsubset</code>	\subset	<code>\subset</code>	\supset	<code>\supsetcirc*</code>
$\not\models$	<code>\nsqsubseteq</code>	\approx	<code>\subsetapprox</code>	\supset	<code>\supsetdot</code>
$\not\models$	<code>\nsqsupset</code>	\supset	<code>\subsetcirc*</code>	\supset	<code>\supseteq</code>
$\not\models$	<code>\nsqsupseteq</code>	\supset	<code>\subsetdot</code>	\supset	<code>\supseteqq</code>
$\not\models$	<code>\nsqsupseteqq</code>	\supset	<code>\subseteqq</code>	\supset	<code>\supsetneq</code>
$\not\models$	<code>\nsubset</code>	\supset	<code>\subsetneq</code>	\supset	<code>\supsetneqq</code>
$\not\models$	<code>\nsubseteq</code>	\supset	<code>\subsetneqq</code>	\supset	<code>\supsetplus</code>
$\not\models$	<code>\nsubseteqq</code>	\supset	<code>\subsetneqq</code>	\supset	<code>\supsetplus</code>
$\not\models$	<code>\nsupset</code>	\supset	<code>\subsetneqq</code>	\supset	<code>\supsim</code>
$\not\models$	<code>\nsupseteq</code>	\supset	<code>\subsetplus</code>	\supset	<code>\supsub</code>

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$\not\supseteqq$	\nsubseteqqq	$\not\subset$	$\not\supseteqq$	$\not\supseteqq$
$\not\rightarrow$	\rightarrowsupset	$\not\subseteq$	$\not\subsetsub$	$\not\subsetneq$
\sqsubset	\sqsubsetset	$\not\sqsubset$	$\not\sqsubset$	$\not\subsetneqq$
\sqsubseteq	\sqsubsetseteq	$\not\sqsubseteq$	$\not\supdsub$	$\not\subsetneq$
\sqsubsetneq	\sqsubsetsetneq	$\not\sqsubsetneq$	$\not\supedot$	$\not\subsetneqq$
\sqsupset	\sqsupsetset	$\not\sqsupset$	$\not\suphsol$	$\not\subsetneqq$

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

TABLE 123: Inequalities

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

TABLE 124: *AMS* Inequalities

\gg	\eqslantgtr	\gtreqdot	\lesseqtr	\ngeq
\ll	\eqslantless	\gtreqless	\lesseqgtr	\ngeqq
\lll	\geqq	\gtreqqless	\lessgtr	\ngeqslant
\ggg	\geqslant	\gtreqless	\lessapprox	\ngtr
\ggg	\ggtt	\gtreqsim	\lll	\nleq
\approx	\gnapprox	\gvertneqq	\lnapprox	\nleqq
\approx	\gneq	\leqq	\lneq	\nleqslant
\approx	\gneqq	\leqslant	\lneqq	\nless
\approx	\gnsim	\lessapprox	\lnsim	
\approx	\gtrapprox	\lessdot	\lvertneqq	

TABLE 125: *wasysym* Inequalities

$\gtrsim \ \backslash apprge \ \lesssim \ \backslash apprle$

TABLE 126: *txfonts/pxfonts* Inequalities

$\not\gg$	\ngg	$\not\gtreqsim$	$\not\lessapprox$	$\not\lessapprox$
$\not\approx$	\ngtrapprox	$\not\lessapprox$	$\not\ll$	
$\not\approx$	\ngtrless	$\not\lessapprox$	$\not\lessgtr$	

TABLE 127: *mathabx* Inequalities

\geq	<code>\eqslantgtr</code>	$\wedge\vee$	<code>\gtreqless</code>	\lesssim	<code>\lesssim</code>	\dagger	<code>\ngtr</code>
\leq	<code>\eqslantless</code>	$\wedge\backslash\vee$	<code>\gtreqqless</code>	\ll	<code>\lll</code>	\ddagger	<code>\ngtrapprox</code>
\geqslant	<code>\geq</code>	$\wedge\backslash\vee$	<code>\gtrless</code>	\llslant	<code>\lll</code>	\ddagger	<code>\ngtrsim</code>
\geqq	<code>\geqq</code>	$\wedge\backslash\vee$	<code>\gtrsim</code>	\llapprox	<code>\lnapprox</code>	\ddagger	<code>\nleq</code>
\gg	<code>\gg</code>	$\wedge\backslash\vee$	<code>\gvertneqq</code>	\llneq	<code>\lneq</code>	\ddagger	<code>\nleqq</code>
\ggg	<code>\ggg</code>	$\wedge\backslash\vee$	<code>\leq</code>	\llneqq	<code>\lneqq</code>	\dagger	<code>\nless</code>
\gtrapprox	<code>\gnapprox</code>	$\wedge\backslash\vee$	<code>\leqq</code>	\llsim	<code>\lnsim</code>	\ddagger	<code>\nlessapprox</code>
\gneq	<code>\gneq</code>	$\wedge\backslash\vee$	<code>\lessapprox</code>	\llneq	<code>\lvertneqq</code>	\ddagger	<code>\nlesssim</code>
\gneqq	<code>\gneqq</code>	$\wedge\backslash\vee$	<code>\lessdot</code>	$\not\ll$	<code>\neqslantgtr</code>	\ddagger	<code>\nvargeq</code>
\gnsim	<code>\gnsim</code>	$\wedge\backslash\vee$	<code>\lesseqgtr</code>	$\not\ll$	<code>\neqslantless</code>	\ddagger	<code>\nvarleq</code>
\gtrapprox	<code>\gtrapprox</code>	$\wedge\backslash\vee$	<code>\lesseqgtr</code>	$\not\ll$	<code>\ngeq</code>	\geq	<code>\vargeq</code>
\gtrdot	<code>\gtrdot</code>	$\wedge\backslash\vee$	<code>\lessgtr</code>	$\not\ll$	<code>\ngeqq</code>	\leq	<code>\varleq</code>

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

TABLE 128: MnSymbol Inequalities

\geq	<code>\eqslantgtr</code>	$\geq\backslash\wedge$	<code>\gtreqless</code>	\leq	<code>\lesssim</code>	$\geq\backslash\wedge$	<code>\gtreqless</code>
\leq	<code>\eqslantless</code>	$\leq\backslash\wedge$	<code>\gtrless</code>	\ll	<code>\ll</code>	$\leq\backslash\wedge$	<code>\gtreqless</code>
\geq	<code>\geq</code>	$\geq\backslash\wedge$	<code>\gtrneqqless</code>	\lll	<code>\lll</code>	$\geq\backslash\wedge$	<code>\gtreqless</code>
\triangleright	<code>\geqclosed</code>	$\triangleright\backslash\wedge$	<code>\gtrsim</code>	\approx	<code>\lnapprox</code>	$\triangleright\backslash\wedge$	<code>\gtrless</code>
\geq	<code>\geqdot</code>	$\geq\backslash\wedge$	<code>\leq</code>	\leq	<code>\lneqq</code>	$\geq\backslash\wedge$	<code>\nleq</code>
\geq	<code>\geqq</code>	$\geq\backslash\wedge$	<code>\leqclosed</code>	$\not\approx$	<code>\lnsim</code>	$\geq\backslash\wedge$	<code>\nleqclosed</code>
\geq	<code>\geqlant</code>	$\geq\backslash\wedge$	<code>\leqdot</code>	$\not\approx$	<code>\neqslantgtr</code>	$\geq\backslash\wedge$	<code>\nleqdot</code>
\geq	<code>\geqlantdot</code>	$\geq\backslash\wedge$	<code>\leqq</code>	$\not\approx$	<code>\neqslantless</code>	$\geq\backslash\wedge$	<code>\nleqq</code>
\gg		$\gg\backslash\wedge$	<code>\leqslant</code>	$\not\approx$	<code>\ngeq</code>	$\gg\backslash\wedge$	<code>\nleqslant</code>
\ggg		$\ggg\backslash\wedge$	<code>\leqslantdot</code>	$\not\approx$	<code>\ngeqclosed</code>	$\ggg\backslash\wedge$	<code>\nleqslantdot</code>
\approx	<code>\gnapprox</code>	$\approx\backslash\wedge$	<code>\less</code>	$\not\approx$	<code>\ngeqdot</code>	$\approx\backslash\wedge$	<code>\nless</code>
$\not\approx$	<code>\gneqq</code>	$\not\approx\backslash\wedge$	<code>\lessapprox</code>	$\not\approx$	<code>\ngeqq</code>	$\not\approx\backslash\wedge$	<code>\nlessclosed</code>
$\not\approx$	<code>\gnsim</code>	$\not\approx\backslash\wedge$	<code>\lessclosed</code>	$\not\approx$	<code>\ngeqslant</code>	$\not\approx\backslash\wedge$	<code>\nlessdot</code>
$>$	<code>\gtr</code>	$>\backslash\wedge$	<code>\lessdot</code>	$\not\approx$	<code>\ngeqslantdot</code>	$>\backslash\wedge$	<code>\nlesseqgtr</code>
$\approx\backslash\wedge$	<code>\gtrapprox</code>	$\approx\backslash\wedge$	<code>\lesseqgtr</code>	$\not\approx$	<code>\ngg</code>	$\approx\backslash\wedge$	<code>\nlesseqgtrslant</code>
\triangleright	<code>\gtrclosed</code>	$\triangleright\backslash\wedge$	<code>\lesseqgtrslant</code>	\gg	<code>\nggg</code>	$\triangleright\backslash\wedge$	<code>\nlesseqgqgtr</code>
$>$	<code>\gtrdot</code>	$>\backslash\wedge$	<code>\lesseqgqgtr</code>	\triangleright	<code>\ngtr</code>	$>\backslash\wedge$	<code>\nlessgtr</code>
$\approx\backslash\wedge$	<code>\gtreqless</code>	$\approx\backslash\wedge$	<code>\lessgr</code>	$\not\approx$	<code>\ngtrclosed</code>	$\approx\backslash\wedge$	<code>\nll</code>
$\approx\backslash\wedge$	<code>\gtreqless</code>	$\approx\backslash\wedge$	<code>\lessneqqgtr</code>	$\not\approx$	<code>\ngtrdot</code>	$\approx\backslash\wedge$	<code>\nlll</code>

MnSymbol additionally defines synonyms for some of the preceding symbols:

\ggg	<code>\gggtr</code>	(same as <code>\ggg</code>)
$\not\approx$	<code>\gvertneqq</code>	(same as <code>\gneqq</code>)
\triangleleft	<code>\lhd</code>	(same as <code>\lessclosed</code>)
\lll	<code>\lll</code>	(same as <code>\lll</code>)
$\approx\backslash\wedge$	<code>\lvertneqq</code>	(same as <code>\lneqq</code>)
$\not\approx$	<code>\ntrianglelefteq</code>	(same as <code>\nleqclosed</code>)
$\not\approx$	<code>\ntriangleleft</code>	(same as <code>\nlessclosed</code>)
$\not\approx$	<code>\ntrianglerighteq</code>	(same as <code>\ngeqclosed</code>)
$\not\approx$	<code>\ntriangleright</code>	(same as <code>\ngtrclosed</code>)
\triangleright	<code>\rhd</code>	(same as <code>\gtrclosed</code>)
\triangleleft	<code>\trianglelefteq</code>	(same as <code>\leqclosed</code>)
\triangleright	<code>\trianglerighteq</code>	(same as <code>\geqclosed</code>)
\triangleleft	<code>\unlhd</code>	(same as <code>\leqclosed</code>)
\triangleright	<code>\unrhd</code>	(same as <code>\geqclosed</code>)
\triangleleft	<code>\vartriangleleft</code>	(same as <code>\lessclosed</code>)
\triangleright	<code>\vartriangleright</code>	(same as <code>\gtrclosed</code>)

TABLE 129: *fdsymbol* Inequalities

\geq	<code>\eqslantgtr</code>	\leq	<code>\eqslantdot</code>	$\not\equiv$	<code>\ngtrapprox</code>
\leq	<code>\eqslantless</code>	\geq	<code>\eqslcc</code>	$\not\leq$	<code>\ngtrcc</code>
\geq	<code>\geq</code>	$<$	<code>\less</code>	$\not\geq$	<code>\ngtrclosed</code>
\triangleright	<code>\geqclosed</code>	\leqslant	<code>\lessapprox</code>	$\not\triangleright$	<code>\ngtrdot</code>
\geq	<code>\geqdot</code>	\triangleleft	<code>\lesscc</code>	$\not\geq$	<code>\ngtreqless</code>
\geq	<code>\geqq</code>	\triangleleft	<code>\lessclosed</code>	$\not\geq$	<code>\ngtreqqless</code>
\geq	<code>\geqlant</code>	\triangleleft	<code>\lessdot</code>	$\not\geq$	<code>\ngtreqslantless</code>
\geq	<code>\geqlantdot</code>	$\leqslant \leq$	<code>\lesseqgtr</code>	$\not\geq$	<code>\ngtrless</code>
\geq	<code>\geqlcc</code>	$\leqslant \leq$	<code>\lesseqgtr</code>	$\not\geq$	<code>\ngtrsim</code>
\gg	<code>\gg</code>	$\leqslant \leq$	<code>\lesseqslantgtr</code>	$\not\geq$	<code>\nleq</code>
\ggg	<code>\ggg</code>	$\leqslant \leq$	<code>\lessgtr</code>	$\not\geq$	<code>\nleqclosed</code>
$\not\geq$	<code>\gnapprox</code>	\leqslant	<code>\lessim</code>	$\not\geq$	<code>\nleqdot</code>
$\not\geq$	<code>\gneq</code>	\ll	<code>\l1</code>	$\not\geq$	<code>\nleqq</code>
$\not\geq$	<code>\gneqq</code>	\lll	<code>\l11</code>	$\not\geq$	<code>\nleqlant</code>
$\not\geq$	<code>\gnsim</code>	$\not\leqslant$	<code>\lnapprox</code>	$\not\geq$	<code>\nleqlantdot</code>
$>$	<code>\gtr</code>	$\not\leq$	<code>\lneq</code>	$\not\geq$	<code>\nleqlcc</code>
$\not\geq$	<code>\gtrapprox</code>	$\not\leq$	<code>\lneqq</code>	$\not\geq$	<code>\nless</code>
\triangleright	<code>\gtrcc</code>	$\not\leq$	<code>\lnsim</code>	$\not\geq$	<code>\nlessapprox</code>
\triangleright	<code>\gtrclosed</code>	$\not\leq$	<code>\neqlantgtr</code>	$\not\geq$	<code>\nlesscc</code>
$>$	<code>\gtrdot</code>	$\not\leq$	<code>\neqlantless</code>	$\not\geq$	<code>\nlessclosed</code>
$\not\geq \not\leq$	<code>\gtreqless</code>	$\not\leq$	<code>\ngeq</code>	$\not\geq$	<code>\nlessdot</code>
$\not\geq \not\leq$	<code>\gtreqqless</code>	$\not\leq$	<code>\ngeqclosed</code>	$\not\geq$	<code>\nlesseqgtr</code>
$\not\geq \not\leq$	<code>\gtreqslantless</code>	$\not\leq$	<code>\ngeqdot</code>	$\not\geq$	<code>\nlesseqgqtr</code>
$\not\geq$	<code>\gtrless</code>	$\not\leq$	<code>\ngeqq</code>	$\not\geq$	<code>\nlesseqslantgtr</code>
\geq	<code>\gtrsim</code>	$\not\leq$	<code>\ngeqlant</code>	$\not\geq$	<code>\nlessgtr</code>
\leq	<code>\leq</code>	$\not\leqslant$	<code>\ngeqlantdot</code>	$\not\geq$	<code>\nlessim</code>
\trianglelefteq	<code>\leqclosed</code>	$\not\leqslant$	<code>\ngeqlcc</code>	$\not\geq$	<code>\nll</code>
\trianglelefteq	<code>\leqdot</code>	$\not\geq$	<code>\ngg</code>	$\not\geq$	<code>\nlll</code>
$\not\leq$	<code>\leqq</code>	\ggg			
$\not\leq$	<code>\leqlant</code>	$\not\geq$	<code>\ngtr</code>		

fdsymbol defines synonyms for some of the preceding symbols:

\geq	<code>\ge</code>	\leq	<code>\lesdot</code>	$\not\leq$	<code>\ngtcc</code>
\triangleright	<code>\gescc</code>	\leqslant	<code>\lesg</code>	$\not\leqslant$	<code>\ngtreqlesslant</code>
\geq	<code>\gesdot</code>	\leqslant	<code>\lesseqgtrslant</code>	$\not\leqslant$	<code>\nlescc</code>
\geq	<code>\gesl</code>	\triangleleft	<code>\lhd</code>	$\not\leqslant$	<code>\nlesdot</code>
\ggg	<code>\gggtr</code>	\lll	<code>\l1less</code>	$\not\leqslant$	<code>\nlesg</code>

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\triangleright	\gtcc	\triangleleft	\ltcc	\nleqslant	$\nlesseqgtr_{\text{slant}}$
\lessdot	$\gtreqless_{\text{slant}}$	$\not\leq$	$\lvert neqq$	$\not\geq$	\nltcc
$\not\geq$	\gvertneqq	$\not\leq$	\ngescc	\triangleright	\rhd
\leq	\le	$\not\leq$	\ngesdot	\trianglelefteq	\unlhd
\triangleleft	\lescc	$\not\geq$	\ngesl	\trianglerighteq	\unrhd

TABLE 130: boisik Inequalities

\asymp	\eqslantgtr	\asymp	\gtcir	\asymp	\lesseqgtr	$\not\geq$	\ngeq
\ll	\eqslantless	$\approx\approx$	\gtreqapprox	\ll	\lessgtr	$\not\geq$	\ngeqq
$\approx\approx$	\geqq	$\approx\approx\approx\approx$	\gtreqless	\approx	\lessapprox	$\not\geq$	\ngeqslant
$\approx\approx$	\geqslant	$\approx\approx\approx\approx$	\gtreqless	$\ll\ll$	\lll	$\not\geq$	\ngtr
$\gg\gg$	\gg	$\approx\approx$	\gtreqless	$\approx\approx$	\lnapprox	$\not\geq$	\nleq
$\times\approx$	\glj	$\approx\approx$	\gtreqless	$\approx\approx$	\lneq	$\not\geq$	\nleqq
$\approx\approx$	\gnapprox	$\approx\approx$	\gvertneqq	$\approx\approx$	\lneqq	$\not\geq$	\nleqslant
$\approx\approx$	\gneq	$\leq\leq$	\leqq	$\approx\approx$	\lnsim	$\not\geq$	\nless
$\approx\approx$	\gneqq	$\leq\leq$	\leqslant	\ll	\lt		
$\approx\approx$	\gnsim	$\approx\approx$	\lessapprox	$\approx\approx$	\ltcir		
$\approx\approx$	\Gt	$\approx\approx$	\lesseqgtr	$\approx\approx$	$\lvert neqq$		

TABLE 131: stix Inequalities

\asymp	\egsdot	\asymp	\gtquest	\asymp	\lnsim
\ll	\elsdot	$\approx\approx$	\gtreqapprox	$\approx\approx$	\lsime
$\approx\approx$	\eqgtr	$\approx\approx$	\gtreqarr	$\approx\approx$	\lsimg
$\approx\approx$	\eqless	$\approx\approx$	\gtreqdot	\ll	\lt
$\approx\approx\approx\approx$	\eqqgtr	$\approx\approx\approx\approx$	\gtreqless	\triangleleft	\ltcc
$\approx\approx\approx\approx$	\eqqless	$\approx\approx\approx\approx$	\gtreqless	\triangleleft	\ltcir
$\approx\approx\approx\approx$	\eqslantgtr	$\approx\approx\approx\approx$	\gtreqless	$\approx\approx$	\ltlarr
$\approx\approx\approx\approx$	\eqslantless	$\approx\approx\approx\approx$	\gtreqless	$\approx\approx$	\ltquest
$\approx\approx$	\eqslantgtr	$\approx\approx$	\gvertneqq	$\approx\approx$	$\lvert neqq$
\ll	\eqslantless	$\approx\approx$	\lat	$\not\geq$	\neqslantgtr
$\approx\approx$	\geq	$\approx\approx$	\late	$\not\geq$	\neqslantless
$\approx\approx$	\geqq	$\approx\approx$	\leftarrowless	$\not\geq$	\ngeq

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\geqslant	$\backslash geqslant$	\leq	$\backslash leq$	\neq	$\backslash ngeqq$
\geqslant	$\backslash geqlant$	\leqslant	$\backslash leqq$	$\not\equiv$	$\backslash ngeqslant$
\gtrless	$\backslash gescc$	\gtrless	$\backslash leqqslant$	$\not\gtrless$	$\backslash ngg$
\gtrless	$\backslash gesdot$	\gtrless	$\backslash leqslant$	$\not\gtrless$	$\backslash ngtr$
\gtrless	$\backslash gesdoto$	\gtrless	$\backslash lescc$	$\not\gtrless$	$\backslash ngtrless$
\gtrless	$\backslash gesdotol$	\gtrless	$\backslash lesdot$	$\not\gtrless$	$\backslash ngtrsim$
\gtrless	$\backslash gesles$	\gtrless	$\backslash lesdoto$	$\not\gtrless$	$\backslash nleq$
\gtrless	$\backslash gg$	\gtrless	$\backslash lesdotor$	$\not\gtrless$	$\backslash nleqq$
\gtrless	$\backslash ggg$	\gtrless	$\backslash lesges$	$\not\gtrless$	$\backslash nleqslant$
\gtrless	$\backslash gggnest$	\gtrless	$\backslash lessapprox$	$\not\gtrless$	$\backslash nless$
\gtrless	$\backslash gla$	\gtrless	$\backslash lessdot$	$\not\gtrless$	$\backslash nlessgtr$
\gtrless	$\backslash gle$	\gtrless	$\backslash lesseqgtr$	$\not\gtrless$	$\backslash nlesssim$
\gtrless	$\backslash glj$	\gtrless	$\backslash lesseqqgtr$	$\not\gtrless$	$\backslash nll$
\gtrless	$\backslash gnapprox$	\gtrless	$\backslash lessgtr$	$\not\gtrless$	$\backslash partialmeetcontraction$
\gtrless	$\backslash gneq$	\gtrless	$\backslash lesssim$	$\not\gtrless$	$\backslash rightarrowgtr$
\gtrless	$\backslash gneqq$	\gtrless	$\backslash lgE$	$\not\gtrless$	$\backslash simgE$
\gtrless	$\backslash gnsim$	\gtrless	$\backslash ll$	$\not\gtrless$	$\backslash simgtr$
\gtrless	$\backslash gsime$	\gtrless	$\backslash lll$	$\not\gtrless$	$\backslash simLE$
\gtrless	$\backslash gsimpl$	\gtrless	$\backslash lllnest$	$\not\gtrless$	$\backslash simless$
\gtrless	$\backslash Gt$	\gtrless	$\backslash lnapprox$	$\not\gtrless$	$\backslash smt$
\gtcc	$\backslash gtcc$	\leq	$\backslash lneq$	$\not\leq$	$\backslash smte$
\gtcir	$\backslash gtcir$	$\not\leq$	$\backslash lneqq$	$\not\leq$	

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

TABLE 132: *AMS* Triangle Relations

```
◀ \blacktriangleleft    ▷ \ntriangleright    ▷ \trianglerighteq  
▶ \blacktriangleright ▷ \ntrianglerighteq    □ \vartriangleleft  
▢ \ntriangleleft      △ \trianglelefteq    ▷ \vartriangleright  
▢ \ntrianglelefteq   △ \triangleq
```

TABLE 133: stmaryrd Triangle Relations

\triangleleft	$\backslash trianglelefteqslant$	\triangleright	$\backslash trianglerighteqslant$
\ntriangleleft	$\backslash ntrianglelefteqslant$	\ntriangleright	$\backslash ntrianglerighteqslant$

TABLE 134: mathabx Triangle Relations

\triangleleft	<code>\ntriangleleft</code>	\lhd	<code>\triangleleft</code>	\lhd	<code>\vartriangleleft</code>
\trianglelefteq	<code>\ntrianglelefteq</code>	$\lhd\eqqrel$	<code>\trianglelefteq</code>	$\lhd\eqqrel$	<code>\vartriangleleft</code>
\triangleright	<code>\ntriangleright</code>	\rhd	<code>\triangleright</code>	\rhd	<code>\vartriangleright</code>
\trianglerighteq	<code>\ntrianglerighteq</code>	$\rhd\eqqrel$	<code>\trianglerighteq</code>	$\rhd\eqqrel$	<code>\vartrianglerighteq</code>

TABLE 135: MnSymbol Triangle Relations

\blacktriangledown	<code>\filledmedtriangledown</code>	\blacktriangleup	<code>\largetriangleup</code>	\blacktriangledown	<code>\smalltriangledown</code>
\blacktriangleleft	<code>\filledmedtriangleleft</code>	\blacktriangledown	<code>\medtriangledown</code>	\blacktriangleleft	<code>\smalltriangleleft</code>
\blacktriangleright	<code>\filledmedtriangleright</code>	\blacktriangleleft	<code>\medtriangleleft</code>	\blacktriangleright	<code>\smalltriangleright</code>
\blacktriangleup	<code>\filledmedtriangleup</code>	\blacktriangleright	<code>\medtriangleright</code>	\blacktriangleup	<code>\smalltriangleup</code>
\blacktriangledown	<code>\filledtriangledown</code>	\blacktriangleup	<code>\medtriangleup</code>	\blacktriangledown	<code>\triangleeq</code>
\blacktriangleleft	<code>\filledtriangleleft</code>	\neq	<code>\ntriangleeq</code>	\triangleleft	<code>\trianglelefteq</code>
\blacktriangleright	<code>\filledtriangleright</code>	\neq	<code>\ntriangleleft</code>	\triangleright	<code>\trianglerighteq</code>
\blacktriangleup	<code>\filledtriangleup</code>	\neq	<code>\ntrianglelefteq</code>	\triangleleft	<code>\vartriangleleft</code>
\blacktriangledown	<code>\largetriangledown</code>	\neq	<code>\ntriangleright</code>	\triangleright	<code>\vartriangleright</code>
\blacktriangleleft	<code>\largetriangleleft</code>	\neq	<code>\ntrianglerighteq</code>	\neq	<code>\ntrianglerighteq</code>
\blacktriangleright	<code>\largetriangleright</code>	\circledcirc	<code>\otriangle</code>	\circledcirc	<code>\otriangle</code>

MnSymbol additionally defines synonyms for many of the preceding symbols: `\triangleeq` is a synonym for `\triangleeq`; `\lhd` and `\lessclosed` are synonyms for `\vartriangleleft`; `\rhd` and `\gtrclosed` are synonyms for `\vartriangleright`; `\unlhd` and `\leqclosed` are synonyms for `\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 136: *fdsymbol* Triangle Relations

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

fdsymbol defines synonyms for almost all of the preceding symbols:

\bigtriangledown	<code>\bigtriangledown</code>	$\not\trianglelefteq$	<code>\ntrianglelefteq</code>	\triangleq	<code>\triangleeq</code>
\bigtriangleup	<code>\bigtriangleup</code>	$\not\trianglelefteq$	<code>\ntrianglelefteq</code>	\triangleright	<code>\triangleright</code>
\blacktriangle	<code>\blacktriangle</code>	$\not\trianglelefteq$	<code>\ntrianglelefteq</code>	\triangleq	<code>\triangleq</code>
\blacktriangledown	<code>\blacktriangledown</code>	\triangle	<code>\triangle</code>	\triangle	<code>\vartriangle</code>
\blacktriangleleft	<code>\blacktriangleleft</code>	\triangleright	<code>\triangledown</code>	\triangleleft	<code>\vartriangleleft</code>
\blacktriangleright	<code>\blacktriangleright</code>	\triangleleft	<code>\triangleleft</code>	\triangleright	<code>\vartriangleright</code>
$\not\triangleleft$	<code>\not\triangleleft</code>	\triangleleft	<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 137: *boisik* Triangle Relations

\trianglelefteq	<code>\ntriangleleft</code>	\trianglelefteq	<code>\trianglelefteq</code>	\triangleq	<code>\varlrttriangle</code>
\trianglelefteqslant	<code>\ntrianglelefteqslant</code>	\trianglelefteqslant	<code>\trianglelefteqslant</code>	\triangle	<code>\vartriangle</code>
\triangleright	<code>\ntriangleleft</code>	\triangleright	<code>\triangleright</code>	\triangleleft	<code>\vartriangleleft</code>
\trianglelefteq	<code>\ntrianglelefteq</code>	\triangleq	<code>\triangleq</code>	\triangleright	<code>\vartriangleright</code>
\triangleleft	<code>\triangleleft</code>	\triangleright	<code>\triangleright</code>		

TABLE 138: *stix* Triangle Relations

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

TABLE 139: Arrows

\Downarrow	<code>\Downarrow</code>	\longleftarrow	<code>\longleftarrow</code>	\nwarrow	<code>\nwarrow</code>
\downarrow	<code>\downarrow</code>	\Longleftarrow	<code>\Longleftarrow</code>	\Rightarrow	<code>\Rightarrow</code>
\hookleftarrow	<code>\hookleftarrow</code>	\longleftrightarrow	<code>\longleftrightarrow</code>	\rightarrow	<code>\rightarrow</code>
\hookrightarrow	<code>\hookrightarrow</code>	\Longleftrightarrow	<code>\Longleftrightarrow</code>	\searrow	<code>\searrow</code>
\leadsto	<code>\leadsto</code> *	\longmapsto	<code>\longmapsto</code>	\swarrow	<code>\swarrow</code>
\leftarrow	<code>\leftarrow</code>	\Longrightarrow	<code>\Longrightarrow</code>	\uparrow	<code>\uparrow</code>
\Leftarrow	<code>\Leftarrow</code>	\longrightarrow	<code>\longrightarrow</code>	\Uparrow	<code>\Uparrow</code>
\Leftrightarrow	<code>\Leftrightarrow</code>	\mapsto	<code>\mapsto</code>	\updownarrow	<code>\updownarrow</code>
\leftrightarrow	<code>\leftrightarrow</code>	\nearrow	<code>\nearrow</code> [†]	\Updownarrow	<code>\Updownarrow</code>

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

† See the note beneath Table 246 for information about how to put a diagonal arrow across a mathematical expression (as in “ $\nabla \cdot \vec{B}$ ”).

TABLE 140: Harpoons

\leftarrow	<code>\leftharpoondown</code>	\rightarrow	<code>\rightharpoondown</code>	\rightleftharpoons	<code>\rightleftharpoons</code>
\leftarrow	<code>\leftharpoonup</code>	\rightarrow	<code>\rightharpoonup</code>		

TABLE 141: `textcomp` Text-mode Arrows

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

TABLE 142: \mathcal{AM} S Arrows

\circlearrowleft	<code>\circlearrowleft</code>	\Leftarrow	<code>\Leftarrow</code>	\rightleftarrows	<code>\rightleftarrows</code>
\circlearrowright	<code>\circlearrowright</code>	\Rightarrow	<code>\Rightarrow</code>	\rightrightarrows	<code>\rightrightarrows</code>
\curvearrowleft	<code>\curvearrowleft</code>	\rightsquigarrow	<code>\rightsquigarrow</code>	\rightsquigarrow	<code>\rightsquigarrow</code>
\curvearrowright	<code>\curvearrowright</code>	\Leftarrow	<code>\Leftarrow</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		\upuparrows	<code>\upuparrows</code>
\leftarrowtail	<code>\leftarrowtail</code>	\rightarrowtail	<code>\rightarrowtail</code>		

TABLE 143: \mathcal{AM} S Negated Arrows

$\not\Leftarrow$	<code>\not\Leftarrow</code>	$\not\Rightarrow$	<code>\not\Rightarrow</code>	$\not\rightleftarrows$	<code>\not\rightleftarrows</code>
$\not\Leftarrowtail$	<code>\not\Leftarrowtail</code>	$\not\rightarrowtail$	<code>\not\rightarrowtail</code>	$\not\upuparrows$	<code>\not\upuparrows</code>

TABLE 144: *AMS* Harpoons

$\downarrow \downarrow \downarrow$	$\backslash\downharpoonleft$	\equiv	$\backslash\leftrightharpoons$	$\uparrow \uparrow \uparrow$	$\backslash\upharpoonleft$
$\downarrow \downarrow \downarrow$	$\backslash\downharpoonright$	\equiv	$\backslash\rightrightharpoons$	$\uparrow \uparrow \uparrow$	$\backslash\upharpoonright$

TABLE 145: stmaryrd Arrows

\leftarrow	$\backslash\leftarrowtriangle$	\Leftarrow	$\backslash\leftrightarrowtriangle$	\leftarrow	$\backslash\shortleftarrow$
\Leftarrow	$\backslash\leftarrowtriangleq$	\Leftarrow	$\backslash\leftrightarrowtriangleq$	\rightarrow	$\backslash\rightarrowtriangle$
\Leftrightarrow	$\backslash\leftarrowtriangletriangle$	\Rightarrow	$\backslash\rightarrowtriangletriangle$	\uparrow	$\backslash\uparrowtriangle$
\swarrow	$\backslash\lightning$	\nearrow	$\backslash\nearrow$	\downarrow	$\backslash\searrow$
\Longleftarrow	$\backslash\Longleftarrowtriangle$	\nearrow	$\backslash\nearrow$	\downarrow	$\backslash\downarrowtriangle$
\Longleftarrow	$\backslash\longleftarrowtriangle$	\rightarrow	$\backslash\rightarrowtriangletriangle$	\downarrow	$\backslash\downarrowtriangletriangle$
\Longrightarrow	$\backslash\Longrightarrowtriangle$	\rightarrow	$\backslash\rightarrowtriangletriangle$	\downarrow	$\backslash\downarrowtriangletriangle$

TABLE 146: txfonts/pfxfonts Arrows

$\square \square \square$	$\backslash\boxdotLeft$	$\circ \circ \circ$	$\backslash\circleddotright$	$\diamond \diamond \diamond$	$\backslash\Diamondleft$
$\square \square \square$	$\backslash\boxdotleft$	$\circ \circ \circ$	$\backslash\circleleft$	$\diamond \diamond \diamond$	$\backslash\Diamondright$
$\square \square \square$	$\backslash\boxdotright$	$\circ \circ \circ$	$\backslash\circleright$	$\diamond \diamond \diamond$	$\backslash\DiamondRight$
$\square \square \square$	$\backslash\boxdotRight$	$\leftrightarrow \leftrightarrow \leftrightarrow$	$\backslash\dashleftrightarrow$	$\rightsquigarrow \rightsquigarrow \rightsquigarrow$	$\backslash\lefttsquigarrow$
$\square \square \square$	$\backslash\boxLeft$	$\Leftrightarrow \Leftrightarrow \Leftrightarrow$	$\backslash\DiamonddotLeft$	$\nearrow \nearrow \nearrow$	$\backslash\Narrow$
$\square \square \square$	$\backslash\boxleft$	$\Leftrightarrow \Leftrightarrow \Leftrightarrow$	$\backslash\Diamonddotleft$	$\nwarrow \nwarrow \nwarrow$	$\backslash\Nwarrow$
$\square \square \square$	$\backslash\boxright$	$\diamond \diamond \diamond$	$\backslash\Diamonddotright$	$\Rightarrow \Rightarrow \Rightarrow$	$\backslash\Rightarrow$
$\square \square \square$	$\backslash\boxRight$	$\diamond \diamond \diamond$	$\backslash\DiamonddotRight$	$\Rightarrow \Rightarrow \Rightarrow$	$\backslash\Searrow$
$\circ \circ \circ$	$\backslash\circleddotleft$	$\Leftrightarrow \Leftrightarrow \Leftrightarrow$	$\backslash\DiamondLeft$	$\swarrow \swarrow \swarrow$	$\backslash\Swarrow$

TABLE 147: mathabx Arrows

\circlearrowleft	$\backslash\circlearrowleft$	\leftarrow	$\backslash\leftarrow$	\nwarrow	$\backslash\nwarrow$
\circlearrowright	$\backslash\circlearrowright$	\Leftarrow	$\backslash\leftleftarrows$	\restriction	$\backslash\restriction$
\curvearrowbotleft	$\backslash\curvearrowbotleft$	\leftrightarrow	$\backslash\leftrightarrow$	\rightarrow	$\backslash\rightarrowarrow$
\curvearrowbotleft	$\backslash\curvearrowbotleft$	\Leftrightarrow	$\backslash\leftrightsquigarrow$	\rightleftarrows	$\backslash\rightleftarrows$
\curvearrowbotright	$\backslash\curvearrowbotright$	$\rightsquigarrow \rightsquigarrow \rightsquigarrow$	$\backslash\leftrightsquigarrow$	\rightrightarrows	$\backslash\rightrightarrows$
\curvearrowleft	$\backslash\curvearrowleft$	$\rightsquigarrow \rightsquigarrow \rightsquigarrow$	$\backslash\lefttsquigarrow$	$\rightsquigarrow \rightsquigarrow \rightsquigarrow$	$\backslash\rightsquigarrow$
\curvearrowleftright	$\backslash\curvearrowleftright$	$\circ \circ \circ$	$\backslash\leftarrowrightarrow$	\righttoleftarrow	$\backslash\righttoleftarrow$
\curvearrowright	$\backslash\curvearrowright$	$\leftrightarrow \leftrightarrow \leftrightarrow$	$\backslash\looparrowdownleft$	\Rsh	$\backslash\Rsh$
\dsh	$\backslash\dsh$	$\leftrightarrow \leftrightarrow \leftrightarrow$	$\backslash\looparrowdownright$	\searrow	$\backslash\searrow$
\downdownarrows	$\backslash\downdownarrows$	$\leftrightarrow \leftrightarrow \leftrightarrow$	$\backslash\looparrowleft$	\swarrow	$\backslash\swarrow$
\dtoparrow	$\backslash\dtoparrow$	$\rightsquigarrow \rightsquigarrow \rightsquigarrow$	$\backslash\looparrowright$	\updownarrows	$\backslash\updownarrows$
\dtopup	$\backslash\dtopup$	$\rightsquigarrow \rightsquigarrow \rightsquigarrow$	$\backslash\Lsh$	\uptodownarrow	$\backslash\uptodownarrow$
\drsh	$\backslash\drsh$	$\nearrow \nearrow \nearrow$	$\backslash\nearrow$	\upuparrows	$\backslash\upuparrows$

TABLE 148: mathabx Negated Arrows

$\not\Leftarrow$	$\backslash\nLeftarrow$	$\not\leftrightarrow$	$\backslash\nleftrightarrow$	$\not\rightarrow$	$\backslash\nrightarrow$
$\not\Leftarrow$	$\backslash\nleftarrow$	$\not\leftrightarrow$	$\backslash\nleftrightarrow$	$\not\rightarrow$	$\backslash\nrightarrow$

TABLE 149: mathabx Harpoons

\Leftarrow	<code>\barleftharpoon</code>	\leftarrow	<code>\leftharpoonup</code>	\Rightarrow	<code>\rightleftharpoons</code>
\Rightarrow	<code>\barrightharpoon</code>	\Leftarrow	<code>\leftleftharpoons</code>	\Rightarrow	<code>\rightrightharpoons</code>
\Downarrow	<code>\downdownharpoons</code>	\leftarrow	<code>\leftrightharpoon</code>	\Downarrow	<code>\updownharpoons</code>
\downarrow	<code>\downharpoonleft</code>	\Leftarrow	<code>\leftrightharpoons</code>	\uparrow	<code>\upharpoonleft</code>
\downarrow	<code>\downharpoonright</code>	\Rightarrow	<code>\rightbarharpoon</code>	\uparrow	<code>\upharpoonright</code>
\Downarrow	<code>\downupharpoons</code>	\rightarrow	<code>\rightharpoondown</code>	\Downarrow	<code>\upupharpoons</code>
\Leftarrow	<code>\leftbarharpoon</code>	\rightarrow	<code>\rightharpoonup</code>		
\leftarrow	<code>\leftharpoondown</code>	\rightarrow	<code>\rightleftharpoon</code>		

TABLE 150: MnSymbol Arrows

\curvearrowdownup	<code>\curvearrowdownup</code>	\longleftarrow	<code>\longleftarrow</code>	\swarrow	<code>\rhookswarrow</code>
\curvearrowleftright	<code>\curvearrowleftright</code>	\Longleftarrow	<code>\Longleftarrow</code>	\uparrow	<code>\rhookuparrow</code>
\curvearrownesw	<code>\curvearrownesw</code>	\longleftrightarrow	<code>\longleftrightarrow</code>	\rightarrow	<code>\rightarrow</code>
\curvearrownsew	<code>\curvearrownsew</code>	\longleftrightarrow	<code>\longleftrightarrow</code>	\Rightarrow	<code>\Rightarrow</code>
\curvearrowrightleft	<code>\curvearrowrightleft</code>	\Longrightarrow	<code>\longmapsto</code>	\gg	<code>\rightarrowtail</code>
\curvearrowsenw	<code>\curvearrowsenw</code>	\longrightarrow	<code>\longrightarrow</code>	\Leftarrow	<code>\rightleftarrows</code>
\curvearrowswne	<code>\curvearrowswne</code>	\Longrightarrow	<code>\Longrightarrow</code>	\rightsquigarrow	<code>\rightlsquigarrow</code>
\curvearrowupdown	<code>\curvearrowupdown</code>	\looparrowleft	<code>\looparrowleft</code>	\mapsto	<code>\rightmapsto</code>
\dasheddownarrow	<code>\dasheddownarrow</code>	\looparrowright	<code>\looparrowright</code>	\Rightarrow	<code>\rightrightarrows</code>
\dashedleftarrow	<code>\dashedleftarrow</code>	\Lsh		\rightsquigarrow	<code>\rightrsquigarrow</code>
\dashednearrow	<code>\dashednearrow</code>	\nearrow	<code>\nearrow</code>	\Rightarrow	<code>\Rrightarrow</code>
\dashednarrow	<code>\dashednarrow</code>	\nearrow	<code>\Nearrow</code>	\rightarrow	<code>\Rsh</code>
\dashedrightarrow	<code>\dashedrightarrow</code>	\nearrowtail	<code>\nearrowtail</code>	\searrow	<code>\searrow</code>
\dashedsearrow	<code>\dashedsearrow</code>	\nearrow	<code>\nelsquigarrow</code>	\swarrow	<code>\Searrow</code>
\dashedswarrow	<code>\dashedswarrow</code>	\nearrow	<code>\nmapsto</code>	\nwarrowtail	<code>\searrowtail</code>
\dasheduparrow	<code>\dasheduparrow</code>	\nearrow	<code>\nenarrows</code>	\nwarrowtail	<code>\selsquigarrow</code>
\Downarrow	<code>\Downarrow</code>	\nearrow	<code>\nersquigarrow</code>	\nwarrowtail	<code>\semapsto</code>
\downarrow	<code>\downarrow</code>	\nearrow	<code>\nesarrow</code>	\nwarrowtail	<code>\senarrows</code>
\downarrowtail	<code>\downarrowtail</code>	\nearrow	<code>\Nesarrow</code>	\nwarrowtail	<code>\sersquigarrow</code>
\Downarrowtail	<code>\Downarrowtail</code>	\nearrow	<code>\nesarrows</code>	\nwarrowtail	<code>\sesarrows</code>
\downarrow	<code>\downarrow</code>	\nearrow	<code>\neswarrows</code>	\nwarrowtail	<code>\squigarrowdownup</code>
\downarrow	<code>\downarrow</code>	\nearrow	<code>\nwarrow</code>	\nwarrowtail	<code>\squigarrowleftright</code>
\Downarrow	<code>\Downarrow</code>	\nearrow	<code>\nwarrowtail</code>	\nwarrowtail	<code>\squigarrownesw</code>
\Downarrow	<code>\Downarrow</code>	\nearrow	<code>\nwlsquigarrow</code>	\nwarrowtail	<code>\squigarrownwse</code>
\Downarrow	<code>\Downarrow</code>	\nearrow	<code>\nwmapsto</code>	\nwarrowtail	<code>\squigarrowrightleft</code>
\Downarrow	<code>\Downarrow</code>	\nearrow	<code>\nwnwarrows</code>	\nwarrowtail	<code>\squigarrowsenw</code>
\Downarrow	<code>\Downarrow</code>	\nearrow	<code>\nwsquigarrow</code>	\nwarrowtail	<code>\squigarrowswne</code>
\Downarrow	<code>\Downarrow</code>	\nearrow	<code>\nwsearrow</code>	\nwarrowtail	<code>\squigarrowupdown</code>
\Downarrow	<code>\Downarrow</code>	\nearrow	<code>\Nwsearrow</code>	\nwarrowtail	<code>\swarrow</code>
\Downarrow	<code>\Downarrow</code>	\nearrow	<code>\nwsearrows</code>	\nwarrowtail	<code>\Swarrow</code>
\Downarrow	<code>\Downarrow</code>	\circ	<code>\partialvardlcircleleftint*</code>	\nwarrowtail	<code>\swarrowtail</code>
\Downarrow	<code>\Downarrow</code>	\circ	<code>\partialvardlcirclerightint*</code>	\nwarrowtail	<code>\swlsquigarrow</code>
\Downarrow	<code>\Downarrow</code>	\circ	<code>\partialvardrcircleleftint*</code>	\nwarrowtail	<code>\swmapsto</code>

(continued on next page)

(continued from previous page)

\lcurvearrowse	Q	\partialovalrcirclerightint*	↗	\swnearrows
\lcurvearrowsw	○	\partialovalrtlcircleleftint*	↖	\swrsquigarrow
\lcurvearrowup	○	\partialovalrtlcirclerightint*	↘	\swwarrows
\Leftarrow	○	\partialovalvartrccircleleftint*	↓	\twoheaddownarrow
\leftarrow	○	\partialovalvartrccirclerightint*	←	\twoheadleftarrow
\leftarrowtail	○	\rcirclearrowdown	↗	\twoheadnearrow
\leftleftarrows	○	\rcirclearrowleft	↖	\twoheadnarrow
\leftlsquigarrow	○	\rcirclearrowright	→	\twoheadrightarrow
\leftmapsto	○	\rcirclearrowup	↘	\twoheadsearrow
\leftrightarrow	↳	\rcurvearrowdown	↖	\twoheadswarrow
\Leftrightarrow	↔	\rcurvearrowleft	↑	\twoheaduparrow
\leftrightsquigarrow	↔	\rcurvearrowne	↑	\uparrow
\leftrightsquigarrow	↔	\rcurvearrownw	↑↑	\Uparrow
\hookdownarrow	↙	\rcurvearrowright	↑↑	\uparrowtail
\hookleftarrow	↙	\rcurvearrowse	↓	\updownarrow
\hooknearrow	↙	\rcurvearrowsw	↓↓	\Updownarrow
\hooknwarrow	↙	\rcurvearrowup	↓↓	\updownarrows
\hookrightarrow	↓	\rhookdownarrow	↑	\upsquigarrow
\hooksearrow	←	\rhookleftarrow	↑↑	\upmapsto
\hookswarrow	↖	\rhooknearrow	↑↑	\uprsquigarrow
\hookuparrow	↖	\rhooknwarrow	↑↑	\upuparrows
\lightning	→	\rhookrightarrow		
\Lleftarrow	→	\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>\rightlarrow</code>)
\leftrightarrow	<code>\leftrightarrow</code>	(same as <code>\leftarrowright</code>)
\mapsto	<code>\mapsto</code>	(same as <code>\rightarrowmap</code>)
\rightsquigarrow	<code>\rightsquigarrow</code>	(same as <code>\rightlarrow</code>)

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

TABLE 151: MnSymbol Negated Arrows

\swarrow	<code>\ncurvearrowdownup</code>	\nwarrow	<code>\nlhooknarrow</code>	\nearrow	<code>\nrightleftarrows</code>
\nwarrow	<code>\ncurvearrowleftright</code>	\rightarrow	<code>\nlhookrightarrow</code>	\rightarrow	<code>\nrightlsquigarrow</code>
\curvearrowright	<code>\ncurvearrownesw</code>	\nwarrow	<code>\nlhooksearrow</code>	\rightarrow	<code>\nrightmapsto</code>
\curvearrowleft	<code>\ncurvearrownwse</code>	\nwarrow	<code>\nlhookswarrow</code>	\rightarrow	<code>\nrightrightarrows</code>
\curvearrowleft	<code>\ncurvearrowrightleft</code>	\rightarrow	<code>\nlhookuparrow</code>	\rightarrow	<code>\nrightrsquigarrow</code>
\curvearrowleft	<code>\ncurvearrowsenw</code>	$\not\rightarrow$	<code>\nLleftarrow</code>	$\not\rightarrow$	<code>\nRightarrow</code>
\curvearrowleft	<code>\ncurvearrowswne</code>	$\not\rightarrow$	<code>\nnearrow</code>	$\not\rightarrow$	<code>\nSearrow</code>
\curvearrowleft	<code>\ncurvearrowupdown</code>	$\not\rightarrow$	<code>\nNearrow</code>	$\not\rightarrow$	<code>\nsearrow</code>
\downarrow	<code>\ndasheddownarrow</code>	$\not\rightarrow$	<code>\nnearrowtail</code>	$\not\rightarrow$	<code>\nsearrowtail</code>
\leftarrow	<code>\ndashedleftarrow</code>	$\not\rightarrow$	<code>\nnelsquigarrow</code>	$\not\rightarrow$	<code>\nselsquigarrow</code>
\nearrow	<code>\ndashednearrow</code>	$\not\rightarrow$	<code>\nnemapsto</code>	$\not\rightarrow$	<code>\nsemapsto</code>
\nwarrow	<code>\ndashednarrow</code>	$\not\rightarrow$	<code>\nnenarrows</code>	$\not\rightarrow$	<code>\nsenwarrows</code>
\rightarrow	<code>\ndashedrightarrow</code>	$\not\rightarrow$	<code>\nnersquigarrow</code>	$\not\rightarrow$	<code>\nsersquigarrow</code>
\uparrow	<code>\ndashedsearrow</code>	$\not\rightarrow$	<code>\nNesarrow</code>	$\not\rightarrow$	<code>\nsesearrows</code>
\downarrow	<code>\ndashedswarrow</code>	$\not\rightarrow$	<code>\nnesarrow</code>	$\not\rightarrow$	<code>\nsquigarrowdownup</code>
\uparrow	<code>\ndasheduparrow</code>	$\not\rightarrow$	<code>\nnesarrows</code>	$\not\rightarrow$	<code>\nsquigarrowleftright</code>
\downarrow	<code>\ndownarrow</code>	$\not\rightarrow$	<code>\nNwarrow</code>	$\not\rightarrow$	<code>\nsquigarrownesw</code>
\Downarrow	<code>\nDownarrow</code>	$\not\rightarrow$	<code>\nnwarrow</code>	$\not\rightarrow$	<code>\nsquigarrownwse</code>
\Downarrow	<code>\ndownarrowtail</code>	$\not\rightarrow$	<code>\nnwarrownarrowtail</code>	$\not\rightarrow$	<code>\nsquigarrowrightleft</code>
\Downarrow	<code>\ndowndownarrows</code>	$\not\rightarrow$	<code>\nnwlsquigarrow</code>	$\not\rightarrow$	<code>\nsquigarrowsenw</code>
\Downarrow	<code>\ndownlsquigarrow</code>	$\not\rightarrow$	<code>\nnwmapsto</code>	$\not\rightarrow$	<code>\nsquigarrowswne</code>
\Downarrow	<code>\ndownmapsto</code>	$\not\rightarrow$	<code>\nnwnarrows</code>	$\not\rightarrow$	<code>\nsquigarrowupdown</code>
\Downarrow	<code>\ndownrsquigarrow</code>	$\not\rightarrow$	<code>\nnwrsquigarrow</code>	$\not\rightarrow$	<code>\nswarrow</code>
\Downarrow	<code>\ndownuparrows</code>	$\not\rightarrow$	<code>\nnwsearrow</code>	$\not\rightarrow$	<code>\nSwarrow</code>
\circlearrowleft	<code>\nlcirclearrowdown</code>	$\not\rightarrow$	<code>\nNwsearrow</code>	$\not\rightarrow$	<code>\nswarrowtail</code>
\circlearrowleft	<code>\nlcirclearrowleft</code>	$\not\rightarrow$	<code>\nnwsearrows</code>	$\not\rightarrow$	<code>\nswlsquigarrow</code>
\circlearrowright	<code>\nlcirclearrowright</code>	\circlearrowleft	<code>\nrcirclearrowdown</code>	$\not\rightarrow$	<code>\nswmapsto</code>
\circlearrowright	<code>\nlcirclearrowup</code>	\circlearrowleft	<code>\nrcirclearrowleft</code>	$\not\rightarrow$	<code>\nswnearrows</code>
\curvearrowright	<code>\nlcurvearrowdown</code>	\circlearrowleft	<code>\nrcirclearrowright</code>	$\not\rightarrow$	<code>\nswrsquigarrow</code>
\curvearrowright	<code>\nlcurvearrowleft</code>	\circlearrowleft	<code>\nrcirclearrowup</code>	$\not\rightarrow$	<code>\nswswarrows</code>
\curvearrowright	<code>\nlcurvearrowne</code>	\curvearrowleft	<code>\nrcurvearrowdown</code>	\Downarrow	<code>\ntwoheaddownarrow</code>
\curvearrowright	<code>\nlcurvearrownw</code>	\curvearrowleft	<code>\nrcurvearrowleft</code>	\Downarrow	<code>\ntwoheadleftarrow</code>
\curvearrowright	<code>\nlcurvearrowright</code>	\curvearrowleft	<code>\nrcurvearrowne</code>	\curvearrowleft	<code>\ntwoheadnearrow</code>
\curvearrowright	<code>\nlcurvearrowse</code>	\curvearrowleft	<code>\nrcurvearrownw</code>	\curvearrowleft	<code>\ntwoheadnarrow</code>
\curvearrowright	<code>\nlcurvearrowsw</code>	\curvearrowleft	<code>\nrcurvearrowright</code>	\Downarrow	<code>\ntwoheadrightarrow</code>
\curvearrowright	<code>\nlcurvearrowup</code>	\curvearrowleft	<code>\nrcurvearrowse</code>	\curvearrowleft	<code>\ntwoheadsearrow</code>
$\not\rightarrow$	<code>\nLeftarrow</code>	\curvearrowleft	<code>\nrcurvearrowsw</code>	\curvearrowleft	<code>\ntwoheadswarrow</code>
$\not\rightarrow$	<code>\nleftarrow</code>	\curvearrowleft	<code>\nrcurvearrowup</code>	$\not\rightarrow$	<code>\ntwoheaduparrow</code>
$\not\rightarrow$	<code>\nleftarrowtail</code>	\Downarrow	<code>\nrhookdownarrow</code>	$\not\rightarrow$	<code>\nuparrow</code>
$\not\rightarrow$	<code>\nleftleftarrows</code>	$\not\rightarrow$	<code>\nrhookleftarrow</code>	$\not\rightarrow$	<code>\nUparrow</code>
$\not\rightarrow$	<code>\nleftlsquigarrow</code>	$\not\rightarrow$	<code>\nrhooknearrow</code>	$\not\rightarrow$	<code>\nuparrowtail</code>
$\not\rightarrow$	<code>\nleftmapsto</code>	$\not\rightarrow$	<code>\nrhooknarrow</code>	$\not\rightarrow$	<code>\nupdownarrow</code>
$\not\rightarrow$	<code>\nleftrightarrow</code>	$\not\rightarrow$	<code>\nrhookrightarrow</code>	$\not\rightarrow$	<code>\nUpdownarrow</code>
$\not\rightarrow$	<code>\nleftrightarrow</code>	$\not\rightarrow$	<code>\nrhooksearrow</code>	$\not\rightarrow$	<code>\nupdownarrows</code>
$\not\rightarrow$	<code>\nleftrightarrows</code>	$\not\rightarrow$	<code>\nrhookswarrow</code>	$\not\rightarrow$	<code>\nuplsquigarrow</code>
$\not\rightarrow$	<code>\nleftrsquigarrow</code>	$\not\rightarrow$	<code>\nrhookuparrow</code>	$\not\rightarrow$	<code>\nupmapsto</code>
$\not\rightarrow$	<code>\nlhookdownarrow</code>	$\not\rightarrow$	<code>\nrightarrow</code>	$\not\rightarrow$	<code>\nuprsquigarrow</code>

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\leftarrow	<code>\nlhookleftarrow</code>	\Rightarrow	<code>\nRightarrow</code>	\Updownarrow	<code>\nupuparrows</code>
\nearrow	<code>\nlhooknearrow</code>	$\Rightarrow\!\Rightarrow$	<code>\nrightarrowtail</code>		

MnSymbol additionally defines synonyms for some of the preceding symbols:

\circlearrowleft	<code>\ncirclearrowleft</code>	(same as <code>\nrcirclearrowup</code>)
\circlearrowright	<code>\ncirclearrowright</code>	(same as <code>\nlcirclearrowup</code>)
\curvearrowleft	<code>\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>\dashedleftarrow</code>)
\dashrightarrow	<code>\dashrightarrow</code>	(same as <code>\dashedrightarrow</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>\nleadsto</code>	(same as <code>\nrightsquigarrow</code>)
$\Leftarrow\!\Leftarrow$	<code>\nleftrightsquigarrow</code>	(same as <code>\nsquigarrowleftright</code>)
\mapsto	<code>\nmapsto</code>	(same as <code>\nrightmapsto</code>)
\rightsquigarrow	<code>\rightsquigarrow</code>	(same as <code>\nrightlsquigarrow</code>)
\rightarrow	<code>\nto</code>	(same as <code>\nrightarrow</code>)

TABLE 152: MnSymbol Harpoons

\downarrow	<code>\downharpoonccw*</code>	\nearrow	<code>\neswharpoons</code>	\nwarrow	<code>\seharpooncw</code>
\downarrow	<code>\downharpooncw*</code>	\nearrow	<code>\neswharpoonsenw</code>	\nwarrow	<code>\senwharpoons</code>
\Downarrow	<code>\downupharpoons</code>	\nearrow	<code>\nwharpoonccw</code>	\swarrow	<code>\swharpoonccw</code>
\leftarrow	<code>\leftharpoonccw*</code>	\nwarrow	<code>\nwharpooncw</code>	\nearrow	<code>\swharpooncw</code>
\leftarrow	<code>\leftharpooncw*</code>	\nwarrow	<code>\nwseharpoonnesw</code>	\nearrow	<code>\swneharpoons</code>
\leftarrow	<code>\leftrightharpoondownup</code>	\nwarrow	<code>\nwseharpoons</code>	\uparrow	<code>\updownharpoonleftright</code>
\Leftarrow	<code>\leftrightharpoons</code>	\nwarrow	<code>\nwseharpoonsnwe</code>	\uparrow	<code>\updownharpoonrightleft</code>
\Leftarrow	<code>\leftrightharpoonupdown</code>	\rightarrow	<code>\rightharpoonccw*</code>	\Downarrow	<code>\updownharpoons</code>
\nearrow	<code>\neharpoonccw</code>	\rightarrow	<code>\rightharpooncw*</code>	\uparrow	<code>\upharpoonccw*</code>
\nearrow	<code>\neharpooncw</code>	$\Rightarrow\!\Rightarrow$	<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 153: MnSymbol Negated Harpoons

\dagger	<code>\ndownharpoonccw*</code>	\nexists	<code>\nneswharpoons</code>	\times	<code>\nseharpooncw</code>
\dagger	<code>\ndownharpooncw*</code>	\nexists	<code>\nneswharpoonsenw</code>	\nexists	<code>\nsenwharpoons</code>
\nexists	<code>\ndownupharpoons</code>	\nexists	<code>\nnwharpoonccw</code>	\nexists	<code>\nswharpoonccw</code>
\nexists	<code>\nleftharpoonccw*</code>	\nexists	<code>\nnwharpooncw</code>	\nexists	<code>\nswharpooncw</code>
\nexists	<code>\nleftharpooncw*</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>\nnwseharpoonsne</code>	\nexists	<code>\nupdownharpoonrightleft</code>
\nexists	<code>\nleftrightharpoonupdown</code>	\nexists	<code>\nrightharpoonccw*</code>	\nexists	<code>\nupdownharpoons</code>
\nexists	<code>\nnearpoonccw</code>	\nexists	<code>\nrightharpooncw*</code>	\nexists	<code>\nupharpoonccw*</code>
\nexists	<code>\nnearpooncw</code>	\nexists	<code>\nrightleftharpoons</code>	\nexists	<code>\nupharpooncw*</code>
\nexists	<code>\nneswharpoonnwse</code>	\nexists	<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 `\nrestriction`.)

TABLE 154: fdsymbol Arrows

\circlearrowleft	<code>\acwcirclearrowdown</code>	\leftarrow	<code>\leftarrow</code>	\Rightarrow	<code>\rightrightarrow</code>
\circlearrowleft	<code>\acwcirclearrowleft</code>	\leftarrowtail	<code>\leftarrowtail</code>	\rightsquigarrow	<code>\rightwavearrow</code>
\circlearrowleft	<code>\acwcirclearrowright</code>	\leftarrowtail	<code>\leftarrowtail</code>	\Rrightarrow	<code>\Rrightarrow</code>
\circlearrowleft	<code>\acwcirclearrowup</code>	\leftarrowtail	<code>\leftarrowtail</code>	\Rsh	<code>\Rsh</code>
\leftarrowtail	<code>\acwlefttarcarrow</code>	\leftarrowtail	<code>\leftarrowtail</code>	\searrowtail	<code>\searrowtail</code>
\nearrowtail	<code>\acwnearcarrow</code>	\nearrowtail	<code>\nearrowtail</code>	\Searrowtail	<code>\Searrowtail</code>
\nwarrowtail	<code>\acwnwarcarrow</code>	\nwarrowtail	<code>\nwarrowtail</code>	\searrowtail	<code>\searrowtail</code>
$\overrightarrow{\wedge}$	<code>\acwoverarcarrow</code>	$\overrightarrow{\wedge}$	<code>\overrightarrow{\wedge}</code>	\searrowtail	<code>\searrowtail</code>
\rightleftarrows	<code>\acwrighttarcarrow</code>	\rightleftarrows	<code>\rightleftarrows</code>	$\S\!\!\! \searrowtail$	<code>\S\!\!\! \searrowtail</code>
\searrowtail	<code>\acwsearcarrow</code>	\searrowtail	<code>\searrowtail</code>	$\S\!\!\! \searrowtail$	<code>\S\!\!\! \searrowtail</code>
\swarrowtail	<code>\acwsvarcarrow</code>	\swarrowtail	<code>\swarrowtail</code>	$\S\!\!\! \searrowtail$	<code>\S\!\!\! \searrowtail</code>
\swarrowtail	<code>\acwunderarcarrow</code>	\swarrowtail	<code>\swarrowtail</code>	$\S\!\!\! \searrowtail$	<code>\S\!\!\! \searrowtail</code>
\swarrowtail	<code>\bdlefttarcarrow</code>	\swarrowtail	<code>\swarrowtail</code>	$\S\!\!\! \searrowtail$	<code>\S\!\!\! \searrowtail</code>
\swarrowtail	<code>\bdnearcarrow</code>	\swarrowtail	<code>\swarrowtail</code>	$\S\!\!\! \searrowtail$	<code>\S\!\!\! \searrowtail</code>
\swarrowtail	<code>\bdnwarcarrow</code>	\swarrowtail	<code>\swarrowtail</code>	$\S\!\!\! \searrowtail$	<code>\S\!\!\! \searrowtail</code>
\swarrowtail	<code>\bdovertarcarrow</code>	\swarrowtail	<code>\swarrowtail</code>	$\S\!\!\! \searrowtail$	<code>\S\!\!\! \searrowtail</code>
\swarrowtail	<code>\bdrighttarcarrow</code>	\swarrowtail	<code>\swarrowtail</code>	$\S\!\!\! \searrowtail$	<code>\S\!\!\! \searrowtail</code>
\swarrowtail	<code>\bdsearcarrow</code>	\swarrowtail	<code>\swarrowtail</code>	$\S\!\!\! \searrowtail$	<code>\S\!\!\! \searrowtail</code>
\swarrowtail	<code>\bdswarcarrow</code>	\swarrowtail	<code>\swarrowtail</code>	$\S\!\!\! \searrowtail$	<code>\S\!\!\! \searrowtail</code>
\swarrowtail	<code>\bdunderarcarrow</code>	\swarrowtail	<code>\swarrowtail</code>	$\S\!\!\! \searrowtail$	<code>\S\!\!\! \searrowtail</code>
\circlearrowright	<code>\cwcirclearrowdown</code>	\Rightarrow	<code>\Longmapsto</code>	\Rightarrow	<code>\twoheadrightarrow</code>
\circlearrowright	<code>\cwcirclearrowleft</code>	\Rightarrow	<code>\Longmapsto</code>	\Rightarrow	<code>\twoheadrightarrow</code>
\circlearrowright	<code>\cwcirclearrowright</code>	\Rightarrow	<code>\Longrightarrow</code>	\Rightarrow	<code>\twoheadrightarrow</code>
\circlearrowright	<code>\cwcirclearrowup</code>	\Rightarrow	<code>\Longrightarrow</code>	\Rightarrow	<code>\twoheadrightarrow</code>
\leftarrowtail	<code>\cwlefttarcarrow</code>	\leftarrowtail	<code>\longleftarrowtail</code>	\uparrow	<code>\uparrow</code>
\rightarrowtail	<code>\cwnearcarrow</code>	\rightarrowtail	<code>\looparrowleft</code>	\uparrow	<code>\uparrow</code>

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↶	\cwnwarcarrow	↖	\looparrowright	↑	\uparrowarrowtail
↷	\cwoverarcarrow	↙	\Lsh	↑	\upbkarrow
⤷	\cwrightarcarrow	↗	\nearrow	↕	\Updownarrow
⤸	\cwsearcarrow	⤹	\Nearrow	⤻	\updownarrow
⤹	\cwsvarcarrow	⤻	\nearrowtail	⤻	\updownarrows
⤺	\cwunderarcarrow	⤻	\nebkarrow	⤻	\updownwavearrow
⤻	\Ddownarrow	⤻	\nenearrows	⤻	\upmapsto
⤻	\Downarrow	⤻	\Neswarrow	⤻	\Upmapsto
⤻	\downarrow	⤻	\neswarrow	⤻	\upuparrows
⤻	\downarrowtail	⤻	\neswarrows	⤻	\upwavearrow
⤻	\downbkarrow	⤻	\Nwarrow	⤻	\Uparrow
⤻	\downdownarrows	⤻	\narrow	⤻	\vardownwavearrow
⤻	\Downmapsto	⤻	\narrowtail	⤻	\varhookdownarrow
⤻	\downmapsto	⤻	\nwbkarrow	⤻	\varhookleftarrow
⤻	\downuparrows	⤻	\nnwarrows	⤻	\varhooknearrow
⤻	\downwavearrow	⤻	\Nwsearrow	⤻	\varhooknarrow
⤻	\hookdownarrow	⤻	\nwsearrow	⤻	\varhookrightarrow
⤻	\hookleftarrow	⤻	\nwsearrows	⤻	\varhooksearrow
⤻	\hooknearrow	⤻	\Rdsh	⤻	\varhookswarrow
⤻	\hooknarrow	⤻	\Rightarrow	⤻	\varhookuparrow
⤻	\hookrightarrow	⤻	\rightarrow	⤻	\varleftrightwavearrow
⤻	\hooksearrow	⤻	\rightarrowtail	⤻	\varleftwavearrow
⤻	\hookswarrow	⤻	\rightbkarrow	⤻	\varrightwavearrow
⤻	\hookuparrow	⤻	\rightleftarrows	⤻	\varupdownwavearrow
⤻	\Ldsh	⤻	\Rightmapsto	⤻	\varupwavearrow
⤻	\Leftarrow	⤻	\rightmapsto	⤻	

fdsymbol defines synonyms for most of the preceding symbols:

↺	\acwgpcirclearrow	⤻	\leftrightsquigarrow	⤻	\rhooknarrow
↺	\acwopencirclearrow	⤻	\leftrsquigarrow	⤻	\rhookrightarrow
↺	\circlearrowleft	⤻	\leftsquigarrow	⤻	\rhooksearrow
↻	\circlearrowright	⤻	\leftupcurvedarrow	⤻	\rhookswarrow
⤻	\curvearrowleft	⤻	\lhookdownarrow	⤻	\rhookuparrow
⤻	\curvearrowright	⤻	\lhookleftarrow	⤻	\rightcurvedarrow
⟳	\cgapccirclearrow	⤻	\lhooknearrow	⤻	\rightdowncurvedarrow
⟳	\cwopencirclearrow	⤻	\lhooknarrow	⤻	\rightlcurvearrow
⤻	\dasharrow	⤻	\lhookrightarrow	⤻	\rightleftcurvearrow
⤻	\dashleftarrow	⤻	\lhooksearrow	⤻	\rightleftsquigarrow
⤻	\dashrightarrow	⤻	\lhookswarrow	⤻	\rightlsquigarrow
⤻	\downlcurvearrow	⤻	\lhookuparrow	⤻	\rightrcurvearrow
⤻	\downleftcurvedarrow	⤻	\longleadsto	⤻	\rightrsquigarrow
⤻	\downlsquigarrow	⤻	\longleftsquigarrow	⤻	\rightsquigarrow
⤻	\downrcurvearrow	⤻	\longrightsquigarrow	⤻	\rightupcurvedarrow
⤻	\downrightcurvedarrow	⤻	\mapsdown	⤻	\selcurvearrow
⤻	\downrsquigarrow	⤻	\Mapsdown	⤻	\senwcurvearrow
⤻	\downupcurvearrow	⤻	\mapsfrom	⤻	\sercurvearrow
⤻	\downupsquigarrow	⤻	\Mapsfrom	⤻	\swlcurvearrow
⤻	\downzigzagarrow	⤻	\mapsto	⤻	\swnecurvearrow

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\leftarrow	\gets	\Rightarrow	\Mapsto	\curvearrowleft	\swrcurvearrow
\nwarrow	\hknarrow	\uparrow	\mapsup	\rightarrow	\to
\nearrow	\hknarrow	\Downarrow	\Mapsup	\Downarrow	\updowncurvearrow
\searrow	\hksearrow	\curvearrowright	\nelcurvearrow	\Downarrow	\updownsquigarrow
\swarrow	\hksarrow	\curvearrowleft	\nercurvearrow	\curvearrowleft	\uplcurvearrow
\rightsquigarrow	\leadsto	$\curvearrowleft\curvearrowright$	\neswcurvearrow	$\curvearrowleft\curvearrowright$	\uleftcurvedarrow
\leftarrowtail	\leftcurvedarrow	\curvearrowleft	\nlcurvearrow	\curvearrowleft	\uplsquigarrow
\leftarrowtail	\leftdowncurvedarrow	\curvearrowleft	\nwrcurvearrow	\curvearrowleft	\uprcurvearrow
\leftarrowtail	\leftlcurvearrow	\curvearrowleft	\nwsecurvearrow	\curvearrowleft	\uprightcurvearrow
\leftarrowtail	\leftlsquigarrow	\curvearrowleft	\rhookdownarrow	\curvearrowleft	\uprsquigarrow
\leftarrowtail	\leftrccurvearrow	\curvearrowleft	\rhookleftarrow		
\leftarrowtail	\leftrightcurvearrow	\curvearrowleft	\rhooknearrow		

TABLE 155: *fdsymbol* Negated Arrows

\nexists	\nacwcirclearrowdown	$\not\leftarrow$	\nleftarrow	$\not\Rightarrow$	\nRightarrow
\nexists	\nacwcirclearrowleft	$\not\Leftarrow$	\nLeftarrow	$\not\times$	\nsearrow
\nexists	\nacwcirclearrowright	$\not\leftarrowtail$	\nleftarrowtail	$\not\boxtimes$	\nSearrow
\nexists	\nacwcirclearrowup	$\not\leftarrow\!\!\leftarrow$	\nleftbkarrow	$\not\boxtimes$	\nsearrowtail
\nexists	\nacwleftarcarrow	$\not\#$	\nleftleftarrows	$\not\boxtimes$	\nsebkarw
\nexists	\nacwnearcarrow	$\not\#$	\nleftmapsto	$\not\boxtimes$	\nsenwarrows
\nexists	\nacwnwarcarrow	$\not\#$	\nLeftmapsto	$\not\boxtimes$	\nsesearrows
\nexists	\nacwoverarcarrow	$\not\Rightarrow$	\nleftrightarrow	$\not\boxtimes$	\nswarrow
\nexists	\nacwrightarcarrow	$\not\Rightarrow$	\nLeftrightarrow	$\not\boxtimes$	\nSwarrow
\nexists	\nacwsearcarrow	$\not\#$	\nleftrightarrows	$\not\boxtimes$	\nswarrowtail
\nexists	\nacwswarcarrow	$\not\Rightarrow$	\nleftrightwavearrow	$\not\boxtimes$	\nswbkarw
\nexists	\nacwunderarcarrow	$\not\Rightarrow$	\nleftwavearrow	$\not\boxtimes$	\nswnearrows
\nexists	\nbdbleftarcarrow	$\not\Leftarrow$	\nLeftarrow	$\not\boxtimes$	\nswswarrows
\nexists	\nbdbnearcarrow	$\not\leftarrow$	\nlongleftarrow	$\not\boxtimes$	\ntwoheaddownarrow
\nexists	\nbdbnwarcarrow	$\not\Leftarrow$	\nLongleftarrow	$\not\boxtimes$	\ntwoheadleftarrow
\nexists	\nbdboverarcarrow	$\not\Rightarrow$	\nlongleftrightarrow	$\not\boxtimes$	\ntwoheadnearrow
\nexists	\nbdbrightarcarrow	$\not\Rightarrow$	\nLongleftrightarrow	$\not\boxtimes$	\ntwoheadnarrow
\nexists	\nbdssearcarrow	$\not\sim\sim$	\nlongleftwavearrow	$\not\boxtimes$	\ntwoheadrightarrow
\nexists	\nbdswarccarw	$\not\leftarrow$	\nlongmapsfrom	$\not\boxtimes$	\ntwoheadsearrow
\nexists	\nbdunderarcarrow	$\not\Rightarrow$	\nLongmapsfrom	$\not\boxtimes$	\ntwoheadswarrow
\nexists	\ncwcirclearrowdown	$\not\rightarrow$	\nlongmapsto	$\not\boxtimes$	\ntwoheaduparrow
\nexists	\ncwcirclearrowleft	$\not\Rightarrow$	\nLongmapsto	$\not\boxtimes$	\nuparrow
\nexists	\ncwcirclearrowright	$\not\rightarrow$	\nlongrightarrow	$\not\boxtimes$	\nUparrow
\nexists	\ncwcirclearrowup	$\not\Rightarrow$	\nLongrightarrow	$\not\boxtimes$	\nuparrowtail
\nexists	\ncwleftarcarrow	$\not\sim\sim$	\nlongrightwavearrow	$\not\boxtimes$	\nupbkarw
\nexists	\ncwnearcarrow	$\not\boxtimes$	\nnearrow	$\not\boxtimes$	\nupdownarrow
\nexists	\ncwnwarcarrow	$\not\boxtimes$	\nNearrow	$\not\boxtimes$	\nUpdownarrow
\nexists	\ncwoverarcarrow	$\not\boxtimes$	\nnearrowtail	$\not\boxtimes$	\nupdownarrows

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↶	\ncwrightarcarrow	↷	\nnebkarrow	⤳	\nupdownwavearrow
⤲	\ncwsearcarrow	⤴	\nnenarrows	⤵	\nupmapsto
⤳	\ncswarcarrow	⤵	\nneswarrow	⤶	\nUmapsto
⤷	\ncwunderarcarrow	⤷	\nNeswarrow	⤸	\nupuparrows
⤹	\nDdownarrow	⤸	\nneswarrows	⤹	\nupwavearrow
⤻	\ndownarrow	⤺	\nnwarrow	⤻	\nUparrow
⤼	\nDownarrow	⤻	\nNwarrow	⤼	\nvardownwavearrow
⤽	\ndownarrowtail	⤽	\nnarrowtail	⤽	\nvarhookdownarrow
⤾	\ndownbkarrown	⤾	\nnwbkarrown	⤾	\nvarhookleftarrow
⤿	\ndowndownarrows	⤿	\nnwnarrows	⤿	\nvarhooknearrow
⤻	\ndownmapsto	⤻	\nnsearrow	⤻	\nvarhooknarrow
⤼	\nDownmapsto	⤼	\nWsearrow	⤼	\nvarhookrightarrow
⤽	\ndownuparrows	⤽	\nnsearrows	⤽	\nvarhooksearrow
⤹	\ndownwavearrow	⤹	\nrightarrow	⤹	\nvarhookswarrow
⤻	\nhookdownarrow	⤻	\nRightarrow	⤻	\nvarhookuparrow
⤾	\nhookleftarrow	⤾	\nrightarrowtail	⤾	\nvarleftrightwavearrow
⤽	\nhooknearrow	⤽	\nrightbkarrown	⤽	\nvarleftwavearrow
⤼	\nhooknarrow	⤼	\nrightleftarrows	⤼	\nvarrightwavearrow
⤻	\nhookrightarrow	⤻	\nrightmapsto	⤻	\nvarupdownwavearrow
⤼	\nhooksearrow	⤼	\nRightmapsto	⤼	\nvarupwavearrow
⤽	\nhookswarrow	⤽	\nrightrightarrows		
⤹	\nhookuparrow	⤹	\nrightwavearrow		

fdsymbol defines synonyms for most of the preceding symbols:

⌚	\nacwgapcirclearrow	⌚	\nleftdowncurvedarrow	⌚	\nrightcurvedarrow
⌚	\nacwopencirclearrow	⌚	\nleftlcurvearrow	⌚	\nrightdowncurvedarrow
⌚	\ncirclearrowleft	⌚	\nleftlsquigarrow	⌚	\nrightlcurvearrow
⌚	\ncirclearrowright	⌚	\nleftrcurearrow	⌚	\nrightleftcurvearrow
⌚	\ncurvearrowleft	⌚	\nleftrightcurvearrow	⌚	\nrightleftsquigarrow
⌚	\ncurvearrowright	⌚	\nleftrightsquigarrow	⌚	\nrightlsquigarrow
⌚	\ncwgapcirclearrow	⌚	\nleftrsquigarrow	⌚	\nrightrcurvearrow
⌚	\nacwopencirclearrow	⌚	\nleftsquigarrow	⌚	\nrightrsquigarrow
⤻	\ndasharrow	⤻	\nleftupcurvedarrow	⤻	\nrightsquigarrow
⤻	\ndashleftarrow	⤻	\nlongleadsto	⤻	\nrightupcurvedarrow
⤻	\ndashrightarrow	⤻	\nlongleftsquigarrow	⤻	\nsecurvearrow
⤻	\ndownlcurvearrow	⤻	\nlongrightsquigarrow	⤻	\nsenwcurvearrow
⤻	\downleftcurvedarrow	⤻	\nmapsdown	⤻	\nscurvearrow
⤻	\downlsquigarrow	⤻	\nMapsdown	⤻	\nswlcurvearrow
⤻	\downrcurvearrow	⤻	\nmapsfrom	⤻	\nswnecurvearrow
⤻	\downrightcurvedarrow	⤻	\nMapsfrom	⤻	\nswrcurvearrow
⤻	\downrsquigarrow	⤻	\nmapsto	⤻	\nsto
⤻	\downupcurvearrow	⤻	\nMapsto	⤻	\nupdowncurvearrow
⤻	\downupsquigarrow	⤻	\nmapsup	⤻	\nupdownsquigarrow
⤻	\ngets	⤻	\nMapsup	⤻	\nuplcurvearrow
⤻	\nhknearrow	⤻	\nnelcurvearrow	⤻	\npleftcurvedarrow
⤻	\nhknarrow	⤻	\nnercurvearrow	⤻	\nplsquigarrow
⤻	\nhksearrow	⤻	\nneswcurvearrow	⤻	\nprcurvearrow
⤻	\nhkswarrow	⤻	\nnwlcurvearrow	⤻	\nuprightcurvearrow

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\nwarrow	<code>\nleadsto</code>	\nwarrow	<code>\nnwrcurvearrow</code>	\nwarrow	<code>\nuprsquigarrow</code>
$\leftarrow\!\!\!\leftarrow$	<code>\nleftcurvedarrow</code>	\nwarrow	<code>\nnwsecurvearrow</code>		

TABLE 156: *fdsymbol* Harpoons

\downarrow	<code>\downharpoonleft</code>	\nearrow	<code>\neswharpoons</code>	\searrow	<code>\seharpoonsw</code>
\downarrow	<code>\downharpoonright</code>	\nearrow	<code>\neswharpoonsenw</code>	\nwarrow	<code>\senwharpoons</code>
\Downarrow	<code>\downupharpoons</code>	\nwarrow	<code>\nwharpoonne</code>	\swarrow	<code>\swharpoonnw</code>
\leftarrow	<code>\leftharpoondown</code>	\nwarrow	<code>\nwharpoonsw</code>	\swarrow	<code>\swharpoonse</code>
\leftarrow	<code>\leftharpoonup</code>	\nwarrow	<code>\nwseharpoonnesw</code>	\nwarrow	<code>\swneharpoons</code>
$\leftarrow\!\!\!\leftarrow$	<code>\leftrightharpoondownup</code>	\nwarrow	<code>\nwseharpoons</code>	\uparrow	<code>\updownharpoonleftright</code>
\Leftarrow	<code>\leftrightharpoons</code>	\nwarrow	<code>\nwseharpoonswne</code>	\uparrow	<code>\updownharpoonrightleft</code>
$\leftarrow\!\!\!\leftarrow$	<code>\leftrightharpoonupdown</code>	\rightarrow	<code>\rightharpoondown</code>	\uparrow	<code>\updownharpoons</code>
\nearrow	<code>\neharpoonnw</code>	\rightarrow	<code>\rightharpoonup</code>	\uparrow	<code>\upharpoonleft</code>
\nearrow	<code>\neharpoonse</code>	\Rightarrow	<code>\rightleftharpoons</code>	\uparrow	<code>\upharpoonright</code>
\nearrow	<code>\neswharpoonnwse</code>	\searrow	<code>\seharpoonne</code>		

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

TABLE 157: *fdsymbol* Negated Harpoons

$\not\downarrow$	<code>\ndownharpoonleft</code>	$\not\nearrow$	<code>\nneswharpoons</code>	$\not\searrow$	<code>\nseharpoonsw</code>
$\not\downarrow$	<code>\ndownharpoonright</code>	$\not\nearrow$	<code>\nneswharpoonsenw</code>	$\not\nwarrow$	<code>\nsenwharpoons</code>
$\not\Downarrow$	<code>\downupharpoons</code>	$\not\nwarrow$	<code>\nnwharpoonne</code>	$\not\swarrow$	<code>\nswharpoonnw</code>
$\not\leftarrow$	<code>\leftharpoondown</code>	$\not\nwarrow$	<code>\nnwharpoonsw</code>	$\not\swarrow$	<code>\nswharpoonse</code>
$\not\leftarrow$	<code>\leftharpoonup</code>	$\not\nwarrow$	<code>\nnwseharpoonnesw</code>	$\not\nwarrow$	<code>\nswneharpoons</code>
$\not\leftarrow\!\!\!\leftarrow$	<code>\leftrightharpoondownup</code>	$\not\nwarrow$	<code>\nnwseharpoons</code>	$\not\uparrow$	<code>\updownharpoonleftright</code>
$\not\Leftarrow$	<code>\leftrightharpoons</code>	$\not\nwarrow$	<code>\nnwseharpoonswne</code>	$\not\uparrow$	<code>\updownharpoonrightleft</code>
$\not\leftarrow\!\!\!\leftarrow$	<code>\leftrightharpoonupdown</code>	$\not\rightarrow$	<code>\rightharpoondown</code>	$\not\uparrow$	<code>\updownharpoons</code>
$\not\nearrow$	<code>\neharpoonnw</code>	$\not\rightarrow$	<code>\rightharpoonup</code>	$\not\uparrow$	<code>\upharpoonleft</code>
$\not\nearrow$	<code>\neharpoonse</code>	$\not\Rightarrow$	<code>\rightleftharpoons</code>	$\not\uparrow$	<code>\upharpoonright</code>
$\not\nearrow$	<code>\nneswharpoonnwse</code>	$\not\searrow$	<code>\seharpoonne</code>		

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

TABLE 158: boisik Arrows

\leftarrow	\barleftarrow	\uparrow	\Lsh
\nwarrow	\barleftarrowrightarrowbar	\downarrow	\mapsdown
\nearrow	\barovernorthwestarrow	\Leftrightarrow	\Mapsfrom
\leftarrow	\carriagereturn	\Leftarrow	\mapsfrom
\circlearrowleft	\circlearrowleft	\Rightarrow	\Mapsto
\circlearrowright	\circlearrowright	\rightarrow	\mapsto
\cuparrow	\cupleftarrow	\uparrow	\mapsup
\wedgearrow	\curlyveedownarrow	\nearrow	\Nearrow
\veearrow	\curlyveeuparrow	\swarrow	\nearrowcorner
\wedgearrow	\curlywedgedownarrow	\nearrow	\nnearrow
\wedgearrow	\curlywedgeuparrow	\nearrow	\nnarrow
\curvearrowbotleft	\curvearrowbotleft	\nearrow	\Narrow
\curvearrowbotleft	\curvearrowbotleftright	\nearrow	\narrowcorner
\curvearrowbotright	\curvearrowbotright	\rightarrow	\rightarrowbar
\curvearrowleft	\curvearrowleft	\Leftrightarrow	\rightarrowcircle
\curvearrowleftright	\curvearrowleftright	\rightarrow	\rightarrowtail
\curvearrowright	\curvearrowright	\rightarrow	\rightarrowTriangle
\dsh	\dsh	\rightarrow	\rightarrowtriangle
\downarrow	\downblackarrow	\rightarrow	\rightblackarrow
\downarrow	\downdasharrow	\rightarrow	\rightdasharrow
$\downarrow\downarrow$	\downdownarrows	\rightarrow	\rightleftarrows
\downdownarrow	\downtouparrow	\rightarrow	\rightrightarrows
\downdownarrow	\downwhitearrow	\rightarrow	\rightsquigarrow
$\downarrow\downarrow$	\downzigzagarrow	\rightarrow	\rightthreearrows
\downarrow	\drsh	\rightarrow	\righttoleftarrow
\leftrightarrow	\eqleftrightarrow	\rightarrow	\rightwhitearrow
\leftarrow	\hookleftarrow	\rightarrow	\rightwhiteroundarrow
\rightarrow	\hookrightarrow	\Rightarrow	\Rrightarrow
\leftarrow	\leftarrowtail	\rightarrow	\Rsh
\leftarrow	\leftarrowTriangle	\nearrow	\Searrow
\leftarrow	\leftarrowtriangle	\downarrow	\ssarrow
\leftarrow	\leftblackarrow	\downarrow	\sswarro
\leftarrow	\leftdasharrow	\nearrow	\Swarro
$\leftarrow\leftarrow$	\leftleftarrows	\downarrow	\twoheaddownarrow
$\leftarrow\leftarrow$	\leftrightarroweq	\leftarrow	\twoheadleftarrow
$\leftarrow\leftarrow$	\leftrightarrows	\rightarrow	\twoheadrightarrow
$\leftrightarrow\leftarrow$	\leftrightarrowTriangle	\uparrow	\twoheaduparrow
$\leftrightarrow\leftarrow$	\leftrightarrowtriangle	\uparrow	\twoheadwhiteuparrow
$\leftarrow\leftarrow$	\leftrightblackarrow	\uparrow	\twoheadwhiteuparrowpedestal
$\leftarrow\leftarrow$	\leftrightsquigarrow	\uparrow	\upblackarrow
$\leftarrow\leftarrow$	\leftsquigarrow	\uparrow	\updasharrow
G	\lefttorightarrow	\downarrow	\updownarrowbar
\leftarrow	\leftwhitearrow	\updownarrow	\updownblackarrow
\leftarrow	\leftwhiteroundarrow	\updownarrow	\updownwhitearrow
$\leftarrow\leftarrow$	\leftzigzagarrow	$\leftarrow\rightarrow$	\uptodownarrow
\downarrow	\linefeed	$\uparrow\uparrow$	\upuparrows
$\leftarrow\leftarrow$	\Lleftarrow	$\uparrow\uparrow$	\upwhitearrow

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\leftarrow	<code>\looparrowdownleft</code>	\uparrow	<code>\whitearrowupfrombar</code>
\rightarrow	<code>\looparrowdownright</code>	\downarrow	<code>\whitearrowuppedestal</code>
\nwarrow	<code>\looparrowleft</code>	\updownarrow	<code>\whitearrowuppedestalhbar</code>
\nearrow	<code>\looparrowright</code>	\updownarrow	<code>\whitearrowuppedestalvbar</code>

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

TABLE 159: `boisik` Negated Arrows

\nexists	<code>\nHdownarrow</code>	\Leftrightarrow	<code>\nLeftrightarrow</code>	\Rightarrow	<code>\nRightarrow</code>
\nexists	<code>\nHuparrow</code>	\Leftrightarrow	<code>\nLeftrightarrow</code>	\Leftarrow	<code>\nLeftarrow</code>
\nLeftarrow	<code>\nLeftarrow</code>	\Leftrightarrow	<code>\nLeftrightarrow</code>	\Rightarrow	<code>\nRightarrow</code>
\nLeftarrow	<code>\nleftarrow</code>	\Rightarrow	<code>\nrightarrow</code>		

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

TABLE 160: `boisik` Harpoons

\downarrow	<code>\downharpoonleft</code>	\Leftarrow	<code>\leftrightharpoons</code>	\uparrow	<code>\upharpoonleft</code>
\downarrow	<code>\downharpoonright</code>	\rightarrow	<code>\rightharpoondown</code>	\uparrow	<code>\upharpoonright</code>
\leftarrow	<code>\leftharpoonondown</code>	\rightarrow	<code>\rightharpoonup</code>		
\leftarrow	<code>\leftharpoonup</code>	\Rightarrow	<code>\rightleftharpoons</code>		

TABLE 161: `stix` Arrows

\circlearrowleft	<code>\acwcirclearrow</code>	\longrightarrow	<code>\longmapsto</code>
\circlearrowright	<code>\acwgapcirclearrow</code>	\Longrightarrow	<code>\Longmapsto</code>
\curvearrowleft	<code>\acwleftarcarrow</code>	\rightarrowtail	<code>\longrightarrowtail</code>
\curvearrowright	<code>\acwoverarcarrow</code>	\Longrightarrow	<code>\Longrightarrowtail</code>
\curvearrowup	<code>\acwunderarcarrow</code>	\rightsquigarrow	<code>\longrightsquigarrow</code>
\leftarrowtail	<code>\barleftarrow</code>	\Leftrightarrow	<code>\looparrowleft</code>
\leftarrowtail	<code>\barleftarrowrightarrowbar^*</code>	\Rightarrow	<code>\looparrowright</code>
\leftarrowtail	<code>\barrightarrowdiamond</code>	\uparrow	<code>\Lsh</code>
\uparrowtail	<code>\baruparrow</code>	\downarrow	<code>\mapsdown</code>
\leftarrowtail	<code>\bsimilarcharrow</code>	\Leftarrow	<code>\Mapsfrom</code>
\leftarrowtail	<code>\bsimilarcharrow</code>	\Leftarrow	<code>\Mapsfrom</code>
\leftarrowtail	<code>\carriagereturn^*</code>	\rightarrowtail	<code>\mapsto</code>
\curvearrowleft	<code>\ccwundercurvearrow</code>	\Rightarrowtail	<code>\Mapsto</code>
\circlearrowleft	<code>\circlearrowleft</code>	\uparrow	<code>\mapsup</code>
\circlearrowright	<code>\circlearrowright</code>	$\not\equiv$	<code>\Nearrow</code>

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\Leftarrow	<code>\circleonleftarrow</code>	\nearrow	<code>\nearrow</code>
\Rightarrow	<code>\circleonrightarrow</code>	\nwarrow	<code>\neovnarrow*</code>
\curvearrowleft	<code>\curvearrowleft</code>	\swarrow	<code>\neovsearrow*</code>
\curvearrowleftplus	<code>\curvearrowleftplus</code>	$\nearrow\swarrow$	<code>\neswarrow</code>
\curvearrowright	<code>\curvearrowright</code>	$\nwarrow\swarrow$	<code>\narrow</code>
\curvearrowrightminus	<code>\curvearrowrightminus</code>	$\nearrow\swarrow\swarrow$	<code>\Narrow</code>
\circlearrowleft	<code>\cwccirclearrow</code>	$\nearrow\swarrow\swarrow\swarrow$	<code>\nwovnearrow*</code>
\circlearrowright	<code>\cwgapccirclearrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow$	<code>\nwsearrow</code>
\curvearrowright	<code>\cwrighttarcarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rdiagovsearrow*</code>
\curvearrowleft	<code>\cwundercurvearrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\Rdsh</code>
\rightarrowtail	<code>\dbkarow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\Rightarrow</code>
\Downarrow	<code>\DDownarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightarrow</code>
\Downarrow	<code>\Ddownarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightarrowapprox</code>
\leftarrowtail	<code>\diamondleftarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightarrowbackapprox</code>
\leftarrowtail	<code>\diamondleftarrowbar</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightarrowbar</code>
\downarrow	<code>\downarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightarrowbsimilar</code>
\Downarrow	<code>\Downarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightarrowdiamond</code>
\downarrow	<code>\downarrowbar</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightarrowonoplus</code>
\downarrow	<code>\downarrowbarred</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightarrowplus</code>
\Downarrow	<code>\downdasharrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightarrowshortleftarrow</code>
\Downarrow	<code>\downdownarrows</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightarrowsimilar</code>
\rightarrowtail	<code>\downrightcurvedarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightarrowtail</code>
$\uparrow\downarrow$	<code>\downuparrows</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightarrowtriangle</code>
\Downarrow	<code>\downwhitearrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightarrowx</code>
\Downarrow	<code>\downzigzagarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightbkarow</code>
\rightarrowtail	<code>\draftingarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightcurvedarrow</code>
\rightarrowtail	<code>\drbkarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightdasharrow*</code>
\Leftarrowtail	<code>\equalleftarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightdotarrow</code>
\Rightarrowtail	<code>\equalrightarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightdowncurvedarrow</code>
\nwarrow	<code>\fdiagovnearrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightleftarrows</code>
\nearrow	<code>\hknearrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightrightarrows</code>
\nearrow	<code>\hknarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightsquigarrow</code>
\nearrow	<code>\hksearrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightthreearrows</code>
\nearrow	<code>\hkswarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightwavearrow</code>
\hookleftarrow	<code>\hookleftarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\rightwhitearrow*</code>
\hookrightarrow	<code>\hookrightarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\RRightarrow</code>
\Lsh	<code>\Ldsh</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\Rrightarrow</code>
\leftarrowtail	<code>\leftarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\Rsh</code>
\Leftarrowtail	<code>\Leftarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\searrow</code>
\Leftarrowtail	<code>\leftarrowapprox</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\Searrow</code>
\Leftarrowtail	<code>\leftarrowbackapprox</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\seovnearrow*</code>
\Leftarrowtail	<code>\leftarrowbsimilar</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\shortrightarrowleftarrow</code>
\oplus	<code>\leftarrowonoplus</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\similarleftarrow</code>
\Leftarrowtail	<code>\leftarrowplus</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\similarrightarrow</code>
\Leftarrowtail	<code>\leftarrowshortrightarrow</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\swarrow</code>
\Leftarrowtail	<code>\leftarrowsimilar</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\Swarrow</code>
\Leftarrowtail	<code>\leftarrowtail</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\toea</code>
\Leftarrowtail	<code>\leftarrowtriangle</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\tona</code>
\Leftarrowtail	<code>\leftarrowx</code>	$\nearrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow\swarrow$	<code>\tosa</code>

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\leftarrow	<code>\leftbkarrow</code>	\times	<code>\towa</code>
\leftarrow	<code>\leftcurvedarrow</code>	\downarrow	<code>\twoheaddownarrow</code>
\leftleftarrows	<code>\leftdasharrow^*</code>	\leftarrow	<code>\twoheadleftarrow</code>
\leftleftarrows	<code>\leftdbkarrow</code>	\leftleftarrow	<code>\twoheadleftarrowtail</code>
\leftleftarrows	<code>\leftdotarrow</code>	\leftleftleftarrow	<code>\twoheadleftdbkarrow</code>
\leftleftarrows	<code>\leftdowncurvedarrow</code>	\leftleftarrow	<code>\twoheadmapsfrom</code>
\leftleftarrows	<code>\leftleftarrows</code>	\rightarrow	<code>\twoheadmapsto</code>
\leftleftarrows	<code>\Leftrightarrow</code>	\Rightarrow	<code>\twoheadrightarrow</code>
\leftleftarrows	<code>\Leftrightarrow</code>	\Rightarrow	<code>\twoheadrightarrowtail</code>
\leftleftarrows	<code>\leftrightarrowcircle</code>	\uparrow	<code>\twoheaduparrow</code>
\leftleftarrows	<code>\leftrightarrows</code>	\uparrow	<code>\twoheaduparrowcircle</code>
\leftleftarrows	<code>\leftrightarrowtriangle</code>	\uparrow	<code>\uparrow</code>
\leftleftarrows	<code>\leftrightsquigarrow</code>	\uparrow	<code>\Uparrow</code>
\leftleftarrows	<code>\leftsquigarrow</code>	\uparrow	<code>\uparrowbarred</code>
\leftleftarrows	<code>\leftthreearrows</code>	\uparrow	<code>\updasharrow^*</code>
\leftleftarrows	<code>\leftwavearrow</code>	\Downarrow	<code>\Updownarrow</code>
\leftleftarrows	<code>\leftwhitearrow^*</code>	\Downarrow	<code>\updownarrow</code>
\leftleftarrows	<code>\linefeed^*</code>	\Downarrow	<code>\updownarrowbar^*</code>
\leftleftarrows	<code>\LLeftarrow</code>	\Downarrow	<code>\updownarrows</code>
\leftleftarrows	<code>\LLeftarrow</code>	\curvearrowright	<code>\uprightcurvearrow^*</code>
\leftleftarrows	<code>\longleftarrow</code>	\upuparrows	
\leftleftarrows	<code>\Longleftarrow</code>	\uparrow	<code>\upwhitearrow^*</code>
\leftleftarrows	<code>\Longleftrightarrow</code>	\upuparrows	<code>\UUparrow</code>
\leftleftarrows	<code>\longleftrightarrow</code>	\upuparrows	<code>\Uparrow</code>
\leftleftarrows	<code>\longleftsquigarrow</code>	\Downarrow	<code>\varcarriagereturn^*</code>
\leftleftarrows	<code>\Longmapsfrom</code>	\Downarrow	<code>\whitearrowupfrombar^*</code>
\leftleftarrows	<code>\longmapsfrom</code>		

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

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

TABLE 162: stix Negated Arrows

\nexists	<code>\nHdownarrow*</code>	\nexists	<code>\nvLeftrightarrow</code>
\nexists	<code>\nHuparrow*</code>	\nexists	<code>\nVrightarrow</code>
\nleftarrow	<code>\nleftarrow^{\dagger}</code>	\nexists	<code>\nvRightarrow</code>
\nLeftarrow	<code>\nLeftarrow</code>	\nexists	<code>\nvrightarrow</code>
\nLeftrightarrow	<code>\nLeftrightarrow</code>	\nexists	<code>\nVrightarrowtail</code>
\nLeftrightarrow	<code>\nLeftrightarrow</code>	\nexists	<code>\nvrightarrowtail</code>
\nRrightarrow	<code>\nRrightarrow</code>	\nexists	<code>\nVtwoheadleftarrow</code>
\nrightarrow	<code>\nrightarrow</code>	\nexists	<code>\nVtwoheadleftarrow</code>
\nVleftarrow	<code>\nVleftarrow</code>	\nexists	<code>\nVtwoheadleftarrowtail</code>
\nVLeftarrow	<code>\nVLeftarrow</code>	\nexists	<code>\nVtwoheadleftarrowtail</code>
\nVrightarrowtail	<code>\nVrightarrowtail</code>	\nexists	<code>\nVtwoheadrightarrow</code>
\nVleftarrowtail	<code>\nVleftarrowtail</code>	\nexists	<code>\nVtwoheadrightarrowtail</code>
\nVleftrightharpoonup	<code>\nVleftrightharpoonup</code>	\nexists	<code>\nVtwoheadrightarrowtail</code>
\nVleftrightharpoonup	<code>\nVleftrightharpoonup</code>	\nexists	<code>\nVtwoheadrightarrowtail</code>

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

[†] stix defines `\ngt` as a synonym for `\nleftarrow`.

TABLE 163: stix Harpoons

\lrcorner	<code>\bardownharpoonleft</code>	\lrcorner	<code>\leftrightharpoons</code>
\lrcorner	<code>\bardownharpoonright</code>	\lrcorner	<code>\leftrightharpoonsdown</code>
\lrcorner	<code>\barleftharpoondown</code>	\lrcorner	<code>\leftrightharpoonsup</code>
\lrcorner	<code>\barleftharpoonup</code>	\lrcorner	<code>\leftrightharpoonupdown</code>
\lrcorner	<code>\barrightharpoondown</code>	\lrcorner	<code>\leftrightharpoonupup</code>
\lrcorner	<code>\barrightharpoonup</code>	\lrcorner	<code>\rightharpoondown</code>
\lrcorner	<code>\barupharpoonleft</code>	\lrcorner	<code>\rightharpoondownbar</code>
\lrcorner	<code>\barupharpoonright</code>	\lrcorner	<code>\rightharpoonsupdown</code>
\lrcorner	<code>\dashleftharpoondown</code>	\lrcorner	<code>\rightharpoonup</code>
\lrcorner	<code>\dashrightharpoondown</code>	\lrcorner	<code>\rightharpoonupbar</code>
\lrcorner	<code>\downharpoonleft</code>	\lrcorner	<code>\rightharpoonupdash</code>
\lrcorner	<code>\downharpoonleftbar</code>	\lrcorner	<code>\rightleftharpoons</code>
\lrcorner	<code>\downharpoonright</code>	\lrcorner	<code>\rightleftharpoonsdown</code>
\lrcorner	<code>\downharpoonrightbar</code>	\lrcorner	<code>\rightleftharpoonsup</code>
\lrcorner	<code>\downharpoonsleftright</code>	\lrcorner	<code>\updownharpoonleftleft</code>
\lrcorner	<code>\downupharpoonsleftright</code>	\lrcorner	<code>\updownharpoonleftright</code>
\lrcorner	<code>\leftharpoondown</code>	\lrcorner	<code>\updownharpoonrightleft</code>
\lrcorner	<code>\leftharpoondownbar</code>	\lrcorner	<code>\updownharpoonrightright</code>
\lrcorner	<code>\leftharpoonsupdown</code>	\lrcorner	<code>\updownharpoonsleftright</code>
\lrcorner	<code>\leftharpoonup</code>	\lrcorner	<code>\upharpoonleft</code>
\lrcorner	<code>\leftharpoonupbar</code>	\lrcorner	<code>\upharpoonleftbar</code>
\lrcorner	<code>\leftharpoonupdash</code>	\lrcorner	<code>\upharpoonright*</code>

(continued on next page)

(continued from previous page)

\nwarrow	$\backslash\leftrightharpoonondowndown$	\downarrow	\upharpoonright
\nearrow	$\backslash\leftrightharpoonondownup$	\uparrow	\upharpoonsleftright

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

TABLE 164: harpoon Extensible Harpoons

\overbrace{abc}	$\backslash\overleftharp{abc}$	\overbrace{abc}	$\backslash\overrightharpd{abc}$	\underbrace{abc}	$\backslash\underrightharp{abc}$
\overbrace{abc}	$\backslash\overleftharpd{abc}$	\underbrace{abc}	$\backslash\underleftharp{abc}$	\overbrace{abc}	$\backslash\underrightharpd{abc}$
\overbrace{abc}	$\backslash\overrightharp{abc}$	\underbrace{abc}	$\backslash\underleftharpd{abc}$		

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

TABLE 165: chemarrow Arrows

\rightarrow	\rightarrow	\rightarrow
\rightarrow	$\backslash\chemarrow$	

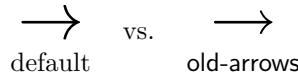
TABLE 166: fge Arrows

\rightsquigarrow	$\backslash\fgerightarrow$	\uparrow
\rightsquigarrow	$\backslash\fgeuparrow$	\uparrow

TABLE 167: `old-arrows` Arrows

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

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



In addition to the arrows shown above, `old-arrows` also reduces the arrowhead size for *AMS*'s `\overleftarrow`, `\overrightarrow`, `\overleftrightarrow`, `\underleftarrow`, `\underrightarrow`, `\underleftrightarrow`, `\xleftarrow`, `\xrightarrow`, `\varinjlim`, and `\varprojlim` symbols (Table 246 on page 117, Table 262 on page 121, and Table 184 on page 99) and `mathtools`'s `\xleftrightarrow`, `\xhookleftarrow`, `\xhookrightarrow`, and `\xmapsto` symbols (Table 263 on page 121).

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

* Requires `stmaryrd`.

TABLE 168: `old-arrows` Harpoons

\leftrightharpoonup	<code>\longleftharpoonup</code>	\rightharpoonup	<code>\longrightharpoonup</code>
-----------------------	---------------------------------	-------------------	----------------------------------

Unlike the symbols shown in Table 167, the `new` package option does not define a `\var...` version of the symbols in this table. Also unlike the symbols shown in Table 167, the harpoon arrowheads in this table are not reduced in size (i.e., relative to the size of those shown in Table 140 on page 78).

TABLE 169: `esrelation` Restrictions

\downarrow	<code>\restrictbarb</code>	\uparrow	<code>\restrictmallet</code>	\downarrow	<code>\restrictwand</code>
\uparrow	<code>\restrictbarbup</code>	\downarrow	<code>\restrictmalletup</code>	\uparrow	<code>\restrictwandup</code>

TABLE 170: MnSymbol Spoons

↓	\downfilledspoon	↗	\nnespoon	↖	\nwfilledspoon
↙	\downspoon	↘	\nnwfilledspoon	↗	\nwspoon
←	\leftfilledspoon	↖	\nnwspoon	→	\rightfilledspoon
→	\leftspoon	↗	\nrightfilledspoon	→	\rightspoon*
↑	\ndownfilledspoon	↗	\nrightspoon*	↙	\sefilledspoon
↑	\ndownspoon	↗	\nsefilledspoon	↘	\sespoon
↗	\nefilledspoon	↘	\nsespoon	↗	\swfilledspoon
↗	\nespoon	↗	\nswfilledspoon	↘	\swspoon
↔	\nleftfilledspoon	↗	\nswspoon	↑	\upfilledspoon
↔	\nleftspoon	↑	\nupfilledspoon	↓	\upspoon
↗	\nnefilledspoon	↑	\nupspoon	↓	

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

TABLE 171: MnSymbol Pitchforks

ψ	\downpitchfork	⊗	\nnwpitchfork	▹	\rightpitchfork
←	\leftpitchfork	≠	\nrightpitchfork	⊗	\sepitchfork
¶	\ndownpitchfork	⊗	\nsepitchfork	≠	\swpitchfork
↙	\nepitchfork	⊗	\nswpitchfork	↳	\uppitchfork
↖	\nleftpitchfork	⊟	\nuppitchfork		
⊗	\nnepitchfork	⊗	\nwpitchfork		

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

TABLE 172: 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>
\approx	<code>\eqfrown</code>	$\not\approx$	<code>\nsqdoublefrown</code>	\approx	<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>
\doteq	<code>\frownneq</code>	$\not\doteq$	<code>\nsqdoublesmileeq</code>	\asymp	<code>\sqdoublesmileeq</code>
\doteq	<code>\frowneqsmile</code>	$\not\doteq$	<code>\nsqeqlfrown</code>	\asymp	<code>\sqeqfrown</code>
\circ	<code>\frownsmile</code>	$\not\circ$	<code>\nsqeqlsmile</code>	\circ	<code>\sqeqsmile</code>
\circ	<code>\frownsmileeq</code>	$\not\circ$	<code>\nsqfrown</code>	\wedge	<code>\sqfrown</code>
$\not\approx$	<code>\ndoublefrown</code>	$\not\approx$	<code>\nsqfrownneq</code>	\triangleleft	<code>\sqfrownneq</code>
$\not\approx$	<code>\ndoublefrownneq</code>	$\not\approx$	<code>\nsqfrownneqsmile</code>	\triangleleft	<code>\sqfrownneqsmile</code>
$\not\approx$	<code>\ndoublesmile</code>	$\not\approx$	<code>\nsqfrownsmile</code>	\triangleleft	<code>\sqfrownsmile</code>
$\not\approx$	<code>\ndoublesmileeq</code>	$\not\approx$	<code>\nsqsmile</code>	\vee	<code>\sqsmile</code>
$\not\approx$	<code>\neqfrown</code>	$\not\approx$	<code>\nsqsmileeq</code>	\asymp	<code>\sqsmileeq</code>
$\not\approx$	<code>\neqsmile</code>	$\not\approx$	<code>\nsqsmileeqfrown</code>	\asymp	<code>\sqsmileeqfrown</code>
$\not\approx$	<code>\nfrown</code>	$\not\approx$	<code>\nsqsmilefrown</code>	\asymp	<code>\sqsmilefrown</code>
$\not\approx$	<code>\nfrownneq</code>	$\not\approx$	<code>\nsqtriplefrown</code>	\asymp	<code>\sqtriplefrown</code>
$\not\approx$	<code>\nfrowneqsmile</code>	$\not\approx$	<code>\nsqtriplesmile</code>	\asymp	<code>\sqtriplesmile</code>
$\not\approx$	<code>\nfrownsmile</code>	$\not\approx$	<code>\ntriplefrown</code>	\asymp	<code>\triplefrown</code>
$\not\approx$	<code>\nfrownsmileeq</code>	$\not\approx$	<code>\ntriplesmile</code>	\asymp	<code>\triplesmile</code>
$\not\approx$	<code>\nsmile</code>	$\not\approx$	<code>\smile</code>	\vee	

* MnSymbol defines `\smallsmile` as a synonym for `\smile`, `\smallfrown` as a synonym for `\frown`, `\asym` as a synonym for `\smilefrown`, and `\nasym` as a synonym for `\nsmilefrown`.

TABLE 173: fdsymbol Spoons

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

fdsymbol defines synonyms for many of the preceding symbols:

$\circ\bullet$	<code>\cirmid</code>	$\circ-$	<code>\multimapinv</code>	$\not\circ$	<code>\nmultimap</code>
$\circ\circ$	<code>\dualmap</code>	$\not\circ$	<code>\ncirmid</code>	$\not\circ$	<code>\nmultimapinv</code>
$\bullet\circ$	<code>\imageof</code>	$\not\bullet\circ$	<code>\ndualmap</code>	$\not\bullet\circ$	<code>\norigof</code>
$\circ\bullet$	<code>\midcir</code>	$\not\circ\bullet$	<code>\nimageof</code>	$\circ\bullet$	<code>\origof</code>
$\circ-$	<code>\multimap</code>	$\not\circ-$	<code>\nmidcir</code>	$\not\circ-$	

TABLE 174: *fdsymbol* Pitchforks

Ψ	<code>\downnpitchfork</code>	$\not\equiv$	<code>\nleftpitchfork</code>	\ni	<code>\rightpitchfork</code>
\Leftarrow	<code>\leftpitchfork</code>	$\not\equiv$	<code>\nrightpitchfork</code>	$\not\ni$	<code>\uppitchfork</code>
\nexists	<code>\ndownnpitchfork</code>	$\not\equiv$	<code>\nuppitchfork</code>		

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

TABLE 175: *fdsymbol* Smiles and Frowns

\sim	<code>\frown</code>	$\not\equiv$	<code>\nfrownneq</code>	$\not\equiv$	<code>\nsmilefrown</code>
\cong	<code>\frownneq</code>	$\not\equiv$	<code>\nfrownsmile</code>	\sim	<code>\smile</code>
\simeq	<code>\frownsmile</code>	$\not\equiv$	<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 176: *halloweenmath* Brooms and Pitchforks

\rightarrowtail	<code>\hmleftpitchfork</code>	\rightarrowtail	<code>\leftbroom</code>
\rightarrowtail	<code>\hmrightpitchfork</code>	\rightarrowtail	<code>\rightbroom</code>

TABLE 177: *ulsy* Contradiction Symbols

$\not\models$	<code>\blitza</code>	$\not\models$	<code>\blitzb</code>	$\not\models$	<code>\blitzc</code>	$\not\models$	<code>\blitzd</code>	$\not\models$	<code>\blitze</code>
---------------	----------------------	---------------	----------------------	---------------	----------------------	---------------	----------------------	---------------	----------------------

TABLE 178: Extension Characters

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

TABLE 179: *stmaryrd* Extension Characters

$/$	<code>\Arrownnot</code>	$ $	<code>\Mapsfromchar</code>	$ $	<code>\Mapstochar</code>
$/$	<code>\arrownot</code>	$ $	<code>\mapsfromchar</code>		

TABLE 180: *txfonts/pxfonts* Extension Characters

\vdash	<code>\Mappedfromchar</code>	\dashv	<code>\Mmappedfromchar</code>	\dashv	<code>\Mmapstochar</code>
\vdash	<code>\mappedfromchar</code>	\dashv	<code>\mmappedfromchar</code>	\dashv	<code>\mmapstochar</code>

TABLE 181: `mathabx` Extension Characters

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

TABLE 182: `stix` Extension Characters

<code>\lhook</code>	<code>\relbar</code>	<code>\RRelbar</code>
<code>\mapsfromchar</code>	<code>\Relbar</code>	<code>\Rrelbar</code>
<code>\mapstochar</code>	<code>\rhook</code>	

TABLE 183: Log-like Symbols

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

Calling the above “symbols” may be a bit misleading.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 184: \mathcal{AM} S Log-like Symbols

<code>inj lim</code>	<code>\injlim</code>	\varinjlim	\varlimsup
<code>proj lim</code>	<code>\projlim</code>	\varprojlim	\varliminf

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.

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

TABLE 185: `mismath` Log-like Symbols

adj	<code>\adj</code>	Conv	<code>\Conv</code>	id	<code>\id</code>	sech	<code>\sech</code>
arccot	<code>\arccot</code>	Cov	<code>\Cov</code>	Id	<code>\Id</code>	sgn	<code>\sgn</code>
arcosh	<code>\arcosh</code>	cov	<code>\cov</code>	im	<code>\im</code>	span	<code>\spa</code>
arcoth	<code>\arcoth</code>	csch	<code>\csch</code>	Im	<code>\Im^*</code>	tr	<code>\tr</code>
arcsch	<code>\arcsch</code>	$\overrightarrow{\text{curl}}$	<code>\curl</code>	lb	<code>\lb</code>	Var	<code>\Var</code>
arsech	<code>\arsech</code>	div	<code>\divg</code>	lcm	<code>\lcm</code>	Z	<code>\Zu</code>
arsinh	<code>\arsinh</code>	End	<code>\End</code>	rank	<code>\rank</code>		
artanh	<code>\artanh</code>	erf	<code>\erf</code>	Re	<code>\Re^*</code>		
Aut	<code>\Aut</code>	$\overrightarrow{\text{grad}}$	<code>\grad</code>	$\overrightarrow{\text{rot}}$	<code>\rot</code>		

* `mismath` renames L^AT_EX's `\Re` and `\Im` (Table 203) to `\oldRe` and `\oldIm`.

TABLE 186: `mismath` Asymptotic Notation

O `\bigo` \mathcal{O} `\bigO` o `\lito`

TABLE 187: Q_NA2e Number Sets

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

TABLE 188: 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 189: *AMS* Greek Letters

F `\digamma` \varkappa `\varkappa`

TABLE 190: `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>\epsilonup</code>	λ	<code>\lambdaau</code>	σ	<code>\sigmaau</code>	ω	<code>\omegaau</code>
ε	<code>\varepsilonup</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 `poltonikogreek`) option—and, of course, a font that provides the glyphs for the Greek alphabet.

TABLE 191: `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>\Upsilon</code>	Σ	<code>\Upsilon</code>	Ψ	<code>\Upsilon</code>
Δ	<code>\Updelta</code>	Ξ	<code>\Upxi</code>	Υ	<code>\Upupsilon</code>	Ω	<code>\Upomega</code>
Θ	<code>\Upsilon</code>	Π	<code>\Upsilon</code>	Φ	<code>\Upsilon</code>		

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

Unlike `textgreek` (Table 6 on page 17), `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 `poltonikogreek`) option—and, of course, a font that provides the glyphs for the Greek alphabet.

TABLE 192: `fourier` Variant Greek Letters

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

TABLE 193: `txfonts/pxfonts` Variant Latin Letters

<i>g</i>	<code>\varg</code>	<i>v</i>	<code>\varv</code>	<i>w</i>	<code>\varw</code>	<i>y</i>	<code>\vary</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 194: `boisik` Variant Greek Letters

β	<code>\varbeta</code>	κ	<code>\varkappa</code>	ϖ	<code>\varpi</code>	ς	<code>\varsigma</code>
ϵ	<code>\varepsilon</code>	φ	<code>\varphi</code>	ϱ	<code>\varrho</code>	ϑ	<code>\vartheta</code>

TABLE 195: `boisik` Variant Latin Letters

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

TABLE 196: `stix` Variant Greek Letters

ϵ	<code>\varepsilon</code>	φ	<code>\varphi</code>	ϱ	<code>\varrho</code>	ϑ	<code>\vartheta</code>
κ	<code>\varkappa</code>	ϖ	<code>\varpi</code>	ς	<code>\varsigma</code>		

TABLE 197: `stix` Transformed Greek Letters

ε	<code>\backepsilon</code>	ι	<code>\turniota</code>
σ	<code>\mho</code>	ϑ	<code>\upbackepsilon</code>

TABLE 198: *AMS* Hebrew Letters

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

`\aleph` (\aleph) appears in Table 302 on page 130.

TABLE 199: `MnSymbol` Hebrew Letters

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

TABLE 200: `fdsymbol` Hebrew Letters

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

TABLE 201: **boisik** Hebrew Letters

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

TABLE 202: **stix** Hebrew Letters

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

TABLE 203: Letter-like Symbols

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

TABLE 204: **AMS** Letter-like Symbols

\mathbb{k}	<code>\Bbbk</code>	\complement	<code>\complement</code>	\hbar	<code>\hbar</code>
\mathbb{R}	<code>\circledR</code>	\exists	<code>\exists</code>	\hslash	<code>\hslash</code>
\mathbb{S}	<code>\circledS</code>	\exists	<code>\exists</code>	\nexists	<code>\nexists</code>

TABLE 205: **txfonts/pxfonts** Letter-like Symbols

```
\mathcent \mathsterling* \notin \notni
```

* It's generally preferable to use the corresponding symbol from Table 3 on page 16 because the symbols in that table work properly in both text mode and math mode.

TABLE 206: **mathabx** Letter-like Symbols

$\bar{\epsilon}$	<code>\barin</code>	\in	<code>\in</code>	$\not\top$	<code>\nottop</code>	\notin	<code>\notin</code>	\varnotin	<code>\varnotin</code>
\complement	<code>\complement</code>	$\not\exists$	<code>\notexists</code>	\owns	<code>\owns</code>	$\not\owns$	<code>\notowns</code>	\varnotowns	<code>\varnotowns</code>
\exists	<code>\exists</code>	$\not\perp$	<code>\notbot</code>	$\not\equiv$	<code>\notequiv</code>	$\not\equiv$	<code>\notequiv</code>	\varnotequiv	<code>\varnotequiv</code>
\exists	<code>\Finv</code>	$\not\in$	<code>\notin</code>	∂	<code>\partial</code>	$\not\partial$	<code>\notpartial</code>	\varnotpartial	<code>\varnotpartial</code>
\exists	<code>\Game</code>	$\not\in$	<code>\notin</code>	$\not\partial$	<code>\notpartial</code>	$\not\partial$	<code>\notpartial</code>	\varnotpartial	<code>\varnotpartial</code>

TABLE 207: **MnSymbol** Letter-like Symbols

\perp	<code>\bot</code>	\in	<code>\in</code>	$\not\owns^*$	<code>\notowns*</code>	\top	<code>\top</code>
\exists	<code>\exists</code>	$\not\exists$	<code>\notexists</code>	\owns	<code>\owns</code>	\wp	<code>\wp</code>
\forall	<code>\forall</code>	\notin	<code>\nin*</code>	\wp	<code>\wp</code>	\wp	<code>\wp</code>

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

TABLE 208: `fdsymbol` Letter-like Symbols

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

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

TABLE 209: `boisik` Letter-like Symbols

k	<code>\Bbbk</code>	\setminus	<code>\Game</code>	i	<code>\imath</code>	\nexists	<code>\nexists</code>
\complement	<code>\complement</code>	\hbar	<code>\hbar</code>	T	<code>\intercal</code>	\wp	<code>\wp</code>
\exists	<code>\exists</code>	\hbar	<code>\Finv</code>	\hbar	<code>\hbar</code>	j	<code>\jmath</code>

TABLE 210: `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>	\mathcal{T}	<code>\mathcal{J}</code>	\wp	<code>\wp</code>
\circledR	<code>\circledR</code>	\forall	<code>\forallall</code>	\mathcal{S}	<code>\mathcal{S}</code>	\Yup	<code>\text{\Yup}</code>
\circledS	<code>\circledS</code>	\mathcal{O}	<code>\Game</code>	\mathcal{P}	<code>\mathcal{P}</code>	\Zbar	<code>\text{\Zbar}</code>
\complement	<code>\complement</code>	\hbar	<code>\hbar</code>	\mathcal{L}	<code>\mathcal{L}</code>	\mathsterling	<code>\text{\mathsterling}</code>
\digamma	<code>\digamma</code>	\hbar	<code>\hbar</code>	\nexists	<code>\nexists</code>		
ℓ	<code>\ell</code>	\mathfrak{I}	<code>\Im</code>	\mathfrak{R}	<code>\Re</code>		

TABLE 211: `trfsigns` Letter-like Symbols

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

TABLE 212: `mathdesign` Letter-like Symbols

\in	<code>\in</code>	\ni	<code>\owns</code>
\notin	<code>\notin</code>	\smallin	<code>\smallin</code>
$\not\in$	<code>\not\in</code>	$\smallnot\in$	<code>\smallnot\in</code>
$\not\models$	<code>\not\models</code>	\smallmodels	<code>\smallmodels</code>

The `mathdesign` package additionally provides versions of each of the letter-like symbols shown in Table 204 on the previous page.

TABLE 213: fge Letter-like Symbols

V	\fgeA	g	\fgeeszett	B	\fgeleftB	F	\fgeU
ß	\fgec	ß	\fgeF	Ó	\fgeleftC		
þ	\fged	þ	\fgef	Þ	\fgerightB		
ð	\fgee	ð	\fgelb*	f	\fges		

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

TABLE 214: fourier Letter-like Symbols

ð \partial ð \varpartialdiff

TABLE 215: cmlL Letter-like Symbols

⊤ \Bot ⊥ \simbot

TABLE 216: *AMS* Delimiters

⌈	\ulcorner	⌉	\urcorner
⌊	\llcorner	⌋	\lrcorner

TABLE 217: stmaryrd Delimiters

{ \Lbag	}	\Rbag	{ \lbag	}	\rbag
⌈ \lceil	⌉	\rceil	⌊ \lfloor	⌋	\rfloor
(\lparenthesis)	\rparenthesis			

TABLE 218: mathabx Delimiters

[\lcorners]	\rcorners
⌈ \ulcorner	⌉	\urcorner
⌊ \llcorner	⌋	\lrcorner

TABLE 219: boisik Delimiters

⌈ \ulcorner	⌉	\urcorner
⌊ \llcorner	⌋	\lrcorner

TABLE 220: stix Delimiters

{	\langledot	}	\rangledot	{	\llangle	}	\rrangle
{	\lbag	}	\rbag	[\llcorner]	\lrcorner
(\lblkbrbrak)	\rbblkbrbrak	(\llparenthesis)	\rrparenthesis
[\lbracklltick]	\rbracklrtick	\&	\Lparengtr	\&	\Rparenless
[\lbrackubar]	\rbrackubar	\&	\lparenless	\>	\rparengtr
[\lbrackkultick]	\rbracklrtick	\&	\lvzigzag	\&	\rvzigzag
{	\Lbrbrak	}	\Rbrbrak	\&	\Lvzigzag	\&	\Rvzigzag
<	\lcurvyangle	>	\rcurvyangle	\&	\ulcorner	\&	\urcorner

TABLE 221: nath Delimiters

_ \niv _ \vin

TABLE 222: Variable-sized Delimiters

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

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

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

TABLE 223: Large, Variable-sized Delimiters

$\left\{ \right\}$	$\backslash lmoustache$	$\left\{ \right\}$	$\backslash rmoustache$	$($	$\left(\right.$	$\backslash lgroup$	$)$	$\left. \right)$	$\backslash rgroup$
$ $	$\backslash arrowvert$	\parallel	$\backslash Arrowvert$	$ $	$\backslash bracevert$				

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

TABLE 224: *AMS* Variable-sized Delimiters

$ $	$\backslash lvert$	$ $	$\backslash rvert$
\parallel	$\backslash lVert$	\parallel	$\backslash rVert$

According to the `amsmath` documentation [AMS99], the preceding symbols are intended to be used as delimiters (e.g., as in “ $| -z|$ ”) while the $\backslash vert$ and $\backslash Vert$ symbols (Table 222 on the previous page) are intended to be used as operators (e.g., as in $p|q$ ”).

TABLE 225: `stmaryrd` Variable-sized Delimiters

\llbracket	$\backslash llbracket$	\rrbracket	$\backslash rrbracket$
--------------	------------------------	--------------	------------------------

TABLE 226: `mathabx` Variable-sized Delimiters

\llbracket	$\left[\right]$	$\backslash ldbrack$	\rrbracket	$\left] \right]$	$\backslash rdbrack$
$\{\}$	$\left\{ \right\}$	$\backslash lfilet$	$\}$	$\left. \right\}$	$\backslash rfilet$
$ $	$\left \right $	$\backslash thickvert$	$\mid \mid$	$\left \right $	$\backslash vvvert$

TABLE 227: MnSymbol Variable-sized Delimiters

\parallel	\parallel	$\backslash\text{Arrowvert}$	{	$\left\{$	$\backslash\text{lbrace}$	$]$	$\right\}$	$\backslash\text{rceil}$
		$\backslash\text{arrowvert}$	[$\left[$	$\backslash\text{lceil}$	$]$	$\right]$	$\backslash\text{rfloor}$
\	\	$\backslash\text{backslash}$	[$\left[$	$\backslash\text{lfloor}$)	$\right)$	$\backslash\text{rgroup}$
		$\backslash\text{bracevert}$	($\left($	$\backslash\text{lgroup}$)	$\right)$	$\backslash\text{rmoustache}$
[[$\backslash\text{llangle}$	$\langle\langle$	$\langle\langle$	$\backslash\text{llangle}$	$\rangle\rangle$	$\rangle\rangle$	$\backslash\text{rrangle}$
]]	$\backslash\text{llcorner}$	\lfloor	\lfloor	$\backslash\text{lcorner}$	\rfloor	\rfloor	$\backslash\text{rsem}$
(($\backslash\text{lmoustache}$	\int	\int	$\backslash\text{moustache}$	$\rangle\rangle$	$\rangle\rangle$	$\backslash\text{rWavy}$
))	$\backslash\text{lrcorner}$	\rfloor	\rfloor	$\backslash\text{rcorner}$	$\rangle\rangle$	$\rangle\rangle$	$\backslash\text{rwavey}$
/	/	$\backslash\text{lsem}$	\llbracket	\llbracket	$\backslash\text{lsem}$	\rrbracket	\rrbracket	$\backslash\text{ulcorner}$
{	{	$\backslash\text{lwavy}$	$\} \}$	$\} \}$	$\backslash\text{wavy}$	\lceil	\rceil	$\backslash\text{ullcorner}$
}	}	$\backslash\text{lWavy}$	$\} \}$	$\} \}$	$\backslash\text{Wavy}$	\lceil	\rceil	$\backslash\text{ulrcorner}$
		$\backslash\text{rangle}$	$\rangle\}$	$\rangle\}$	$\backslash\text{rangle}$	\lceil	\rceil	$\backslash\text{urcorner}$
{	{	$\backslash\text{ranglebar}$	$\rangle\}$	$\rangle\}$	$\backslash\text{ranglebar}$	\parallel	\parallel	$\backslash\ $
{	{	$\backslash\text{langlebar}$	$\}$	$\}$	$\backslash\text{rbrace}$			

$\backslash\text{vert}$ is a synonym for \mid . Vert is a synonym for $\backslash\mid$. 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 228: *fdsymbol* Variable-sized Delimiters

\		\backslash	.		\lrcorner)		\rparen
\downarrow		\downarrow			\lvert			\rvert
\Downarrow		\Downarrow			\lVert			\rVert
\langle		\lAngle			\lVvert			\rVvert
\langle		\langle	/		\mathslash	\rceil		\ulcorner
\langle		\langledot	\rangle		\rangle	\rceil		\ullcorner
\{		\lbrace	\rangle		\rAngle	\rceil		\ulrcorner
\[\lbrack	\rangle		\rangledot	\uparrow		\uparrow
\[\![\lBrack	\}		\rbrace	\uparrow		\Uparrow
\[\![\lceil	\]\!		\rBrack	\updownarrow		\updownarrow
\[\![\lfloor	\]		\rbrack	\updownarrow		\Updownarrow
\[\[\lgroup	\]		\rceil	\rceil		\urcorner
\[\[\llcorner	\]		\rfloor			\vert
\[\[\lmoustache	\]		\rgroup			\Vert

(continued on next page)

(continued from previous page)

((\lparen)	\rmoustache			\Vvert
---	---	---------	---	-------------	--	--	--------

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

TABLE 229: stix Variable-sized Delimiters

“		<code>\Arrowvert</code>	«	<<	<code>\lAngle</code>	】	】	<code>\rceil</code>
·		<code>\arrowvert</code>	{	{	<code>\lbrace</code>	】	】	<code>\rfloor</code>
\	\\	<code>\backslash</code>	{	{	<code>\lBrace</code>)	}	<code>\rgroup</code>
⇓		<code>\Ddownarrow</code>	[[<code>\lBrack</code>]]	<code>\rmoustache</code>
⇓		<code>\DDownarrow</code>	((<code>\lbrbrak</code>))	<code>\rParen</code>
↓		<code>\downarrow</code>	[[<code>\lceil</code>	↑	↑	<code>\uparrow</code>
↓		<code>\Downarrow</code>	[[<code>\lfloor</code>	↑	↑	<code>\Uparrow</code>
[[[((<code>\lgroup</code>	↔	↔	<code>\Updownarrow</code>
]]]))	<code>\rmoustache</code>	↑	↓	<code>\updownarrow</code>

(continued from previous page)

(())	(\lParen	$\uparrow\uparrow$	\Uparrow
)))))	\rAngle	$\uparrow\uparrow$	\UUpArrow
/	/	/))	\rangle	$\parallel\parallel$	\Vert
<	<	<	}	}	\rbrace		\vert
>	>	>))	\rBrace	$\parallel\parallel$	\Vvert
))	\rBrack		
{	{	{))	\rangle		
					\langle		\rbrbrak

TABLE 230: `mathdesign` Variable-sized Delimiters

,		\leftwave	,		\rightwave
,		\leftevaw	,		\rightevaw

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

TABLE 231: `nath` Variable-sized Delimiters (Double)

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

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

All of the symbols in Table 231 can also be expressed using the `\double` macro. See the `nath` documentation for examples and additional information.

TABLE 232: `nath` 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 `\lVert` and `\rVert` in Table 231, `\ltriple` and `\rtriple` must be used instead of `\triple` to disambiguate whether “`|`” is a left or right delimiter.

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

TABLE 233: `fourier` Variable-sized Delimiters

$\llbracket \llbracket \llbracket \backslash llbracket \rrbracket \rrbracket \rrbracket$	$\backslash rrbracket$
$\parallel \parallel \parallel \backslash VERT$	

TABLE 234: `textcomp` Text-mode Delimiters

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

TABLE 235: `metre` Text-mode Delimiters

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

TABLE 236: 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 302 on page 130.) 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 246 on page 117) produces a wider accent than `\bar`: “ \bar{A} ” vs. “ $\bar{\bar{A}}$ ”. 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][2][3]{%
  \mkern#1mu\overline{\mkern-#1mu#2\mkern-#1mu}}
```

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

TABLE 237: \mathcal{AM} S Math-mode Accents

$$\ddot{a} \quad \text{\textbackslash dddot\{a\}} \quad \ddot{\ddot{a}} \quad \text{\textbackslash dddd\{a\}}$$

These accents are also provided by the `mathabx` and `accents` packages and are redefined by the `mathdots` package if the `amsmath` and `amssymb` packages have previously been loaded. All of the variations except for the original \mathcal{AM} S 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 $x^{\text{\textbackslash dddot\{a\}}}$).

TABLE 238: MnSymbol Math-mode Accents

 $\vec{a} \quad \backslash vec\{a\}$

TABLE 239: fdsymbol Math-mode Accents

α	$\backslash middlebar\{a\}$	\not	$\backslash strokethrough\{a\}$
α	$\backslash middleslash\{a\}$	\vec{a}	$\backslash vec\{a\}$

$\backslash middlebar$ and $\backslash middleslash$ 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 240: boisik Math-mode Accents

 $\tilde{a} \quad \backslash vec\{a\}$

TABLE 241: stix Math-mode Accents

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

TABLE 242: fge Math-mode Accents

 $\dot{\grave{a}} \quad \backslash spirituslenis\{A\}\backslash spirituslenis\{a\}^*$

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

TABLE 243: *yhmath* Math-mode Accents
 \mathring{a} \ring{a}

This symbol is largely obsolete, as standard L^AT_EX 2 _{ε} has supported \mathring{} (Table 236 on page 114) since June 1998 [LAT98].

TABLE 244: *halloweenmath* Halloween-Themed Math-mode Accents

\overrightarrow{a}	<code>\overbat{a}</code>	\overleftarrow{a}	<code>\underbat{a}</code>
\overleftrightarrow{a}	<code>\overbat*{a}</code>	$\overleftarrow{\overleftarrow{a}}$	<code>\underbat*{a}</code>

TABLE 245: *realhats* Math-mode Hat Accents

 <code>\hat{a}</code>	 <code>\hat{a}</code>
 <code>\hat{a}</code>	 <code>\hat{a}</code>
 <code>\hat{a}</code>	 <code>\hat{a}</code>
 <code>\hat{a}</code>	 <code>\hat{a}</code>
 <code>\hat{a}</code>	 <code>\hat{a}</code>

These hats are drawn by scaling a graphic image and placing it at an appropriate location.

If \hat{} is used with no argument, it selects a hat at random. Alternatively, a hat type can be passed as an option to *realhats* to specify the default hat. See the *realhats* documentation for more information.

TABLE 246: 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 252 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 250 on the following page). and even more extensible by the `yhmath` package (Table 248).

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

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

 TABLE 247: `overrightarrow` Extensible Accents

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

 TABLE 248: `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>
\widering{abc}			<code>\widering{abc}</code>

TABLE 249: *AMS* Extensible Accents

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

TABLE 250: MnSymbol Extensible Accents

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

TABLE 251: fdsymbol Extensible Accents

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

TABLE 252: stix Extensible Accents

\overbrace{abc}	<code>\longdivision{abc}</code>	\underbrace{abc}	<code>\underbracket{abc}</code>
\overbrace{abc}	<code>\overbrace{abc}</code>	\underbrace{abc}	<code>\underleftarrow{abc}</code>
\overbracket{abc}	<code>\overbracket{abc}</code>	\underbracket{abc}	<code>\underleftharpoon{abc}</code>
\overleftarrow{abc}	<code>\overleftarrow{abc}</code>	\underleftarrow{abc}	<code>\underleftrightarrow{abc}</code>
\overleftarrow{abc}	<code>\overleftharpoon{abc}</code>	\underbrace{abc}	<code>\underparen{abc}</code>
\overrightarrow{abc}	<code>\overleftrightarrow{abc}</code>	\underbrace{abc}	<code>\underrightarrow{abc}</code>
\overbrace{abc}	<code>\overparen{abc}</code>	\underbrace{abc}	<code>\underrightharpoon{abc}</code>
\overrightarrow{abc}	<code>\overrightarrow{abc}</code>	\widecheck{abc}	<code>\widecheck{abc}</code>
\overrightarrow{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 253: 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 254: mathabx Extensible Accents

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

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

TABLE 255: fourier Extensible Accents

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

TABLE 256: esvect Extensible Accents

\overrightarrow{abc}	<code>\vv{abc}</code> with package option a
\overleftarrow{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 257: abraces Extensible Accents

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

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

TABLE 258: undertilde Extensible Accents

\widetilde{abc}	<code>\utilde{abc}</code>
-------------------	---------------------------

Because `\utilde` is based on `\widetilde` it is also made more extensible by the `yhmath` package (Table 248 on page 117).

TABLE 259: ushort Extensible Accents

abc \ushortdw{abc} abc \ushortw{abc}

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

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

TABLE 260: mdwmath Extensible Accents

$$\sqrt{abc} \quad \backslash\sqrt{\{abc\}}$$

TABLE 261: actuarialangle Extensible Accents

`\actuarialangle{abc}`

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

TABLE 262: *AMS* Extensible Arrows

\xleftarrow{abc} \xleftarrow{abc} \xrightarrow{abc} \xrightarrow{abc}

TABLE 263: mathtools Extensible Arrows

\xleftarrow{abc}	<code>\xhookleftarrow{abc}</code>	\xrightleftharpoons{abc}	<code>\xleftrightharpoons{abc}</code>
\xrightarrow{abc}	<code>\xhookrightarrow{abc}</code>	\xmapsto{abc}	<code>\xmapsto{abc}</code>
\xLeftarrow{abc}	<code>\xLeftarrow{abc}</code>	\xRrightarrow{abc}	<code>\xRrightarrow{abc}</code>
$\xleftrightharpoondown{abc}$	<code>\xleftrightharpoondown{abc}</code>	$\xrightleftharpoondown{abc}$	<code>\xrightleftharpoondown{abc}</code>
$\xleftrightharpoonup{abc}$	<code>\xleftrightharpoonup{abc}</code>	$\xrightleftharpoonup{abc}$	<code>\xrightleftharpoonup{abc}</code>
\xleftrightarrow{abc}	<code>\xleftrightarrow{abc}</code>	\xrightleftharpoons{abc}	<code>\xrightleftharpoons{abc}</code>
\xLeftrightarrow{abc}	<code>\xLeftrightarrow{abc}</code>		

TABLE 264: chemarr Extensible Arrows

$\overleftarrow{\overrightarrow{abc}}$ \xrightleftharpoons{abc}

TABLE 265: chemarrow Extensible Arrows

$\xleftarrow[def]{abc}$	<code>\autoleftarrow{abc}{def}</code>	$\xrightarrow[def]{abc}$	<code>\autorightarrow{abc}{def}</code>
$\xleftrightharpoons[def]{abc}$	<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 266: extarrows Extensible Arrows

\xLeftrightarrow{abc}	<code>\xLeftrightarrow{abc}</code>	$\xLongleftrightarrow{abc}$	<code>\xLongleftrightarrow{abc}</code>
\xleftrightarrow{abc}	<code>\xleftrightarrow{abc}</code>	$\xlongleftrightarrow{abc}$	<code>\xlongleftrightarrow{abc}</code>
\xlongequal{abc}	<code>\xlongequal{abc}</code>	\xLongrightarrow{abc}	<code>\xLongrightarrow{abc}</code>
\xLongleftarrow{abc}	<code>\xLongleftarrow{abc}</code>	\xlongrightarrow{abc}	<code>\xlongrightarrow{abc}</code>
\xlongleftarrow{abc}	<code>\xlongleftarrow{abc}</code>		

TABLE 267: extpfeil Extensible Arrows

\xlongequal{abc}	<code>\xlongequal{abc}</code>	\xtwoheadleftarrow{abc}	<code>\xtwoheadleftarrow{abc}</code>
\xmapsto{abc}	<code>\xmapsto{abc}</code>	\xtwoheadrightarrow{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 268: DotArrow Extensible Arrows

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

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 269: `halloweenmath` Extensible Arrows

\overleftarrow{abc}	<code>\overscriptleftarrow{abc}</code>	\overleftarrow{abc}	<code>\underscriptleftarrow{abc}</code>
\overleftrightarrow{abc}	<code>\overscriptleftrightarrow{abc}</code>	\overleftrightarrow{abc}	<code>\underscriptleftrightarrow{abc}</code>
\overrightarrow{abc}	<code>\overscriptrightarrow{abc}</code>	\overrightarrow{abc}	<code>\underscriptrightarrow{abc}</code>

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

$$\begin{array}{ccc} \overrightarrow{abc} & \text{vs.} & \overrightarrow{abc} \\ \text{\scriptsize \code{\overrightarrow{abc}}} & & \text{\scriptsize \code{\overscriptrightarrow{abc}}} \end{array}$$

TABLE 270: `trfsigns` Extensible Transform Symbols

$$\begin{array}{cc} \overleftarrow{abc} & \text{\code{\dft{abc}}} \end{array} \quad \begin{array}{cc} \overrightarrow{abc} & \text{\code{\DFT{abc}}} \end{array}$$

TABLE 271: `esrelation` Extensible Relations

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

TABLE 272: `halloweenmath` Extensible Brooms and Pitchforks

$\overleftarrow{\overleftarrow{abc}}$	<code>\overleftarrow{\overleftarrow{broom}}{abc}</code>	\overleftarrow{abc}	<code>\underrightbroom{abc}</code>
$\overleftarrow{\overleftarrow{\infty}}$	<code>\overleftarrow{\overleftarrow{\infty}}{pitchfork}{abc}</code>	\overleftarrow{abc}	<code>\underrightpitchfork{abc}</code>
$\overrightarrow{\overrightarrow{abc}}$	<code>\overrightarrow{\overrightarrow{broom}}{abc}</code>	$\overleftarrow{\overbrace{abc}}$	<code>\xleftbroom{abc}</code>
$\overrightarrow{\overrightarrow{\exists}}$	<code>\overrightarrow{\overrightarrow{\exists}}{pitchfork}{abc}</code>	$\overleftarrow{\overbrace{\exists}}$	<code>\xleftpitchfork{abc}</code>
$\overleftarrow{\overleftarrow{\exists}}$	<code>\overleftarrow{\overleftarrow{\exists}}{broom}{abc}</code>	$\overleftarrow{\overbrace{\exists}}$	<code>\xrightbroom{abc}</code>
$\overleftarrow{\overleftarrow{\forall}}$	<code>\overleftarrow{\overleftarrow{\forall}}{pitchfork}{abc}</code>	$\overleftarrow{\overbrace{\forall}}$	<code>\xrightpitchfork{abc}</code>

TABLE 273: halloweenmath Extensible Witches

	\overleftwitchonbroom{abc}		\underrightwitchonbroom{abc}
	\overleftwitchonbroom*{abc}		\underrightwitchonbroom*{abc}
	\overleftwitchonpitchfork*{abc}		\underrightwitchonpitchfork*{abc}
	\overleftwitchonpitchfork{abc}		\underrightwitchonpitchfork{abc}
	\overrightwitchonbroom*{abc}		\xleftwitchonbroom*{abc}
	\overrightwitchonbroom{abc}		\xleftwitchonbroom{abc}
	\overrightwitchonpitchfork*{abc}		\xleftwitchonpitchfork*{abc}
	\overrightwitchonpitchfork{abc}		\xleftwitchonpitchfork{abc}
	\underleftwitchonbroom{abc}		\xrightwitchonbroom{abc}
	\underleftwitchonbroom*{abc}		\xrightwitchonbroom*{abc}
	\underleftwitchonpitchfork*{abc}		\xrightwitchonpitchfork*{abc}
	\underleftwitchonpitchfork{abc}		\xrightwitchonpitchfork{abc}

TABLE 274: halloweenmath Extensible Ghosts

	\overleftwishingghost{abc}		\overrightwishingghost{abc}
	\underleftwishingghost{abc}		\underrightwishingghost{abc}
	\xleftwishingghost{abc}		\xrightwishingghost{abc}

TABLE 275: halloweenmath Extensible Bats

	\overleftflutteringbat{abc}		\overrightflutteringbat{abc}
	\underleftflutteringbat{abc}		\underrightflutteringbat{abc}
	\xleftflutteringbat{abc}		\xrightflutteringbat{abc}

TABLE 276: *holtpolt* Non-commutative Division Symbols

$\begin{array}{c} abc \\ \backslash holter{abc}{def} \\ def \end{array}$	$\begin{array}{c} abc \\ \backslash polter{abc}{def} \\ def \end{array}$
--	--

TABLE 277: Dots

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

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

\dagger The `mathdots` package redefines `\ddots` and `\vdots` (Table 283) 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 278: *AMS* Dots

\therefore	<code>\because*</code>	\dots	<code>\dotsi</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 90 on page 55.

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

TABLE 279: *wasysym* Dots

\therefore `\wasytherefore`

TABLE 280: MnSymbol Dots

\cdot	\cdot	\cdot	\cdot
\cdot	\cdot	\cdot	\cdot
\cdot	\cdot	\cdot	\cdot
\cdot	\cdot	\cdot	\cdot
\cdot	\cdot	\cdot	\cdot

`MnSymbol` defines `\therefore` as `\uptherefore` and `\because` as `\downtherefore`. Furthermore, `\cdotp` and `\colon` produce the same glyphs as `\cdot` and `\dots` 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 34.

TABLE 281: *fdsymbol* Dots

\cdot	\cdot	\cdot	\cdot	\cdot
\cdot	\cdot	\cdot	\cdot	\cdot
\cdot	\cdot	\cdot	\cdot	\cdot
\cdot	\cdot	\cdot	\cdot	\cdot
\cdot	\cdot	\cdot	\cdot	\cdot

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

TABLE 282: stix Dots

\therefore	<code>\adots</code>	\cdots	<code>\cdots</code>	<code>\cdots</code>	<code>\fourvdots</code>
\because	<code>\because</code>	$::$	<code>\Colon</code>	$.$	<code>\ldotp</code>
\cdot	<code>\cdot</code>	\cdot	<code>\ddots</code>	\dots	<code>\mathellipsis</code>
\therefore	<code>\cdotp</code>	\therefore	<code>\enleadertwodots</code>	\therefore	<code>\therefore</code>

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

TABLE 283: mathdots Dots

\ddots \iddots \vdots

Unlike the default definitions of the above (Table 277), `mathdots`'s commands are designed to scale properly with the surrounding font size.

TABLE 284: *yhmath* Dots
 $\therefore \backslash adots$
TABLE 285: *teubner* Dots
 $:$ $\backslash:$ \vdots $\backslash;$ \vdash $\backslash?$ $::$ $\backslash antilabe$
TABLE 286: *begriff* Begriffsschrift Symbols

\vdash	$\backslash BGassert$	\dashv	$\backslash BGcontent$	\top	$\backslash BGnot$
\vdash^b_a	$\backslash BGconditional\{a\}\{b\}$	\overline{a}	$\backslash BGquant\{a\}$		

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

TABLE 287: *frege* Begriffsschrift Symbols

\vdash	$\backslash Facontent$	\vdash_{π}	$\backslash Fanncontent$	$\vdash_{\pi\pi}$	$\backslash Fncontent$
\vdash	$\backslash Fancontent$	\vdash_{π}	$\backslash Fcontent$	$\vdash_{\pi\pi}$	$\backslash Fncontent$
\vdash^a	$\backslash Fannquant\{a\}$	\vdash^a	$\backslash Faquant\{a\}$	$\vdash^{a\pi}$	$\backslash Fnquant\{a\}$
$\vdash^{a\pi}$	$\backslash Fannquantn\{a\}$	$\vdash^{a\pi}$	$\backslash Faquantn\{a\}$	$\vdash^{a\pi\pi}$	$\backslash Fnquantn\{a\}$
$\vdash^{a\pi\pi}$	$\backslash Fannquantnn\{a\}$	$\vdash^{a\pi\pi}$	$\backslash Faquantnn\{a\}$	$\vdash^{a\pi\pi\pi}$	$\backslash Fnquantnn\{a\}$
\vdash^{π}	$\backslash Fanquant\{a\}$	$\vdash^{\pi a}$	$\backslash Fnnquant\{a\}$	$\vdash^{a\pi}$	$\backslash Fquantn\{a\}$
$\vdash^{\pi a}$	$\backslash Fanquantn\{a\}$	$\vdash^{\pi a\pi}$	$\backslash Fnnquantn\{a\}$	$\vdash^{a\pi\pi}$	$\backslash Fquantnn\{a\}$
$\vdash^{\pi\pi}$	$\backslash Fanquantnn\{a\}$	$\vdash^{\pi\pi a}$	$\backslash Fnnquantnn\{a\}$	$\vdash^{a\pi\pi\pi}$	$\backslash Fquantnn\{a\}$

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

TABLE 288: *mathcomp* Math Symbols

${}^\circ C$	$\backslash tccentigrade$	Ω	$\backslash tcohm$	$\%$	$\backslash tcperthousand$
μ	$\backslash tcmu$	$\%$	$\backslash tcpertenthousand$		

TABLE 289: marvosym Math Symbols

\triangleleft	<code>\AngleSign</code>	\geq	<code>\LargerOrEqual</code>	\times	<code>\MVMultiplication</code>
\Rightarrow	<code>\Conclusion</code>	\leq	<code>\LessOrEqual</code>	\cdot	<code>\MVPeriod</code>
\equiv	<code>\Congruent</code>	\cdot	<code>\MultiplicationDot</code>	$+$	<code>\MVPlus</code>
\cong	<code>\Corresponds</code>	$,$	<code>\MVComma</code>	\rightarrow	<code>\MVRightArrow</code>
$/$	<code>\Divides</code>	$/$	<code>\MVDivision</code>	$)$	<code>\MVRightBracket</code>
$\not $	<code>\DividesNot</code>	$($	<code>\MVLeftBracket</code>	\neq	<code>\NotCongruent</code>
\Leftrightarrow	<code>\Equivalence</code>	$-$	<code>\MVMinus</code>		

TABLE 290: 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 291: fge Digits

0 `\fgestruckzero` 1 `\fgestruckone`

TABLE 292: dozenal Base-12 Digits

2 `\x` 3 `\e`

TABLE 293: mathabx Mayan Digits

\oplus	<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 294: stix Infinities

\circledinfty	<code>\acidfree</code>	∞	<code>\infty</code>	∞	<code>\tieinfty</code>
\circlearrowright	<code>\iinfin</code>	$\not\infty$	<code>\nvinfty</code>		

TABLE 295: stix Primes

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

TABLE 296: stix Empty Sets

\emptyset	$\backslash emptyset$	$\bar{\emptyset}$	$\backslash emptysetobar$	\varnothing	$\backslash varnothing$
$\vec{\emptyset}$	$\backslash emptysetoarr$	$\dot{\emptyset}$	$\backslash emptysetocirc$		
$\tilde{\emptyset}$	$\backslash emptysetoarrr$	\mathbb{Q}	$\backslash revemptyset$		

TABLE 297: \mathcal{AMS} Angles

```
< \angle < \measuredangle < \sphericalangle
```

TABLE 298: MnSymbol Angles

```
< \angle < \measuredangle < \sphericalangle
```

TABLE 299: *fdsymbol* Angles

\angle	\angle	\triangleright	\revangle	\triangleleft	\sphericalangle
\triangleleft	\measuredangle	\triangleright	\revmeasuredangle	A	\sphericalangledown
\triangleleft	\measuredrightangle	\llcorner	\rightangle	\triangleright	\sphericalangleleft
\triangleleft	\measuredrightangledot	\lrcorner	\rightanglesquare	\triangleright	\sphericalangleup

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

TABLE 300: boisik Angles

```

< \angle           < \rightangle      < \sphericalangle
< \measuredangle   < \rightangledot
< \measuredrightangle < \rightanglesqr

```

TABLE 301: stix Angles

\angle	\backslash angdnr	\triangleleft	\backslash measanglerutone	\triangleright	\backslash rightanglemdot
\angle	\backslash angle	\triangleleft	\backslash measangleultonw	\square	\backslash rightanglesqr
\triangleleft	\backslash angles	\triangleright	\backslash measangleurtone	\triangleleft	\backslash sphericalangle
\leq	\backslash angleubar	\triangleleft	\backslash measuredangle	\triangleright	\backslash sphericalangleup
\triangleright	\backslash gtlpar	\triangleright	\backslash measuredangleleft	\triangleleft	\backslash threeangle
\triangleleft	\backslash measangledltosw	\square	\backslash measuredrightangle	\triangleright	\backslash turnangle
\triangleleft	\backslash measangledrtose	\triangleleft	\backslash rangledownzigzagarrow	\square	\backslash wideangledown
\triangleright	\backslash measangleldtosw	\triangleright	\backslash revangle	\triangleright	\backslash wideangleup
\triangleleft	\backslash measanglelutonw	\leq	\backslash revangleubar		
\triangleright	\backslash measanglerdtose	\sqsubset	\backslash rightangle		

TABLE 302: 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>	$'$	<code>\prime</code>		
\backslash	<code>\backslash</code>	\backslash	<code>\backslash</code>	$\sqrt{}$	<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 303) to that of L^AT_EX’s `\emptyset`.

TABLE 303: Miscellaneous *AMS* Math Symbols

\backslash	<code>\backslashbackprime</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 304: Miscellaneous `wasysym` Math Symbols

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

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

TABLE 305: Miscellaneous `txfonts/pxfonts` Math Symbols

\blacklozenge	<code>\Diamondblack</code>	λ	<code>\lambda</code>	λbar	<code>\lambdabar</code>
\blacklozenge	<code>\Diamonddot</code>	λ	<code>\lambda</code>	\lambdaslash	<code>\lambdaslash</code>

TABLE 306: Miscellaneous `mathabx` Math Symbols

\circ	<code>\degree</code>	$\#/\#$	<code>\fourth</code>	$\not\sim$	<code>\measuredangle</code>	$\#/\#$	<code>\second</code>
\diagdown	<code>\diagdown</code>	$\#/\#$	<code>\hash</code>	\pitchfork	<code>\pitchfork</code>	$\#/\#$	<code>\sphericalangle</code>
\diagup	<code>\diagup</code>	∞/∞	<code>\infty</code>	\propto	<code>\propto</code>	$\#/\#$	<code>\third</code>
\emptyset	<code>\diameter</code>	\times/\times	<code>\leftthreetimes</code>	\times/\times	<code>\rightthreetimes</code>	$\#/\#$	<code>\varhash</code>

TABLE 307: Miscellaneous MnSymbol Math Symbols

\neg	<code>\backneg</code>	\emptyset	<code>\diameter</code>	\neg	<code>\invneg</code>	\neg	<code>\neg</code>
\prime	<code>\backprime</code>	∞	<code>\infty</code>	\maltese	<code>\maltese</code>	$/$	<code>\prime</code>
\checkmark	<code>\checkmark</code>	\sqcup	<code>\invbackneg</code>	∇	<code>\nabla</code>	\int	<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 308: Miscellaneous Internal MnSymbol Math Symbols

\cdots	<code>\partialvardint</code>	\cdots	<code>\partialvartint</code>
\cup	<code>\partialvardlanddownint</code>	\cup	<code>\partialvartlanddownint</code>
\cap	<code>\partialvardlandupint</code>	\cap	<code>\partialvartlandupint</code>
\circlearrowleft	<code>\partialvardlcircleleftint</code>	\circlearrowleft	<code>\partialvartlcircleleftint</code>
\circlearrowright	<code>\partialvardlcirclerightint</code>	\circlearrowright	<code>\partialvartlcirclerightint</code>
\square	<code>\partialvardoint</code>	\square	<code>\partialvartooint</code>
\circlearrowleft	<code>\partialvardpoint</code>	\circlearrowleft	<code>\partialvartoint</code>
\circlearrowright	<code>\partialvardrcircleleftint</code>	\circlearrowright	<code>\partialvartrcicleleftint</code>
\circlearrowleft	<code>\partialvardrcirclerightint</code>	\circlearrowleft	<code>\partialvartrcirlcerightint</code>
\dashv	<code>\partialvardstrokedint</code>	\dashv	<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 80 on page 47 but can nevertheless be used in isolation.

TABLE 309: Miscellaneous fdsymbol Math Symbols

\neg	<code>\backneg</code>	∞	<code>\infty</code>	$/$	<code>\prime</code>
\prime	<code>\backprime</code>	\neg	<code>\invneg</code>	\emptyset	<code>\revemptyset</code>
\checkmark	<code>\checkmark</code>	\maltese	<code>\maltese</code>	∇	<code>\sector</code>
\emptyset	<code>\emptyset</code>	\neg	<code>\neg</code>	\int	<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 `\intprod`; `\turnedneg` as a synonym for `\intprod`; and `\diameter` and `\varnothing` as synonyms for `\emptyset`.

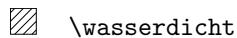
TABLE 310: Miscellaneous boisik Math Symbols

β	<code>\backepsilon</code>	$\dot{+}$	<code>\hermitmatrix</code>	$\not\perp$	<code>\notbot</code>
\backprime	<code>\backprime</code>	\curvearrowleft	<code>\iinf</code>	$\not\top$	<code>\nottop</code>
\checkmark	<code>\checkmark</code>	\sqcup	<code>\invnot</code>	ι	<code>\riota</code>
\square	<code>\dalambert</code>	λ	<code>\lambdabar</code>	\sim	<code>\sinewave</code>
\diagdown	<code>\diagdown</code>	λ	<code>\lambdaslash</code>	\emptyset	<code>\varnothing</code>
\diagup	<code>\diagup</code>	\maltese	<code>\maltese</code>		

TABLE 311: Miscellaneous *stix* Math Symbols

\approx	<code>\accurrent</code>	\doteq	<code>\hermitmatrix</code>	\models	<code>\PropertyLine</code>
\backslash	<code>\backslashbackslash</code>	\cdot	<code>\hyphenbullet</code>	\blacksquare	<code>\QED</code>
\parallel	<code>\bbbrktbrk</code>	$\sim\!\sim$	<code>\hzigzag</code>	$??$	<code>\Question</code>
\perp	<code>\bigbot</code>	Δ	<code>\increment</code>	$\times\!\times$	<code>\rdiagovfdiag</code>
\equiv	<code>\biginterleave</code>	$\blacksquare\blacksquare$	<code>\inversebullet</code>	$\bowtie\bowtie$	<code>\rightouterjoin</code>
\top	<code>\bigtop</code>	\neg	<code>\invnot</code>	\sqcup	<code>\sansLmirrored</code>
\odot	<code>\blacksmiley</code>	\Join		\sqcap	<code>\sansLturned</code>
$ $	<code>\bracevert</code>	\square	<code>\laplac</code>	\sim	<code>\sinewave</code>
\wedge	<code>\caretinsert</code>	\Join	<code>\leftouterjoin</code>	$\rule{0pt}{1ex}$	<code>\strns</code>
\checkmark	<code>\checkmark</code>	\llcorner	<code>\llarc</code>	\pm	<code>\thermod</code>
\triangleright	<code>\conictaper</code>	\lrcorner	<code>\lrarc</code>	\circlearrowleft	<code>\topcir</code>
\geq	<code>\danger</code>	\maltese		\sqsubset	<code>\turnednot</code>
\swarrow	<code>\diagdown</code>	\S	<code>\mathsection</code>	\sqsupset	<code>\ubrbrak</code>
\searrow	<code>\diagup</code>	$_$	<code>\mathvisible</code>	\swarrow	<code>\ularc</code>
\varnothing	<code>\diameter</code>	∇	<code>\nabla</code>	\searrow	<code>\urarc</code>
$*$	<code>\dingasterisk</code>	\neg	*	$\#$	<code>\viewdata</code>
\times	<code>\elinters</code>	\lrcorner	<code>\obrbrak</code>	\wr	<code>\vzigzag</code>
\eth	<code>\eth</code>	\llcorner	<code>\perps</code>	\yen	<code>\yen</code>
$!!$	<code>\Exclam</code>	\mp	<code>\postalmark</code>	$\ddot{\circ}$	<code>\zcmp</code>
$\times\!\times$	<code>\fdiagovrdiag</code>	\curvearrowleft	<code>\profline</code>	\gg	<code>\zpipe</code>
$\bowtie\bowtie$	<code>\fullouterjoin</code>	\curvearrowright	<code>\profsurf</code>	\uparrow	<code>\zproject</code>

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

 TABLE 312: *endofproofwd* End-of-Proof Symbols


\wasserdicht

`\wasserdicht` is implemented as an external PDF graphic. The command in fact typesets the symbol flush right on the page to signify the end of proof. To use the command in inline text, simply load the underlying graphic file directly:

```
\includegraphics[width=10pt]{endofproofwd.pdf}
```

TABLE 313: 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>	$\frac{3}{4}$	<code>\textthreesuperior</code>
$/$	<code>\textfractionsolidus</code>	$\frac{1}{1}$	<code>\textonesuperior</code>	\times	<code>\texttimes</code>
$-$	<code>\textlnot</code>	\pm	<code>\textpm</code>	$\frac{2}{2}$	<code>\texttwosuperior</code>
$-$	<code>\textminus</code>	$\sqrt{-}$	<code>\textminus</code>		<code>\textminus</code>

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

† `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 314: Miscellaneous `fge` Math Symbols

\backslash	<code>\fgebackslash</code>	\cap	<code>\fgecap</code>	\cup	<code>\fgecupacute</code>	\setminus	<code>\fgelangle</code>
\trianglelefteq	<code>\fgebaracute</code>	\trianglelefteq	<code>\fgecapbar</code>	\trianglelefteq	<code>\fgecupbar</code>	\sqsubset	<code>\fgeupbracket</code>
∞	<code>\fgebarcap</code>	\cup	<code>\fgecup</code>	\supseteq	<code>\fgeinfty</code>		

TABLE 315: Miscellaneous `mathdesign` Math Symbols

$\sqsubset \right\rangle \rightangle$

TABLE 316: Math Alphabets

Font sample	Generating command	T _E X font	Required package
ABCdef123	\mathrm{ABCdef123}	cmr10	<i>none</i>
<i>ABCdef123</i>	\mathit{ABCdef123}	cmmi10	<i>none</i>
<i>ABCdef123</i>	\mathnormal{ABCdef123}	cmmi10	<i>none</i>
<i>ABC</i>	\mathcal{ABC}	cmsy10	<i>none</i>
<i>ABC</i>	\mathscr{ABC}	rsfs10	mathrsfs
	or \mathcal{ABC}	rsfs10	calrsfs
<i>ABC</i>	\mathcal{ABC}	eusm10	euscript with the mathcal option
	or \mathscr{ABC}	eusm10	euscript with the mathscr option
<i>ABC</i>	\mathcal{ABC}	rsfso10	rsfso
	or \mathscr{ABC}	rsfso10	rsfso with the scr option
<i>ABC</i>	\mathcal{ABC}	urwchancal	urwchancal*
	or \mathscr{ABC}	urwchancal	urwchancal* with the mathscr option
<i>ABC</i>	\mathbb{ABC}	msbm10	amsfonts, [§] amssymb, txfonts, or pxfonts
<i>ABC</i>	\varmathbb{ABC}	txmia	txfonts or pxfonts
ABCdef123	\mathbb{ABCdef123}	bbold10	bbold or mathbbol [†]
ABCdef123	\mathbb{ABCdef123}	mbb10	mbboard [†]
ABCdef12	\mathbb{ABCdef12}	bbm10	bbm
ABCdef12	\mathbb{ABCdef12}	bbmss10	bbm
ABCdef12	\mathbb{ABCdef12}	bbmtt10	bbm
ABC1	\mathds{ABC1}	dsrom10	dsfont
A B C1	\mathds{ABC1}	dsss10	dsfont with the sans option
ABCdef123	\mathbb{ABCdef123}	DSSerif	dsserif
ABCdef123	\mathbbb{ABCdef123}	DSSerif-Bold	dsserif
ABC	\symA\symB\symC	china10	china2e [‡]
ABCdef123	\mathfrak{ABCdef123}	eufm10	eufrak
ABCdef123	\textfrak{ABCdef123}	yfrak	yfonts [¶]
ABCdef123	\textswab{ABCdef123}	yswab	yfonts [¶]
ABCdef123	\textgoth{ABCdef123}	ygoth	yfonts [¶]

The “T_EX font” column lists the underlying T_EX font (or, more accurately, the .tfm file) that provides the math alphabet. See the corresponding table in the associated Raw Font Tables document for the math alphabet’s complete character set.

* 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 316, 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 “ꝝ” (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, “ $\langle[\alpha\beta]\rangle$ ” is produced by “`\mathbb{\langle\!\!\langle} \alpha\beta \mathbb{\rangle\!\!\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\bbayod\bbqof\bbpe`” → “ פָּיְנָן ”).

[‡] The `\sym...` commands provided by the `GfNA2e` package are actually text-mode commands. They are included in Table 316 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, `GfNA2e` provides three umlauted blackboard-bold letters: `\symAE` (“ \mathbb{A} ”), `\symOE` (“ \mathbb{O} ”), and `\symUE` (“ \mathbb{U} ”). Note that `GfNA2e` does provide math-mode commands for the most common number-set symbols. These are presented in Table 187 on page 100.

[¶] As their `\text...` names imply, the fonts provided by the `yfonts` package are actually text fonts. They are included in Table 316 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 $\text{\LaTeX}\,2_{\varepsilon}$ 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 317: `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 318: `wasymp` Electrical and Physical Symbols

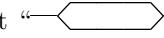
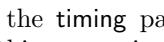
\sim	<code>\AC</code>	\approx	<code>\VHF</code>	$\sim\sim\sim$	<code>\photon</code>	\approx	<code>\HF</code>	$\sim\sim\sim\sim$	<code>\gluon</code>
--------	------------------	-----------	-------------------	----------------	----------------------	-----------	------------------	--------------------	---------------------

TABLE 319: `ifsym` Pulse Diagram Symbols

\sqcup	<code>\FallingEdge</code>	\sqcap	<code>\LongPulseLow</code>	\sqcup	<code>\PulseLow</code>	\sqcup	<code>\ShortPulseHigh</code>
\sqcap	<code>\LongPulseHigh</code>	\sqcup	<code>\PulseHigh</code>	\sqcap	<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 320: `ar` Aspect Ratio Symbol

$\mathcal{A}R$ `\AR`

TABLE 321: `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 322: *steinmetz* Extensible Phasor Symbol
 \underline{abc} $\backslash\text{phase}\{abc\}$

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 323: *emf* Electromotive Force Symbols

\mathcal{E}	<code>\emf</code> with package option <code>boondox</code> (default)
\mathcal{E}	<code>\emf</code> with package option <code>cal</code> *
\mathcal{E}	<code>\emf</code> with package option <code>calligra</code>
\mathcal{E}	<code>\emf</code> with package option <code>chorus</code>
\mathcal{E}	<code>\emf</code> with package option <code>cmr</code>
\mathcal{E}	<code>\emf</code> with package option <code>fourier</code>
\mathcal{E}	<code>\emf</code> with package option <code>frcursive</code>
\mathcal{E}	<code>\emf</code> with package option <code>miam</code>
\mathcal{E}	<code>\emf</code> with package option <code>rsfs</code>

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

TABLE 324: *wasysym* Astronomical Symbols

\textmercury	\textearth	\textjupiter	\texturanus	\textpluto
\textvenus	\textmars	\textsaturn	\textneptune	
\textastrosun	\textfullmoon	\textleftmoon	\textnewmoon	\textrightmoon
\textaries	\textcancer	\textlibra	\textaquarius	
\texttaurus	\textleo	\textscorpio	\textcapricornus	
\textgemini	\textvirgo	\textsagittarius	\textpisces	
\textascnode	\textdescnode	\textconjunction	\textopposition	\textvernal

TABLE 325: 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 326: fontawesome Astronomical Symbols

♂	\faMars	☾	\faMoon0	♀	\faVenus
☿	\faMercury	☀	\faSun0		

TABLE 327: mathabx Astronomical Symbols

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

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

TABLE 328: stix Astronomical Symbols

○	\astrosun	☾	\leftmoon	☽	\rightmoon	⊗	\sun
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TABLE 329: starfont Astronomical Symbols

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

TABLE 330: wasysym APL Symbols

\square	\APLbox	$\text{\textcircled{:}}$	\APLinv	$*$	\APLstar
\textdagger	\APLcomment	$\text{\textcircled{B}}$	\APLleftarrowbox	Δ	\APLup
∇	\APLdown	$\text{\textcircled{O}}$	\APLlog	$\text{\textcircled{I}}$	\APLuparrowbox
\textdagger	\APLdownarrowbox	$\text{\textcircled{-}}$	\APLminus	$\text{\textcircled{+}}$	\notbackslash
\square	\APLinput	$\text{\textcircled{B}}$	\APLrightarrowbox	$\text{\textcircled{/}}$	\notslash
a	\APLcirc{a}	$\text{\textcircled{a}}$	\APLnot{a}	$\text{\textcircled{d}}$	\APLvert{a}

TABLE 331: stix APL Symbols

	\APLboxquestion		\APLnotbackslash
	\APLboxupcaret		\APLnotslash

TABLE 332: apl APL Symbols

	\AB	..	\DD	¶	\GD	†	\LK	◊	\PD	↑	\UA	G	\ZG	Q	\ZQ
α	\AM	⊥	\DE	≥	\GE	○	\LO	⊠	\QQ	-	\US	H	\ZH	B	\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	¤	\ZA	K	\ZK	U	\ZU
Γ	\CE	∩	\DU	∞	\IO	≀	\NN	℃	\RU	B	\ZB	L	\ZL	V	\ZV
⌚	\CO	τ	\EN	{	\LB	▼	\NR	∅	\RV	C	\ZC	M	\ZM	W	\ZW
◦	\CR	€	\EP	Δ	\LD	~	\NT	◦	\SO	D	\ZD	N	\ZN	X	\ZX
/	\CS	l	\FL	≤	\LE	ω	\OM	SS	\SS	E	\ZE	O	\ZO	Y	\ZY
↓	\DA	¤	\FM	⊗	\LG	∨	\OR	◊	\TR	F	\ZF	P	\ZP	Z	\ZZ

TABLE 333: marvosym Computer Hardware Symbols

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

TABLE 334: 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.

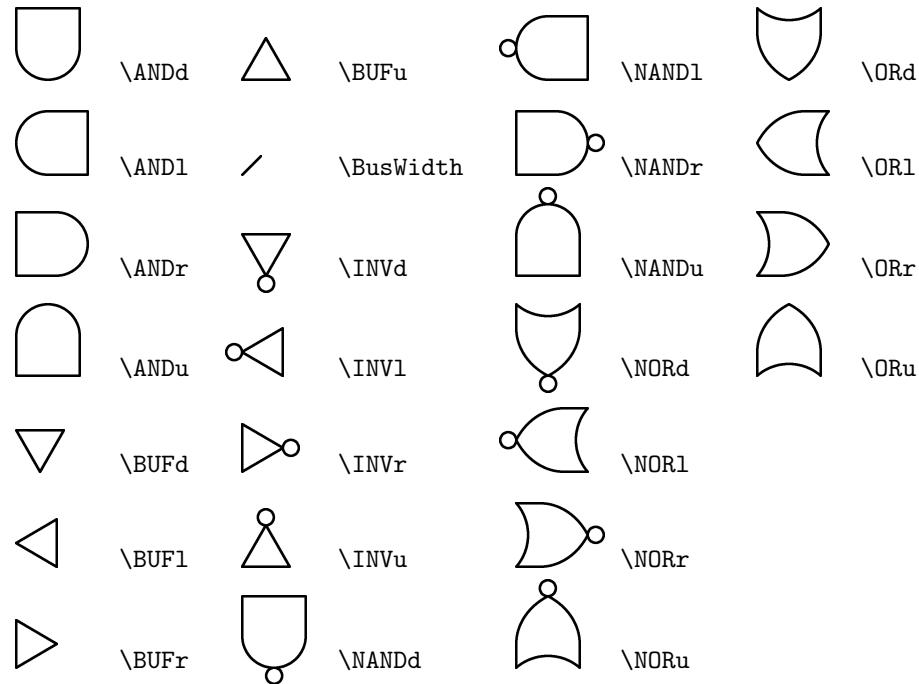
The `\keystroke` command draws a key with an arbitrary label. For example, “`\keystroke{F7}`” produces “”.

TABLE 335: 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 336: logic Logic Gates

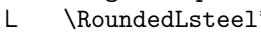
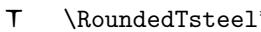


The *logic* package implements the digital logic-gate symbols specified by the U.S. Department of Defense’s MIL-STD-806 standard. Note that on CTAN, the package is *called* *logic*, but the package is *loaded* using \usepackage{milstd}. (There was already a—completely unrelated—*milstd* package on CTAN at the time of *logic*’s release.) Consequently, package details are listed under *milstd* in Table 547 and Table 548 on page 256.

TABLE 337: marvosym Communication Symbols

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

TABLE 338: marvosym Engineering Symbols

 \Beam	 \Force	 \Octosteel	 \RoundedTTsteel
 \Bearing	 \Hexasteel	 \Rectpipe	 \Squarepipe
 \Circpipe	 \Lefttorque	 \Rectsteel	 \Squaresteel
 \Circsteel	 \Lineload	 \Righttorque	 \Tsteel
 \Fixedbearing	 \Loosebearing	 \RoundedLsteel*	 \TTsteel
 \Flatsteel	 \Lsteel	 \RoundedTsteel*	

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

TABLE 339: wasysym Biological Symbols

 \female	 \male
---	---

TABLE 340: stix Biological Symbols

 \female	 \male
 \Hermaphrodite	 \neuter

TABLE 341: marvosym Biological Symbols

 \FEMALE	 \FemaleMale	 \Male	 \Neutral
 \Female	 \Hermaphrodite	 \MALE	
 \FemaleFemale	 \HERMAPHRODITE	 \MaleMale	

TABLE 342: fontawesome Biological Symbols

 \faGenderless	 \faMarsStrokeH	 \faTransgenderAlt
 \faMars	 \faMarsStrokeV	 \faVenus
 \faMarsDouble	 \faNeuter	 \faVenusDouble
 \faMarsStroke	 \faTransgender	 \faVenusMars

fontawesome defines \faIntersex as a synonym for \faTransgender

TABLE 343: marvosym Safety-related Symbols

 \Biohazard	 \CEsign	 \Explosionsafe	 \Radioactivity
 \BSEfree	 \Estatically	 \Laserbeam	 \Stopsign

TABLE 344: 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}
	\feyn{fd}		\feyn{g1}		\feyn{gv}
	\feyn{fl}		\feyn{gd}		\feyn{gvs}
	\feyn{f1S}		\feyn{gl}		\feyn{h}
	\feyn{fs}		\feyn{glB}		\feyn{hd}
					\feyn{x}

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

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

TABLE 345: svrsymbols Physics Ideograms

Δ	\adsorbate	\mathbb{X}	\experimental	\mathfrak{P}	\protein
\textcircled{c}	\adsorbent	\blacksquare	\externalsym	p^+	\proton
μ^+	\antimuon	\mathcal{E}	\fermiDistrib	\mathscr{K}	\quadrupole
$\bar{\nu}$	\antineutrino	\mathcal{F}	\fermion	q	\quark
\bar{n}	\antineutron	g	\Gluon	b	\quarkb
p^-	\antiproton	\mathbb{G}	\graphene	c	\quarkc
\bar{q}	\antiquark	g	\graviton	d	\quarkd
\bar{b}	\antiquarkb	\mathbb{H}^+	\hbond	s	\quarks
\bar{c}	\antiquarkc	\mathbb{A}	\Higgsboson	t	\quarkt
\bar{d}	\antiquarkd	h^+	\hole	u	\quarku
\bar{s}	\antiquarks	\mathfrak{D}	\interaction	R	\reference
\bar{t}	\antiquarkt	\square	\internalsym	\ll	\resistivity
\bar{u}	\antiquarku	\mathcal{O}	\ion	ϱ^-	\rhomesonminus
\textcircled{a}	\anyon	\oplus	\ionicbond	ϱ^0	\rhomesonnull
\textcircled{a}	\assumption	Ψ	\Jpsimeson	ϱ^+	\rhomesonplus
\textcircled{a}	\atom	K^-	\Kaonminus	\boxplus	\solid

(continued on next page)

(continued from previous page)

\star	<code>\bigassumption</code>	K^o	<code>\Kaonnull</code>	\not{x}	<code>\spin</code>
$\star\star$	<code>\Bigassumption</code>	K^+	<code>\Kaonplus</code>	$\not{\downarrow}$	<code>\spindown</code>
$\star\star$	<code>\biggassumption</code>	$\not{\rightarrow}$	<code>\magnon</code>	$\not{\uparrow}$	<code>\spinup</code>
B^-	<code>\Bmesonminus</code>	\mathcal{M}	<code>\maxwellDistrib</code>	$\not{\Phi}$	<code>\surface</code>
B^o	<code>\Bmesonnull</code>	\not{M}	<code>\metalbond</code>	$\not{\mathbb{M}}$	<code>\svrexample</code>
B^+	<code>\Bmesonplus</code>	\mathbb{M}	<code>\method</code>	f	<code>\svrphoton</code>
\rightarrow	<code>\bond</code>	μ^-	<code>\muon</code>	t	<code>\tachyon</code>
\rangle	<code>\boseDistrib</code>	ν	<code>\neutrino</code>	τ^-	<code>\tauleptonminus</code>
\langle	<code>\boson</code>	n^o	<code>\neutron</code>	τ^+	<code>\tauleptonplus</code>
\odot	<code>\conductivity</code>	$\not{\bullet\bullet}$	<code>\nucleus</code>	T^-	<code>\Tmesonminus</code>
\leftarrow	<code>\covbond</code>	$\not{\curvearrowright}$	<code>\orbit</code>	T^o	<code>\Tmesonnull</code>
d^p	<code>\dipole</code>	ϕ	<code>\phimeson</code>	T^+	<code>\Tmesonplus</code>
D^-	<code>\Dmesonminus</code>	ϕ^o	<code>\phimesonnull</code>	$\not{\leftarrow\leftarrow}$	<code>\triplecovbond</code>
D^o	<code>\Dmesonnull</code>	\mathcal{F}	<code>\phonon</code>	γ	<code>\Upsilonilonmeson</code>
D^+	<code>\Dmesonplus</code>	π^-	<code>\pionminus</code>	\mathfrak{f}	<code>\varphoton</code>
$\leftarrow\leftarrow$	<code>\doublecovbond</code>	π^o	<code>\pionnull</code>	\bullet	<code>\water</code>
e^-	<code>\electron</code>	π^+	<code>\pionplus</code>	W	<code>\Wboson</code>
Ξ	<code>\errorsym</code>	$\sim e$	<code>\plasmon</code>	W^-	<code>\Wbosonminus</code>
η	<code>\etameson</code>	\not{x}	<code>\polariton</code>	W^+	<code>\Wbosonplus</code>
η'	<code>\etamesonprime</code>	$\not{\sim F}$	<code>\polaron</code>	Z	<code>\Zboson</code>
$\exists h^+$	<code>\exciton</code>	e^+	<code>\positron</code>		

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 346: `bbding` Arrows

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

TABLE 347: `pifont` Arrows

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

TABLE 348: adfsymbols Arrows

\Rightarrow	<code>\adfarrows{1}</code>	\swarrow	<code>\adfarrows{1}</code>	\Downarrow	<code>\adfarrows{2}</code>	\nwarrow	<code>\adfarrows{2}</code>
\rightarrow	<code>\adfarrows{2}</code>	\nearrow	<code>\adfarrows{2}</code>	\downarrow	<code>\adfarrows{3}</code>	\uparrow	<code>\adfarrows{3}</code>
\blackrightarrow	<code>\adfarrows{3}</code>	\nearrow	<code>\adfarrows{3}</code>	\downarrow	<code>\adfarrows{4}</code>	\uparrow	<code>\adfarrows{4}</code>
\rightarrowtail	<code>\adfarrows{4}</code>	\nearrow	<code>\adfarrows{4}</code>	\downarrow	<code>\adfarrows{5}</code>	\uparrow	<code>\adfarrows{5}</code>
\rightarrow	<code>\adfarrows{5}</code>	\nearrow	<code>\adfarrows{5}</code>	\downarrow	<code>\adfarrows{6}</code>	\uparrow	<code>\adfarrows{6}</code>
\rightarrowtail	<code>\adfarrows{6}</code>	\nearrow	<code>\adfarrows{6}</code>	\downarrow	<code>\adfarrows{7}</code>	\uparrow	<code>\adfarrows{7}</code>
\uparrow	<code>\adfarrown{1}</code>	\nwarrow	<code>\adfarrown{1}</code>	\nwarrow	<code>\adfarrows{8}</code>	\leftarrow	<code>\adfarrows{8}</code>
\uparrow	<code>\adfarrown{2}</code>	\nwarrow	<code>\adfarrown{2}</code>	\nwarrow	<code>\adfarrows{9}</code>	\leftarrow	<code>\adfarrows{9}</code>
\uparrow	<code>\adfarrown{3}</code>	\nwarrow	<code>\adfarrown{3}</code>	\nwarrow	<code>\adfarrows{10}</code>	\leftarrow	<code>\adfarrows{10}</code>
\uparrow	<code>\adfarrown{4}</code>	\nwarrow	<code>\adfarrown{4}</code>	\nwarrow	<code>\adfarrows{11}</code>	\leftarrow	<code>\adfarrows{11}</code>
\uparrow	<code>\adfarrown{5}</code>	\nwarrow	<code>\adfarrown{5}</code>	\nwarrow	<code>\adfarrows{12}</code>	\leftarrow	<code>\adfarrows{12}</code>
\uparrow	<code>\adfarrown{6}</code>	\nwarrow	<code>\adfarrown{6}</code>	\nwarrow	<code>\adfarrows{13}</code>	\leftarrow	<code>\adfarrows{13}</code>
		\rightsquigarrow	<code>\adfhalfarrowleft</code>		\rightsquigarrow	<code>\adfhalfarrowright</code>	
		\rightsquigarrow	<code>\adfhalfarrowleftsolid</code>		\rightsquigarrow	<code>\adfhalfarrowrightsolid</code>	

Technically, the digit at the end of each `\adfarrows{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 `\adfarrows` command. For example, both `\adfarrows{19}` and `\adfarrows[comic]{east}` produce “ \blackrightarrow ”. See the `adfsymbols` documentation for more information.

TABLE 349: adforn Arrows

\blackleftarrow	<code>\adfhalfleftarrow</code>	\blackrightarrow	<code>\adfhalfrightarrowhead</code>
\blacktriangleleft	<code>\adfhalfleftarrowhead</code>	\blacktriangleleft	<code>\adleftarrowhead</code>
\blacktriangleright	<code>\adfhalfrightarrow</code>	\blacktriangleright	<code>\adrightarrowhead</code>

TABLE 350: arev Arrows

\blacktriangleright `\arrowbullet`

TABLE 351: fontawesome Arrows

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

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

TABLE 352: fontawesome Chevrons

❶ \faChevronCircleDown	❷ \faChevronCircleUp	❸ \faChevronRight
❹ \faChevronCircleLeft	❺ \faChevronDown	❻ \faChevronUp
❻ \faChevronCircleRight	❻ \faChevronLeft	

TABLE 353: marvosym Scissors

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

TABLE 354: bbdng Scissors

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

TABLE 355: pifont Scissors

✂ \ding{33}	✂ \ding{34}	✂ \ding{35}	✂ \ding{36}
-------------	-------------	-------------	-------------

TABLE 356: dingbat Pencils



TABLE 357: arev Pencils

✏ \pencil

TABLE 358: fontawesome Pencils

-pencil \faPencil	-square \faPencilSquare	-square0 \faPencilSquare0
-------------------	-------------------------	---------------------------

TABLE 359: bbdng Pencils and Nibs

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

TABLE 360: pifont Pencils and Nibs

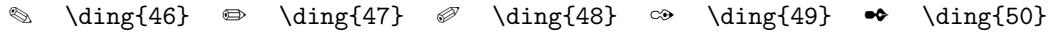
 \ding{46} \ding{47} \ding{48} \ding{49} \ding{50}

TABLE 361: dingbat Fists

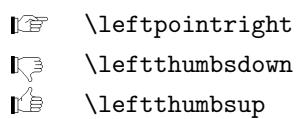
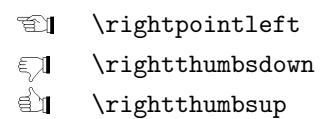
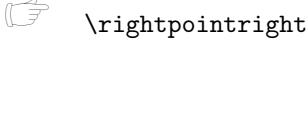
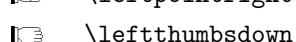
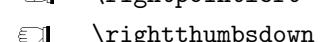
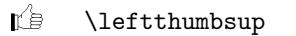
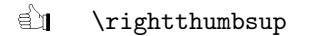
	\leftpointright		\rightpointleft		\rightpointright
	\leftthumbsdown		\rightthumbsdown		
	\leftthumbsup		\rightthumbsup		

TABLE 362: bbding Fists

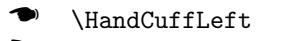
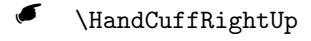
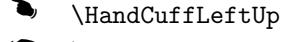
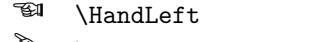
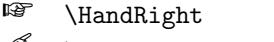
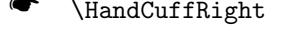
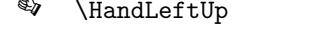
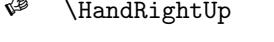
	\HandCuffLeft		\HandCuffRightUp		\HandPencilLeft
	\HandCuffLeftUp		\HandLeft		\HandRight
	\HandCuffRight		\HandLeftUp		\HandRightUp

TABLE 363: pifont Fists

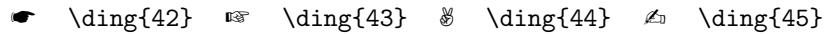
 \ding{42} \ding{43} \ding{44} \ding{45}

TABLE 364: fourier Fists

 \lefthand \righthand

TABLE 365: arev Fists

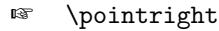
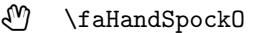
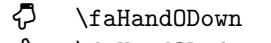
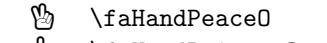
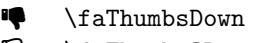
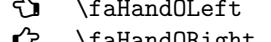
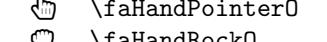
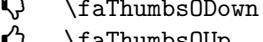
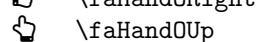
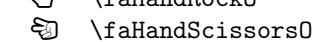
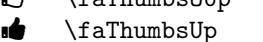
 \pointright

TABLE 366: fontawesome Fists

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

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

TABLE 367: *bding* Crosses and Plusses

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

TABLE 368: *pifont* Crosses and Plusses

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

TABLE 369: *adfsymbols* Crosses and Plusses

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

TABLE 370: *arev* Crosses

\textcircledast	<code>\eastcross</code>	\textcircledast	<code>\westcross</code>
--------------------------	-------------------------	--------------------------	-------------------------

TABLE 371: *bding* Xs and Check Marks

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

TABLE 372: *pifont* Xs and Check Marks

\checkmark	<code>\ding{51}</code>	\times	<code>\ding{53}</code>	\times	<code>\ding{55}</code>
\checkmark	<code>\ding{52}</code>	\times	<code>\ding{54}</code>	\times	<code>\ding{56}</code>

TABLE 373: *wasysym* Xs and Check Marks

\square	<code>\CheckedBox</code>	\square	<code>\Square</code>	\square	<code>\XBox</code>
-----------	--------------------------	-----------	----------------------	-----------	--------------------

TABLE 374: *marvosym* Xs and Check Marks

\square	<code>\Checkedbox</code>	\times	<code>\CrossedBox*</code>	\square	<code>\HollowBox</code>
-----------	--------------------------	----------	---------------------------	-----------	-------------------------

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

TABLE 375: arev Xs and Check Marks

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

TABLE 376: fontawesome Xs and Check Marks

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

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

TABLE 377: pifont Circled Numerals

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

`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 378: wasysym Stars

◊	<code>\davidsstar</code>	*	<code>\hexstar</code>	*	<code>\varhexstar</code>
---	--------------------------	---	-----------------------	---	--------------------------

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

TABLE 379: 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	✿ \FourCloverOpen	* \SnowflakeChevronBold
* \EightStarConvex	◆ \FourCloverSolid	* \Sparkle
* \EightStarTaper	◆ \FourStar	* \SparkleBold
✿ \FiveFlowerOpen	◆ \FourStarOpen	* \TwelveStar

TABLE 380: 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 381: adfsymbols Stars, Flowers, and Similar Shapes

◊ \adfbullet{1}	* \adfbullet{13}	◎ \adfbullet{18}	◊ \adfbullet{23}
◊ \adfbullet{2}	◊ \adfbullet{14}	◎ \adfbullet{19}	◊ \adfbullet{24}
* \adfbullet{3}	◎ \adfbullet{15}	○ \adfbullet{20}	* \adfbullet{25}
* \adfbullet{11}	◎ \adfbullet{16}	◎ \adfbullet{21}	◊ \adfbullet{26}
* \adfbullet{12}	◎ \adfbullet{17}	◎ \adfbullet{22}	

TABLE 382: adforn Stars

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

TABLE 383: fontawesome Stars

★ \faStar ▲ \faStarHalf ★ \faStarHalf0 ☆ \faStar0

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

TABLE 384: fourier Fleurons and Flowers

⌚ \aldine	❖ \decoone	⌚ \floweroneright
⌚ \aldineleft	❖ \decosix	⌚ \leafleft
⌚ \aldineright	❖ \decothreeleft	⌚ \leafNE
⌚ \aldinesmall	❖ \decothreeright	⌚ \leafright
⌚ \decofourleft	❖ \decotwo	+ \starredbullet
⌚ \decofourright	⌚ \floweroneleft	

TABLE 385: adforn Fleurons and Flowers

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

TABLE 386: wasysym Geometric Shapes

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

TABLE 387: MnSymbol Geometric Shapes

★	\filledlargestar	◊	\largeclozene	◊	\medclozene
◆	\filledlozenge	☆	\largepentagram	◊	\medstarofdavid
◆	\filledmedclozene	□	\largesquare	◊	\smallclozene
○	\largecircle	☆	\largestar		
◇	\largediamond	◊	\largestarofdavid		

MnSymbol defines \bigcirc as a synonym for \largecircle; \bigstar as a synonym for \filledlargestar; \lozene as a synonym for \medclozene; and, \blackclozene as a synonym for \filledmedclozene.

TABLE 388: fdsymbol Geometric Shapes

●	\largeblackcircle	▽	\largeangledown	◊	\medclozene
■	\largeblacksquare	△	\largeangleup	◆	\smallblackclozene
★	\largeblackstar	☆	\largewhitestar	◊	\smallclozene
○	\largecircle	◊	\lozengeminus	◊	\starofdavid
□	\lagesquare	◆	\medblackclozene		

fdsymbol defines synonyms for almost all of the preceding symbols:

○	\bigcirc	■	\lgblksquare	◊	\mdlgwhtclozene
★	\bigstar	○	\lgwhtcircle	◊	\mdwhtclozene
▽	\bigangledown	□	\lgwhtsquare	◆	\smbblkclozene
△	\bigangleup	◊	\lozenge	◊	\smwhtclozene
◆	\blackclozene	◆	\mdblkclozene		
●	\lgblkcircle	◆	\mdlgbblkclozene		

TABLE 389: boisik Geometric Shapes

★	\bigstar	◊	\diamond	▽	\angledown
◆	\blackclozene	◊	\lozenge	◀	\angleleft
■	\blacksquare	◊	\lozengedot	▷	\angleright
▲	\blacktriangle	□	\square	▫	\varlrttriangle
▼	\blackangledown	*	\star		

TABLE 390: stix Geometric Shapes

○	\acwopencirclearrow
↖	\barovernorthwestarrow
◎	\benznr
▼	\bigblacktriangledown
▲	\bigblacktriangleup
★	\bigstar
▽	\bigtriangledown
◀	\bigtriangleleft
△	\bigtriangleup
☆	\bigwhitestar
●	\blackcircledownarrow
●	\blackcircledrightdot
●	\blackcircledtwodots
●	\blackcircleulquadwhite
◆	\blackdiamonddownarrow
◆	\blackinwhitediamond
◻	\blackinwhitesquare
◀	\blacklefthalfcircle
◆	\blacklozenge
◀	\blackpointerleft
▶	\blackpointerright
▶	\blackrighthalfcircle
▲	\blacktriangle
▼	\blacktriangledown
◀	\blacktriangleleft
▶	\blacktriangleright
●	\blkhorzoval
●	\blkvertoval
○	\botsemicircle
⊕	\boxonbox
◎	\bullseye
○	\circ
●	\circlebottomhalfblack
●	\circledbullet
♀	\circledownarrow
○	\circledrightdot
✿	\circledstar
○	\circledtwodots
◎	\circledwhitebullet
●	\circlelefthalfblack
○	\circlellquad
○	\circlelrquad
●	\circlerighthalfblack
●	\circletophalfblack
○	\circleulquad
○	\circleurquad
●	\circleurquadblack
▼	\downtriangleleftblack
▼	\downtrianglerightblack
○	\enclosecircle
◇	\enclosediamond
□	\enclosesquare
△	\enclosetriangle
●	\errbarblackcircle
◆	\errbarblackdiamond
■	\errbarblacksquare
○	\errbarcircle
◊	\errbardiamond
□	\errbarsquare
○	\fisheye
□	\fltns
○	\hexagon
●	\hexagonblack
◊	\house
□	\hrectangle
■	\hrectangleblack
○	\inversewhitecircle
▣	\invwhitehalfcircle
▣	\invwhiteupperhalfcircle
●	\lgbkcircle
■	\lgblksquare
○	\lgwhtcircle
□	\lgwtsquare
◀	\llblacktriangle
▽	\lltriangle
◀	\lrblacktriangle
▽	\lrtriangle
●	\mdblkcircle
◆	\mdblkdiamond
◆	\mdblklozenge
■	\mdblksquare
●	\mdlgbkcircle
◆	\mdlgbldiamond
■	\mdlgbksquare
◊	\mdlgwhtdiamond
◊	\mdlgwhtlozenge
□	\mdlgwtsquare
●	\mdsmblkcircle
■	\mdsmblksquare
○	\mdsmwhtcircle
□	\mdsmwtsquare
○	\mdwhtcircle
◊	\mdwhtdiamond
◊	\mdwhtlozenge
◀	\smalltriangleleft
▶	\smalltriangleright
◆	\smbblkdiamond
◆	\smbblklozenge
■	\smbblksquare
☆	\smwhitestar
○	\smwhtcircle
◊	\smwhtdiamond
◊	\smwhtlozenge
□	\smwhtsquare
□	\sqlozenge
■	\squarebotblack
■	\squarecrossfill
■	\squarehfill
■	\squarehvfill
■	\squareleftblack
■	\squarellblack
■	\squarellquad
■	\squarelrblack
■	\squarelrquad
■	\squareneswfill
■	\squarenwsefill
■	\squarightblack
■	\squaretopblack
■	\squareulblack
■	\squareulquad
■	\squareurblack
■	\squareurquad
■	\squarevfill
○	\squaoval
○	\topsemicircle
□	\trapezium
△	\trianglecdot
▽	\triangledown
▲	\triangleleftblack
△	\triangleodot
▲	\trianglerightblack
△	\triangles
△	\triangleubar
◀	\ulblacktriangle
▽	\ultriangle
◊	\uparrowoncircle
◀	\urblacktriangle
▽	\urtriangle
○	\varhexagon
●	\varhexagonblack
○	\varhexagonrbonds

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◐	\circlevertfill	□	\mdwhtsquare	△	\varlrtriangle
○=	\cirE	★	\medblackstar	*	\varstar
○◦	\cirs cir	☆	\medwhitestar	□	\vrectangle
○○	\cwopencirclearrow	□□	\parallelogram	■	\vrectangleblack
◆	\diamondbotblack	■■	\parallelogramblack	·	\vysmblk square
◊	\diamondondot	○	\pentagon	·	\vysmwht square
◆◆	\diamondleftblack	◆	\pentagonblack	△△	\whiteinwhitetriangle
◆◆	\diamondrightblack	◇	\rightpentagon	▷	\whitepointerleft
◆◆	\diamondtopblack	◆	\rightpentagonblack	▷	\whitepointerright
○○	\dottedcircle	◀	\smallblacktriangleleft	○	\whthorzoval
□□	\dottedsquare	▶	\smallblacktriangleright	○	\whtvertoval

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

TABLE 391: 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

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◆ \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 “ \bigcircledcirc ”. Likewise, `\Square` and `\Cross` combine to give “ \boxtimes ”. See Section 10.3 for more information about constructing new symbols out of existing symbols.

TABLE 392: 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 393: 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 394: universa Geometric Shapes

● \baucircle	■ \lausquare	▲ \bautriangle
--------------	--------------	----------------

TABLE 395: 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 396: fontawesome Geometric Shapes

●	\faCircle	○	\faCircleONotch	○	\faDotCircleO	□	\faSquareO
○	\faCircleO	○	\faCircleThin	■	\faSquare		

TABLE 397: oplotsymb1 Geometric Shapes

○	\circlet	◆	\rhombusfillha	△	\trianglepalineh
⊗	\circletcross	◆	\rhombusfillhb	△	\trianglepalinev
⊙	\circletdot	◆	\rhombusfillhl	△	\trianglepalinevh
●	\circletfill	◆	\rhombusfillhr	▽	\trianglepb
◐	\circletfillha	◇	\rhombuslineh	☒	\trianglepbcross
◑	\circletfillhb	◇	\rhombuslinev	▽	\trianglepbdot
◑	\circletfillhl	◇	\rhombuslinevh	▼	\trianglepbfill
◑	\circletfillhr	□	\squad	▽	\trianglepbfillha
⊖	\circletlineh	☒	\squadcross	▽	\trianglepbfillhb
∅	\circletlinev	■	\squaddot	▽	\trianglepbfillhl
⊕	\circletlinevh	■	\squadfill	▽	\trianglepbfillhr
◇	\hexago	■	\squadfillha	▽	\trianglepblineh
⊗	\hexagocross	■	\squadfillhb	▽	\trianglepblinev
◊	\hexagodot	■	\squadfillhl	▽	\trianglepblinevh
◆	\hexagofill	■	\squadfillhr	▷	\trianglepl
◐	\hexagofillha	■	\squadlineh	☒	\triangleplcross
◑	\hexagofillhb	■	\squadlinev	▷	\trianglepldot
◑	\hexagofillhl	■	\squadlinevh	◀	\triangleplfill
◑	\hexagofillhr	☆	\starlet	▷	\triangleplfillha
⊖	\hexagolineh	☒	\starletcross	◀	\triangleplfillhb
∅	\hexagolinev	☆	\starletdot	◀	\triangleplfillhl
⊕	\hexagolinevh	★	\starletfill	◀	\triangleplfillhr
◇	\pentago	★	\starletfillha	▷	\trianglepllineh
⊗	\pentagocross	★	\starletfillhb	▷	\trianglepllinev
◊	\pentagodot	★	\starletfillhl	▷	\trianglepllinevh
◆	\pentagofill	★	\starletfillhr	▷	\trianglepr
◐	\pentagofillha	★	\starletlineh	☒	\triangleprcross
◑	\pentagofillhb	★	\starletlinev	▷	\triangleprdot
◑	\pentagofillhl	★	\starletlinevh	▶	\triangleprfill
◐	\pentagofillhr	△	\trianglepa	▶	\triangleprfillha
∅	\pentagolineh	☒	\trianglepacross	▶	\triangleprfillhb
∅	\pentagolinev	△	\trianglepadot	▶	\triangleprfillhl
⊕	\pentagolinevh	▲	\trianglepafill	▶	\triangleprfillhr
◇	\rhombus	△	\trianglepafillha	▷	\triangleprlineh
⊗	\rhombuscross	▲	\trianglepafillhb	▷	\triangleprlinev
◊	\rhombusdot	▲	\trianglepafillhl	▷	\triangleprlinevh
◆	\rhombusfill	▲	\trianglepafillhr		

“fillha”, “fillhb”, “fillhl”, and “fillhr”, imply, respectively, “half-filled above”, “half-filled below”, “half-filled left”, and “half-filled right”. In the `\triangle...` symbols, “pa”, “pb”, “pr”, and “pl” refer respectively to “peak above”, “peak below”, “peak left”, and “peak right”.

All `oplotsymb1` symbols are implemented with TikZ graphics, not with a font.

TABLE 398: L^AT_EX 2 _{ε} Playing-Card Suits

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

TABLE 399: txfonts/pxfonts Playing-Card Suits

```
◊ \varclubsuit ♦ \vardiamondsuit ♥ \varheartsuit ♣ \varspladesuit
```

TABLE 400: MnSymbol Playing-Card Suits

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

TABLE 401: fdsymbol Playing-Card Suits

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

TABLE 402: boisik Playing-Card Suits

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

TABLE 403: stix Playing-Card Suits

```
♣ \clubsuit ♥ \heartsuit ♫ \varclubsuit ♥ \varheartsuit  
◊ \diamondsuit ♠ \spadesuit ♦ \vardiamondsuit ♣ \varspladesuit
```

TABLE 404: arev Playing-Card Suits

```
◊ \varclub ♦ \vardiamond ♥ \varheart ♣ \varspade
```

TABLE 405: adforn Flourishes

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

TABLE 406: Miscellaneous oplotsymb1 Symbols

_ \lineh | \linev + \linevh X \scross * \scrossvh

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

TABLE 407: Miscellaneous dingbat Dingbats

	\anchor		\eye		\Sborder
	\carriagereturn		\filledsquarewithdots		\squarewithdots
	\checkmark		\satellitedish		\Zborder

TABLE 408: Miscellaneous bbding Dingbats

	\Envelope		\Peace		\PhoneHandset		\SunshineOpenCircled
	\OrnamentDiamondSolid		\Phone		\Plane		\Tape

TABLE 409: Miscellaneous pifont Dingbats

	\ding{37}		\ding{40}		\ding{164}		\ding{167}		\ding{171}
	\ding{38}		\ding{41}		\ding{165}		\ding{168}		\ding{169}
	\ding{39}		\ding{118}		\ding{166}		\ding{170}		

TABLE 410: Miscellaneous adforn Dingbats

• \adfbullet ◊ \adfdiamond § \adfgee § \adfS □ \adfsquare

6 Ancient languages

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

TABLE 411: 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		\PHtrainer
	\PHchild		\PHmanacles		\PHtattooedHead
	\PHclub		\PHmattock		\PHtiara
	\PHcolumn		\PHoxBack		\PHtunny
	\PHcomb		\PHpapyrus		\PHvine
	\PHdolium		\PHpedestrian		\PHwavyBand
	\PHdove		\PHplaneTree		\PHwoman

TABLE 412: protosem Proto-Semitic Characters

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

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

TABLE 413: hierogl f Hieroglyphics

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

The hierogl f 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 f documentation for more information.

TABLE 414: linearA Linear A Script

	\LinearAI		\LinearAXCIX		\LinearACXCVII		\LinearACCXCV
	\LinearAII		\LinearAC		\LinearACXCVIII		\LinearACCXCVI
	\LinearAIII		\LinearACI		\LinearACXCIX		\LinearACCXCVII
	\LinearAIV		\LinearACII		\LinearACC		\LinearACCXCVIII
	\LinearAV		\LinearACIII		\LinearACCI		\LinearACCXCIX
	\LinearAVI		\LinearACIV		\LinearACCII		\LinearACCC
	\LinearAVII		\LinearACV		\LinearACIII		\LinearACCCI
	\LinearAVIII		\LinearACVI		\LinearACCIV		\LinearACCCII
	\LinearAIX		\LinearACVII		\LinearACCV		\LinearACCCIII

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ℳ \LinearAX	ℳ \LinearACVIII	ℳ \LinearACCVI	ℳ \LinearACCCIV
⊕ \LinearAXI	ℳ \LinearACIX	ℳ \LinearACCVII	ℳ \LinearACCCV
ℳ \LinearAXII	ℳ \LinearACX	ℳ \LinearACCVIII	ℳ \LinearACCCVI
ℳ \LinearAXIII	ℳ \LinearACXI	ℳ \LinearACCIX	ℳ \LinearACCCVII
ℳ \LinearAXIV	ℳ \LinearACXII	ℳ \LinearACCX	ℳ \LinearACCCVIII
ℳ \LinearAXV	ℳ \LinearACXIII	ℳ \LinearACCXI	ℳ \LinearACCCIX
ℳ \LinearAXVI	ℳ \LinearACXIV	ℳ \LinearACCXII	ℳ \LinearACCCX
ℳ \LinearAXVII	ℳ \LinearACXV	ℳ \LinearACCXIII	ℳ \LinearACCCXI
ℳ \LinearAXVIII	ℳ \LinearACXVI	ℳ \LinearACCXIV	ℳ \LinearACCCXII
ℳ \LinearAXIX	ℳ \LinearACXVII	ℳ \LinearACCXV	ℳ \LinearACCCXIII
ℳ \LinearAXX	ℳ \LinearACXVIII	ℳ \LinearACCXVI	ℳ \LinearACCCXIV
ℳ \LinearAXXI	ℳ \LinearACXIX	ℳ \LinearACCXVII	ℳ \LinearACCCXV
ℳ \LinearAXXII	ℳ \LinearACXX	ℳ \LinearACCXVIII	ℳ \LinearACCCXVI
ℳ \LinearAXXIII	ℳ \LinearACXXI	ℳ \LinearACCXIX	ℳ \LinearACCCXVII
ℳ \LinearAXXIV	ℳ \LinearACXXII	ℳ \LinearACCXX	ℳ \LinearACCCXVIII
ℳ \LinearAXXV	ℳ \LinearACXXIII	ℳ \LinearACCXI	ℳ \LinearACCCXIX
ℳ \LinearAXXVI	ℳ \LinearACXXIV	ℳ \LinearACCXII	ℳ \LinearACCCXX
ℳ \LinearAXXVII	ℳ \LinearACXXV	ℳ \LinearACCXIII	ℳ \LinearACCCXXI
ℳ \LinearAXXVIII	ℳ \LinearACXXVI	ℳ \LinearACCXIV	ℳ \LinearACCCXXII
ℳ \LinearAXXIX	ℳ \LinearACXXVII	ℳ \LinearACCXV	ℳ \LinearACCCXXIII
ℳ \LinearAXXX	ℳ \LinearACXXVIII	ℳ \LinearACCXVI	ℳ \LinearACCCXXIV
ℳ \LinearAXXXI	ℳ \LinearACXXIX	ℳ \LinearACCXVII	ℳ \LinearACCCXXV
ℳ \LinearAXXXII	ℳ \LinearACXXX	ℳ \LinearACCXVIII	ℳ \LinearACCCXXVI
ℳ \LinearAXXXIII	ℳ \LinearACXXXI	ℳ \LinearACCXIX	ℳ \LinearACCCXXVII
ℳ \LinearAXXXIV	ℳ \LinearACXXXII	ℳ \LinearACXXX	ℳ \LinearACCCXXVIII
ℳ \LinearAXXXV	ℳ \LinearACXXXIII	ℳ \LinearACXXXI	ℳ \LinearACCCXXIX
ℳ \LinearAXXXVI	ℳ \LinearACXXXIV	ℳ \LinearACXXXII	ℳ \LinearACCCXXX
ℳ \LinearAXXXVII	ℳ \LinearACXXXV	ℳ \LinearACXXXIII	ℳ \LinearACCCXXXI
ℳ \LinearAXXXVIII	ℳ \LinearACXXXVI	ℳ \LinearACXXXIV	ℳ \LinearACCCXXXII
ℳ \LinearAXXXIX	ℳ \LinearACXXXVII	ℳ \LinearACXXXV	ℳ \LinearACCCXXXIII
ℳ \LinearAXL	ℳ \LinearACXXXVIII	ℳ \LinearACXXXVI	ℳ \LinearACCCXXXIV
ℳ \LinearAXLI	ℳ \LinearACXXXIX	ℳ \LinearACXXXVII	ℳ \LinearACCCXXXV
ℳ \LinearAXLII	ℳ \LinearACXL	ℳ \LinearACXXXVIII	ℳ \LinearACCCXXXVI
ℳ \LinearAXLIII	ℳ \LinearACXLI	ℳ \LinearACXXXIX	ℳ \LinearACCCXXXVII
ℳ \LinearAXLIV	ℳ \LinearACXLII	ℳ \LinearACXL	ℳ \LinearACCCXXXVIII
ℳ \LinearAXLV	ℳ \LinearACXLIII	ℳ \LinearACXLII	ℳ \LinearACCCXXXIX
ℳ \LinearAXLVI	ℳ \LinearACXLIV	ℳ \LinearACXLII	ℳ \LinearACCCXL
ℳ \LinearAXLVII	ℳ \LinearACXLV	ℳ \LinearACXLIII	ℳ \LinearACCCXL
ℳ \LinearAXLVIII	ℳ \LinearACXLVI	ℳ \LinearACXLIV	ℳ \LinearACCCXLII
ℳ \LinearAXLIX	ℳ \LinearACXLVII	ℳ \LinearACXLV	ℳ \LinearACCCXLIII
ℳ \LinearAL	ℳ \LinearACXLVIII	ℳ \LinearACXLVI	ℳ \LinearACCCXLIV
ℳ \LinearALI	ℳ \LinearACXLIX	ℳ \LinearACXLVII	ℳ \LinearACCCXLV
ℳ \LinearALII	ℳ \LinearACL	ℳ \LinearACXLVIII	ℳ \LinearACCCXLVI
ℳ \LinearALIII	ℳ \LinearACLI	ℳ \LinearACXLIX	ℳ \LinearACCCXLVII
ℳ \LinearALIV	ℳ \LinearACLII	ℳ \LinearACCL	ℳ \LinearACCCXLVIII
ℳ \LinearALV	ℳ \LinearACLIII	ℳ \LinearACCLI	ℳ \LinearACCCXLIX
ℳ \LinearALVI	ℳ \LinearACLIV	ℳ \LinearACCLI	ℳ \LinearACCCCL
ℳ \LinearALVII	ℳ \LinearACLV	ℳ \LinearACCLII	ℳ \LinearACCLI
ℳ \LinearALVIII	ℳ \LinearACLVI	ℳ \LinearACCLIII	ℳ \LinearACCLII

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\LinearALIX	\LinearALVII	\LinearACCLV	\LinearACCCLIII
\LinearALX	\LinearALVIII	\LinearACCLVI	\LinearACCCLIV
\LinearALXI	\LinearALIX	\LinearACCLVII	\LinearACCCLV
\LinearALXII	\LinearACLX	\LinearACCLVIII	\LinearACCCLVI
\LinearALXIII	\LinearACLXI	\LinearACCLIX	\LinearACCCLVII
\LinearALXIV	\LinearACLXII	\LinearACCLX	\LinearACCCLVIII
\LinearALXV	\LinearACLXIII	\LinearACCLXI	\LinearACCCLIX
\LinearALXVI	\LinearACLXIV	\LinearACCLXII	\LinearACCCLX
\LinearALXVII	\LinearACLXV	\LinearACCLXIII	\LinearACCCLXI
\LinearALXVIII	\LinearACLXVI	\LinearACCLXIV	\LinearACCCLXII
\LinearALXIX	\LinearACLXVII	\LinearACCLXV	\LinearACCCLXIII
\LinearALXX	\LinearACLXVIII	\LinearACCLXVI	\LinearACCCLXIV
\LinearALXXI	\LinearACLXIX	\LinearACCLXVII	\LinearACCCLXV
\LinearALXXII	\LinearACLXX	\LinearACCLXVIII	\LinearACCCLXVI
\LinearALXXIII	\LinearACLXXI	\LinearACCLXIX	\LinearACCCLXVII
\LinearALXXIV	\LinearACLXXII	\LinearACCLXX	\LinearACCCLXVIII
\LinearALXXV	\LinearACLXXIII	\LinearACCLXXI	\LinearACCCLXIX
\LinearALXXVI	\LinearACLXXIV	\LinearACCLXXII	\LinearACCCLXX
\LinearALXXVII	\LinearACLXXV	\LinearACCLXXIII	\LinearACCCLXXI
\LinearALXXVIII	\LinearACLXXVI	\LinearACCLXXIV	\LinearACCCLXXII
\LinearALXXIX	\LinearACLXXVII	\LinearACCLXXV	\LinearACCCLXXIII
\LinearALXXX	\LinearACLXXVIII	\LinearACCLXXVI	\LinearACCCLXXIV
\LinearALXXXI	\LinearACLXXIX	\LinearACCLXXVII	\LinearACCCLXXV
\LinearALXXXII	\LinearACLXXX	\LinearACCLXXVIII	\LinearACCCLXXVI
\LinearALXXXIII	\LinearACLXXXI	\LinearACCLXXIX	\LinearACCCLXXVII
\LinearALXXXIV	\LinearACLXXXII	\LinearACCLXXX	\LinearACCCLXXVIII
\LinearALXXXV	\LinearACLXXXIII	\LinearACCLXXXI	\LinearACCCLXXIX
\LinearALXXXVI	\LinearACLXXXIV	\LinearACCLXXXII	\LinearACCCLXXX
\LinearALXXXVII	\LinearACLXXXV	\LinearACCLXXXIII	\LinearACCCLXXXI
\LinearALXXXVIII	\LinearACLXXXVI	\LinearACCLXXXIV	\LinearACCCLXXXII
\LinearALXXXIX	\LinearACLXXXVII	\LinearACCLXXXV	\LinearACCCLXXXIII
\LinearALXXXX	\LinearACLXXXVIII	\LinearACCLXXXVI	\LinearACCCLXXXIV
\LinearAXCI	\LinearACLXXXIX	\LinearACCLXXXVII	\LinearACCCLXXXV
\LinearAXCII	\LinearACLXXXX	\LinearACCLXXXVIII	\LinearACCCLXXXVI
\LinearAXCIII	\LinearACXCI	\LinearACCLXXXIX	\LinearACCCLXXXVII
\LinearAXCIV	\LinearACXCII	\LinearACCLXXXX	\LinearACCCLXXXVIII
\LinearAXCV	\LinearACXCIII	\LinearACCXCI	\LinearACCCLXXXIX
\LinearAXCVI	\LinearACXCIV	\LinearACCXII	\LinearACCCLXXXIV
\LinearAXCVII	\LinearACXCV	\LinearACCXIII	\LinearACCCLXXXVII
\LinearAXCVIII	\LinearACXCVI	\LinearACCXIV	\LinearACCCLXXXIX

TABLE 415: *linearb* Linear B Basic and Optional Letters

↳ \Ba	☷ \Bja	☲ \Bmu	☱ \Bpte	☴ \Broii	☵ \Bto
Ⓣ \Baii	☱ \Bje	☲ \Bna	☱ \Bpu	☴ \Bru	☴ \Btu
Ⓛ \Baiii	☶ \Bjo	☵ \Bne	☲ \Bpuii	☱ \Bsa	☲ \Btwo
Ⓑ \Bau	☷ \Bju	☲ \Bni	☴ \Bqa	☱ \Bse	☵ \Bu
⊜ \Bda	⊕ \Bka	☲\Bno	☲ \Bqe	☱ \Bsi	☲ \Bwa
☱ \Bde	☱ \Bke	☲ \Bnu	☲ \Bqi	☲ \Bso	☲ \Bwe
Ⓣ \Bdi	☵ \Bki	☲ \Bnwa	☲ \Bqo	☱ \Bsu	☵ \Bwi
☴ \Bdo	☲ \Bko	☲ \Bo	☲ \Bra	☲ \Bswa	☲ \Bwo
☱ \Bdu	☱ \Bku	☲ \Bpa	☲ \Braii	☲ \Bswi	☲ \Bza
☱ \Bdwe	☱ \Bma	☲ \Bpaiii	☲ \Braiii	☲ \Bta	☲ \Bze
☱ \Bdwo	☲ \Bme	☲ \Bpe	☲ \Bre	☲ \Btaii	☲ \Bzo
☱ \Be	☲ \Bmi	☲ \Bpi	☲ \Bri	☲ \Bte	
☲ \Bi	☲ \Bmo	☲ \Bpo	☲ \Bro	☲ \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 “`#\V\Y`”, for example. See the *linearb* documentation for more information.

TABLE 416: *linearb* Linear B Numerals

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

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

TABLE 417: *linearb* Linear B Weights and Measures

☱\BPtalent	▷ \BPvolb	↶ \BPvolcf	☱ \BPwtb	▷ \BPwtd
☱\BPvola	▷ \BPvolcd	↶ \BPwta	▷ \BPwtc	

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

TABLE 418: `linearb` Linear B Ideograms

Ϙ	\BPamphora	Ϙ	\BPchassis	Ϙ	\BPman	Ϙ	\BPwheat
»»	\BParrow	Ϙ	\BPcloth	Ϙ	\BPnanny	Ϙ	\BPwheel
Ϙ	\BPbarley	Ϙ	\BPCow	Ϙ	\BPolive	Ϙ	\BPwine
Ϙ	\BPbilly	Ϙ	\BPcup	Ϙ	\BPOx	Ϙ	\BPwineiih
Ϙ	\BPboar	Ϙ	\BPeve	Ϙ	\BPpig	Ϙ	\BPwineiiih
Ϙ	\BPbronze	Ϙ	\BPfoal	Ϙ	\BPram	Ϙ	\BPwineivh
Ϙ	\BPbull	Ϙ	\BPgoat	Ϙ	\BPsheep	Ϙ	\BPwoman
Ϙ	\BPcauldroni	Ϙ	\BPGoblet	Ϙ	\BPsow	Ϙ	\BPwool
Ϙ	\BPcauldronii	Ϙ	\BPGold	Ϙ	\BPspear		
Ϙ	\BPchariot	Ϙ	\BPhorse	Ϙ	\BPsword		

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

TABLE 419: `linearb` Unidentified Linear B Symbols

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

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

TABLE 420: `cypriot` Cypriot Letters

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

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

TABLE 421: *sarabian* South Arabian Letters

◦	\SAa	☒	\SAz	☒	\SAM	☒	\SAsd	☒	\SAdb
□	\SAb	Ψ	\SAhd	□	\SAN	◊	\SAq	☒	\SATb
□	\SAg	□□	\SATd	☒	\SAs	○	\SAr	□	\SAGa
՚	\SAd	՚	\SAY	◊	\SAf	՚	\SAsv	՚	\SAzd
՚	\SAh	՚	\SAK	՚	\SAlq	X	\SAT	՚	\SAsa
՞	\SAw	՚	\SAl	՚	\SAo	՞	\SAhu	՞	\SAdd

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

TABLE 422: *teubner* Archaic Greek Letters and Greek Numerals

Ϙ	\Coppa [†]	F	\Digamma*	ϙ	\sampi*	ϙ	\varstigma
ϙ	\coppa [†]	ϙ	\koppa*	Ϙ	\Stigma		
ϙ	\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 `\koppa` and `\ddigamma` for `\digamma`.

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

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

TABLE 423: *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		
ϙ	\Heta	ϙ	\sampi	ϙ	\Varsampi		

TABLE 424: epiolmec Epi-Olmec Script

	\EOafter		\EOMiddle		\EOStarWarrior
	\EOandThen		\EOmonster		\EOstep
	\EOAppear		\EOMountain		\EOSu
	\EOBeardMask		\EOmuu		\EOsu
	\EOBedeck		\EOna		\EOSun
	\EOblood		\EOOne		\EOSuu
	\EObrace		\EOni		\EOSuu
	\EObuilding		\EOnow		\Eota
	\EObundle		\EOnu		\Eote
	\EOchop		\EOnuu		\EOthrone
	\EOChronI		\EOofficerI		\Eoti
	\EOcloth		\EOofficerII		\Eotime
	\EodealWith		\EOofficerIII		\Eotime
	\EOdeer		\EOofficerIV		\Eotitle
	\EOeat		\Eopa		\EotitleII
	\EOflint		\EOpak		\EotitleIV
	\EOflower		\EOPatron		\Eoto
	\EOFold		\EOPatronII		\Eotu
	\EOGod		\EOpe		\Eotuki
	\EOGoUp		\EOpenis		\Eotukpa
	\EOgovernor		\EOpi		\Eoturtle
	\EOguise		\EOPierce		\Eotuu
	\EOhallow		\EOPlant		\Eotza
	\EOja		\EOPlay		\Eotze
	\EOjaguar		\EOpo		\Eotzetz
	\EOje		\EOpriest		\Eotzi
	\EOji		\EOPrince		\Eotzu
	\EOJI		\EOpu		\Eotzuu

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	\EOjo		\EOpuu		\EOundef
	\EOju		\EOpuuk		\EOvarBeardMask
	\EOkak		\EORain		\EOvarja
	\EOke		\EOSa		\EOvarji
	\EOki		\EOsa		\EOvarki
	\EOkij		\EOSacrifice		\EOvarkuu
	\EOKing		\EOSaw		\EOvarni
	\EOknottedCloth		\EOScorpius		\EOvarpa
	\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 425: 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		

TABLE 426: `allrunes` Runes

þ	\a	Þ	E	ɸ	\ING	ℳ	m	Ψ	R	ſ	\sthree
*	\A	ȝ	F	ȝ	\ing	ȝ	n	ȝ	\RR	ȝ	T
ȝ	a	ȝ	f	ȝ	\Ing	ȝ	\NG	ȝ	\s	ȝ	t
ȝ	A	X	g	ȝ	\j	ȝ	\ng	ȝ	s	ȝ	\textsection
ȝ	b	H	ȝ	ȝ	j	ȝ	o	ȝ	S	ȝ	\th
ȝ	B	N	H	ȝ	J	ȝ	\p	ȝ	\seight	ȝ	U
ȝ	\d	H	h	ȝ	\k	ȝ	p	ȝ	\sfive	ȝ	u
ȝ	D	ȝ	\i	ȝ	\K	ȝ	P	ȝ	\sfour	ȝ	w
ȝ	d	I	i	ȝ	k	ȝ	\R	ȝ	\seven		
ȝ	e	ȝ	I	ȝ	l	ȝ	r	ȝ	\ssix		

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

TABLE 427: `allrunes` Rune Separators

'	\bar	:	\doubleeye	+	\plus	:	\tripledot
*	\cross	‡	\doubleplus	⋮	\quaddot	⋮	\tripleeye
.	\dot	‡	\doublestar	♂	\quadeye	‡	\tripleplus
'	\doublebar	·	\eye	*	\star		
*	\doublecross	⋮	\pentdot	⋮	\triplebar		
:	\doubledot	⁺	\penteye	⋮⋮	\triplecross		

See the usage comment under Table 426.

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 LuaLaTeX or XeLaTeX.

A simple way to typeset time signatures, due to Daniel Hirst, is to attach a superscript and a subscript to an empty math object. For example, `\{{}^3_4` renders as “ $\frac{3}{4}$ ”. Because superscripts and subscripts are left-justified, some extra padding may need to be added if the beats per measure and beat unit contain different numbers of digits. A 5mu space (“\;”) vertically centers the “8” relative to the “12” in `\{{}^{12}_{\;8}` (“ $\frac{12}{8}$ ”). For boldface time signatures (e.g., “ $\frac{4}{4}$ ”), consider the boldface-math options presented in Section 10.5. See also Table 440.

TABLE 428: LATEX 2 ε Musical Symbols

`\flat \flat \natural \natural \sharp \sharp`

TABLE 429: textcomp Musical Symbols

`\textmusicalnote`

TABLE 430: wasysym Musical Symbols

`\eighthnote \halfnote \twonotes \fullnote \quarternote`

TABLE 431: MnSymbol Musical Symbols

`\flat \flat \natural \natural \sharp \sharp`

TABLE 432: fdsymbol Musical Symbols

`\flat \flat \natural \natural \sharp \sharp`

TABLE 433: boisik Musical Symbols

`\flat \flat \natural \natural \sharp \sharp`

TABLE 434: stix Musical Symbols

<code>\eighthnote</code>	<code>\natural</code>	<code>\sharp</code>	<code>\fullnote</code>
<code>\flat</code>	<code>\quarternote</code>	<code>\twonotes</code>	

TABLE 435: arev Musical Symbols

♩ \quarternote ♪ \eighthnote ♪♪ \sixteenthnote

TABLE 436: MusiXTEX Musical Symbols

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

TABLE 437: MusiXTEX Alternative Clefs

	\drumclef		\gregorianFclef
	\gregorianCclef		\oldGclef

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

TABLE 438: 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 439: `musicography` Musical Symbols

$\flat\flat$	<code>\musDoubleFlat</code>	\natural	<code>\musNatural</code>	$\frac{1}{16}$	<code>\musSixtyFourth</code>
\times	<code>\musDoubleSharp</code>	$\frac{1}{8}$	<code>\musQuarter</code>	$\frac{1}{12}$	<code>\musSixtyFourthDotted</code>
$\frac{1}{4}$	<code>\musEighth</code>	$\frac{1}{16}$	<code>\musQuarterDotted</code>	$\frac{1}{24}$	<code>\musThirtySecond</code>
$\frac{1}{8}$	<code>\musEighthDotted</code>	$\frac{1}{32}$	<code>\musSegno</code>	$\frac{1}{48}$	<code>\musThirtySecondDotted</code>
\flat	<code>\musFlat</code>	\sharp	<code>\musSharp</code>	\circ	<code>\musWhole</code>
$\frac{1}{2}$	<code>\musHalf</code>	$\frac{1}{16}$	<code>\musSixteenth</code>	$\circ.$	<code>\musWholeDotted</code>
$\frac{1}{4}$	<code>\musHalfDotted</code>	$\frac{1}{32}$	<code>\musSixteenthDotted</code>		

`musicography` defines `\f1`, `\sh`, and `\na` as shorthands for `\musFlat`, `\musSharp`, and `\musNatural`, respectively. It also defines `\musCorchea` as an alias for `\musEighth`, `\musCorcheaDotted` as an alias for `\musEighthDotted`, `\musFusa` as an alias for `\musEighth`, `\musFusaDotted` as an alias for `\musEighthDotted`, `\musMinim` as an alias for `\musHalf`, `\musMinimDotted` as an alias for `\musHalfDotted`, `\musSemibreve` as an alias for `\musWhole`, `\musSemibreveDotted` as an alias for `\musWholeDotted`, `\musSemiminim` as an alias for `\musQuarter`, and `\musSemiminiminDotted` as an alias for `\musQuarterDotted`.

The `MusiXTEX` package must be installed to use `musicography`.

TABLE 440: `musicography` Time Signatures

C	<code>\meterC</code>	C₂³	<code>\meterCThreeTwo</code>	CZ	<code>\meterCZ</code>
C3	<code>\meterCThree</code>	C	<code>\meterCutC</code>	O	<code>\meterO</code>

Other time signatures can be specified with `\musMeter`, as in

$$\text{\musMeter}\{2\}\{4\} \rightarrow \frac{2}{4}$$

The `MusiXTEX` package must be installed to use `musicography`.

TABLE 441: harmony Musical Accents

$\widehat{A}\widehat{a}$	<code>\Ferli{A}\Ferli{a}* \Fermi{A}\Fermi{a}</code>	\AA	<code>\Ohne{A}\Ohne{a}* \Umd{A}\Umd{a}</code>
$\widehat{\textcircled{A}}\widehat{a}$	<code>\Kr{A}\Kr{a}</code>	$\widetilde{A} \widetilde{a}$	

* 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 “ $X\overset{b}{\underset{d}{\ddot{a}}}$ ”. 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 “ \mathbb{C} ”.

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

TABLE 442: *lilylypbs* Single Notes

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

lilylypbs defines synonyms for all of the preceding symbols:

♩	<code>\crotchet</code>	♩.	<code>\minimDottedDown</code>
♩.	<code>\crotchetDotted</code>	♩	<code>\minimDown</code>
♩..	<code>\crotchetDottedDouble</code>	♪	<code>\quaver</code>

(continued on next page)

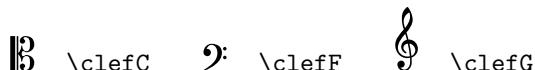
(continued from previous page)

$\text{F}^{\cdot\cdot}$	<code>\crotchetDottedDoubleDown</code>	$\text{J}.$	<code>\quaverDotted</code>
F^{\cdot}	<code>\crotchetDottedDown</code>	$\text{J}..$	<code>\quaverDottedDouble</code>
F^{\cdot}	<code>\crotchetDown</code>	$\text{F}^{\cdot\cdot}$	<code>\quaverDottedDoubleDown</code>
J^{\cdot}	<code>\demisemiquaver</code>	F^{\cdot}	<code>\quaverDottedDown</code>
J^{\cdot}	<code>\demisemiquaverDotted</code>	F^{\cdot}	<code>\quaverDown</code>
$\text{J}..$	<code>\demisemiquaverDottedDouble</code>	o	<code>\semibreve</code>
$\text{F}^{\cdot\cdot}$	<code>\demisemiquaverDottedDoubleDown</code>	$\text{o}.$	<code>\semibreveDotted</code>
$\text{F}^{\cdot\cdot}$	<code>\demisemiquaverDottedDown</code>	J^{\cdot}	<code>\semiquaver</code>
$\text{F}^{\cdot\cdot}$	<code>\demisemiquaverDown</code>	$\text{J}^{\cdot\cdot}$	<code>\semiquaverDotted</code>
J^{\cdot}	<code>\minim</code>	$\text{J}..$	<code>\semiquaverDottedDouble</code>
J^{\cdot}	<code>\minimDotted</code>	$\text{F}^{\cdot\cdot}$	<code>\semiquaverDottedDoubleDown</code>
$\text{J}..$	<code>\minimDottedDouble</code>	F^{\cdot}	<code>\semiquaverDottedDown</code>
$\text{F}^{\cdot\cdot}$	<code>\minimDottedDoubleDown</code>	F^{\cdot}	<code>\semiquaverDown</code>

TABLE 443: *lilyglyphs* Beamed Notes

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

TABLE 444: *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 445: *lilyglyphs* Time Signatures

`\lilyTimeC` `\lilyTimeCHalf`

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

TABLE 446: *lilyglyphs* Accidentals

x	<code>\doublesharp</code>	\sharp	<code>\sharpArrowdown</code>
\flat	<code>\flat</code>	\sharp	<code>\sharpArrowup</code>
$\flat\flat$	<code>\flatflat</code>	$\sharp\sharp$	<code>\sharpSlashslashslashstem</code>
\natural	<code>\natural</code>	$\sharp\sharp$	<code>\sharpSlashslashslashstemstem</code>
\sharp	<code>\sharp</code>	$\sharp\sharp$	<code>\sharpSlashslashstem</code>
$\sharp\sharp$	<code>\sharp\sharp</code>	$\sharp\sharp\sharp$	<code>\sharpSlashslashstemstemstem</code>

TABLE 447: *lilyglyphs* Rests

K	<code>\crotchetRest</code>	.	<code>\quaverRestDotted</code>
K.	<code>\crotchetRestDotted</code>	.	<code>\semiquaverRest</code>
--	<code>\halfNoteRest</code>	.	<code>\semiquaverRestDotted</code>
--.	<code>\halfNoteRestDotted</code>	--	<code>\wholeNoteRest</code>
7	<code>\quaverRest</code>	--.	<code>\wholeNoteRestDotted</code>

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

TABLE 448: *lilyglyphs* Dynamics Letters

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

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

TABLE 449: *lilyglyphs* Dynamics Symbols

$<$ `\crescHairpin` $>$ `\decrescHairpin`

TABLE 450: *lilyglyphs* Articulations

$>$	<code>\lilyAccent</code>	\wedge	<code>\marcato</code>	$,$	<code>\staccatissimo</code>
$<>$	<code>\lilyEspressivo</code>	\vee	<code>\marcatoDown</code>	$-$	<code>\tenuto</code>
$.$	<code>\lilyStaccato</code>	\div	<code>\portato</code>		
\circ	<code>\lilyThumb</code>	\div	<code>\portatoDown</code>		

TABLE 451: *lilyglyp̄bs* Scripts

⌚	\fermata
---	----------

TABLE 452: *lilyglyp̄bs* Accordion Notation

▣	\accordionBayanBass	⊗	\accordionOldEE	☰	\accordionStdBass
⊖	\accordionDiscant	↑	\accordionPull		
⊖	\accordionFreeBass	>	\accordionPush		

TABLE 453: *lilyglyp̄bs* Named Time Signatures

⌚	\lilyGlyph{timesig.C22}	⌚	\lilyGlyph{timesig.mensural198}
⌚	\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}

lilyglyp̄bs defines shorter names for a few of these symbols. See Table 445.

TABLE 454: *lilyglyp̄bs* 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}
ʃ	\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}

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⌚	\lilyGlyph{scripts.dfermata}	+ \lilyGlyph{scripts.stopped}	
▣	\lilyGlyph{scripts.dlongfermata}	- \lilyGlyph{scripts.tenuto}	
▼	\lilyGlyph{scripts.dmarcato}	◊ \lilyGlyph{scripts.thumb}	
□	\lilyGlyph{scripts.downbow}	✓ \lilyGlyph{scripts.tickmark}	
❖	\lilyGlyph{scripts.downmordent}	◆ \lilyGlyph{scripts.trilelement}	
❖	\lilyGlyph{scripts.downprall}	♪ \lilyGlyph{scripts.trill}	
○	\lilyGlyph{scripts.dpedalheel}	~ \lilyGlyph{scripts.trill_element}	
^	\lilyGlyph{scripts.dpedaltoe}	∞ \lilyGlyph{scripts.turn}	
~	\lilyGlyph{scripts.dportato}	. \lilyGlyph{scripts.uaccentus}	
.	\lilyGlyph{scripts.dsemicirculus}	⌚ \lilyGlyph{scripts.ufermata}	
▽	\lilyGlyph{scripts.dshortfermata}	▣ \lilyGlyph{scripts.ulongfermata}	
§	\lilyGlyph{scripts.dsignumcongruentiae}	▲ \lilyGlyph{scripts.umarcato}	
,	\lilyGlyph{scripts.dstaccatissimo}	▽ \lilyGlyph{scripts.upbow}	
▣	\lilyGlyph{scripts.dverylongfermata}	○ \lilyGlyph{scripts.updalheel}	
<>	\lilyGlyph{scripts.espr}	▽ \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}	
❖	\lilyGlyph{scripts.lineprall}	§ \lilyGlyph{scripts.usignumcongruentiae}	
/	\lilyGlyph{scripts.lvarcomma}	,	\lilyGlyph{scripts.ustaccatissimo}
❖	\lilyGlyph{scripts.mordent}	▣ \lilyGlyph{scripts.uverylongfermata}	
○	\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 451.

TABLE 455: *lilyglyphs* Named Rests

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

lilyglyphs defines shorter names for a few of these symbols. See Table 447.

TABLE 456: *lilyglyphs* Named Pedals

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

TABLE 457: *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 458: *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 459: *lilyGlyphs* 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.medicaea.do}		\lilyGlyph{clefs.petrucci.f_change}
	\lilyGlyph{clefs.medicaea.do_change}		\lilyGlyph{clefs.petrucci.g}
	\lilyGlyph{clefs.medicaea.fa}		\lilyGlyph{clefs.petrucci.g_change}
	\lilyGlyph{clefs.medicaea.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}

lilyGlyphs defines shorter names for a few of these symbols. See Table 444.

TABLE 460: *lilyglypbs* Named Noteheads

```

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

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```
▀ \lilyGlyph{noteheads . dM2mensural}
▀ \lilyGlyph{noteheads . dM2neomensural}
▀ \lilyGlyph{noteheads . dM2semimensural}
▀ \lilyGlyph{noteheads . dM3blackmensural}
▀ \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}
o \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}
o \lilyGlyph{noteheads . s0re}
o \lilyGlyph{noteheads . s0reThin}
a \lilyGlyph{noteheads . s0reWalker}
▷ \lilyGlyph{noteheads . s0slash}
o \lilyGlyph{noteheads . s0sol}
o \lilyGlyph{noteheads . s0solFunk}
◊ \lilyGlyph{noteheads . s0ti}
◊ \lilyGlyph{noteheads . s0tiThin}
△ \lilyGlyph{noteheads . s0tiWalker}
▼ \lilyGlyph{noteheads . s0triangle}
o \lilyGlyph{noteheads . s1}
♦ \lilyGlyph{noteheads . s1blackpetrucci}
≈ \lilyGlyph{noteheads . s1cross}
```

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```
¤ \lilyGlyph{noteheads .s1diamond}
` \lilyGlyph{noteheads .s1kievan}
= \lilyGlyph{noteheads .s1la}
o \lilyGlyph{noteheads .s1laFunk}
o \lilyGlyph{noteheads .s1laThin}
o \lilyGlyph{noteheads .s1laWalker}
◊ \lilyGlyph{noteheads .s1mensural}
◊ \lilyGlyph{noteheads .s1mi}
◊ \lilyGlyph{noteheads .s1miMirror}
◊ \lilyGlyph{noteheads .s1miThin}
◊ \lilyGlyph{noteheads .s1miWalker}
◊ \lilyGlyph{noteheads .s1neomensural}
◊ \lilyGlyph{noteheads .s1petrucci}
// \lilyGlyph{noteheads .s1slash}
o \lilyGlyph{noteheads .s1sol}
o \lilyGlyph{noteheads .s1solFunk}
• \lilyGlyph{noteheads .s2}
◊ \lilyGlyph{noteheads .s2blackpetrucci}
x \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.1pes}
◊ \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 .sM2blackligemensural}
■ \lilyGlyph{noteheads .sM2kievan}
```

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```
  \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}
  \lilyGlyph{noteheads.srM2ligmensural}
  \lilyGlyph{noteheads.srM2semiligmensural}
  \lilyGlyph{noteheads.srM3ligmensural}
  \lilyGlyph{noteheads.srM3semiligmensural}
  \lilyGlyph{noteheads.ssolesmes.auct.asc}
  \lilyGlyph{noteheads.ssolesmes.auct.desc}
  \lilyGlyph{noteheads.ssolesmes.incl.auctum}
  \lilyGlyph{noteheads.ssolesmes.incl.parvum}
  \lilyGlyph{noteheads.ssolesmes.oriscus}
  \lilyGlyph{noteheads.ssolesmes.stropha}
  \lilyGlyph{noteheads.ssolesmes.stropha.aucta}
  \lilyGlyph{noteheads.svaticana.cehalicus}
  \lilyGlyph{noteheads.svaticana.epiphonus}
  \lilyGlyph{noteheads.svaticana.inclinatum}
  \lilyGlyph{noteheads.svaticana.inner.cehalicus}
  \lilyGlyph{noteheads.svaticana.linea.punctum}
  \lilyGlyph{noteheads.svaticana.linea.punctum.cavum}
  \lilyGlyph{noteheads.svaticana.lpes}
  \lilyGlyph{noteheads.svaticana.plica}
  \lilyGlyph{noteheads.svaticana.punctum}
  \lilyGlyph{noteheads.svaticana.punctum.cavum}
  \lilyGlyph{noteheads.svaticana.quilisma}
  \lilyGlyph{noteheads.svaticana.reverse.plica}
  \lilyGlyph{noteheads.svaticana.reverse.vplica}
  \lilyGlyph{noteheads.svaticana.upes}
  \lilyGlyph{noteheads.svaticana.vephonous}
  \lilyGlyph{noteheads.svaticana.vlpes}
  \lilyGlyph{noteheads.svaticana.vplica}
  \lilyGlyph{noteheads.svaticana.vupes}
  \lilyGlyph{noteheads.u0doFunk}
  \lilyGlyph{noteheads.u0fa}
  \lilyGlyph{noteheads.u0faFunk}
  \lilyGlyph{noteheads.u0faThin}
  \lilyGlyph{noteheads.u0miFunk}
  \lilyGlyph{noteheads.u0reFunk}
  \lilyGlyph{noteheads.u0tiFunk}
```

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```
▷      \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}
▷      \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}

\underline{\lilyGlyph{noteheads .uM2}}
\underline{\lilyGlyph{noteheads .uM2blackmensural}}
\underline{\lilyGlyph{noteheads .uM2mensural}}
\underline{\lilyGlyph{noteheads .uM2neomensural}}
\underline{\lilyGlyph{noteheads .uM2semimensural}}
\underline{\lilyGlyph{noteheads .uM3blackmensural}}
\underline{\lilyGlyph{noteheads .uM3mensural}}
\underline{\lilyGlyph{noteheads .uM3neomensural}}
\underline{\lilyGlyph{noteheads .uM3semimensural}}
\underline{\lilyGlyph{noteheads .urM2mensural}}
```

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```
▀ \lilyGlyph{noteheads.urM2neomensural}
▀ \lilyGlyph{noteheads.urM2semimensural}
▀ \lilyGlyph{noteheads.urM3mensural}
▀ \lilyGlyph{noteheads.urM3neomensural}
▀ \lilyGlyph{noteheads.urM3semimensural}
```

TABLE 461: *lilyglyp̄s* 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}

lilyglyp̄s defines shorter names for all of these symbols except `\lilyGlyph{accordion.dot}`. See Table 452.

TABLE 462: *lilyglyp̄s* 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.medicaeal1}
* \lilyGlyph{accidentals.mensural1}
♭ \lilyGlyph{accidentals.mensuralM1}
♩ \lilyGlyph{accidentals.mirroredflat}
♪ \lilyGlyph{accidentals.mirroredflat.backslash}
```

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```
↳ \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.slashslashslashstemstem}
\lilyGlyph{accidentals.vaticana0}
\lilyGlyph{accidentals.vaticanaM1}
```

lilyglyphs defines shorter names for a few of these symbols. See Table 446.

TABLE 463: *lilyglyphs* 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 464: *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{period}
-	+	\lilyGlyph{plus}

See Table 448 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 465: Miscellaneous *lily\lypbs* 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 466: `textcomp` Genealogical Symbols

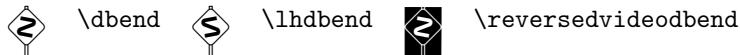
*	<code>\textborn</code>	<code>\textdivorced</code>	<code>\textmarried</code>
+	<code>\textdied</code>		<code>\textleaf</code>

TABLE 467: `wasy sym` General Symbols

	<code>\ataribox</code>		<code>\diameter</code>		<code>\lightning</code>		<code>\sun</code>
	<code>\bell</code>		<code>\DOWNarrow</code>		<code>\phone</code>		<code>\UParrow</code>
	<code>\blacksmiley</code>		<code>\frownie</code>		<code>\pointer</code>		<code>\wasycmd*</code>
	<code>\Bowtie</code>		<code>\invdiameter</code>		<code>\recorder</code>		<code>\wasylozenge</code>
	<code>\brokenvert</code>		<code>\kreuz</code>		<code>\RIGHTarrow</code>		
	<code>\checked</code>		<code>\LEFTarrow</code>		<code>\rightturn</code>		
	<code>\clock</code>		<code>\leftturn</code>		<code>\smiley</code>		

* `wasy sym` defines `\applecmd` as a synonym for `\wasycmd`.

TABLE 468: `manfnt` Dangerous Bend Symbols



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

TABLE 469: Miscellaneous `manfnt` Symbols

	<code>\manboldkidney</code>		<code>\manpenkidney</code>
	<code>\manconcentriccircles</code>		<code>\manquadrifolium</code>
	<code>\manconcentricdiamond</code>		<code>\manquartercircle</code>
	<code>\mancone</code>		<code>\manrotatedquadrifolium</code>
	<code>\mancube</code>		<code>\manrotatedquartercircle</code>
	<code>\manerrarrow</code>		<code>\manstar</code>
	<code>\manfilledquartercircle</code>		<code>\mantiltPennib</code>
	<code>\manhPennib</code>		<code>\mantriangledown</code>
	<code>\manimpossiblecube</code>		<code>\manangleright</code>
	<code>\mankidney</code>		<code>\mantriangleup</code>
	<code>\manlhpennib</code>		<code>\manpennib</code>

TABLE 470: marvosym Media Control Symbols

▶	\Forward	▼	\MoveDown	◀◀	\RewindToIndex	▲	\ToTop
▶▶	\ForwardToEnd	▲	\MoveUp	◀	\RewindToStart		
▶▶▶	\ForwardToIndex	◀	\Rewind	▼	\ToBottom		

TABLE 471: 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 472: marvosym Information Symbols

🚲	\Bicycle	🚹	\Gentsroom	👉	\PointingHand
⌚	\ClockLogo	🏭	\Industry	♿	\Wheelchair
☕	\Coffeecup	ℹ	\Info	✍	\WritingHand
⚽	\Football	🚻	\Ladiesroom		

TABLE 473: Other marvosym Symbols

†	\Ankh	﴿	\Bouquet	♥	\Heart	🐦	\PeaceDove
🦇	\Bat	❖	\Celtcross	👤	\ManFace	😊	\Smiley
BOOLE	\BOLogo	Ⓐ	\CircledA	⚒	\MineSign	👩	\WomanFace
BOOLE	\BOLogoL	†	\Cross	✳	\Mundus	☯	\Yinyang
BOOLE	\BOLogoP	☺	\Frowny	@	\MVAt		

TABLE 474: Miscellaneous universa Symbols

∅ ⊕ \bauforms ⊖ \bauhead

TABLE 475: Miscellaneous fourier Symbols

💣	\bomb	🚫	\noway	☒	\textxswdown*	⚠	\warning
😉	\grimace	❗	\textthing*	☒	\textxswup*		

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

TABLE 476: ifsym Weather Symbols

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

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

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

TABLE 477: ifsym Alpine Symbols

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

TABLE 478: ifsym Clocks

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

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

TABLE 479: 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 480: *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 `\ClockFrame=true` or `\ClockFrame=false` as illustrated above. See the `clock` documentation for more information.

TABLE 481: epsdice Dice

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

TABLE 482: 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 483: stix Dice

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

TABLE 484: `\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:

<code>small</code>	<code>large</code>	<code>heart</code>
<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 485: `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 486: `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 487: *skull* Symbols

 \skull

TABLE 488: Non-Mathematical *mathabx* Symbols

 \rip

TABLE 489: *skak* Chess Informator Symbols

\mp	\bbetter	\circ	\doublepawns	$\circ\circ$	\seppawns
$\rightarrow+$	\bdecisive	\perp	\ending	O-O	\shortcastling
\supset	\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
\approx	\compensation	\blacksquare	\opposbishops	\sqcup	\without
\Leftrightarrow	\counterplay	\diamond	\passedpawn	\pm	\wupperhand
C	\devadvantage	\ll	\qside	\odot	\zugzwang
$\nearrow\swarrow$	\diagonal	\blacksquare	\samebishops		

TABLE 490: *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 491: *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, ..., ⑨9 and ①, ②, ③, ..., ⑨9, respectively.

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

TABLE 492: go Go Symbols

+	\botborder	L	\lftbotcorner	T	\rttopcorner
+	\empty	F	\lfttopcorner	O	\square
+	\hoshi	H	\rtborder	T	\topborder
F	\lftborder	J	\rtbotcorner	O	\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 O and and O for \black and O and and O for \white.

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

TABLE 493: metre Metrical Symbols

x	\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	ꝝ	\ma	ꝝ	\pm	⠇	\ps	⋮	\vppm
⌚	\bb	⌚	\bm	ꝝ	\Mb	:	\pp	⋮	\pxp	⋮	\vpppm
⌚	\bB	⌚	\Bm	ꝝ	\mb	:	\Pp	⋮	\Pxp	::	\x
⌚	\bba		\c	⌾	\mBb	ꝝ	\ppm	~	\R		
⌚	\bbb		\C	⌚	\mbB	⋮	\ppp	~	\r		
⌚	\BBm		\Cc	ꝝ	\mbb	:	\Ppp	⊗	\T		

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

TABLE 494: 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 495: teubner Metrical Symbols

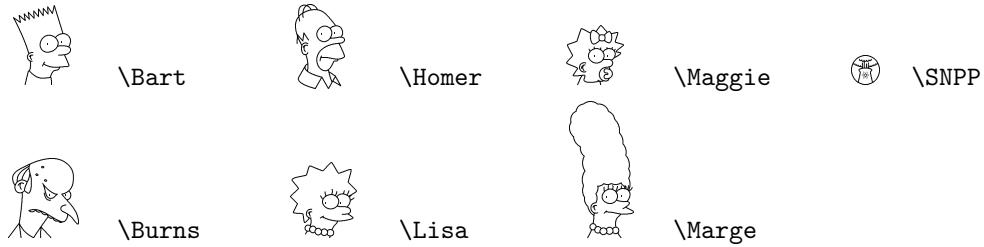
oo	\aeolicbii	o	\barbrevis	+	\ipercatal
ooo	\aeolicbiii	oo	\bbrevis	-	\longa
oooo	\aeolicbiv	u	\brevis	uu	\ubarbbrevis
x	\anceps	^	\catal	u	\ubarbrevis
✗	\ancepsdbrevis	o	\corona	uu	\ubarsbrevis
✗	\banceps	o	\coronainv	o	\ubrevislonga
☒	\barbbrevis	H	\hiatus		

The *teubner* package provides a `\newmetrics` command that helps users combine the preceding symbols as well as other *teubner* symbols. For example, the predefined `\pentam` symbol uses `\newmetrics` to juxtapose six `\longas`, two `\barbbrevises`, four `\brevises`, and a `\dBar` into “`_☒_☒_|_oo_oo_`”. See the *teubner* documentation for more information.

TABLE 496: dictsym Dictionary Symbols

☒	\dsaeronautical	†	\dscommercial	☒	\dsmedical
↗	\dsagricultural	☒	\dsheraldical	☒	\dsmilitary
△	\dsarchitectural	‡	\dsjuridical	☒	\dsrailways
⌚	\dsbiological	⌚	\dsliterary	☒	\dstechnical
⚗	\dschemical	⚗	\dsmathematical		

TABLE 497: simpsons Characters from *The Simpsons*



The location of the characters' pupils can be controlled with the `\Goofy` command. See *A METAFONT of ‘Simpsons’ characters* [Che98] for more information. Also, each of the above can be prefixed with `\Left` to make the character face left instead of right:

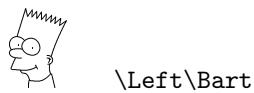


TABLE 498: pmboxdraw Box-Drawing Symbols

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

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

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

TABLE 499: 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

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

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

TABLE 500: 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 501: GIMP Phases of the Moon

⊕ \MoonPha{1} ⚡ \MoonPha{2} ☽ \MoonPha{3} ☾ \MoonPha{4}

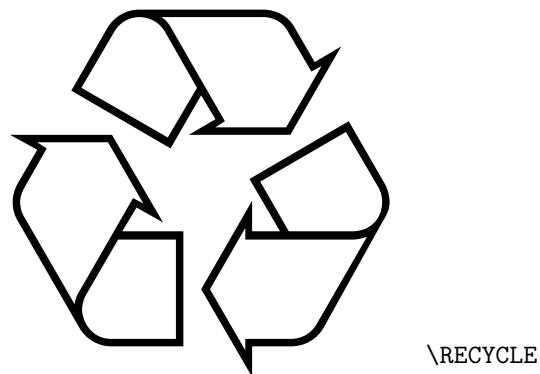
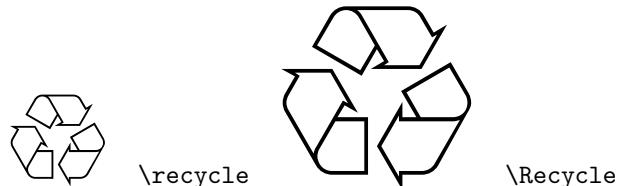
TABLE 502: $\text{\texttt{GfNA2e}}$ Recycling Symbols

 \Greenpoint

TABLE 503: $\text{\texttt{marvosym}}$ Recycling Symbols

 \PackingWaste  \Recycling

TABLE 504: $\text{\texttt{recycle}}$ Recycling Symbols



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

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

TABLE 505: Other $\text{\texttt{GfNA2e}}$ Symbols

 \Info	 \Request
 \Postbox	 \Telephone

TABLE 506: soyombo Soyombo Symbols

	\Soyombo		\sA*		\sO*
---	----------	---	------	--	------

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

TABLE 507: knitting Knitting Symbols

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

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

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

TABLE 508: countriesofeurope Country Maps

	\Albania		\Latvia
	\Andorra		\Liechtenstein
	\Austria		\Lithuania
	\Belarus		\Luxembourg
	\Belgium		\Macedonia
	\Bosnia		\Malta
	\Bulgaria		\Moldova
	\Croatia		\Montenegro
	\Czechia		\Netherlands
	\Denmark		\Norway
	\Estonia		\Poland
	\Finland		\Portugal
	\France		\Romania

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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 508 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 509: euflag European Union flag



The \euflag flag is drawn using the L^AT_EX picture environment.

TABLE 510: Miscellaneous arev Symbols

```

\anchor          \smileface      \skull        \triangle     \warning
\biohazard      \radiation     \smileface    \circleleft  \yinyang
\heavyqtleft    \recycle       \steaming     \heavysteam
\heavyqtright   \sadface      \swords

```

TABLE 511: *cookingsymbols* Cooking Symbols

□	\Bottomheat		\Fork		\Knife	□	\Topbottomheat
○	\Dish	□	\Gasstove	□	\Oven	□	\Topheat
▣	\Fanoven	⌚	\Gloves	⌚	\Spoon		

TABLE 512: tikzsymbols Cooking Symbols

■ \bakingplate	● \eggbeater	▬ \pan	▲ \squeezer
! \blender	▬ \fryingpan	▬ \peeler	! \trident
□ \bottle	▬ \garlicpress	▬ \pot	
cup \bowl	▬ \grater	▬ \rollingpin	
oven \cooker	▬ \oven	▬ \sieve	

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

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

TABLE 513: tikzsymbols Emoticons

☺	\Annoey	☺	\Laughey	☺	\rWalley	☺	\Tongey
🐱	\Cat	☺	\Neutrey	☺	\Sadey	☺	\Vomey
😡	\cChangey{1}	😡	\NiceReapey	😡	\SchrodingersCat{0}	😡	\Walley
😊	\Changey{1}	😡	\Ninja	☺	\Sey	☺	\Winkey
😁	\Cooley	☺	\Nursey	☺	\Sleepey	☺	\wInnocey
😎	\Innocey	☺	\oldWinkey	☺	\Smiley	☺	\Xey

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. Also note that \cChangey, \Changey, and \SchrodingersCat take a mandatory argument. See the tikzsymbols documentation for more information.

TABLE 514: tikzsymbols 3D Emoticons

😊	\dAnnoey	😊	\dLaughey	😊	\dSadey	😊	\dVomey
😡	\dcChangey{1}	😡	\dNeutrey	😡	\dSey	😡	\dWalley
😊	\dChangey{1}	😡	\dNinja	😡	\dSleepey	😊	\dWinkey
😁	\dCooley	😊	\dNursey	😊	\dSmiley	😊	\dKey
😎	\dInnocey	😊	\drWalley	😊	\dTongey	😊	\olddWinkey

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 514 accepts one or more color arguments for further customization. Note that \dcChangey and \dChangey also take a mandatory argument. See the tikzsymbols documentation for more information.

TABLE 515: tikzsymbols Trees

🍁	\AutumnTree	🌳	\SummerTree	🌴	\WorstTree
🌳	\SpringTree	🌴	\WinterTree		

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 516: Miscellaneous tikzsymbols Symbols

🛏️	\Bed	🪑	\Chair	🔥	\Fire	⛄	\Snowman	⚠️	\Tribar
蠟	\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 517: `snowman` Snowmen

 \snowman

* `\snowman` is drawn using TikZ. The command accepts a number of options for controlling the presence, appearance, and color of the snowman's body, eyes, nose, mouth, arms, hat, and more. See the `snowman` documentation for more information, but the following examples showcase a subset of the possibilities (drawn large for clarity):

	
\snowman	\snowman[eyes, mouth, nose, arms, hat, muffler, buttons, snow, broom]

TABLE 518: Miscellaneous `bclogo` Symbols

	\bcattention		\bcetoile		\bcpanchant
	\bc bombe		\bc femme		\bc peaceandlove
	\bc book		\bc feu jaune		\bc pluie
	\bc calendrier		\bc feu rouge		\bc plume
	\bc cle		\bc feu vert		\bc poisson
	\bc clefa		\bc feu tricolore		\bc question
	\bc clesol		\bc fleur		\bc recyclage
	\bc coeur		\bc homme		\bc rosevents
	\bc crayon		\bc horloge		\bc smbH
	\bc cube		\bc icosaedre		\bc smmh
	\bc d allemagne		\bc info		\bc soleil
	\bc danger		\bc interdit		\bc spadesuit
	\bc da utriche		\bc lampe		\bc stop

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	\bcdbelgique		\bccloupe		\bctakecare
	\bcdbulgarie		\bcneige		\bctetraedre
	\bcdfrance		\bcnote		\bctrefle
	\bcditalie		\bcnucleaire		\bctrombone
	\bcdluxembourg		\bcocetaedre		\bcvaletcoeur
	\bcdodecaedre		\bcoeil		\bcvelo
	\bcdpaysbas		\bcorne		\bcyin
	\bcdz		\bcours		
	\bceclaircie		\bcoutil		

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 519: 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

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apple	\faApple	firefox	\faFirefox	recycle	\faRecycle
archive	\faArchive	flag	\faFlag	reddit	\faReddit
area chart	\faAreaChart	flag checkered	\faFlagCheckered	reddit square	\faRedditSquare
asterisk	\faAsterisk	flag 0	\faFlag0	refresh	\faRefresh
at	\faAt	flask	\faFlask	renren	\faRenren
backward	\faBackward	flickr	\faFlickr	reply	\faReply
balance scale	\faBalanceScale	floppy 0	\faFloppy0	reply all	\faReplyAll
ban	\faBan	folder	\faFolder	retweet	\faRetweet
bar chart	\faBarChart	folder 0	\faFolder0	road	\faRoad
barcode	\faBarcode	folder open	\faFolderOpen	rocket	\faRocket
bars	\faBars	folder open 0	\faFolderOpen0	rss	\faRss
battery empty	\faBatteryEmpty	font	\faFont	rss square	\faRssSquare
battery full	\faBatteryFull	font icons	\faFonticons	safari	\faSafari
battery half	\faBatteryHalf	forumbee	\faForumbee	scissors	\faScissors
battery quarter	\faBatteryQuarter	forward	\faForward	search	\faSearch
battery three quarters	\faBatteryThreeQuarters	foursquare	\faFoursquare	search minus	\faSearchMinus
bed	\faBed	frown 0	\faFrown0	search plus	\faSearchPlus
beer	\faBeer	futbol 0	\faFutbol0	sellsy	\faSellsy
behance	\faBehance	gamepad	\faGamepad	server	\faServer
behance square	\faBehanceSquare	gavel	\faGavel	share	\faShare
bell	\faBell	get pocket	\faGetPocket	share alt	\faShareAlt
bell slash	\faBellSlash	gg	\faGg	share alt square	\faShareAltSquare
bell slash 0	\faBellSlash0	gg circle	\faGgCircle	share square	\faShareSquare
bicycle	\faBicycle	gift	\faGift	share square 0	\faShareSquare0
binoculars	\faBinoculars	github	\faGithub	shield	\faShield
birthday cake	\faBirthdayCake	github alt	\faGithubAlt	ship	\faShip
bitbucket	\faBitbucket	github square	\faGithubSquare	shirts in bulk	\faShirtsinbulk
bitbucket square	\faBitbucketSquare	git	\faGit	shopping cart	\faShoppingCart
black tie	\faBlackTie	git square	\faGitSquare	signal	\faSignal
bold	\faBold	glass	\faGlass	sign in	\faSignIn
bolt	\faBolt	globe	\faGlobe	sign out	\faSignOut
bomb	\faBomb	google	\faGoogle	simply built	\faSimplybuilt
book	\faBook	google plus	\faGooglePlus	sitemap	\faSitemap
bookmark	\faBookmark	google plus square	\faGooglePlusSquare	skyatlas	\faSkyatlas
bookmark 0	\faBookmark0	google wallet	\faGoogleWallet	skype	\faSkype
briefcase	\faBriefcase	graduation cap	\faGraduationCap	slack	\faSlack
bug	\faBug	gratipay	\faGratipay	sliders	\faSliders
building	\faBuilding	hacker news	\faHackerNews	slideshare	\faSlideshare
building 0	\faBuilding0	hdd 0	\faHdd0	smile 0	\faSmile0
bullhorn	\faBullhorn	header	\faHeader	sort	\faSort
bullseye	\faBullseye	headphones	\faHeadphones	sort alpha asc	\faSortAlphaAsc
bus	\faBus	heart	\faHeart	sort alpha desc	\faSortAlphaDesc
buysellads	\faBuysellads	heartbeat	\faHeartbeat	sort amount asc	\faSortAmountAsc
calculator	\faCalculator	heart 0	\faHeart0	sort amount desc	\faSortAmountDesc
calendar	\faCalendar	history	\faHistory	sort asc	\faSortAsc
calendar check 0	\faCalendarCheck0	home	\faHome	sort desc	\faSortDesc
calendar minus 0	\faCalendarMinus0	hospital 0	\faHospital0	sort numeric asc	\faSortNumericAsc
calendar 0	\faCalendar0	hourglass	\faHourglass	sort numeric desc	\faSortNumericDesc
		hourglass end	\faHourglassEnd	soundcloud	\faSoundcloud

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📅	\faCalendarPlus0	🕒	\faHourglassHalf	🚀	\faSpaceShuttle
📅	\faCalendarTimes0	🕒	\faHourglass0	⌚	\faSpinner
📷	\faCamera	🕒	\faHourglassStart	🍴	\faSpoon
📷	\faCameraRetro	Houzz	\faHouzz	Spotify	\faSpotify
🚗	\faCar	H	\faHSquare	Stack Exchange	\faStackExchange
▼	\faCaretDown	HTML5	\faHtml5	Stack Overflow	\faStackOverflow
◀	\faCaretLeft	I	\faIcon	Steam	\faSteam
▶	\faCaretRight	⌂	\faInbox	Steam Square	\faSteamSquare
☒	\faCaretSquare0Down	⌂	\faIndent	Step Backward	\faStepBackward
☒	\faCaretSquare0Left	i	\faIndustry	Step Forward	\faStepForward
☒	\faCaretSquare0Right	i	\faInfo	Stethoscope	\faStethoscope
☒	\faCaretSquare0Up	Instagram	\faInfoCircle	Sticky Note	\faStickyNote
▲	\faCaretUp	Internet Explorer	\faInternetExplorer	Sticky Note0	\faStickyNote0
▼	\faCartArrowDown	Ioxhost	\faIoxhost	Stop	\faStop
+	\faCartPlus	Italic	\faItalic	Street View	\faStreetView
CC	\faCc	Joomla	\faJoomla	Strikethrough	\faStrikethrough
AMERICAN EXPRESS	\faCcAmex	JsFiddle	\faJsfiddle	StumbleUpon	\faStumbleupon
①	\faCcDinersClub	Key	\faKey	StumbleUpon Circle	\faStumbleuponCircle
DISCOVER	\faCcDiscover	Keyboard0	\faKeyboard0	Subscript	\faSubscript
JCB	\faCcJcb	Language	\faLanguage	Subway	\faSubway
MC	\faCcMastercard	Laptop	\faLaptop	Suitcase	\faSuitcase
PayPal	\faCcPaypal	Lastfm	\faLastfm	Superscript	\faSuperscript
stripe	\faCcStripe	Lastfm Square	\faLastfmSquare	Table	\faTable
VISA	\faCcVisa	Leaf	\faLeaf	Tablet	\faTablet
✿	\faCertificate	Leanpub	\faLeanpub	Tachometer	\faTachometer
⚡	\faChainBroken	Lemon0	\faLemon0	Tag	\faTag
👶	\faChild	Level Down	\faLevelDown	Tags	\faTags
ⓧ	\faChrome	Level Up	\faLevelUp	Tasks	\faTasks
📋	\faClipboard	Life Ring	\faLifeRing	Taxi	\faTaxi
⌚	\faClock0	Lightbulb0	\faLightbulb0	Television	\faTelevision
📁	\faClone	Line Chart	\faLineChart	Tencent Weibo	\faTencentWeibo
☁	\faCloud	Link	\faLink	Terminal	\faTerminal
🌩	\faCloudDownload	Linkedin	\faLinkedin	Text Height	\faTextHeight
🌩	\faCloudUpload	Linkedin Square	\faLinkedinSquare	Text Width	\faTextWidth
</>	\faCode	Linux	\faLinux	Th	\faTh
⚡	\faCodeFork	List	\faList	Th Large	\faThLarge
❖	\faCodepen	List Alt	\faListAlt	Th List	\faThList
☕	\faCoffee	List01	\faList01	Thumbtack	\faThumbtack
⚙	\faCog	List U1	\faListU1	Ticket	\faTicket
⚙	\faCogs	Location Arrow	\faLocationArrow	Tint	\faTint
☰	\faColumns	Lock	\faLock	Toggle Off	\faToggleOff
💬	\faComment	Magic	\faMagic	Toggle On	\faToggleOn
💬	\faCommenting	Magnet	\faMagnet	Train	\faTrain
💬	\faCommenting0	Male	\faMale	Trash	\faTrash
💬	\faComment0	Map	\faMap	Trash0	\faTrash0
💬	\faComments	Map Marker	\faMapMarker	Tree	\faTree
💬	\faComments0	Map0	\faMap0	Trello	\faTrello
🧭	\faCompass	Map Pin	\faMapPin	TripAdvisor	\faTripadvisor
✗	\faCompress			Trophy	\faTrophy

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	\faConnectdevelop		\faMapSigns		\faTruck
	\faContao		\faMaxcdn		\faTty
	\faCreditCard		\faMeanpath		\faTumblr
	\faCrop		\faMedium		\faTumblrSquare
	\faCrosshairs		\faMedkit		\faTwitch
	\faCss3		\faMeh0		\faTwitter
	\faCube		\faMicrophone		\faTwitterSquare
	\faCubes		\faMicrophoneSlash		\faUmbrella
	\faCutlery		\faMinus		\faUnderline
	\faDashcube		\faMinusCircle		\faUniversity
	\faDatabase		\faMinusSquare		\faUnlock
	\faDelicious		\faMinusSquare0		\faUnlockAlt
	\faDesktop		\faMobile		\faUpload
	\faDeviantart		\faMoney		\faUser
	\faDiamond		\faMotorcycle		\faUserMd
	\faDigg		\faMousePointer		\faUserPlus
	\faDownload		\faMusic		\faUsers
	\faDribbble		\faNewspaper0		\faUserSecret
	\faDropbox		\faObjectGroup		\faUserTimes
	\faDrupal		\faObjectUngroup		\faVideoCamera
	\faEject		\faOdnoklassniki		\faVimeo
	\faEllipsisH		\faOdnoklassnikiSquare		\faVimeoSquare
	\faEllipsisV		\faOpencart		\faVine
	\faEmpire		\faOpenid		\faVk
	\faEnvelope		\faOpera		\faVolumeDown
	\faEnvelope0		\faOptinMonster		\faVolumeOff
	\faEnvelopeSquare		\faOutdent		\faVolumeUp
	\faEraser		\faPagelines		\faWeibo
	\faExchange		\faPaintBrush		\faWeixin
	\faExclamation		\faPaperclip		\faWhatsapp
	\faExclamationCircle		\faPaperPlane		\faWheelchair
	\faExclamationTriangle		\faPaperPlane0		\faWifi
	\faExpand		\faParagraph		\faWikipediaW
	\faExpeditedssl		\faPause		\faWindows
	\faExternalLink		\faPaw		\faWordpress
	\faExternalLinkSquare		\faPaypal		\faWrench
	\faEye		\faPhone		\faKing
	\faEyedropper		\faPhoneSquare		\faKingSquare
	\faEyeSlash		\faPicture0		\faYahoo
	\faFacebook		\faPieChart		\faYCombinator
	\faFacebookOfficial		\faPiedPiper		\faYelp
	\faFacebookSquare		\faPiedPiperAlt		\faYoutube
	\faFastBackward		\faPinterest		\faYoutubePlay
	\faFastForward		\faPinterestP		\faYoutubeSquare
	\faFax		\faPinterestSquare		

fontawesome defines synonyms for many of the preceding symbols:

🚘	\faAutomobile	⚡	\faFileZip0	⌚	\faRa
🏦	\faBank	⚡	\faFlash	☰	\faReorder
📊	\faBarChart0	✳️	\faGe	💾	\faSave
🔋	\faBattery0	⚙️	\faGear	📨	\faSend
🔋	\faBattery1	⚙️	\faGears	📨	\faSend0
🔋	\faBattery2	❤️	\faGittip	⚽	\faSoccerBall0
🔋	\faBattery3	👤	\faGroup	▼	\faSortDown
🔋	\faBattery4	🏨	\faHotel	▶	\faSortUp
🚖	\faCab	🖼️	\faImage	🌐	\faSupport
🔗	\faChain	🏛️	\faInstitution	☑️	\faToggleDown
📄	\faCopy	↗️	\faLegal	☒️	\faToggleLeft
✂️	\faCut	🌐	\faLifeBouy	☒️	\faToggleRight
📊	\faDashboard	🌐	\faLifeSaver	📺	\faToggleUp
💻	\faDedent	➡️	\faMailForward	🔗	\faTv
✍️	\faEdit	⬅️	\faMailReply	✖️	\faUnlink
👤	\faFacebookF	➡️	\faMailReplyAll	◆	\faUnsorted
RSS	\faFeed	📱	\faMobilePhone	⚠️	\faWarning
🎥	\faFileMovie0	📝	\faMortarBoard	:@{}	\faWechat
📷	\faFilePhoto0	☰	\faNavIcon	🇾	\faYc
🖼️	\faFilePicture0	📄	\faPaste	🇾	\faYCombinatorSquare
🎵	\faFileSound0	🖼️	\faPhoto	🇾	\faYcSquare

TABLE 520: rubikcube Rubik's Cube Rotations

⤓	\rrrhD	⤒	\rrrhF	⤓	\rrrhLw	⤓	\rrrhRw	⤓	\rrrhU
⤔	\rrhDa	⤒	\rrhFp	⤓	\rrhLwp	⤓	\rrhRwp	⤔	\rrhUa
⤔	\rrhDap	⤒	\rrhFw	⤓	\rrhM	⤓	\rrhSd	⤔	\rrhUap
⤔	\rrhDp	⤒	\rrhFwp	⤓	\rrhMp	⤓	\rrhSdp	⤔	\rrhUp
⤔	\rrhDs	⤓	\rrhL	⤓	\rrhR	⤓	\rrhS1	⤔	\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** ⤔”) as well as commands that produce colored illustrations of Rubik's Cube configurations and rotations. See the `rubikcube` documentation for more information.

9 Fonts with minimal L^AT_EX support

The symbol fonts shown in this section are provided without a corresponding L^AT_EX 2_E 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}{<name>}{}
\DeclareFontShape{U}{<name>}{m}{n}{<-> <font>}{}
```

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

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

TABLE 521: hands Fists

	\Pisymbol{hands}{65}		\Pisymbol{hands}{67}
	\Pisymbol{hands}{66}		\Pisymbol{hands}{68}

TABLE 522: greenpoint Recycling Symbols

TABLE 523: nkarta Map Symbols

○	\Pisymbol{nkarta}{33}	◊	\Pisymbol{nkarta}{96}	●	\Pisymbol{nkarta}{193}
◎	\Pisymbol{nkarta}{34}	◀	\Pisymbol{nkarta}{97}	□	\Pisymbol{nkarta}{194}
△	\Pisymbol{nkarta}{35}	↑	\Pisymbol{nkarta}{98}	■	\Pisymbol{nkarta}{195}
◇	\Pisymbol{nkarta}{36}	🌐	\Pisymbol{nkarta}{99}	▢	\Pisymbol{nkarta}{196}
○	\Pisymbol{nkarta}{37}	▲	\Pisymbol{nkarta}{100}	▢	\Pisymbol{nkarta}{197}
★	\Pisymbol{nkarta}{38}	★	\Pisymbol{nkarta}{101}	✈	\Pisymbol{nkarta}{198}
⊕	\Pisymbol{nkarta}{39}	✉	\Pisymbol{nkarta}{102}	✉	\Pisymbol{nkarta}{199}
↓	\Pisymbol{nkarta}{40}	↑	\Pisymbol{nkarta}{103}	→	\Pisymbol{nkarta}{200}
↓	\Pisymbol{nkarta}{41}	↳	\Pisymbol{nkarta}{104}	▲	\Pisymbol{nkarta}{201}
★	\Pisymbol{nkarta}{42}	🕒	\Pisymbol{nkarta}{105}	◆	\Pisymbol{nkarta}{202}
..	\Pisymbol{nkarta}{43}	▲	\Pisymbol{nkarta}{106}	■	\Pisymbol{nkarta}{203}
☞	\Pisymbol{nkarta}{44}	➤	\Pisymbol{nkarta}{107}	■	\Pisymbol{nkarta}{204}

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	\Pisymbol{nkarta}{92}	\boxtimes	\Pisymbol{nkarta}{189}		\Pisymbol{nkarta}{252}
	\Pisymbol{nkarta}{93}	\times	\Pisymbol{nkarta}{190}		\Pisymbol{nkarta}{253}
	\Pisymbol{nkarta}{94}	\circlearrowleft	\Pisymbol{nkarta}{191}		\Pisymbol{nkarta}{254}
	\Pisymbol{nkarta}{95}	\divideontimes	\Pisymbol{nkarta}{192}		

TABLE 524: moonphase Astronomical Symbols

	\Pisymbol{moonphase}{0}		\Pisymbol{moonphase}{2}
	\Pisymbol{moonphase}{1}		\Pisymbol{moonphase}{3}

TABLE 525: astrosym Astronomical Symbols

	\Pisymbol{astrosym}{0}		\Pisymbol{astrosym}{132}
	\Pisymbol{astrosym}{1}		\Pisymbol{astrosym}{133}
	\Pisymbol{astrosym}{2}		\Pisymbol{astrosym}{134}
	\Pisymbol{astrosym}{3}		\Pisymbol{astrosym}{135}
	\Pisymbol{astrosym}{4}		\Pisymbol{astrosym}{136}
	\Pisymbol{astrosym}{5}		\Pisymbol{astrosym}{137}
	\Pisymbol{astrosym}{6}		\Pisymbol{astrosym}{138}
	\Pisymbol{astrosym}{7}		\Pisymbol{astrosym}{139}
	\Pisymbol{astrosym}{8}		\Pisymbol{astrosym}{140}
	\Pisymbol{astrosym}{9}		\Pisymbol{astrosym}{141}
	\Pisymbol{astrosym}{10}		\Pisymbol{astrosym}{142}
	\Pisymbol{astrosym}{11}		\Pisymbol{astrosym}{143}
	\Pisymbol{astrosym}{12}		\Pisymbol{astrosym}{144}
	\Pisymbol{astrosym}{13}		\Pisymbol{astrosym}{145}
	\Pisymbol{astrosym}{14}		\Pisymbol{astrosym}{146}
	\Pisymbol{astrosym}{15}		\Pisymbol{astrosym}{147}
	\Pisymbol{astrosym}{16}		\Pisymbol{astrosym}{148}
	\Pisymbol{astrosym}{17}		\Pisymbol{astrosym}{149}
	\Pisymbol{astrosym}{18}		\Pisymbol{astrosym}{150}
	\Pisymbol{astrosym}{19}		\Pisymbol{astrosym}{151}

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⌚	\Pisymbol{astrosym}{20}	⌚	\Pisymbol{astrosym}{152}
❖	\Pisymbol{astrosym}{21}	❖	\Pisymbol{astrosym}{153}
♓	\Pisymbol{astrosym}{22}	♓	\Pisymbol{astrosym}{154}
♑	\Pisymbol{astrosym}{23}	♑	\Pisymbol{astrosym}{155}
♒	\Pisymbol{astrosym}{24}	♒	\Pisymbol{astrosym}{156}
♑	\Pisymbol{astrosym}{25}	♑	\Pisymbol{astrosym}{157}
♒	\Pisymbol{astrosym}{26}	♒	\Pisymbol{astrosym}{158}
♒	\Pisymbol{astrosym}{27}	♒	\Pisymbol{astrosym}{159}
♒	\Pisymbol{astrosym}{28}	★	\Pisymbol{astrosym}{160}
⊕	\Pisymbol{astrosym}{29}	△	\Pisymbol{astrosym}{161}
♂	\Pisymbol{astrosym}{30}	□	\Pisymbol{astrosym}{162}
♃	\Pisymbol{astrosym}{31}	▲	\Pisymbol{astrosym}{163}
♄	\Pisymbol{astrosym}{32}	♂	\Pisymbol{astrosym}{164}
*	\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}

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⌚	\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}
剟	\Pisymbol{astrosym}{64}	♾	\Pisymbol{astrosym}{212}
ڳ	\Pisymbol{astrosym}{65}	♊	\Pisymbol{astrosym}{213}
ଓ	\Pisymbol{astrosym}{66}	ଓ	\Pisymbol{astrosym}{214}
Ⓛ	\Pisymbol{astrosym}{67}	Ⓜ	\Pisymbol{astrosym}{215}
ଓ	\Pisymbol{astrosym}{68}	♏	\Pisymbol{astrosym}{216}
*	\Pisymbol{astrosym}{69}	♑	\Pisymbol{astrosym}{217}
☺	\Pisymbol{astrosym}{90}	♏	\Pisymbol{astrosym}{218}
☻	\Pisymbol{astrosym}{91}	↗	\Pisymbol{astrosym}{219}
Ѡ	\Pisymbol{astrosym}{92}	Ѡ	\Pisymbol{astrosym}{220}
Ѽ	\Pisymbol{astrosym}{93}	❀	\Pisymbol{astrosym}{221}
Ѽ	\Pisymbol{astrosym}{94}	♓	\Pisymbol{astrosym}{222}
Ѽ	\Pisymbol{astrosym}{95}	♐	\Pisymbol{astrosym}{223}
ଓ	\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}
ଓ	\Pisymbol{astrosym}{107}	▷	\Pisymbol{astrosym}{231}
↑↑	\Pisymbol{astrosym}{108}	□	\Pisymbol{astrosym}{232}
▷	\Pisymbol{astrosym}{109}	*	\Pisymbol{astrosym}{233}
🕒	\Pisymbol{astrosym}{110}	ଓ	\Pisymbol{astrosym}{234}
▼	\Pisymbol{astrosym}{111}	↖	\Pisymbol{astrosym}{235}
♾	\Pisymbol{astrosym}{112}	ଓ	\Pisymbol{astrosym}{236}
♊	\Pisymbol{astrosym}{113}	ଓ○	\Pisymbol{astrosym}{237}
♓	\Pisymbol{astrosym}{114}	□	\Pisymbol{astrosym}{238}
ଓ	\Pisymbol{astrosym}{115}	○	\Pisymbol{astrosym}{239}
♏	\Pisymbol{astrosym}{116}	●	\Pisymbol{astrosym}{240}
♑	\Pisymbol{astrosym}{117}	○○	\Pisymbol{astrosym}{241}
♏	\Pisymbol{astrosym}{118}	●●	\Pisymbol{astrosym}{242}

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	\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 526: 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}

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	\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 527: 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}

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❶ \Pisymbol{umranda}{15}		\Pisymbol{umranda}{49}		❷ \Pisymbol{umranda}{83}
❷ \Pisymbol{umranda}{16}		\Pisymbol{umranda}{50}		❸ \Pisymbol{umranda}{84}
❸ \Pisymbol{umranda}{17}		\Pisymbol{umranda}{51}		❹ \Pisymbol{umranda}{85}
❹ \Pisymbol{umranda}{18}		\Pisymbol{umranda}{52}		❺ \Pisymbol{umranda}{86}
❺ \Pisymbol{umranda}{19}		\Pisymbol{umranda}{53}		❻ \Pisymbol{umranda}{87}
❻ \Pisymbol{umranda}{20}		\Pisymbol{umranda}{54}		❼ \Pisymbol{umranda}{88}
❼ \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 528: `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}

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	\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}{124}
	\Pisymbol{umrandb}{41}		\Pisymbol{umrandb}{83}		

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

TABLE 529: *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 361 and Table 407 (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 530: *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}

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	\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}
	\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}

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\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}
\Pisymbol{knot3}{67}		\Pisymbol{knot3}{83}		
□		\Pisymbol{knot4}{68}		\Pisymbol{knot4}{84}
☒		\Pisymbol{knot4}{69}		\Pisymbol{knot4}{85}
☒☒		\Pisymbol{knot4}{70}		\Pisymbol{knot4}{86}
◆		\Pisymbol{knot4}{71}		\Pisymbol{knot4}{87}
●		\Pisymbol{knot4}{72}		\Pisymbol{knot4}{88}
◻		\Pisymbol{knot4}{73}		\Pisymbol{knot4}{96}
□□		\Pisymbol{knot4}{74}		\Pisymbol{knot4}{97}
□□□		\Pisymbol{knot4}{75}		\Pisymbol{knot4}{98}
□□□□		\Pisymbol{knot4}{76}		\Pisymbol{knot4}{99}
□□□□□		\Pisymbol{knot4}{77}		\Pisymbol{knot4}{100}
□□□□□□		\Pisymbol{knot4}{78}		\Pisymbol{knot4}{101}
□□□□□□□		\Pisymbol{knot4}{79}		\Pisymbol{knot4}{102}
□□□□□□□□		\Pisymbol{knot4}{80}		\Pisymbol{knot4}{103}
□□□□□□□□□		\Pisymbol{knot4}{81}		\Pisymbol{knot4}{104}
□□□□□□□□□□		\Pisymbol{knot4}{82}		\Pisymbol{knot4}{105}
□□□□□□□□□□□		\Pisymbol{knot4}{83}		
□		\Pisymbol{knot5}{68}		\Pisymbol{knot5}{84}
☒		\Pisymbol{knot5}{69}		\Pisymbol{knot5}{85}
☒☒		\Pisymbol{knot5}{70}		\Pisymbol{knot5}{86}
◆		\Pisymbol{knot5}{71}		\Pisymbol{knot5}{87}
●		\Pisymbol{knot5}{72}		\Pisymbol{knot5}{88}
◻		\Pisymbol{knot5}{73}		\Pisymbol{knot5}{96}
□□		\Pisymbol{knot5}{74}		\Pisymbol{knot5}{97}
□□□		\Pisymbol{knot5}{75}		\Pisymbol{knot5}{98}
□□□□		\Pisymbol{knot5}{76}		\Pisymbol{knot5}{99}
□□□□□		\Pisymbol{knot5}{77}		\Pisymbol{knot5}{100}
□□□□□□		\Pisymbol{knot5}{78}		\Pisymbol{knot5}{101}
□□□□□□□		\Pisymbol{knot5}{79}		\Pisymbol{knot5}{102}
□□□□□□□□		\Pisymbol{knot5}{80}		\Pisymbol{knot5}{103}

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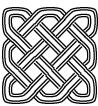
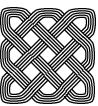
	\Pisymbol{knot5}{65}		\Pisymbol{knot5}{81}		\Pisymbol{knot5}{104}
	\Pisymbol{knot5}{66}		\Pisymbol{knot5}{82}		\Pisymbol{knot5}{105}
	\Pisymbol{knot5}{67}		\Pisymbol{knot5}{83}		
	\Pisymbol{knot6}{48}		\Pisymbol{knot6}{68}		\Pisymbol{knot6}{84}
	\Pisymbol{knot6}{49}		\Pisymbol{knot6}{69}		\Pisymbol{knot6}{85}
	\Pisymbol{knot6}{50}		\Pisymbol{knot6}{70}		\Pisymbol{knot6}{86}
◆	\Pisymbol{knot6}{51}		\Pisymbol{knot6}{71}		\Pisymbol{knot6}{87}
●	\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}

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 \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 531: `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}

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\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}
\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}

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\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}
\Pisymbol{dancers}{69}	\Pisymbol{dancers}{155}	\Pisymbol{dancers}{241}
\Pisymbol{dancers}{70}	\Pisymbol{dancers}{156}	\Pisymbol{dancers}{242}
\Pisymbol{dancers}{71}	\Pisymbol{dancers}{157}	\Pisymbol{dancers}{243}
\Pisymbol{dancers}{72}	\Pisymbol{dancers}{158}	\Pisymbol{dancers}{244}
\Pisymbol{dancers}{73}	\Pisymbol{dancers}{159}	\Pisymbol{dancers}{245}
\Pisymbol{dancers}{74}	\Pisymbol{dancers}{160}	\Pisymbol{dancers}{246}
\Pisymbol{dancers}{75}	\Pisymbol{dancers}{161}	\Pisymbol{dancers}{247}
\Pisymbol{dancers}{76}	\Pisymbol{dancers}{162}	\Pisymbol{dancers}{248}
\Pisymbol{dancers}{77}	\Pisymbol{dancers}{163}	\Pisymbol{dancers}{249}
\Pisymbol{dancers}{78}	\Pisymbol{dancers}{164}	\Pisymbol{dancers}{250}
\Pisymbol{dancers}{79}	\Pisymbol{dancers}{165}	\Pisymbol{dancers}{251}
\Pisymbol{dancers}{80}	\Pisymbol{dancers}{166}	\Pisymbol{dancers}{252}

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\Pisymbol{dancers}{81} \Pisymbol{dancers}{167} \Pisymbol{dancers}{253}
\Pisymbol{dancers}{82} \Pisymbol{dancers}{168} \Pisymbol{dancers}{254}
\Pisymbol{dancers}{83} \Pisymbol{dancers}{169} \Pisymbol{dancers}{255}
\Pisymbol{dancers}{84} \Pisymbol{dancers}{170}
\Pisymbol{dancers}{85} \Pisymbol{dancers}{171}

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

TABLE 532: semaphor Semaphore Alphabet

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

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\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 `semafd.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{semafd.fd}` in the document's preamble. For example, `\usefont{OT1}{smfp}{m}{n}Hello` will typeset “”. This can be useful for typesetting complete messages. Roman, bold, monospace, slanted, and bold+slanted styles are all supported.

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



TABLE 533: cryst Crystallography Symbols

◦	\Pisymbol{cryst}{0}	◆	\Pisymbol{cryst}{63}	◀	\Pisymbol{cryst}{138}
◆	\Pisymbol{cryst}{2}	◆	\Pisymbol{cryst}{64}	◀	\Pisymbol{cryst}{139}
▲	\Pisymbol{cryst}{3}	◆	\Pisymbol{cryst}{65}	■	\Pisymbol{cryst}{140}
◆	\Pisymbol{cryst}{4}	◆	\Pisymbol{cryst}{66}	▶	\Pisymbol{cryst}{141}
→	\Pisymbol{cryst}{5}	↖	\Pisymbol{cryst}{75}	◀	\Pisymbol{cryst}{142}
●	\Pisymbol{cryst}{6}	↖	\Pisymbol{cryst}{77}	▶	\Pisymbol{cryst}{143}
→	\Pisymbol{cryst}{7}	↖	\Pisymbol{cryst}{78}	↗	\Pisymbol{cryst}{145}
→	\Pisymbol{cryst}{8}	↖	\Pisymbol{cryst}{79}	↙	\Pisymbol{cryst}{147}
→	\Pisymbol{cryst}{9}	↖	\Pisymbol{cryst}{80}	↙	\Pisymbol{cryst}{148}
◦	\Pisymbol{cryst}{10}	↖	\Pisymbol{cryst}{81}	↙	\Pisymbol{cryst}{149}
◊	\Pisymbol{cryst}{12}	↖	\Pisymbol{cryst}{82}	↑	\Pisymbol{cryst}{155}
◆	\Pisymbol{cryst}{15}	↖	\Pisymbol{cryst}{83}	↓	\Pisymbol{cryst}{157}
◆	\Pisymbol{cryst}{20}	↖	\Pisymbol{cryst}{84}	↓	\Pisymbol{cryst}{158}
◆	\Pisymbol{cryst}{21}	↖	\Pisymbol{cryst}{85}	↓	\Pisymbol{cryst}{159}
◆	\Pisymbol{cryst}{22}	↖	\Pisymbol{cryst}{87}	↖	\Pisymbol{cryst}{175}
◆	\Pisymbol{cryst}{24}	↖	\Pisymbol{cryst}{88}	↖	\Pisymbol{cryst}{177}
↗	\Pisymbol{cryst}{25}	↖	\Pisymbol{cryst}{89}	↖	\Pisymbol{cryst}{178}
↗	\Pisymbol{cryst}{27}	↖	\Pisymbol{cryst}{95}	↖	\Pisymbol{cryst}{179}
↗	\Pisymbol{cryst}{28}	↖	\Pisymbol{cryst}{97}	↖	\Pisymbol{cryst}{185}
↗	\Pisymbol{cryst}{29}	↖	\Pisymbol{cryst}{98}	↖	\Pisymbol{cryst}{187}
▲	\Pisymbol{cryst}{30}	↖	\Pisymbol{cryst}{99}	↖	\Pisymbol{cryst}{188}
▲	\Pisymbol{cryst}{31}	◆	\Pisymbol{cryst}{102}	↖	\Pisymbol{cryst}{189}
▲	\Pisymbol{cryst}{32}	◦	\Pisymbol{cryst}{103}	↖	\Pisymbol{cryst}{195}
↗	\Pisymbol{cryst}{35}	■	\Pisymbol{cryst}{104}	↖	\Pisymbol{cryst}{197}
●	\Pisymbol{cryst}{36}	▬	\Pisymbol{cryst}{105}	↖	\Pisymbol{cryst}{198}
↗	\Pisymbol{cryst}{37}	▬	\Pisymbol{cryst}{107}	↖	\Pisymbol{cryst}{199}
↗	\Pisymbol{cryst}{38}	▬	\Pisymbol{cryst}{108}	◆	\Pisymbol{cryst}{202}
↗	\Pisymbol{cryst}{39}	▬	\Pisymbol{cryst}{109}	◆	\Pisymbol{cryst}{203}
◆	\Pisymbol{cryst}{40}	◆	\Pisymbol{cryst}{112}	▬	\Pisymbol{cryst}{204}
◆	\Pisymbol{cryst}{41}	◆	\Pisymbol{cryst}{113}	▬	\Pisymbol{cryst}{210}
◆	\Pisymbol{cryst}{42}	◆	\Pisymbol{cryst}{120}	▬	\Pisymbol{cryst}{212}
◆	\Pisymbol{cryst}{43}	◆	\Pisymbol{cryst}{121}	▬	\Pisymbol{cryst}{213}
■	\Pisymbol{cryst}{44}	▬	\Pisymbol{cryst}{123}	▬	\Pisymbol{cryst}{220}
↗	\Pisymbol{cryst}{45}	▬	\Pisymbol{cryst}{124}	▬	\Pisymbol{cryst}{221}
↗	\Pisymbol{cryst}{47}	▬	\Pisymbol{cryst}{125}	▬	\Pisymbol{cryst}{223}
↗	\Pisymbol{cryst}{48}	▬	\Pisymbol{cryst}{127}	▬	\Pisymbol{cryst}{224}
↗	\Pisymbol{cryst}{49}	▬	\Pisymbol{cryst}{128}	◦	\Pisymbol{cryst}{230}
◆	\Pisymbol{cryst}{50}	▬	\Pisymbol{cryst}{129}	◦	\Pisymbol{cryst}{231}
↑	\Pisymbol{cryst}{55}	▬	\Pisymbol{cryst}{130}	◦	\Pisymbol{cryst}{232}
↑	\Pisymbol{cryst}{57}	▬	\Pisymbol{cryst}{131}	▬	\Pisymbol{cryst}{233}
↑	\Pisymbol{cryst}{58}	▬	\Pisymbol{cryst}{132}	▬	\Pisymbol{cryst}{236}
↑	\Pisymbol{cryst}{59}	▬	\Pisymbol{cryst}{133}	◆	\Pisymbol{cryst}{240}
◆	\Pisymbol{cryst}{60}	▬	\Pisymbol{cryst}{135}	▬	\Pisymbol{cryst}{241}
◆	\Pisymbol{cryst}{61}	▬	\Pisymbol{cryst}{136}	▬	\Pisymbol{cryst}{242}
◆	\Pisymbol{cryst}{62}	▬	\Pisymbol{cryst}{137}	▬	\Pisymbol{cryst}{243}

TABLE 534: dice Dice

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

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

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

TABLE 535: magic Trading Card Symbols

⓪	\Pisymbol{magic}{48}	⑥	\Pisymbol{magic}{54}	⑦	\Pisymbol{magic}{55}	⑧	\Pisymbol{magic}{56}	⑨	\Pisymbol{magic}{57}	⑩	\Pisymbol{magic}{58}	⑪	\Pisymbol{magic}{66}	⑫	\Pisymbol{magic}{71}	⑬	\Pisymbol{magic}{72}
①	\Pisymbol{magic}{49}	⑤	\Pisymbol{magic}{50}	③	\Pisymbol{magic}{51}	④	\Pisymbol{magic}{52}	②	\Pisymbol{magic}{53}	⑥	\Pisymbol{magic}{54}	⑦	\Pisymbol{magic}{55}	⑧	\Pisymbol{magic}{56}	⑨	\Pisymbol{magic}{57}
⑩	\Pisymbol{magic}{82}	⑪	\Pisymbol{magic}{84}	⑫	\Pisymbol{magic}{85}	⑬	\Pisymbol{magic}{87}	⑭	\Pisymbol{magic}{88}	⑮	\Pisymbol{magic}{89}	⑯	\Pisymbol{magic}{90}	⑰	\Pisymbol{magic}{91}	⑱	\Pisymbol{magic}{92}
⑲	\Pisymbol{magic}{93}	⑳	\Pisymbol{magic}{94}	㉑	\Pisymbol{magic}{95}	㉒	\Pisymbol{magic}{96}	㉓	\Pisymbol{magic}{97}	㉔	\Pisymbol{magic}{98}	㉕	\Pisymbol{magic}{99}	㉖	\Pisymbol{magic}{100}	㉗	\Pisymbol{magic}{101}

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

⓪–⑨	0–9	Circled numerals 0–9
❶	B	Black magic symbol
❷	G	Green magic symbol
❸	R	Red magic symbol
❹	T	Tap symbol (tilted "T" in a circle)
❺	U	Blue magic symbol
❻	W	White magic symbol
❽	X	Circled "X" (for mana cost, e.g., Fireball)
❾	Z	Circled "10" (for mana cost, e.g., Aladdin's Lamp)

TABLE 536: 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}

(continued on next page)

(continued from previous page)

♚	\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}
♝	\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}{163}
♝	\Pisymbol{fselch}{38}	♝	\Pisymbol{fselch}{93}	●	\Pisymbol{fselch}{169}
♞	\Pisymbol{fselch}{39}	♞	\Pisymbol{fselch}{94}	●	\Pisymbol{fselch}{175}
♝	\Pisymbol{fselch}{40}	♝	\Pisymbol{fselch}{95}	☒	\Pisymbol{fselch}{180}
♞	\Pisymbol{fselch}{41}	♞	\Pisymbol{fselch}{96}	☒	\Pisymbol{fselch}{186}
♝	\Pisymbol{fselch}{42}	♝	\Pisymbol{fselch}{97}	☒	\Pisymbol{fselch}{192}
♞	\Pisymbol{fselch}{43}	♞	\Pisymbol{fselch}{98}	☒	\Pisymbol{fselch}{198}
♝	\Pisymbol{fselch}{44}	♝	\Pisymbol{fselch}{99}	☒	\Pisymbol{fselch}{204}
♞	\Pisymbol{fselch}{45}	♞	\Pisymbol{fselch}{100}	☒	\Pisymbol{fselch}{210}
♝	\Pisymbol{fselch}{46}	♝	\Pisymbol{fselch}{101}	☒	\Pisymbol{fselch}{216}
♞	\Pisymbol{fselch}{47}	♞	\Pisymbol{fselch}{102}	☒	\Pisymbol{fselch}{222}
♝	\Pisymbol{fselch}{48}	♝	\Pisymbol{fselch}{103}	☒	\Pisymbol{fselch}{228}
♞	\Pisymbol{fselch}{49}	♞	\Pisymbol{fselch}{104}	☒	\Pisymbol{fselch}{234}
♝	\Pisymbol{fselch}{50}	♝	\Pisymbol{fselch}{105}	☒	\Pisymbol{fselch}{240}
♞	\Pisymbol{fselch}{51}	♞	\Pisymbol{fselch}{106}	☒	\Pisymbol{fselch}{246}
♝	\Pisymbol{fselch}{52}	♝	\Pisymbol{fselch}{107}		
♞	\Pisymbol{fselch}{53}	♞	\Pisymbol{fselch}{108}		
♝	\Pisymbol{fselch}{54}	♝	\Pisymbol{fselch}{109}		

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

`bartel-chess-fonts` provides the `fselch` and `pkelch` fonts in various sizes (optically scaled). See “`LATEX 2\epsilon` Font Selection” [IAT19] 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 537 on the following page presents a selection of name clashes that appear in this document.

Using multiple symbols with the same name in the same document—or even merely loading conflicting symbol packages—can be tricky but, as evidenced by the existence of Table 537, 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{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 537 because they are designed to be compatible with the symbols they replace. Table 538 on page 237 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 539 on page 237 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 T_EX 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 237. 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.

TABLE 537: Symbol Name Clashes

Symbol	$\text{\LaTeX} 2\epsilon$	$\mathcal{W}\mathcal{S}$	stmaryrd	wasysym	mathabx	marvosym	bbding	ifsym	dingbat	wsuipa
<code>\baro</code>					ϕ					Θ
<code>\bigtriangledown</code>	\bigtriangledown				\bigtriangledown					
<code>\bigtriangleup</code>		\triangle		\checkmark						
<code>\checkmark</code>								\checkmark		
<code>\Circle</code>					\circ			\circ		
<code>\Cross</code>							\dagger	\times		
<code>\ggg</code>						\gg				
<code>\Letter</code>								\boxtimes		
<code>\lightning</code>					\not					
<code>\Lightning</code>							\not			
<code>\lll</code>						\ll				
<code>\Square</code>							\square	\square	\odot	
<code>\Sun</code>							\odot			
<code>\TriangleDown</code>							\blacktriangledown	\triangleright		
<code>\TriangleUp</code>							\blacktriangleup	\triangleright		

TABLE 538: Example of a Benign Name Clash

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

TABLE 539: Sample resized delimiters

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

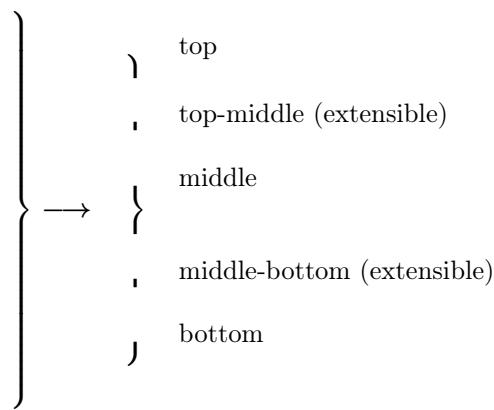


Figure 1: Implementation of variable-sized delimiters

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:

- 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_ε's low-level font commands [LAT19] 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:⁵

```
\newcommand{\textlongs}{{%
  \fontencoding{TS1}\fontfamily{lmr}\selectfont\char115%
}}
```

Then, “\textlongs ucce\textlongs sful” will produce “succesful”—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}{ι}` produces the definite-description operator (“r”). 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}{$\scriptstyle\mathfrak{3}$}}}
\newcommand\wholeof{\mathrel{\reflectbox{$\scriptstyle\mathfrak{3}$}}}
```

The disadvantage of the `graphicx`/`graphics` approach is that not every T_EX backend handles graphical transformations.⁶ Far better is to find a suitable font that contains the desired symbol in the correct

⁵Since January 2020, the `wasy` package provides a `\longs` symbol. See Table 47.

⁶As an example, Xdvi ignores both `\reflectbox` and `\rotatebox`.

orientation. For instance, if the phonetic package is available, then `\textit{\riota}` will yield a backend-independent “ \imath ”. Similarly, tipa’s `\textrevespsilon` (“ \exists ”) or wsipa’s `\revepsilon` (“ \exists ”) may be used to express the mathematical notion of “such that” in a cleaner manner than with `\reflectbox` or `\rotatebox`.⁷

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 89 on page 54) 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 (“ $=\mid$ ”):

```
\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` (“ \hbar ”) as a “ $-$ ” character (`\mathchar'26`) followed by a backspace of 9 math units (`\mkern-9mu`), followed by the letter “ h ”:

```
\def\hbar{{\mathchar'26\mkern-9mu h}}
```

We can just as easily define other barred letters:

```
\def\bbar{{\mathchar'26\mkern-9mu b}}
\def\dbar{{\mathchar'26\mkern-12mu d}}
```

(The space after the “mu” is optional but is added for clarity.) `\bbar` and `\dbar` define “ \overline{b} ” and “ \overline{d} ”, respectively. Note that `\dbar` requires a greater backward math kern than `\bbar`; a -9 mu kern would have produced the less-attractive “ $\overline{\overline{d}}$ ” glyph.

The `amsmath` package provides `\overset` and `\underset` commands for placing one symbol respectively above or below another. For example, `\overset{G}{\sim}`⁸ 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` (“ \divideontimes ”) 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}{\scriptsize[-2ex]*\ast*}%
    \end{tabular}}}}
```

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

There is a T_EX primitive called `\mathaccnt` that centers one mathematical symbol atop another. For example, one can define `\dotcup` (“ $\dot{\cup}$ ”—the composition of a `\cup` and a `\cdot`)—as follows:

⁷More common symbols for representing “such that” include “ $|$ ”, “ $:$ ”, and “ s.t. ”.

⁸L^AT_EX’s `\stackrel` command is similar but is limited to placing a symbol above a binary relation.

```
\newcommand{\dotcup}{\ensuremath{\mathrel{\mathop{\mathord{\cup}}\limits_{\scriptscriptstyle\mathord{\cdot}}}}}
```

The catch is that `\mathrel` requires the accent to be a “math character”. That is, it must be a character in a math font as opposed to a symbol defined in terms of other symbols. See *The TeXbook* [Knu86a] for more information.

Another *TeX* primitive that is useful for composing symbols is `\vcenter`. `\vcenter` is conceptually similar to “`\begin{tabular}{l}`” in *LATeX* but takes a list of vertical material instead of `\backslash`-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:

```
\newcommand*{\threesim}{%
  \mathrel{\vcenter{\offinterlineskip
    \hbox{$\sim$}\vskip-.35ex\hbox{$\sim$}\vskip-.35ex\hbox{$\sim$}}}}
```

The `\threesim` symbol, which vertically centers three `\sim` (“~”) symbols with 0.35 *x*-heights of space between them, is rendered as “ \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 *LATeX* command, borrowed from Plain *TeX*, 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 *TeX*’s `\ialign` primitive, `\oalign` uses *TeX*’s tabular syntax instead of *LATeX*’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 ”),⁹ 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-$\hfil\cr\hfil#2$\hfil\cr}}
\newcommand\stst{\overset{\scriptstyle\ominus}{\barcirc}}
\makeatother
```

In the preceding code, note the `\oalign` call’s use of `\hfil` to horizontally center a minus sign (“–”) and a `\circ` (“o”).

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 “3” symbol for “such that” discussed on the previous page:

```
\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 “ D ”. However, the `\declareoverlashed` 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 (“ I ”). This can be declared as follows:

```
\newcommand{\rqn}{%
  \declareoverlashed{}{\text{-}}{0.04}{0}{I}\slashed{I}}
```

⁹While `\barcirc` illustrates how to combine symbols using `\oalign`, the `stmaryrd` package’s `\minuso` command (Table 52 on page 33) provides a similar glyph (“ \ominus ”) as a single, indivisible symbol.

`\declareslashed{·}{·}{·}{·}{I}` affects the meaning of all subsequent `\slashed{I}` commands in the same scope. The preceding definition of `\rqm` therefore uses an extra set of curly braces to limit that scope to a single `\slashed{I}`. In addition, `\rqm` uses `amstext`'s `\text` macro (described on the next page) to make `\declareslashed` use a text-mode hyphen (“-”) instead of a math-mode minus sign (“–”) and to ensure that the hyphen scales properly in size in subscripts and superscripts. See `slashed`'s documentation (located in `slashed.sty` itself) for a detailed usage description of the `\slashed` and `\declareslashed` commands.

Somewhat simpler than `slashed` is the `centernot` package. `centernot` provides a single command, `\centernot`, which, like `\not`, puts a slash over the subsequent mathematical symbol. However, instead of putting the slash at a fixed location, `\centernot` centers the slash over its argument. `\centernot` might be used, for example, to create a “does not imply” symbol:

$\not\Rightarrow$ \not\Longrightarrow
 $\not\Rightarrow$ \centernot\Longrightarrow

See the `centernot` documentation for more information.

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 “ \top ” symbol out of `\top` and `\bot` (“ \top ” and “ \perp ”):

```
\def\topbotatom#1{\hbox{\hbox to 0pt{$\#1\bot$\hss}\#1\top$}}
\newcommand*\topbot{\mathrel{\mathchoice{\topbotatom\displaystyle}{\topbotatom\textstyle}{\topbotatom\scriptstyle}{\topbotatom\scriptscriptstyle}}}
```

The following is another example that uses `\mathchoice` to construct symbols in different math modes. The code defines a principal value integral symbol, which is an integral sign with a line through it.

```

\def \Xint#1{\mathchoice
  {\XXint\displaystyle\textstyle{#1}}%
  {\XXint\textstyle\scriptstyle{#1}}%
  {\XXint\scriptstyle\scriptscriptstyle{#1}}%
  {\XXint\scriptscriptstyle\scriptscriptstyle{#1}}%
  \!\! int}
\def \XXint#1#2#3{{\setbox0=\hbox{$#1#2#3$\int$}}
  \vcenter{\hbox{$#2#3$}\kern-.5\wd0}}
\def \ddashint{\Xint=}
\def \dashint{\Xint-}

```

(The preceding code was taken verbatim from the UK TeX Users Group FAQ at <http://www.tex.ac.uk/>.) `\dashint` produces a single-dashed integral sign (“ $\overset{\circ}{\int}$ ”), while `\ddashint` produces a double-dashed one (“ $\overset{\bullet}{\int}$ ”). The `\Xint` macro defined above can also be used to generate a wealth of new integrals: “ $\overset{\circ}{\int}$ ” (`\Xint\circlearrowright`), “ $\overset{\bullet}{\int}$ ” (`\Xint\circlearrowleft`), “ $\overset{\circ}{\int}$ ” (`\Xint\subset`), “ $\overset{\bullet}{\int}$ ” (`\Xint\infty`), and so forth.

$\text{\LaTeX} 2\epsilon$ 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\independentT}{\perp}}
\def\independentT#1#2{\mathrel{\rlap{$#1$}\mkern2mu{#1}}}
```

The `\independent` macro uses `\mathpalette` to pass the `\independentT` helper macro both the current math style and the `\perp` symbol. `\independentT` typesets `\perp` in the current math style, moves two math units to the right, and finally typesets a second—overlapping—copy of `\perp`, again in the current math style. `\rlap`, which enables text overlap, is described later on this page.

Some people like their square-root signs with a trailing “hook” (i.e., “ $\sqrt{-}$ ”) as this helps visually distinguish expressions like “ $\sqrt{3x}$ ” from those like “ $\sqrt{3}x$ ”. In March 2002, Dan Luecking posted a `\mathpalette`-based definition of a hooked square-root symbol to `comp.text.tex`. This code was subsequently refined by Max Dohse and Scott Pakin into the version shown below, which accepts a root as an optional argument, for consistency with `\sqrt`.

```
\newcommand{\hksqrt}[2][]{\mathpalette{\DHLhksqrt{#1}{#2}}}
\def\mathpalette{\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` (“ \swarrow ”) and `\nwsearrow` (“ \nwarrow ”):¹⁰

```
\newcommand{\nesarrow}{\mathrel{\text{$\swarrow$}\llap{$\swarrow$}}}
\newcommand{\nwsearrow}{\mathrel{\text{$\nwarrow$}\llap{$\nwarrow$}}}
```

`\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 “`\`” 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}`”.

¹⁰Note that if your goal is to typeset commutative diagrams or pushout/pullback diagrams, then you should probably be using `XY-pic`.

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`.

Steven B. Segletes answered a question on TeX Stack Exchange, “AMS inequalities: a variant of `\gtrsim` and `\lessim`” on typesetting `\gtrsim` (“ \gtrsim ”) and `\lessim` (“ \lessim ”) with the `\sim` symbol slanted to match the angle of the greater-than/less-than sign. His solution incorporates the `graphicx` package's `\rotatebox` for rotating the “ \sim ”, the `stackengine` package's `\stackengine` command for stacking two symbols on top of each other, and the `scalerel` package's `\ThisStyle`, `\SavedStyle`, and `\LMex` commands for scaling the symbol based on the surrounding context. The following code due to Segletes defines the `\gtrsimslant` (“ \gtrsim ”) and `\lessimslant` (“ \lessim ”) symbols:¹¹

```
\newcommand{\lessimslant}{\mathrel{\ensurestackMath{\ThisStyle{%
\stackengine{-.4\LMex}{\SavedStyle<}{\%%
\rotatebox{-25}{\$ \SavedStyle\sim\$}}{U}{r}{F}{T}{S}}}}}
\newcommand{\gtrsimslant}{\mathrel{\ensurestackMath{\ThisStyle{%
\stackengine{-.4\LMex}{\SavedStyle>}{\%%
\rotatebox{25}{\$ \SavedStyle\sim\$}}{U}{l}{F}{T}{S}}}}}
```

Modifying L^AT_EX-generated symbols

Oftentimes, symbols composed in the L^AT_EX 2 _{ϵ} source code can be modified with minimal effort to produce useful variations. For example, `fontdef.dtx` composes the `\ddots` symbol (see Table 277 on page 125) 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 _{ϵ} shortcut for “pt” or “1.0pt”. The remaining commands are defined in The TeXbook [Knu86a]. To draw a version of `\ddots` with the dots going along the opposite diagonal, we merely have to reorder the `\raise7\p@`, `\raise4\p@`, and `\raise\p@`:

```
\makeatletter
\def\revddots{\mathinner{\mkern1mu\raise\p@
\vbox{\kern7\p@\hbox{.}}\mkern2mu
\raise4\p@\hbox{.}\mkern2mu\raise7\p@\hbox{.}\mkern1mu}}
\makeatother
```

`\revddots` is essentially identical to the `mathdots` package's `\iddots` command or the `yhmath` package's `\adots` command.

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[{\code{\diatop[\v{ }\v{ =}]}}]{\textsubdot{r}}` produces “ \acute{f} ”. See the `wsipa` documentation for more information.

¹¹The code as posted on TeX Stack Exchange named these `\vargtrsim` and `\varlessim`. They are renamed here for naming consistency with symbols such as `\geqslant` (“ \geqslant ”).

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 “ \hat{f} ” and `\accentset{e}{X}` produces “ \ddot{X} ”. `\underaccent` does the same thing, but places the accent beneath the character. This enables constructs like `\underaccent{\tilde}{V}`, which produces “ \tilde{V} ”. `accents` provides other accent-related features as well; see the documentation for more information.

Creating extensible symbols

A relatively simple example of creating extensible symbols stems from a `comp.text.tex` post by Donald Arseneau (June 2003). The following code defines an equals sign that extends as far to the right as possible, just like L^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@{}c}{\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 261). For a more complete solution for typesetting actuarial symbols see the `actuarialsymbol` package.

A more complex example of composing accents is the following definition of extensible `\overbracket`, `\underbracket`, `\overparenthesis`, and `\underparenthesis` symbols, taken from a May 2002 `comp.text.tex` post by Donald Arseneau:

```
\makeatletter
\def\overbracket#1{\mathop{\vbox{\ialign{##\crcr\noalign{\kern3\p@}
  \downbracketfill\crcr\noalign{\kern3\p@\nointerlineskip}
  $ \hfil\displaystyle{#1} \hfil \$ \crcr}}}\limits}
\def\underbracket#1{\mathop{\vtop{\ialign{##\crcr
  \$ \hfil\displaystyle{#1} \hfil \$ \crcr\noalign{\kern3\p@\nointerlineskip}}}\limits}}
```

```

\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{$\m@th\bracel\leaders\vrule\hfill\braceru$}
\def\upbracketfill{$\m@th\makesm@sh{\llap{\vrule\@height3\p@\@width.7\p@}}\%
\leaders\vrule\@height.7\p@\hfill
\makesm@sh{\rlap{\vrule\@height3\p@\@width.7\p@}}$}
\def\downbracketfill{$\m@th
\makesm@sh{\llap{\vrule\@height.7\p@\@depth2.3\p@\@width.7\p@}}\%
\leaders\vrule\@height.7\p@\hfill
\makesm@sh{\rlap{\vrule\@height.7\p@\@depth2.3\p@\@width.7\p@}}$}
\makeatother

```

Table 540 showcases these accents. The *T_EXbook* [Knu86a] or another book on *T_EX* 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 540: Manually Composed Extensible Accents

\overbrace{abc}	<i>\overbracket{abc}</i>	\overbrace{abc}	<i>\overparenthesis{abc}</i>
\underline{abc}	<i>\underbracket{abc}</i>	\underline{abc}	<i>\underparenthesis{abc}</i>

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.

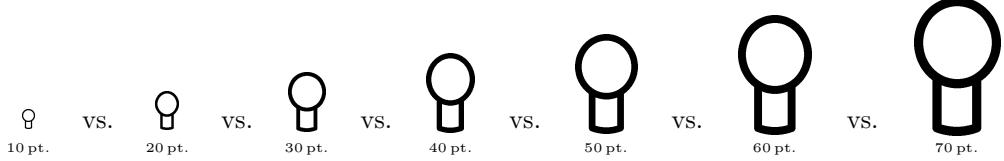
Developing new symbols from scratch

Sometimes it is simply not possible to define a new symbol in terms of existing symbols. Fortunately, most, if not all, *T_EX* distributions are shipped with a tool called METAFONT which is designed specifically for creating fonts to be used with *T_EX*. 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 L^AT_EX symbol using METAFONT. Its primary purpose is to cover the L^AT_EX-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 (“Q”).¹² 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 size and

¹²I’m not a very good artist; you’ll have to pretend that “Q” looks like a light bulb.

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:



<code>font_identifier := "LightBulb10";</code>	% Name the font.
<code>font_size 10pt#;</code>	% Specify the design size.
<code>em# := 10pt#;</code>	% “M” width is 10 points.
<code>cap# := 7pt#;</code>	% Capital letter height is 7 points above the baseline.
<code>sb# := 1/4pt#;</code>	% Leave this much space on the side of each character.
<code>o# := 1/16pt#;</code>	% Amount that curves overshoot borders.
<code>input lightbulb</code>	% 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:

<code>prompt> mf lightbulb10.mf</code>	⇐ Produces <code>lightbulb10.2602gf</code>
<code>prompt> gftodvi lightbulb10.2602gf</code>	⇐ Produces <code>lightbulb10.dvi</code>

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

```

```

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.

  z5 = point 2 -  $1/3$  of bulb;          %  $z_5$  lies on the bulb, a little to the right of  $z_3$ .
  z6 = ( $x_5, 0$ );                    %  $z_6$  is at the bottom, directly under  $z_5$ .
  z7 = ( $x_8, 0$ );                    %  $z_7$  is at the bottom, directly under  $z_8$ .
  z8 = point 2 +  $1/3$  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 z5 -- z6 .. z67 .. z7 -- z8; % Draw the base of the bulb.

  %% Display key positions and points to help us debug.
  makegrid(0, sb,  $w/2, w - sb$ )(0, -1pt,  $y_2, h$ ); % 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`)

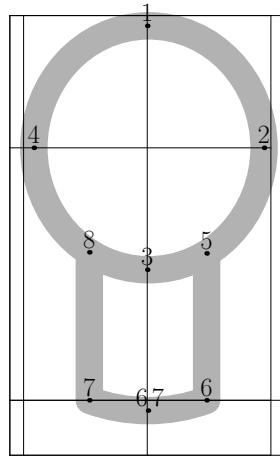


Figure 4: Proof diagram of `lightbulb10.mf`

```
*\\bye  
[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 . $\text{\LaTeX} 2\epsilon$, however, needs more information before documents can use the font. First, we create a font-description file that tells $\text{\LaTeX} 2\epsilon$ how to map fonts in a given font family and encoding to a particular font in a particular font size. For symbol fonts, this mapping is fairly simple. Symbol fonts almost always use the “U” (“Unknown”) font encoding and frequently occur in only one variant: normal weight and non-italicized. The filename for a font-description file important; it must be of the form “ $\langle \text{encoding} \rangle \langle \text{family} \rangle .\text{fd}$ ”, where $\langle \text{encoding} \rangle$ is the lowercase version of the encoding name (typically “u” for symbol fonts) and $\langle \text{family} \rangle$ is the name of the font family. For LightBulb10, let’s call this “bulb”. Figure 6 lists the contents of `ubulb.fd`. The document “ $\text{\LaTeX} 2\epsilon$ Font Selection” [LAT19] 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 $\text{\LaTeX} 2\epsilon$ request for a U-encoded version of `bulb` with a (m)edium font series (as opposed to, e.g., bold) and a (n)ormal font shape (as opposed to, e.g., italic) should translate into a \TeX request for `lightbulb10.tfm` mechanically scaled to the current font size.

```
\DeclareFontFamily{U}{bulb}{}  
\DeclareFontShape{U}{bulb}{m}{n}{<-> lightbulb10}{}  
%
```

Figure 6: L^AT_EX 2 _{ϵ} font-description file (ubulb.fd)

The final step is to write a L^AT_EX 2 _{ε} 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: L^AT_EX 2 _{ϵ} 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/FAQ-textrace.html> 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 “`$A \mathbin{\dot{\cup}} B$” (“ $A \dot{\cup} B$ ”) with “$A \mathbin{\dot{\cup}} B$” (“ $A \dot{\cup} B$ ”). See The TEXbook [Knu86a] for the definitive description of math-mode spacing.`

The purpose of the “log-like symbols” in Table 183 and Table 184 is to provide the correct amount of spacing around and within multiletter function names. Table 541 contrasts the output of the log-like symbols with various, naïve alternatives. In addition to spacing, the log-like symbols also handle subscripts properly. For example, “`\max_{p \in P}`” produces “ $\max_{p \in P}$ ” in text, but “ $\max_{p \in P}$ ” as part of a displayed formula.

TABLE 541: 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 542 contrasts symbols declared with `\DeclareMathOperator` and `\DeclareMathOperator*` in both text style (`$. . . $`) and display style (`\[. . .]`).¹³

TABLE 542: Defining new log-like symbols

Declaration function	<code>\$\newlogsym_{\{p \in P\}}</code>	<code>\[\newlogsym_{\{p \in P\}} \]</code>
<code>\DeclareMathOperator</code>	$\newlogsym_{p \in P}$	$\newlogsym_{p \in P}$
<code>\DeclareMathOperator*</code>	$\newlogsym_{p \in P}$	$\newlogsym_{p \in P}$

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 184 utilize this spacing convention.

¹³Note that `\displaystyle` can be used to force display style within `$. . . $` and `\textstyle` can be used to force text style within `\[. . .]`.

10.5 Bold mathematical symbols

\LaTeX does not normally use bold symbols when typesetting mathematics. However, bold symbols are occasionally needed, for example when naming vectors. Any of the approaches described at <http://www.tex.ac.uk/FAQ-boldgreek.html> can be used to produce bold mathematical symbols. Table 543 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. `xfakebold`'s `\setBold` command is unique in that it takes a thickness argument and supports arbitrary symbol thickness, although it works only with vector fonts, not bitmapped fonts.

TABLE 543: Producing bold mathematical symbols

Package	Code	Output	
<code>none</code>	<code>\$\alpha + b = \Gamma \div D\$</code>	$\alpha + b = \Gamma \div D$	(no bold)
<code>none</code>	<code>\$\mathbf{\alpha} + b = \Gamma \div D\$</code>	$\alpha + b = \Gamma \div D$	
<code>none</code>	<code>\boldsymbol{\alpha} + b = \Gamma \div D\$</code>	$\alpha + b = \Gamma \div D$	
<code>amsbsy</code>	<code>\$\pmb{\alpha} + b = \Gamma \div D\$</code>	$\pmb{\alpha} + b = \Gamma \div D$	(faked bold)
<code>amsbsy</code>	<code>\$\boldsymbol{\alpha} + b = \Gamma \div D\$</code>	$\alpha + b = \Gamma \div D$	
<code>bm</code>	<code>\$\bm{\alpha} + b = \Gamma \div D\$</code>	$\alpha + b = \Gamma \div D$	
<code>fixmath</code>	<code>\$\mathbf{\alpha} + b = \Gamma \div D\$</code>	$\alpha + b = \Gamma \div D$	
<code>xfakebold</code>	<code>\setBold[0.3]</code> <code>\$\alpha + b = \Gamma \div D\$</code> <code>\unsetBold</code>	$\alpha + b = \Gamma \div D$	(faked bold)

10.6 ASCII and Latin 1 quick reference

Table 544 on the next page 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 `\textttt{...}` command (or, more generally, when `\ttfamily` is in effect).

The following are some additional notes about the contents of Table 544:

- “`”` is not available in the OT1 font encoding.
- Table 544 shows a close quote for character 39 for consistency with the open quote shown for character 96. A straight quote can be typeset using `\textquotesingle` (cf. Table 46).
- The characters “`<`”, “`>`”, and “`|`” do work as expected in math mode, although they produce, respectively, “`_l`”, “`_c`”, and “`—`” in text mode when using the OT1 font encoding.¹⁴ The following are some alternatives for typesetting “`<`”, “`>`”, and “`|`”:
 - Specify a document font encoding other than OT1 (as described on page 13).
 - Use the appropriate symbol commands from Table 2 on page 15, viz. `\textless`, `\textgreater`, and `\textbar`.
 - Enter the symbols in math mode instead of text mode, i.e., `$<$`, `$>$`, and `$|$`.

¹⁴Donald Knuth didn't think such symbols were important outside of mathematics so he omitted them from his text fonts.

TABLE 544: L^AT_EX 2 _{ϵ} ASCII Table

Dec	Hex	Char	Body text	\texttt{}	Dec	Hex	Char	Body text	\texttt{}
33	21	!	!	!	62	3E	>	\textgreater	>
34	22	"	\textquotedbl	"	63	3F	?	?	?
35	23	#	\#	\#	64	40	@	\textat	@
36	24	\$	\\$	\\$	65	41	A	\texttt{A}	A
37	25	%	\%	\%	66	42	B	\texttt{B}	B
38	26	&	\&	\&	67	43	C	\texttt{C}	C
39	27	,	,	,	68	44	:	\textcolon	:
40	28	(((69	45	Z	\texttt{Z}	Z
41	29)))	70	46	[\texttt{[}	[
42	2A	*	*	*	71	47	\textbackslash	\textbackslash	\textbackslash
43	2B	+	+	+	72	48	\textbackslash	\textbackslash	\textbackslash
44	2C	,	,	,	73	49]	\texttt{]}]
45	2D	-	-	-	74	50	^	\textasciicircum	\textasciicircum
46	2E	.	.	.	75	51	\texttildelow	\texttildelow	\texttildelow
47	2F	/	/	/	76	52	‘	\textgrave	\textgrave
48	30	0	0	0	77	53	a	\texttt{a}	a
49	31	1	1	1	78	54	b	\texttt{b}	b
50	32	2	2	2	79	55	c	\texttt{c}	c
⋮	⋮	⋮	⋮	⋮	80	56	⋮	⋮	⋮
57	39	9	9	9	81	57	z	\texttt{z}	z
58	3A	:	:	:	82	58	{	\textbraceleft	\textbraceleft
59	3B	;	;	;	83	59	\textbar	\textbar	\textbar
60	3C	<	\textless	<	84	60	}	\textbraceright	\textbraceright
61	3D	=	=	=	85	61	\texttilde	\texttilde	\texttilde

Note that for typesetting metavariables many people prefer \textlangle and \textrangle to \textless and \textgreater; i.e., “*filename*” instead of “<*filename*>”.

- Although “/” does not require any special treatment, 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 \textasciicircum, and \textasciitilde can be used instead of \textasciitilde. Note that \textasciitilde and \textasciicircum produce raised, diacritic tildes. “Text” (i.e., vertically centered) tildes can be generated with either the math-mode \sim command (shown in Table 89 on page 54), which produces a somewhat wide “~”, or the textcomp package’s \texttildelow (shown in Table 46 on page 29), 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 335 on page 141.
- 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 544, Table 545 on the next page is an amalgamation of data from other tables in this document. While Table 544 shows how to typeset the 7-bit ASCII character set, Table 545 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 545:

- 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 22 plus an empty argument. For instance, `\={}` is essentially the same as `\textasciimacron`.
- The commands in the “ $\text{\LaTeX} 2\epsilon$ ” columns work both in body text and within a `\textttt{...}` command (or, more generally, when `\ttfamily` is in effect).
- The “£” and “\$” glyphs occupy the same slot (36) of the OT1 font encoding, with “£” appearing in italic fonts and “\$” appearing in roman fonts. A problem with \LaTeX ’s default handling of this double-mapping is that “`\sffamily\slshape\pounds`” produces “\$”, not “£”. Other font encodings use separate slots for the two characters and are therefore robust to the problem of “£”/“\$” conflicts. Authors who use `\pounds` should select a font encoding other than OT1 (as explained on page 13) 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 546 presents the characters with which CP1252 augments the standard Latin 1 table.

The following are some additional notes about the contents of Table 546:

- As in Table 545, a “(tc)” after a symbol name means that the `textcomp` package must be loaded to access that symbol. A “(T1)” means that the symbol requires the T1 font encoding. The `fontenc` package can change the font encoding document-wide.
- Not all characters in the 128–159 range are defined.
- Look up “euro signs” in the index for alternatives to `\texteuro`.

While too large to incorporate into this document, a listing of ISO 8879:1986 SGML/XML character entities and their \LaTeX equivalents is available from <http://www.bitjungle.com/isoent/>. Some of the characters presented there make use of `isoent`, a $\text{\LaTeX} 2\epsilon$ package (available from the same URL) that fakes some of the missing ISO glyphs using the \LaTeX `picture` environment.¹⁵

10.7 Unicode characters

Unicode is a “universal character set”—a standard for encoding (i.e., assigning unique numbers to) the symbols appearing in many of the world’s languages. While ASCII can represent 128 symbols and Latin 1 can represent 256 symbols, Unicode can represent an astonishing 1,114,112 symbols.

Because \TeX and \LaTeX predate the Unicode standard and Unicode fonts by almost a decade, support for Unicode has had to be added to the base \TeX and \LaTeX systems. Note first that \LaTeX distinguishes between *input* encoding—the characters used in the `.tex` file—and *output* encoding—the characters that appear in the generated `.dvi`, `.pdf`, etc. file.

¹⁵`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.

TABLE 545: LATEX 2 ϵ Latin 1 Table

Dec	Hex	Char	LATEX 2 ϵ		Dec	Hex	Char	LATEX 2 ϵ
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	\Ø
169	A9	©	\textcopyright		217	D9	Ù	\‘{U}
170	AA	ª	\textordfeminine		218	DA	Û	\’{U}
171	AB	«	\guillemetleft	(T1)	219	DB	Û	\^{U}
172	AC	»	\textlnot	(tc)	220	DC	Ü	\\"{"U}
173	AD	-	\-		221	DD	Ý	\‘{Y}
174	AE	®	\textregistered		222	DE	Þ	\TH (T1)
175	AF	—	\textasciimacron	(tc)	223	DF	ß	\ss
176	B0	°	\textdegree	(tc)	224	E0	à	\‘{a}
177	B1	±	\textpm	(tc)	225	E1	á	\’{a}
178	B2	²	\texttwosuperior	(tc)	226	E2	â	\^{a}
179	B3	³	\textthreesuperior	(tc)	227	E3	ã	\~{a}
180	B4	‘	\textasciacute	(tc)	228	E4	ä	\\"{"a}
181	B5	µ	\textmu	(tc)	229	E5	å	\aa
182	B6	¶	\P		230	E6	æ	\ae
183	B7	.	\textperiodcentered		231	E7	ç	\c{c}
184	B8	›	\c{c}		232	E8	è	\‘{e}
185	B9	í	\textonesuperior	(tc)	233	E9	é	\’{e}
186	BA	º	\textordmasculine		234	EA	ê	\^{e}
187	BB	»	\guillemetright	(T1)	235	EB	ë	\\"{"e}
188	BC	¼	\textonequarter	(tc)	236	EC	ì	\‘{i}
189	BD	½	\textonehalf	(tc)	237	ED	í	\’{i}
190	BE	¾	\textthreequarters	(tc)	238	EE	î	\~{i}
191	BF	¿	?		239	EF	ï	\\"{"i}
192	C0	À	\‘{A}		240	F0	ð	\dh (T1)
193	C1	Á	\’{A}		241	F1	ñ	\~{n}
194	C2	Â	\^{A}		242	F2	ò	\‘{o}
195	C3	Ã	\~{A}		243	F3	ó	\’{o}
196	C4	Ä	\\"{"A}		244	F4	ô	\^{o}
197	C5	Å	\AA		245	F5	õ	\~{o}
198	C6	Æ	\AE		246	F6	ö	\\"{"o}
199	C7	Ç	\c{C}		247	F7	÷	\textdiv (tc)
200	C8	È	\‘{E}		248	F8	ø	\o
201	C9	É	\’{E}		249	F9	ù	\‘{u}
202	CA	Ê	\^{E}		250	FA	ú	\’{u}
203	CB	Ë	\\"{"E}		251	FB	û	\~{u}
204	CC	Ì	\‘{I}		252	FC	ü	\\"{"u}
205	CD	Í	\’{I}		253	FD	ý	\‘{y}
206	CE	Î	\^{I}		254	FE	þ	\th (T1)
207	CF	Ï	\\"{"I}		255	FF	ÿ	\\"{"y}
208	D0	Ð	\DH	(T1)				

TABLE 546: 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	Ÿ	\"Y

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.¹⁶ These packages enable L^AT_EX to translate UTF-8 sequences to L^AT_EX commands, which are subsequently processed as normal. For example, the UTF-8 text “Copyright © 2020”—“©” 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{} 2020” and therefore typeset as “Copyright © 2020”.

The `ucs`/`inputenc` combination supports only a tiny subset of Unicode’s million-plus symbols. Additional symbols can be added manually using the `\DeclareUnicodeCharacter` command. `\DeclareUnicodeCharacter` takes two arguments: a Unicode number and a L^AT_EX 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+2103.¹⁷ However, “°” is not one of the characters that `ucs` and `inputenc` recognize. The following document shows how to use `\DeclareUnicodeCharacter` to tell L^AT_EX that the “°” character should be treated as a synonym for `\textcelsius`:

```
\documentclass{article}
\usepackage{ucs}
\usepackage[utf8x]{inputenc}
\usepackage{textcomp}

\DeclareUnicodeCharacter{"2103}{\textcelsius} % Enable direct input of U+2103.

\begin{document}
It was a balmy 21°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.

¹⁶UTF-8 is the 8-bit Unicode Transformation Format, a popular mechanism for representing Unicode symbol numbers as sequences of one to four bytes.

¹⁷The Unicode convention is to express character positions as “U+*hexadecimal number*”.

Outputting Unicode characters

Orthogonal to the ability to include Unicode characters in a L^AT_EX input file is the ability to include a given Unicode character in the corresponding output file. By far the easiest approach is to use X_EL^AT_EX instead of pdfL^AT_EX or ordinary L^AT_EX. X_EL^AT_EX handles Unicode input and output natively and can utilize system fonts directly without having to expose them via .tfm, .fd, and other such files. To output a Unicode character, a X_EL^AT_EX document can either include that character directly as UTF-8 text or use T_EX's \char primitive, which X_EL^AT_EX extends to accept numbers larger than 255.

Suppose we want to output the symbols for versicle (“VV”) and response (“RR”) in a document. The Unicode charts list “versicle” at position U+2123 and “response” at position U+211F. We therefore need to install a font that contains those characters at their proper positions. One such font that is freely available from CTAN is Junicode (*Junicode.ttf*) from the junicode package. The *fontspec* package makes it easy for a X_EL^AT_EX 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}
```

which produces

We use “VV” for a versicle and “RR” 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 72, Table 89, Table 139, Table 183, Table 188, Table 222, Table 223, Table 236, Table 246, Table 302, 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 90, Table 91, Table 142, Table 143, Table 189, Table 198, Table 216, and Table 303) and an initial Math Alphabets table (Table 316) were added thereafter. Later, Alexander Holt provided the *stmaryrd* tables (Table 52, Table 74, Table 92, Table 145, Table 179, and Table 217).

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 547 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 via <https://www.ctan.org/pkg/comprehensive/>. Table 548 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 547 or Table 548.

TABLE 547: Document Characteristics

Characteristic	Value
Source file:	<code>symbols.tex</code>
Build date:	June 25, 2020
Symbols documented:	14599
Packages included:	textcomp latexsym amssymb stmaryrd euscript wasysym pifont manfnt bbdng undertilde ifsym tipa tipx extraipa wsuipa phonetic uly ar metre txfonts mathabx fcfont skak ascii dingbat skull eurosym esvect yfonts yhmath esint mathdots trsym universa upgreek overrightarrow chemarr chemarrow nath trfsigns mathtools phaistos arcs vietnam t4phonet holtbolt semtrans dictsym extarrows protosem harmony hieroglif cclenses mathdesign arev MnSymbol fdsymbol boisik cmll extpfeil keystroke fge turnstile simpsons epsdice feyn staves igo colonequals shuffle fourier dozenal pmboxdraw pigpen clock teubner linearA linearB cypriot sarabian china2e harpoon steinmetz milstd recycle DotArrow ushort hhcount ogonek combelow musixtex ccicons adfsymbols adforn bigints soyombo tfrupee knitting textgreek begriff frege abraces countriesofeurope cookingsymbols prodint epiolmec mdwmath rsfso fontawesome stix hands greenpoint nkarta astrosym webomints moonphase dancers semaphor umranda umrandb cryst starfont tikzsymbols dice apl go magic bartel-chess-fonts actuarialangle lilyglyphs knot bclogo bullcntr rubikcube svrsymbols halloweenmath old-arrows allrunes emf esrelation oplotsyml cmupint realhats euflag scsnowman endofproofwd mismath musicography accents nicefrac bm xfakebold junicode mathrsfs chancery urwchancal calligra bbold mbboard dfont bbm dsserif
Packages omitted:	<i>none</i>

TABLE 548: Package versions used in the preparation of this document

Name	Date	Name	Date	Name	Date
textcomp	2020/02/02	latexsym	1998/08/17	amssymb	2013/01/14
stmaryrd	1994/03/03	euscript	2009/06/22	wasysym	2020/01/19
pifont	2020/03/25	manfnt	1999/07/01	bding	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	2018/01/08	ascii	2006/05/30	dingbat	2001/04/27
skull	2002/01/23	eurosym	1998/08/06	yfonts	2019/04/04
mathdots	2014/06/11	trsym	2000/06/25	universa	2019/08/26
upgreek	2003/02/12	chemarr	2016/05/16	mathtools	2020/03/24
phaistos	2004/04/23	arcs	2004/05/09	t4phonet	2004/06/01
semtrans	1998/02/10	dictsym	2004/07/26	extarrows	2020/03/12
protosem	2005/03/18	harmony	2007/05/04	hieroglf	2015/06/02
ccllicenses	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	2017/11/03	colonequals	2016/05/16	shuffle	2008/10/27
dozenal	2018/05/11	pmboxdraw	2019/12/05	pigpen	2008/12/07
clock	2001/04/10	teubner	2016/03/31	linearA	2006/03/13
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	2017/10/30	adorn	2019/10/13
bigints	2010/02/15	soyombo	1996/09/01	tfruee	2010/12/15
knitting	2019/04/03	textgreek	2011/10/09	frege	2012/08/04
abraces	2012/08/24	countriesofeurope	2018/12/29	cookingsymbols	2014/12/28
epiolmec	2003/11/05	mdwmath	1996/04/11	fontawesome	2016/05/15
stix	2018/04/17	starfont	2010/09/29	tikzsymbols	2019/02/08
actuarialangle	2019/06/13	bclogo	2016/01/10	bullcntr	2007/04/02
rubikcube	2018/02/25	svrsymbols	2019/02/12	halloweenmath	2019/11/01
emf	2016/09/09	oplotsymbl	2017/08/04	cmupint	2020/04/13
realhats	2019/04/14	euflag	2020/05/22	scsnowman	2018/06/07
musicography	2020/01/29	accents	2006/05/12	nicefrac	1998/08/04
bm	2019/07/24	xfakebold	2020/06/22	calligra	2012/04/10

10.9 Copyright and license

The Comprehensive L^AT_EX Symbol List

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<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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- [Knu86b] Donald E. Knuth. *The METAFONTbook*, volume C of *Computers and Typesetting*. Addison-Wesley, Reading, MA, USA, 1986.
- [Lam86] Leslie Lamport. *\LaTeX : A document preparation system*. Addison-Wesley, Reading, MA, USA, 1986.
- [LAT98] $\text{\LaTeX}3$ Project Team. A new math accent. *\LaTeX News*. Issue 9, June 1998. Available from <https://www.latex-project.org/news/latex2e-news/ltnews09.pdf> and also included in many \TeX distributions.
- [LAT19] $\text{\LaTeX}3$ Project Team. $\text{\LaTeX}2\epsilon$ font selection, October 2019. Available from <http://mirrors.ctan.org/macros/latex/base/fntguide.pdf> and also included in many \TeX distributions.

Index

If you’re having trouble locating a symbol, try looking under “T” for “`\text{...}`”. Many text-mode commands begin with that prefix. Also, accents are shown over/under a gray box (e.g., “ $\text{\texttt{A}}$ ” for “`\v{A}`”).

Some symbol entries appear to be listed repeatedly. This happens when multiple packages define identical (or nearly identical) glyphs with the same symbol name.¹⁸

Symbols	
<code>\^ (̂)</code>	22
<code>\# (#)</code>	15, 251
<code>\\$ (\$)</code>	15, 16, 251
<code>\\$ (\$)</code>	16
<code>\% (%)</code>	15, 251
<code>\& (&)</code>	15, 38, 251
<code>\` (́)</code>	22
<code>\ (()</code>	107
<code>\ (()</code>	109
<code>\ (()</code>	112
<code>\) ()</code>	107
<code>\) ()</code>	109
<code>\) ()</code>	112
<code>* (*)</code>	34
<code>\,</code>	249
<code>\- (-)</code>	252, 253
<code>\. (̄)</code>	22
<code>\ (/ /)</code>	107
<code>\ (/ /)</code>	109
<code>\ (/ /)</code>	112
<code>\: (:)</code>	127
<code>\; (:)</code>	127
<code>\< (()</code>	109
<code>\< (()</code>	112
<code>\? (:)</code>	127
<code>\[([)</code>	107
<code>\[([)</code>	109
<code>\[([)</code>	111
<code>\\\</code>	240
<code>\] (])</code>	107
<code>\] (])</code>	109
<code>\] (])</code>	111
<code>\^ (̄)</code>	22
<code>\^{} (̄)</code>	15, 251
<code>\ ()</code>	107
<code>\ ()</code>	107, 109
<code>\ (̄)</code>	22
<code>\= (̄)</code>	22
<code>\= (̄)</code>	252
<code>\ ()</code>	111
<code>\ ()</code>	109
<code>\ ()</code>	112
<code>\ ()</code>	54, 107, 109, 113
<code>\(()</code>	111
<code>\) ()</code>	111
<code>\/ (/)</code>	111
<code>\[([)</code>	111
<code>_ (_)</code>	16
<code>_ (_)</code>	15, 251
<code>\f ({)</code>	15, 16, 107
<code>\f ({)</code>	251
<code>\} (})</code>	15, 16, 107
<code>\} (})</code>	251
<code>\] (])</code>	111
<code>\` (́)</code>	22
<code>\^ (̄)</code>	22
<code>\~ (̄)</code>	22
<code>\^{} (̄)</code>	15, 251
A	
<code>\A (̄)</code>	169
<code>\A (̄*)</code>	169
<code>a</code> (esvect package option)	120
<code>\a (̄)</code>	169
<code>\a (x)</code>	197
<code>\a (f)</code>	169
<code>\AA (̄)</code>	16
<code>\aa (̄)</code>	16
<code>\AAaleph (̄)</code>	160
<code>\AAayin (ػ)</code>	160
<code>\AAbeth (ػ)</code>	160
<code>\AAcht (ػ)</code>	172
<code>\AAdaleth (ػ)</code>	160
<code>\AAhe (ػ)</code>	160
<code>\AAhelmet (ػ)</code>	160
<code>\AAheth (̄)</code>	160
<code>\AAkaph (ػ)</code>	160
<code>\AAlamed (ػ)</code>	160
<code>\AAleph (ػ)</code>	160
<code>\AApe (ػ)</code>	160
<code>\AAqoph (ػ)</code>	160
<code>\AAresh (ػ)</code>	160
<code>\AAasade (ػ)</code>	160
<code>\Aayin (ػ)</code>	160
<code>\AAyod (ػ)</code>	160
<code>\AB (ػ)</code>	140
<code>\Abeth (ػ)</code>	160
<code>abracess (package)</code>	120, 256, 257
absolute value	<i>see</i> <code>\lvert</code> and <code>\rvert</code>
abzüglich	<i>see</i> <code>\textdiscount</code>
<code>\AC (ػ)</code>	136
<code>\ac (ػ)</code>	62
<code>\acarc</code>	24
<code>\acbar</code>	24
accents	22–26, 114–121, 125, 174, 243–245
acute (̄)	22–26, 114
any character as	243
arc (̄)	22–25, 117–120
breve (̄)	22–26, 114
caron (̄)	22, 26, 114, 119
cedilla (̄)	22
circumflex (̄)	22–24, 114, 117–119
comma-below (̄)	26
Cyrillic breve (ػ)	22
Cyrillic flex (ػ)	22
Cyrillic umlaut (ػ)	22
diæresis (̄)	22, 25, 26, 114, 135
dot (̄ or ̄)	22–24, 114
double acute (̄)	22, 26
double grave (̄)	22
extensible	117–121, 125, 244–245
grave (̄)	22–26, 114
háček	<i>see</i> accents, caron
hook (̄)	22
Hungarian umlaut	<i>see</i> accents, double acute
inverted breve (̄)	22
kroužek	<i>see</i> accents, ring
macron (̄)	22, 25, 26, 114, 117, 119
multiple per character	22–24, 243
ogonek (̄)	22–25
ring (̄)	22–24, 26, 114, 116
Romanian comma-below accent	<i>see</i> accents, comma-below

¹⁸This occurs frequently between `amssymb` and `mathabx`, for example.

trema	<i>see</i> accents, diæresis
umlaut	<i>see</i> accents, diæresis
accents (package)	114, 244, 256, 257
\accentset	244
accidentals	<i>see</i> musical symbols
accordion notation	177
\accordionBayanBass (□)	177
\accordionDiscant (○)	177
\accordionFreeBass (⊖)	177
\accordionOldEE (⊗)	177
\accordionPull (˥)	177
\accordionPush (↗)	177
\accordionStdBass (○)	177
\acurrent (≈)	132
\Acht (♪)	172
\AchtBL (♪)	172
\AchtBR (♪)	172
\acidfree (◎)	128
\ACK (♣)	141
\acontraction	245
\AcPa (γ)	172
\actuarial (■)	244
actuarial symbols	121, 244
actuarialangle (package)	121, 244, 256, 257
\actuarialangle	244
\actuarialangle (■)	121
actuarialsymbol (package)	244
\acute (á)	115
\acute (á)	114
acute (á)	<i>see</i> accents
\acusus (á)	25
\acwcirclearrow (○)	90
\acwcirclearrowdown (○)	84
\acwcirclearrowleft (○)	84
\acwcirclearrowright (○)	84
\acwcirclearrowup (○)	84
\acwgapcirclearrow (○)	85
\acwgapcirclearrow (○)	90
\acwlefttarcarrow (↶)	84
\acwlefttarcarrow (↶)	90
\acwneararrow (↷)	84
\acwnwarcarrow (↷)	84
\acwopencirclearrow (○)	85
\acwopencirclearrow (○)	92, 154
\acwoverarcarrow (↷)	84
\acwoverarcarrow (↷)	90
\acwrighttarcarrow (↷)	84
\acwsearcarrow (↷)	84
\acwsvarcarrow (↶)	84
\acwunderarcarrow (↷)	84
\acwunderarcarrow (↷)	90
\Adaleth (⤠)	160
adeles (A)	<i>see</i> alphabets, math
\adfarrowspace	146
\adfarrowspace1 (⤠)	146
\adfarrowspace2 (⤡)	146
\adfarrowspace3 (⤢)	146
\adfarrowspace4 (⤣)	146
\adfarrowspace5 (⤤)	146
\adfarrowspace6 (⤥)	146
\adfarrowspace7 (⤦)	146
\adfarrowspace8 (⤧)	146
\adfarrowspace9 (⤨)	146
\adfarrowspace10 (⤩)	146
\adfarrowspace11 (⤪)	146
\adfarrowspace12 (⤫)	146
\adfarrowspace13 (⤬)	146
\adfarrowspace14 (⤭)	146
\adfarrowspace15 (⤮)	146
\adfarrowspace16 (⤯)	146
\adfarrowspace17 (⤰)	146
\adfarrowspace18 (⤱)	146
\adfarrowspace19 (⤲)	146
\adfarrowspace20 (⤳)	146
\adfarrowspace21 (⤴)	146
\adfarrowspace22 (⤵)	146
\adfarrowspace23 (⤶)	146
\adfarrowspace24 (⤷)	146
\adfarrowspace25 (⤸)	146
\adfarrowspace26 (⤹)	146
\adfarrowspace27 (⤺)	146
\adfarrowspace28 (⤻)	146
\adfarrowspace29 (⤼)	146
\adfarrowspace30 (⤽)	146
\adfarrowspace31 (⤾)	146
\adfarrowspace32 (⤿)	146
\adfarrowspace33 (⤿)	146
\adfarrowspace34 (⤿)	146
\adfarrowspace35 (⤿)	146
\adfarrowspace36 (⤿)	146
\adfarrowspace37 (⤿)	146
\adfarrowspace38 (⤿)	146
\adfarrowspace39 (⤿)	146
\adfarrowspace40 (⤿)	146
\adfarrowspace41 (⤿)	146
\adfarrowspace42 (⤿)	146
\adfarrowspace43 (⤿)	146
\adfarrowspace44 (⤿)	146
\adfarrowspace45 (⤿)	146
\adfarrowspace46 (⤿)	146
\adfarrowspace47 (⤿)	146
\adfarrowspace48 (⤿)	146
\adfarrowspace49 (⤿)	146
\adfarrowspace50 (⤿)	146
\adfarrowspace51 (⤿)	146
\adfarrowspace52 (⤿)	146
\adfclosedflourishleft (⤿)	159
\adfclosedflourishright (⤿)	159
\adfdiamond (⤿)	159
\adfdoubleflourishleft (⤿)	159
\adfdoubleflourishright (⤿)	159
\adfdoublesharpflourishleft (⤿)	159

\adfdoublesharpflourishright (~~)	159
\adfdownhalfleafleft (⌚)	152
\adfdownhalfleafright (⌚)	152
\adfdownleafleft (⌚)	152
\adfdownleafright (⌚)	152
\adfflatdownhalfleafleft (⌚)	152
\adfflatdownhalfleafright (⌚)	152
\adfflatdownoutlineleafleft (⌚)	152
\adfflatdownoutlineleafright (⌚)	152
\adfflatleafleft (⌚)	152
\adfflatleafoutlineleft (⌚)	152
\adfflatleafoutlinerright (⌚)	152
\adfflatleafright (⌚)	152
\adfflatleafsolidleft (⌚)	152
\adfflatleafsolidright (⌚)	152
\adfflourishleft (~~)	159
\adfflourishleftrdouble (~~)	159
\adfflourishright (~~)	159
\adfflourishrightdouble (~~)	159
\adfflowerleft (❖)	152
\adfflowerright (❖)	152
\adfgee (❖)	159
\adhfarrowleft (↔)	146
\adhfarrowleftsolid (↔)	146
\adhfarrowright (↔)	146
\adhfarrowrightsolid (↔)	146
\adhfhalfleafleft (↔)	152
\adhfhalfleafright (↔)	152
\adhfleftarrow (↔)	146
\adhfleftarrowhead (↔)	146
\adhfrightarrow (↔)	146
\adhfrightarrowhead (↔)	146
\adfhangingflatleafleft (⌚)	152
\adfhangingflatleafright (⌚)	152
\adfhangingleafleft (⌚)	152
\adfhangingleafright (⌚)	152
\adfleafleft (⌚)	152
\adfleafright (⌚)	152
\adfleftarrowhead (↔)	146
\adfopenflourishleft (~~)	159
\adfopenflourishright (~~)	159
adforn (package)	146, 151, 152, 159, 256, 257
\adfoutlineleafleft (⌚)	152
\adfoutlineleafright (⌚)	152
\adfrightharrowhead (►)	146
\adfS (⌚)	159
\adfsingleflourishleft (—)	159
\adfsingleflourishright (—)	159
\adfsickleflourishleft (~~)	159
\adfsickleflourishright (~~)	159
\adfsingleflourishleft (~~)	159
\adfsingleflourishright (~~)	159
\adfsmallhangingleafleft (⌚)	152
\adfsmallhangingleafright (⌚)	152
\adfsmallleafleft (⌚)	152
\adfsmallleafright (⌚)	152
\adfsolidleafleft (●)	152
\adfsolidleafright (●)	152
\adfsquare (▣)	159
adfsymbols (package)	146, 149, 151, 156, 256
\adftripleflourishleft (⌚⌚)	159
\adftripleflourishright (⌚⌚)	159
\adfwavesleft (⌚⌚)	159
\adfwavesright (⌚⌚)	159
\adj (adj)	100
adjoint (†)	see \dag
\Admetos (❖)	139
Adobe Acrobat	249
\adots (..)	127, 243
\adots (..)	126
\adots (..)	126
\adsorbate (Δ)	143
\adsorbent (⌚)	143
advancing	see \textadvancing
\AE (Æ)	16
\ae (æ)	16
\aeolicbii (oo)	198
\aeolicbiii (ooo)	198
\aeolicbiv (oooo)	198
\agemO (Ӯ)	130
\Agimel (ߵ)	160
\Ahe (ߴ)	160
\Ahelmet (߶)	160
\Aheth (߷)	160
\ain (߸)	26
\Air (߹)	139
\Akaph (߻)	160
\Alad (߻)	114
\alad (߻)	114
\Alamed (߸)	160
\Alas (߻)	114
\alas (߻)	114
\Albania (߱)	203
\aldine (߻)	152
\aldineleft (߻)	152
\aldineright (߻)	152
\aldinesmall (߻)	152
\aleph (߱)	103, 130
\aleph (߲)	103
\aleph (߳)	103
\aleph (ߴ)	104
\Alif (߲)	21
alla breve	171–175, 177
\allabreve (ߪ)	171
allrunes (package)	169, 256
\Alpha (A)	101
\alpha (α)	101
alphabets	134
African	17
Cypriot	165
Cyrillic	238
Greek	17, 101, 102, 135, 166
Hebrew	103, 104, 135
hieroglyphic	161
Linear A	161
Linear B	164
math	134
phonetic	18–21
proto-Semitic	160
South Arabian	166
Vietnamese	17
\alphaphaup (α)	102
alpine symbols	192
\Alt (Alt)	140
alternative denial	see \uparrowarrow and
\AltGr (AltGr)	140
\altoclef ()	171
\AM (α)	140
\amalg (II)	32
\amalg (II)	35
\amalg (U)	34
\amalg (U)	37
\Amem (~~)	160
\Amor (߹)	139
ampersand	see \&
\AMS (package)	13, 16, 32, 43, 55, 67, 70, 75, 78, 79, 95, 99, 101, 103, 104, 106, 108, 114, 118, 121, 125, 129, 130, 135, 235, 236, 255
amsbsy (package)	250

amsfonts (package)	130, 134
amsmath (package)	13, 53, 99, 114, 239, 249
amssymb (package)	13, 114, 130, 134, 166, 256, 257
amstext (package)	241, 242
\Anaclasis (÷)	197
\anaclasis (÷)	197
\anceps (×)	198
\ancepsdbrevis (×)	198
\anchor (⚓)	205
\anchor (Ĵ)	159
ancient-language symbols . .	160– 169
and	see \wedge
AND gates	141
\ANDd ()	141
\ANDl ()	141
\Andorra ()	203
\ANDr ()	141
\ANDu ()	141
\angdnr (∠)	129
\angl (▀)	121
\angle (∠)	129
\angle (∠)	130
\angle (∠)	129
\angle (∠)	129
\angle (∠)	129
\angle (∠)	129
\angle (∠)	129
angle notation	137
angles	128–130, 133, 139
\angles (△)	129
\AngleSign (📐)	128
\angleubar (≤)	129
\angln (¬)	121
Anglo-Frisian runes	169
\anglr (¬)	121
\Angstrom (Å)	105
Ångström unit	
math mode	see \mathring{A}
text mode	see \AA
\Angud (⟨)	114
\angud (⟨)	114
angular minutes	see \prime
angular seconds	see \second
\Angus (⟨)	114
\angus (⟨)	114
animals	160, 161, 165
\Ankh (†)	191
\Annoey (⊗)	206
\annuity (▀)	115
annuity symbols	121, 244
\Antidiple (<)	197
\antidiple (<)	197
\Antidiple* (<)	197
\antidiple* (<)	197
\antilabe (::)	127
\antimuon (μ*)	143
\antineutrino (ν̄)	143
\antineutron (n̄)	143
\antiproton (p̄)	143
\antiquark (q̄)	143
\antiquarkb (b̄)	143
\antiquarkc (c̄)	143
\antiquarkd (d̄)	143
\antiquarks (s̄)	143
\antiquarkt (t̄)	143
\antiquarku (ū)	143
\Antisigma (▷)	197
\antisigma (▷)	197
\Anun (〽)	160
\anyon (安东)	143
\aooverbrace (▀)	120
\Ape (✉)	160
APL	
symbols	63–64
\apl (package)	140, 256
APL symbols	139, 140
\APLbox (□)	139
\APLboxquestion (⁇)	140
\APLboxupcaret (↑)	140
\APLcirc (▀)	139
\APLcomment (¤)	139
\APLdown (▽)	139
\APLdownarrowbox (↓)	139
\APLinput (□)	139
\APLinv (☒)	139
\APLleftarrowbox (←)	139
\APLlog (⊗)	139
\APLminus (⊖)	139
\APLnot (⌐)	139
\APLnotbackslash (¬)	140
\APLnotslash (≠)	140
\APLrightarrowbox (→)	139
\APLstar (★)	139
\APLup (△)	139
\APLuparrowbox (↑)	139
\APLvert (▀)	139
\Apollon (Ϣ)	139
apostropha	see musixgre
\applecmd (⌘)	190
\apprge (≥)	70
\apprle (≤)	70
\approx (≈)	54
\approx (≈)	60
\approx (≈)	57
\approx (≈)	63
\approxcolon (≈:)	67
\approxcoloncolon (≈::)	67
\approxeq (≈)	55
\approxeq (≈)	62
\approxeq (≈)	60
\approxeq (≈)	57
\approxeq (≈)	63
\approxeqq (≈)	63
\approxident (≈)	60
\approxident (≈)	63
\Aqph (∞)	160
\Aquarius (♒)	138
\Aquarius (♒)	139
\aquarius (≈≈)	137
\AR (Ⓐ)	136
ar (package)	136, 256, 257
\arafamily	169
arc (▀)	see accents
\arccos (arccos)	99
\arccot (arccot)	100
\arceq (⊐)	62
\arceq (⊑)	60, 98
\arceq (⊒)	63
\arcfamily	169
arcminutes	see \prime
\arcosh (arcosh)	100
\arcoth (arcoth)	100
arcs (package)	25, 256, 257
\arcsch (arcsch)	100
arcseconds	see \second
\arcsin (arcsin)	99
\arctan (arctan)	99
\Aresh (ܵ)	160
arev (package)	146–150, 158, 171, 205, 256
\arg (arg)	99
\Aries (♈)	138
\Aries (♉)	138
\Aries (♊)	139
\Aries (♋)	138
\aries (ܵ)	137
\arlfamily	169
\armfamily	169
\arnfamily	169
\ArrowBoldDownRight (➡)	145
\ArrowBoldRightCircled (○)	145
\ArrowBoldRightShort (⤏)	145
\ArrowBoldRightStrobe (⤏⤏)	145
\ArrowBoldUpRight (⤏)	145
\arrowbullet (➤)	146
\Arrownot ()/.	98
\arrownot ()/.	98
\ArrowOver (⤕)	26
\arrowOver (⤕)	26
arrows	78–80, 84, 89–95, 117–123, 139, 140, 145, 146, 160, 165, 191, 202, 208–215, 231, 238

diagonal, for reducing subexpressions	117
dotted	122
double-headed, diagonal	242
extensible	117–123
fletched	94, 145
negated	78, 79, 82, 86
arrows (boisik package option)	90
\Arrowvert ()	108
\Arrowvert ()	109
\Arrowvert ()	111
\arrowvert ()	108
\arrowvert ()	109
\arrowvert ()	111
\arsech (arsech)	100
Arseneau, Donald	240–242, 244
\arsinh (arsinh)	100
\artanh (artanh)	100
\artfamily	169
articulations <i>see</i> musical symbols	
\Asade (†)	160
\Asamekh (◊)	160
\ASC (ASC)	139
ASCII	13, 16, 141, 226, 235, 250–252, 254, 256
table	251
ascii (package)	141, 251, 256, 257
\ascnode (Ω)	137
\Ashin (ω)	160
aspect ratio	136
\Assert ()	60
\assert (⊣)	60
\assert (⊣)	63
\assumption (★)	143
\ast (*)	34
\ast (*)	32
\ast (*)	36
\ast (*)	35
\ast (*)	34
\ast (*)	37
\asteq (≈)	63
\asteraccent (*)	115
\Asteriscus (⌘)	197
\asteriscus (⌘)	197
\Asterisk (*)	34
\Asterisk (⌘)	151
\asterisk (*)	34
\AsteriskBold (⌘)	151
\AsteriskCenterOpen (⌘)	151
\AsteriskRoundedEnds (✿)	151
asterisks	34, 151
\AsteriskThin (⌘)	151
\AsteriskThinCenterOpen (⌘)	151
\asterism (⌘)	239
asteroids	139
astrological symbols	137–139, 215–218
astronomical symbols	137–139, 200, 215–218
\astrosun (⊙)	138
\astrosun (⊕)	137
astrosym (package)	215, 256
asymmetric braces	120
\asymp (≈)	54
\asymp (≈)	60, 98
\asymp (≈)	97
\asymp (≈)	63
asymptotic notation	100
\atan (atan)	249
\ataribox (⊤)	190
\Atav (+)	160
\Ateth (§)	160
\AtForty (⌚)	191
\AtNinetyFive (⌚⌚)	191
\atom (⌘)	143
atomic math objects	99, 100, 249
\AtSixty (⌚⌚)	191
\aunderbrace (▀)	120
\Austria (•)	203
\Aut (Aut)	100
\autoleftarrow (←)	122
\autoleftrightharpoons (↔)	122
\autorightarrow (→)	122
\autorightleftharpoons (↔)	122
\AutumnTree (🍂)	206
\Avav (՞)	160
average	31
\awint (ʃ)	52
\awint (ʃ)	49
\awint (ʃ)	49
\awintsl (ʃ)	51
\awintup (ʃ)	51
\Ayn (՞)	21
\Ayod (լչ)	160
\Azayin (=)	160
B	
\B (Բ)	169
\B	17
\B (Յ)	197
b (esvect package option)	120
\b (▀)	22
\b (Յ)	197
\b (Բ)	169
\Ba (՚)	164
\Ba (՚՚)	164
\babylgamma (Յ)	20
Bachmann–Landau notation	100
\backapprox (≈)	57
\backapproxeq (≈)	57
\Backblech (▀)	205
\backcong (≡)	60
\backcong (≡)	57
\backcong (≡)	63
\backdprime (〃)	128
\backepsilon (϶)	55
\backepsilon (϶)	131
\backepsilon (϶)	103
\backeqsim (≂)	57
\backneg (¬)	131
\backneg (¬)	131
\backprime (ߵ)	130
\backprime (ߵ)	131
\backprime (ߵ)	131
\backprime (ߵ)	131
\backprime (ߵ)	128
\backproto (∞)	60
\backsim (∽)	55
\backsim (∽)	62
\backsim (∽)	60
\backsim (∽)	57
\backsim (∽)	63
\backsimeq (≂)	55
\backsimeq (≂)	62
\backsimeq (≂)	60
\backsimeq (≂)	57
\backsimeq (≂)	63
\backsimeqeq (≂)	63
\backsimneqq (≠)	61
\backslash (\\)	107, 130
\backslash (\\)	110
\backslash (\\)	109
\backslash (\\)	132
\backslash (\\)	111
\backslash (\\)	34
\backtriplesim (≿)	57
\backtrprime (ߵߵߵ)	128
\backturn (ߵߵߵ)	171
\bagmember (⊎)	62
\bagmember (⊎)	63
\Baii (՚՚՚)	164
\Baiii (՚՚՚՚)	164
\bakingplate (▀)	205
\ballotcheck (✓)	150
\ballotx (✗)	150

banana brackets	60
see \llparenthesis and \rrparenthesis	
\banceps (\bar{x})	198
\bar (\bar{m})	115
\bar (\bar{n})	114
\bar ('')	169
\barb (b)	20
\barbbrevi (w)	198
\barbrevis (o)	198
\barcap (n)	37
\barcirc (e)	240
\barcup (U)	37
\bard (d)	20
\ardownharpoonleft (J) . .	93
\ardownharpoonright (T) . .	93
\bari (i)	20
\barin (E)	104
\barint (f)	52
\barj (j)	21
\barl (t)	20
\barlambda (lambda)	21
\barleftarrow (leftarrow) . .	89
\barleftarrow (leftarrow) . .	90
\barleftarrowrightarrowbar (leftrightarrow)	89
\barleftarrowrightarrowbar (leftrightarrow)	90
\barleftharpoon (rightleftharpoons)	80
\barleftharpoondown (leftarrow) . .	93
\barleftharpoonup (leftarrow) . .	93
\baro (phi)	33
\baro (phi vs. e)	236
\baro (phi)	36
\baro (e)	20
\BarOver (overline)	26
\barOver (overline)	26
\barovernorthwestarrow (nwarrow)	89
\barovernorthwestarrow (nwarrow)	154
\barp (p)	20
barred letters	239
\barrightarrowdiamond (rightarrow) . .	90
\barrightharpoon (rightleftharpoons) . .	80
\barrightharpoondown (leftarrow) . .	93
\barrightharpoonup (leftarrow) . .	93
\barsci (f)	20
\barscu (u)	20
	
\Bart (Bart)	198
bartel-chess-fonts (package)	233, 234, 256
\baru (u)	20
\baruparrow (uparrow)	90
\barupharpoonleft (upharpoonleft) . .	93
\barupharpoonright (upharpoonright) . .	93
\Barv (barv)	60
\Barv (barv)	63
\barV (barV)	60
\barV (barV)	63
\barvee (barvee)	37
\barwedge (barwedge)	34
\barwedge (barwedge)	32
\barwedge (barwedge)	36
\barwedge (barwedge)	35
\barwedge (barwedge)	37
base twelve	
numerals	128
tally markers	194
\BasicTree	206
\bassclef (bass clef)	171
\Bat (bat)	191
bats	41, 124
\Bau (bau)	164
\baucircle (baucircle)	156
\bauforms (bauforms)	191
\bauhead (bauhead)	191
\laus (laus)	156
\bautriangle (bautriangle)	156
\BB (BB)	197
\Bb (Bb)	197
\bB (bB)	197
\bb (bb)	197
\bba (bba)	197
\bbalpha (bbalpha)	135
\bbar (bbar)	239
\bbb (bbb)	197
\bbbeta (bbbeta)	135
\Bbbk (Bbbk)	104
\Bbbk (Bbbk)	105
\Bbbk (Bbbk)	105
\Bbbsum (Bbbsum)	49
bbding (package)	145, 147–149, 151, 156, 159, 236, 256, 257
\bbdollar (\$)	135
\bbetter (bbetter)	195
\bbeuro (bbeuro)	135
\bbfinalnun (bbfinalnun)	135
\bbgamma (bbgamma)	135
bbgreekl (mathbbol package option)	135
\BBm (BBm)	197
\Bbm (Bbm)	197
\bBm (bBm)	197
bbm (package)	134, 256
\bbm (bbm)	197
\bbmb (bbmb)	197
\bbmx (bbmx)	197
\bbnabla (bbnabla)	135
bbold (package)	134, 256
\bbpe (bbpe)	135
\bbqof (bbqof)	135
\bbrevis (bbrevis)	198
\bbktbrk (bbktbrk)	132
\bbslash (\bbslash)	33
\bbslash (\bbslash)	36
\bbyod (^)	135
\bcattention (bcattention)	207
	
\bcbombe (bcbombe)	207
	
\bcbbook (bcbbook)	207
	
\bccalendrier (bccalendrier)	207
	
\bccle (bccle)	207
	
\bcclefa (bcclefa)	207
	
\bcclesol (bcclesol)	207
	
\bccoeur (bccoeur)	207
	
\bccrayon (bccrayon)	207
	
\bccube (bccube)	207
	
\bcdallemande (bcdallemande)	207
	
\bcdanger (bcdanger)	207
	
\bcdautriche (bcdautriche)	207
	
\bcdbelgique (bcdbelgique)	208
	
\bcdbulgarie (bcdbulgarie)	208
	
\bcdfrance (bcdfrance)	208
	
\bcditalie (bcditalie)	208
	
\bcdluxembourg (bcdluxembourg)	208
	
\bcdodecaedre (bcdodecaedre)	208
	
\bcdpaysbas (bcdpaysbas)	208
	
\bcdz (bcdz)	208
	
\bceclaircie (bceclaircie)	208
	
\bcetoile (bcetoile)	207
	
\bcfemme (bcfemme)	207
	
\bcfeujaune (bcfeujaune)	207
	

\bcfeuro rouge (Traffic light)	207
\bcfeutricolore (Traffic light)	207
\bcfeuvert (Traffic light)	207
\bcfleur (Flower)	207
\bchomme (Male)	207
\bchorloge (Clock)	207
\bcicosaedre (Dodecahedron)	207
\bcinfo (Info)	207
\bcinterdit (Ban)	207
\bclampe (Lightbulb)	207
bclogo (package)	207, 208, 256, 257
\bcloupe (Magnifying glass)	208
\bcneige (Snowflake)	208
\bcnote (Note)	208
\bcnucleaire (Nuclear symbol)	208
\bcocetaedre (Rhombicosidodecahedron)	208
\bcoeil (Eye)	208
\bcontraction	245
\bcorne (Horn)	208
\bcours (Bear)	208
\bcoutil (Wrench)	208
\bcpanchant (Flag)	207
\bcpeaceandlove (Peace)	207
\bcpluie (Rain)	207
\bcplume (Feather)	207
\bcpoisson (Fish)	207
\bcquestion (Question mark)	207
\bcrecyclage (Recycling)	207
\bcrosevents (Rose)	207
\bcsmhb (Smiley)	207
\bcsmmh (Sad face)	207
\bcsoleil (Sun)	207
\bcspadesuit (Spade)	207
\bcstop (Stop sign)	207
\bctakecare (Warning)	208
\bctetraedre (Tetrahedron)	208
\bctrefle (Clover)	208
\bctrombone (Trombone)	208
\bcvaletcoeur (Card)	208
\bcvelo (Bicycle)	208
\bcyin (Yin-Yang)	208
\Bda (Up arrow)	164
\Bde (Down arrow)	164
\bdecisive (Plus-minus)	195
\Bdi (Top arrow)	164
\bdleftarcarrow (Left arc)	84
\bdnearcarrow (Near arc)	84
\bdnwarcarrow (Near arc)	84
\Bdo (Up)	164
\bdoverarcarrow (Over arc)	84
\bdrightarcarrow (Right arc)	84
\bdsearcarrow (Self arc)	84
\bdswarcarrow (Self arc)	84
\Bdu (Up)	164
\bdunderarcarrow (Under arc)	84
\Bdwe (Up)	164
\Bdwo (Up)	164
\Be (A)	164
\Beam (Underline)	142
\Bearing (Delta)	142
\because (..)	55, 125
\because (..)	62
\because (..)	126
\because (..)	126
\because (..)	126
\Bed (Down)	206
begriff (package)	127, 256
Begriffsschrift symbols	127
\BEL (.)	141
\Belarus (Belarus)	203
\Belgium (Belgium)	203
\bell (Bell)	190
\benzenr (Benzene ring)	154
beret	116
Berry, Karl	258
\Beta (Beta)	101
\beta (Beta)	101
\betaaup (Beta up)	102
\beth (\beth_0)	103
\beth (\beth_1)	104
\beth (\beth_2)	103
\beth (\beth_3)	103
\beth (\beth_4)	104
better	see \triangleleft
\betteris (Diamond)	195
\between (between)	56
\between (between)	55
\between (between)	62
\between (between)	60
\between (between)	57
\between (between)	63
\BGassert (F)	127
\BGconditional (Box)	127
\BGcontent (-)	127
\BGnot (T)	127
\BGquant (Box)	127
\Bi (Y)	164
\bibridge (Box)	24
biconditional	see \leftrightarrow and \equiv
\Bicycle (Bicycle)	191
\Big (Big)	235, 237
\big (big)	235, 237
big O (O)	see alphabets, math
big O notation	100
\Bigassumption (Star)	144
\bigassumption (Star)	144
\bigast (*)	34
\bigblacktriangledown (Down triangle)	154
\bigblacktriangleup (Up triangle)	154
\bigbosonloop (Loop)	143
\bigbosonloop^A (Loop)	143
\bigbosonloop^V (Loop)	143
\bigbot (Down)	132
\bigbox (Box)	43
\bigboxasterisk (Box)	44
\bigboxbackslash (Box)	44
\bigboxbot (Box)	44
\bigboxcirc (Box)	44
\bigboxcoasterisk (Box)	44
\bigboxdiv (Box)	44
\bigboxdot (Box)	44
\bigboxleft (Box)	45
\bigboxminus (Box)	45
\bigboxplus (Box)	45
\bigboxright (Box)	45
\bigboxslash (Box)	44
\bigboxtimes (Box)	44
\bigboxtop (Box)	44

\bigboxtriangleup (\square)	44
\bigboxvoid (\square)	44
\bigcap (\cap)	43
\bigcap (\cap)	48
\bigcap (\cap)	47
\bigcap (\cap)	49
\bigcapdot (\cap)	48
\bigcapdot (\cap)	47
\bigcapplus (\oplus)	48
\bigcapplus (\oplus)	47
\bigcirc (\bigcirc)	32
\bigcirc (\bigcirc)	153
\bigcirc (\bigcirc)	153
\bigcirc (\bigcirc)	155
\BigCircle (\bigcirc)	155
\BigCircle (\bigcirc)	156
\bigcircle (\bigcirc)	47
\bigcoast (*)	34
\bigcomplementop (\complement)	44
\BigCross (\times)	155
\bigcup (\cup)	43
\bigcup (\cup)	48
\bigcup (\cup)	47
\bigcup (\cup)	49
\bigcupdot (\cup)	48
\bigcupdot (\cup)	47
\bigcupdot (\cup)	50
\bigcupplus (\uplus)	48, 49
\bigcupplus (\uplus)	47, 48
\bigcurlyvee (\vee)	44
\bigcurlyvee (\vee)	43
\bigcurlyvee (\vee)	48
\bigcurlyvee (\vee)	47
\bigcurlyveedot (\vee)	47
\bigcurlywedge (\wedge)	44
\bigcurlywedge (\wedge)	43
\bigcurlywedge (\wedge)	48
\bigcurlywedge (\wedge)	47
\bigcurlywedgedot (\wedge)	47
\BigDiamondshape (\diamondsuit)	155
\bigdoublecurlyvee ($\vee\vee$)	47
\bigdoublecurlywedge ($\wedge\wedge$)	47
\bigdoublevee ($\vee\vee$)	48, 49
\bigdoublevee ($\vee\vee$)	48
\bigdoublewedge ($\wedge\wedge$)	48, 49
\bigdoublewedge ($\wedge\wedge$)	48
\Bigg	235, 237
\bigg	235, 237
\biggassumption (\star)	144
\BigHBar ($\overline{}$)	155
\bigint (\int)	47
\biginterleave ($\parallel\parallel$)	43
\biginterleave ($\parallel\parallel$)	132
bigints (package)	47, 256, 257
\bigints (\int)	47
\bigintss (\int)	47
\bigintsss (\int)	47
\bigintssss (\int)	47
\biginvamp (\wp)	54
\BigLowerDiamond (\blacklozenge)	155
\bignplus (\wp)	43
\bigO (\mathcal{O})	100
\bigo (\mathbf{O})	100
\bigoast (\otimes)	48
\bigoast (\otimes)	48
\bigoasterisk (\circledast)	44
\bigobackslash ($\backslash\backslash$)	44
\bigobackslash ($\backslash\backslash$)	48
\bigobot (\oplus)	44
\bigocirc (\odot)	44
\bigocirc (\odot)	48
\bigocoasterisk (\circledast)	45
\bigodiv (\div)	45
\bigodot (\odot)	43
\bigodot (\odot)	48
\bigodot (\odot)	48
\bigodot (\odot)	50
\bigoint (\oint)	47
\bigoints (\oint)	47
\bigointss (\oint)	47
\bigointsss (\oint)	47
\bigoleft (\oplus)	45
\bigominus (\ominus)	45
\bigominus (\ominus)	47
\bigoplus (\oplus)	43
\bigoplus (\oplus)	48
\bigoplus (\oplus)	47
\bigoplus (\oplus)	50
\bigotimes (\otimes)	43
\bigright (\oplus)	44
\bigoslash (\oslash)	44
\bigoslash (\oslash)	47
\bigostar (\otimes)	47
\bigotimes (\otimes)	43
\bigotimes (\otimes)	49
\bigotimes (\otimes)	47
\bigotimes (\otimes)	50
\bigotimes (\otimes)	44
\bigotop (\oplus)	44
\bigotriangle (\odot)	47
\bigotriangleup (\odot)	44
\bigovert (\oplus)	47
\bigovoid (\bigcirc)	44
\bigparallel (\parallel)	43
\bigparr (\wp)	54
\bigplus (+)	44
\bigplus (+)	49
\bigplus (+)	47
\bigpumpkin (\smiley)	41
\BigRightDiamond (\blacklozenge)	155
\bigskull (\skull)	41
\bigslopedvee (\vee)	37
\bigslopedwedge (\wedge)	37
\bigsqcap (\sqcap)	44
\bigsqcap (\sqcap)	43
\bigsqcap (\sqcap)	49
\bigsqcap (\sqcap)	47
\bigsqcap (\sqcap)	50
\bigsqcapdot (\sqcap)	49
\bigsqcapdot (\sqcap)	47
\bigsqcapplus (\sqcap)	45
\bigsqcapplus (\sqcap)	49
\bigsqcapplus (\sqcap)	47
\bigsqcup (\sqcup)	43
\bigsqcup (\sqcup)	48
\bigsqcup (\sqcup)	47
\bigsqcup (\sqcup)	50
\bigsqcupdot (\sqcup)	48
\bigsqcupdot (\sqcup)	47
\bigsqcupplus (\sqcap)	45
\bigsqcupplus (\sqcap)	48
\bigsqcupplus (\sqcap)	48
\bigsqcupplus (\sqcap)	48
\BigSquare (\square)	155
\bigsquplus (\sqcup)	44
\bigstar (\star)	34
\bigstar (\star)	130
\bigstar (\star)	153
\bigstar (\star)	153
\bigstar (\star)	153
\bigstar (\star)	154
\bigtalloblong ($\parallel\parallel$)	50
\bigtimes (\times)	44
\bigtimes (\times)	48
\bigtimes (\times)	48
\bigtimes (\times)	50
\bigtop (T)	132
\BigTriangleDown (∇)	155
\bigtriangledown (∇)	43
\bigtriangledown (∇ vs. ∇)	236
\bigtriangledown (∇)	32
\bigtriangledown (∇)	77, 153
\bigtriangledown (∇)	76
\bigtriangledown (∇)	154, 155
\BigTriangleLeft (\triangleleft)	155
\bigtriangleleft (\triangleleft)	154
\BigTriangleRight (\triangleright)	155
\BigTriangleUp (\triangle)	155
\bigtriangleup (\triangle)	43
\bigtriangleup (\triangle vs. Δ)	236
\bigtriangleup (\triangle)	13, 32
\bigtriangleup (\triangle)	77, 153
\bigtriangleup (\triangle)	76
\bigtriangleup (\triangle)	154, 155
\BigTriangleLeft (\triangleleft)	155
\bigtriangleleft (\triangleleft)	154
\BigTriangleRight (\triangleright)	155

\biguplus (⊕)	49
\biguplus (⊕)	48
\biguplus (⊕)	50
\bigvarstar (★)	34
\BigVBar ()	155
\bigvee (V)	43
\bigvee (V)	48
\bigvee (V)	48
\bigvee (V)	50
\bigveedot (V̄)	48
\bigveedot (V̄)	48
\bigwedge (Λ)	43
\bigwedge (Λ)	48
\bigwedge (Λ)	48
\bigwedge (Λ)	48
\bigwedge (Λ)	50
\bigwedgedot (Λ̄)	48
\bigwedgedot (Λ̄)	48
\bigwhitestar (☆)	154
\bigwith (&)	54
\binampersand (&)	33
\binampersand (&)	36
binary operators	32–41
binary relations	55–58, 60, 62–75, 96–98 negated . 55–59, 61, 63, 65
\bindnasrepma (♂)	33
\bindnasrepma (♀)	36
\Biohazard (☣)	142
\biohazard (☣)	205
biological symbols	142
birds	161
bishop	196, 233–235
\bischoppair (¤)	195
\Bja (✉)	164
\Bje (✉)	164
\Bjo (✉)	164
\Bju (✉)	164
\Bka (⊕)	164
\Bke (⊗)	164
\Bki (▽)	164
\Bko (⊟)	164
\Bku (⊠)	164
\BL (\\)	140
\black	197
\BlackBishopOnBlack (♝)	196
\BlackBishopOnWhite (♝)	196
blackboard bold <i>see</i> alphabets, math	
\blackbowtie (▣)	36
\blackcircledownarrow (◐)	154
\blackcircledrightdot (●)	154
\blackcircledtwodots (◐)	154
\blackcircleulquadwhite (◐)	154
\blackdiamond (◆)	34
\blackdiamond (◆)	40
\blackdiamonddownarrow (◆)	154
\BlackEmptySquare (▨)	196
\blackhourglass (▢)	41
\blackinwhitediamond (◇)	154
\blackinwhitesquare (▢)	154
\BlackKingOnBlack (♚)	196
\BlackKingOnWhite (♔)	196
\BlackKnightOnBlack (♞)	196
\BlackKnightOnWhite (♞)	196
\BlackPawnOnBlack (♟)	196
\BlackPawnOnWhite (♟)	196
\blackpointerleft (◀)	154
\blackpointerright (▶)	154
\BlackQueenOnBlack (♛)	196
\BlackQueenOnWhite (♛)	196
\blackrighthalfcircle (◑)	154
\BlackRookOnBlack (♜)	196
\BlackRookOnWhite (♜)	196
\blacksmiley (☺)	132
\blacksmiley (☺)	190
\blacksquare (■)	130
\blacksquare (■)	40, 153
\blacksquare (■)	39
\blacksquare (■)	155
\blackstone	196
\blacktriangle (▲)	130
\blacktriangle (▲)	40, 153
\blacktriangle (▲)	40, 77
\blacktriangle (▲)	76
\blacktriangle (▲)	154
\blacktriangledown (▼)	38
\blacktriangledown (▼)	130
\blacktriangledown (▼)	40, 153
\blacktriangledown (▼)	77
\blacktriangleright (▶)	76
\blacktriangleright (▶)	154
\blacktriangleup (▲)	38
\blackwhitespoon (↔)	97
blank	<i>see</i> \textblank
\Bleech (△)	191
\blender (!)	205
\blitza (↯)	98
\blitza (↯)	31
\blitzb (↯)	98
\blitzc (↯)	98
\blitzd (↯)	98
\blitze (↯)	98
\blkhorzoval (▬)	154
\blkvertoval (▬)	154
block-element symbols	199
\Bm (Ⓜ)	197
\bm (package)	250, 256, 257
\bm	250
\bm (Ⓜ)	197
\Bma (Ⓜ)	164
\Bme (〽)	164
\Bmesonminus (B⁻)	144
\Bmesonnull (B⁰)	144
\Bmesonplus (B⁺)	144
\Bmi (Ⓜ)	164
\Bmo (〽)	164
\bmod	99
\Bmu (〽)	164
\Bna (Ⓜ)	164
\BNc (○)	164
\BNcc (○)	164
\BNccc (○○)	164
\BNcd (○○)	164
\BNcm (○○○○)	164
\Bnd (○○○)	164
\Bndc (○○○)	164
\Bndcc (○○○○)	164
\Bndccc (○○○○○)	164
\Bne (〽)	164

\BNi (')	164	\bot (\perp)	105	\boxdotleft ($\leftrightarrow\square$)	79
\Bni (Y)	164	\botborder (\perp)	197	\boxdotRight ($\square\Rightarrow$)	79
\BNii (")	164	\botdoteq (=)	56	\boxdotright ($\square\rightarrow$)	79
\BNiii (")	164	\botsemicircle (\curvearrowleft)	154	\boxempty (\square)	33
\BNiv (")	164	\bottle (@)	205	\boxLeft ($\leftarrow\square$)	79
\BNix (")	164	\Bottomheat (\square)	205	\boxleft (\square)	38
\BNlx (")	164	\Bouquet (\bowtie)	191	\boxleft ($\leftarrow\square$)	79
\BNlxx (")	164	\bowl (\cup)	205	\boxleft (\square)	40
\BNlxxx (")	164	\Bowtie (\bowtie)	190	\boxminus (\square)	38
\BNm (")	164	\bowtie (\bowtie)	54	\boxminus (\square)	32
\Bno (")	164	\bowtie (\bowtie)	36	\boxminus (\square)	40
\bNot (\neg)	63	\bowtie (\bowtie)	36, 60	\boxminus (\square)	39
\Bnu ()	164	\bowtie (\bowtie)	34, 35	\boxminus (\square)	39
\BNv (")	164	\bowtie (\bowtie)	63	\boxminus (\square)	41
\BNvi (")	164	\Box (\square)	130	\boxonbox ($\square\Box$)	154
\BNvii (")	164	\Box (\square)	130	\boxplus (\square)	38
\BNviii (")	164	\Box (\square)	40	\boxplus (\square)	32
\Bnwa (X)	164	\Box (\square)	39	\boxplus (\square)	40
\BNx ()	164	\Box (\square)	155	\boxplus (\square)	39
\BNxc (")	164	box-drawing symbols	199	\boxplus (\square)	39
\BNxl (")	164	\boxast (\boxast)	33	\boxplus (\square)	41
\BNxx (")	164	\boxast (\boxast)	40	\boxRight ($\square\Rightarrow$)	79
\BNxxx (")	164	\boxast (\boxast)	41	\boxright (\square)	38
\Bo (")	164	\boxasterisk (\boxast)	38	\boxright ($\square\rightarrow$)	79
body-text symbols	15–30	\boxbackslash ($\Box\backslash$)	38	\boxright (\square)	40
boisik (package)	36, 40,	\boxbackslash ($\Box\backslash$)	39	\boxslash ($\Box\backslash$)	38
49, 62, 63, 69, 74, 77, 89,		\boxbackslash ($\Box\backslash$)	39	\boxslash ($\Box\backslash$)	33
90, 103–106, 115, 129, 131,		\boxbar ($\Box\bar{}$)	39	\boxslash ($\Box\backslash$)	40
153, 158, 166, 170, 256, 257		\boxbar ($\Box\bar{}$)	33	\boxslash ($\Box\backslash$)	39
bold symbols	250	\boxbar ($\Box\bar{}$)	40	\boxslash ($\Box\backslash$)	39
\boldmath	250	\boxbar ($\Box\bar{}$)	40	\boxslash ($\Box\backslash$)	39
\boldsymbol	250	\boxbar ($\Box\bar{}$)	41	\boxtimes (\boxtimes)	38
\BOLogo (BO)	191	\boxbar ($\Box\bar{}$)	41	\boxtimes (\boxtimes)	38
\BOLogoL (Technische Universität Berlin, Institute of Applied Sciences BO)	191	\boxbot ($\Box\downarrow$)	38	\boxtimes (\boxtimes)	32
\BOLogoP (BO)	191	\boxbot ($\Box\downarrow$)	40	\boxtimes (\boxtimes)	40
bomb	207–208	\boxbox ($\Box\Box$)	33	\boxtimes (\boxtimes)	39
\bomb (•)	191	\boxbox ($\Box\Box$)	40	\boxtimes (\boxtimes)	39
\bond (\leftarrow)	144	\boxbox ($\Box\Box$)	39	\boxtimes (\boxtimes)	41
Boolean domain (\mathbb{B})	see alphabets, math	\boxbox ($\Box\Box$)	39	\boxtop ($\Box\top$)	38
Boolean logic gates	141	\boxbox ($\Box\Box$)	39	\boxtop ($\Box\top$)	40
boondox (emf package option)	137	\boxbox ($\Box\Box$)	41	\boxtriangle ($\Box\triangle$)	40
borders	218–226	\boxbox ($\Box\Box$)	41	\boxtriangleup ($\Box\triangleup$)	38
born	see \textborn	\boxbox ($\Box\Box$)	41	\boxvert ($\Box\mid$)	39
\boseDistrib (§)	144	\boxbox ($\Box\Box$)	41	\boxvert ($\Box\mid$)	39
\Bosnia (,)	203	\boxdiag ($\Box\diagup$)	40	\boxvoid ($\Box\emptyset$)	38
\boson (§)	144	\boxdiag ($\Box\diagup$)	41	\boy (♂)	138
bosons	143	\boxdiag ($\Box\diagup$)	41	\Bpa (†)	164
\Bot ()	106	\boxdiag ($\Box\diagup$)	41	\Bpaiii ()	164
\bot (\perp)	31, 104, 241	\boxdot ($\Box\cdot$)	38	\BPamphora (Ø)	165
\bot (\perp)	105	\boxdot ($\Box\cdot$)	32, 33	\BPbarley (¶)	165
\bot (\perp)	104	\boxdot ($\Box\cdot$)	40	\BPbilly (‡)	165
		\boxdot ($\Box\cdot$)	39	\BPboar (¶)	165
		\boxdot ($\Box\cdot$)	39	\BPbronze ()	165
		\boxdot ($\Box\cdot$)	41	\BPbull (‡)	165
		\boxdotleft ($\leftrightarrow\square$)	79	\BPCauldroni (¶)	165
		\boxdotleft ($\leftrightarrow\square$)	79	\BPCauldronei (¶)	165
				\BPchariot (¶¶)	165

\BPchassis (⌚)	165
\BPCloth (⠀)	165
\BPCow (🐮)	165
\BPCup (☕)	165
\BPe (💶)	164
\BPewe (ߣ)	165
\BPfoal (ߣ)	165
\BPgoat (ߣ)	165
\BPGoblet (🍷)	165
\BPGold (₭)	165
\BPhorse (🐎)	165
\BPI (₩)	164
\BPMAN (₭)	165
\BPNanny (ߣ)	165
\BPO (₩)	164
\BPolive (₱)	165
\BPOX (₭)	165
\BPPig (🐖)	165
\BPram (┉)	165
\BPsheep (ߣ)	165
\BPsow (🐖)	165
\BPspear (ߣ)	165
\BPsword (⚔)	165
\BPTalent (ℳ)	164
\Bpte (✉)	164
\Bpu (ℳ)	164
\Bpuii (ℳ)	164
\Bpvola (₩)	164
\Bpvolt (₱)	164
\Bpvolcd (₺)	164
\Bpvolcf (₺)	164
\Bpwheat (₩)	165
\Bpwheel (ℳ)	165
\Bpwine (☔)	165
\Bwinei (₩)	165
\Bwineiih (₩)	165
\Bwineiiv (₩)	165
\Bwoman (ሴ)	165
\Bwool (ℳ)	165
\Bwta (₺)	164
\Bwtb (ℳ)	164
\Bwtc (ℳ)	164
\Bwtd (ℳ)	164
\Bqa (ଓ)	164
\Bqe (ଓ)	164
\Bqi (Ⓣ)	164
\Bqo (₩)	164
\Bra (Ⓛ)	164
bra	107
\braceld (⌚)	245
\bracerd (⌚)	245
braces	15, 108–111, 117–120
asymmetric	120
extensible	117–120
multiline	120
\bracevert ()	108
\bracevert ()	109
\bracevert ()	132
brackets	<i>see</i> delimiters
\Braii (₩)	164
\Braiii (₩)	164
braket (package)	107
\Bratpfanne (─)	205
\Bre (₩)	164
\Break (Break)	140
\breve (݂)	115
\breve (݂)	114
\breve (݂)	25
breve (݂)	<i>see</i> accents
\brevis (݂)	198
\Bri (܂)	164
\Bro (†)	164
\Broii (܂)	164
\brokenvert (܂)	190
Bronger, Torsten	241
brooms	98, 123, 124
\Bru (܂)	164
\BS (▣)	141
\Bsa (܂)	164
\Bse (܂)	164
\BSEfree (܂)	142
\Bsi (܂)	164
\bsimilarleftarrow (↔)	90
\bsimilarrightarrow (↔)	90
\Bso (܂)	164
\bsolhsub (\C)	69
\BSpace (◀)	140
\Bsu (܂)	164
\Bswa (܂)	164
\Bswi ([x])	164
\Bta (܂)	164
\Btaii (܂)	164
\Bte (܂)	164
\Bti (܂)	164
\btimes (☒)	36
\btimes (☒)	37
\Bto (Ⓣ)	164
\Btu (܂)	164
\Btwe (܂)	165
\Btwo (܂)	164
\Bu (܂)	164
\BUFd (▽)	141
buffers	141
\BUF1 (△)	141
\BUFr (△)	141
\BUFu (△)	141
\BUUi (܂)	165
\BUUi (܂)	165
\BUiii (Ⓣ)	165
\BUiv (܂)	165
\BUix (܂)	165
\Bulgaria (܂)	203
\bullcntr (package)	194, 256, 257
\bullcntr{1} (●)	194
\bullcntr{2} (●●)	194
\bullcntr{3} (●●●)	194
\bullcntr{4} (●●●●)	194
\bullcntr{5} (●●●●●)	194
\bullcntr{6} (●●●●●●)	194
\bullcntr{7} (●●●●●●●)	194
\bullcntr{8} (●●●●●●●●)	194
\bullcntr{9} (●●●●●●●●●)	194
\bulletenum (package)	194
\bulletenum	194
\bullet (●)	32
\bullet (●)	40
\bullet (●)	34
\bullet (●)	41
bullseye	<i>see</i> \textbullseye
\bullseye (◎)	154
\Bumpedeq (≈)	56
\bumpdeq (≈)	56
\Bumpeq (≈)	55
\Bumpeq (≈)	62
\Bumpeq (≈)	60
\Bumpeq (≈)	57
\Bumpeq (≈)	63
\bumpeq (≈)	55
\bumpeq (≈)	62
\bumpeq (≈)	60
\bumpeq (≈)	57
\bumpeq (≈)	63
\bumpeq (≈)	60
\bumpeqq (≡)	60
\bumpeqq (≡)	63
\bumpeqq (≡)	63
\upperhand (±)	195
	
\Burns (⤵)	198
\BusWidth (⤵)	141
\BUv (܂)	165
\BUvi (܂)	165
\BUvii (܂)	165
\BUviii (܂)	165
\BUx (܂)	165

\BUxi (⌚)	165
\BUxii (⌚)	165
\Bwa (Ϣ)	164
\Bwe (߳)	164
\Bwi (ߴ)	164
\Bwo (ߵ)	164
\BX (߶)	140
\Bza (߷)	164
\Bze (߸)	164
\Bzo (߹)	164
C	
\C (߱)	22
\C (߲)	197
c (esvect package option)	120
\c (߱)	22, 253
\c (߲)	197
\Ca (܂)	165
\caesura (܄)	171
cal (emf package option)	137
calligra (package)	134, 256, 257
calligra (emf package option)	137
Calligra (font)	134
calrsfs (package)	134
\CAN (߁)	141
cancel (package)	117
\Cancer (܃)	138
\Cancer (܅)	139
\cancer (܃)	137
\Candle (܄)	206
\candra (܆)	115
\Cap (߱)	32
\Cap (߲)	36
\Cap (߱)	36
\Cap (߱)	35
\Cap (߱)	37
\cap (߱)	34
\cap (߱)	32
\cap (߱)	36
\cap (߱)	35
\cap (߱)	37
\capbarcup (߱)	37
\capdot (߱)	35
\capdot (߱)	34
\capdot (߱)	37
\capovercup (߱)	37
\capplus (߱)	35
\capplus (߱)	34
\Capricorn (܃)	138
\Capricorn (܅)	139
\capricornus (܆)	137
\capturesymbol (܂)	195
\capwedge (߱)	37
card suits	158, 159, 207–208
cardinality	<i>see</i> \aleph
care of (%)	133
caret	<i>see</i> \^
\caretinsert (݈)	132
Carlisle, David	1, 255, 256
caron (ݕ)	<i>see</i> accents
carriage return	89–92, 140, 141, 159, 238, <i>see also</i> \hookleftarrow
\carriagereturn (߄)	89
\carriagereturn (߄)	90
\carriagereturn (߄)	159
Cartesian product	<i>see</i> \times
castle	196, 233–235
\castlingchar (O)	195
\castlinghyphen (-)	195
\Cat (܂)	206
\catal (݈)	198
\Catalexis (݈)	197
\catalexis (݈)	197
catamorphism	<i>see</i> \llparenthesis and \rrparenthesis
\CB (܂)	140
\cb (߱)	26
\Cc (߲)	197
\cc (܂܂)	29
\cc (߲߲)	197
\ccAttribution (܀)	29
\ccbby (܂܀)	29
\ccbyncnd (܂܀܂܀܂܀)	29
\Ccc (߲߲߲)	197
\ccCopy (܀)	29
\cChangey (܂)	206
ccicons (package)	29, 256, 257
cclicenses (package)	29, 256, 257
\ccLogo (܀)	29
\ccnc (܀)	29
\ccnd (܀)	29
\ccNoDerivatives (܀)	29
\ccNonCommercial (܀)	29
\ccNonCommercialEU (܀)	29
\ccNonCommercialJP (܀)	29
\ccPublicDomain (܀)	29
\ccRemix (܀)	29
\ccsa (܀)	29
\ccSampling (܀)	29
\ccShare (܀)	29
\ccShareAlike (܀)	29
\ccwundercurvearrow (܂)	90
\ccZero (܀)	29
\cdotp (.)	32, 239
\cdotp (.)	36
\cdotp (.)	35, 126
\cdotp (...)	126
\cdotp (.)	34, 126
\cdotp (.)	126
\cdotp (.)	125
\cdotp (...)	126
\cdotp (.)	126
\checkmark (✓)	190
\CheckedBox (܂)	149
\Checkedbox (܂)	149
\Checkmark (✓)	149
\checkmark (✓)	16
\checkmark (✓)	159
\checkmark (✓)	131
\checkmark (✓)	131
\checkmark (✓)	131
\checkmark (✓)	132
\checkmark (✓ vs. ✓)	236
\CheckmarkBold (✓)	149
\checksymbol (+)	195
chemarr (package)	121, 256, 257
chemarrow (package)	94, 122, 256
\chemarrow (→)	94
Chen, Raymond	258

\ClockLogo (⌚)	191	\Colon (::)	126	complex numbers (\mathbb{C})	see alphabets, math
\ClockStyle	193	\colon	125	composited accents	22
\clocktime	193	\colon(:)	125	Comprehensive TeX Archive Network	1, 13, 117, 135, 141, 235, 252, 255, 256
\closedcurlyvee (⌚)	34	\colon(:)	126	computer hardware symbols	140
\closedcurlywedge (⌐)	34	\colon(:)	126	computer keys	140
\closedequal (≡)	57	\Colonapprox (::::)	56	Computer Modern (font)	95, 235, 237, 251
\closedniomega (⌚)	20	\Colonapprox (::::)	65	computer symbols	208–212
\closedprec (⌐)	57	\Colonapprox (::::)	67	\ComputerMouse (🖱)	140
\closedrevpsilon (⌚)	20	\Colonapprox (::::)	65	\concavediamond (diamond)	41
\closedsucc (⌐)	57	\Colonapprox (::::)	56	\concavediamondtickleleft (diamond)	41
\closedvarcap (⌐)	37	\coloncolon (::)	67	\concavediamondtickleright (diamond)	41
\closedvarcup (⌐)	37	\coloncolonapprox (::::)	67	\Conclusion (⇒)	128
\closedvarcupsmashprod (⌚)	37	\coloncolonapprox (::::)	67	\conductivity (⊗)	144
\closure (▀)	114	\coloncolonminus (::::)	67	\cong (≈)	54
\closure (⌚)	60, 98	\coloncolonminus (::::)	67	\cong (≈)	62
\closure (⌚)	63	\coloncolonapprox (::::~)	67	\cong (≈)	60
\Cloud (⌚)	192	\coloncolonapprox (::::~)	67	\cong (≈)	57
clouds	41	\Coloneq (::::)	56	\cong (≈)	64
clovers	151	\Coloneq (::::)	65	\congdot (≈)	64
\Clu (⌚)	165	\Coloneq (::::)	63	\Congruent (≡)	128
clubs	158, 159	\Coloneq (::::)	31, 56	congruent	see \equiv
\clubsuit (♣)	158	\Coloneq (::::)	65	\conictaper (►)	132
\clubsuit (♦)	158	\Coloneq (::::)	56	\conjquant (ℳ)	49
\clubsuit (♥)	158	\Coloneq (::::)	60	\conjquant (ℳ)	50
\clubsuit (♠)	158	\Coloneq (::::)	57	\Conjunction (σ)	139
\clubsuit (♣)	158	\Coloneq (::::)	64	\conjunction (σ)	137
\Cma (Ⓜ)	165	\Coloneqq (::::)	56	conjunction, logical	see \wedge and \&
\Cme (Ⓜ)	165	\Coloneqq (::::)	65	consequence relations	65
\Cmi (Ⓜ)	165	\Coloneqq (::::)	65	contradiction symbols	31, 98
cml (package)	31, 38, 54, 67, 106, 256	\Coloneqq (::::)	31, 56	control characters	141
\Cmo (Φ)	165	\Coloneqq (::::)	60	\Conv (Conv)	100
cmr (emf package option)	137	\Coloneqq (::::)	64	converse implication	see \leftarrow and \subset
\Cmu (Ⓜ)	165	\Coloneqq (::::)	56	converse nonimplication	see \leftarrow and \nsubset
cmupint (package)	52, 53, 256, 257	\Colonequals (::::)	31, 67	\convolution (*)	34
\Cna (Ⓣ)	165	\Colonminus (::::)	67	\convolution (*)	36
\Cne (≠)	165	\Colonsim (::::~)	56	\cooker (_Grid)	205
\Cni (⤒)	165	\Colonsim (::::~)	65	cooking symbols	205, 208–212
\Cno (⤓)	165	\Colonsim (::::~)	67	cookingsymbols (package)	205, 256, 257
\Cnu (⤔)	165	\Colonsim (::::~)	65	\Cooley (⌚)	206
\CO (⌚)	140	\Colonsim (::::~)	65	\Coppa (Ϙ)	166
\Co (Ⓜ)	165	\Colonsim (::::~)	56	\coprod (⊔)	31, 43
\coAsterisk (*)	34	\Colonsim (::::~)	56	\coprod (⊔)	48
\coAsterisk (*)	36	combelow (package)	26, 256, 257	\coprod (⊔)	47
\coasterisk (*)	34	combinatorial logic gates	141	\coprod (⊔)	49
\Coda (⌚)	171	comma-below accent (▀)	see accents	copyright	15, 16, 28, 29, 253
\coda (⌚)	171	\commaminus (±)	37	\copyright (©)	16
code page 1252	252	communication symbols	142	\copyright (©)	16
table	254	commutative diagrams	242		
code page 437	141, 199, 251	comp.text.tex (newsgroup)	14, 31, 32, 238–242, 244		
\Coffeecup (☕)	191, 206	compass	213–215		
\coh (⌚)	67	\compensation (⌚)	195		
coins, ancient	28	\complement (⌚)	104		
\Colon (::)	126	\complement (⌚)	104		
		\complement (⌚)	105		
		\complement (⌚)	105		
		\complement (⌚)	47		
		\complement (⌚)	105		
		complete shuffle product (⊠)	38		
		\COMPLEX (⌚)	100		
		\Complex (⌚)	100		

\corner (⊸)	26	\Cup (⌚)	35
corners, box	199	\Cup (⌚)	37
\corona (☊)	198	\cup (∪)	34
\coronainv (☋)	198	\cup (∪)	32, 239, 249
\Corresponds (≡)	128	\cup (∪)	36
\corresponds (≣)	56	\cup (∪)	35
\corresponds (≣)	62	\cup (∪)	34
\cos (cos)	99, 249	\cup (∪)	37
\cosh (cosh)	99	\cupbarcap (ꝑ)	37
\cot (cot)	99	\cupdot (⌚)	35
\coth (coth)	99	\cupdot (⌚)	34
\counterplay (⤵)	195	\cupdot (⌚)	37
countries	203	\Cupido (ↄ)	139
European	203	\cupleftarrow (⌚)	36, 89
countriesofeurope (package)	203, 256, 257	\cupleftarrow (⌚)	37
CountriesOfEurope (font)	204	\cupovercap (ꝑ)	37
\countriesofeuropefamily	204	\cupplus (⌚)	35, 36
Courier (font)	27	\cupplus (⌚)	34, 35
\Cov (Cov)	100	\cupvee (⌚)	37
\cov (cov)	100	\curl (curl)	100
\covbond (←)	144	\curlyc (⌚)	20
cowboy hat	116	\curlyeqprec (≲)	56
CP1252	see code page 1252	\curlyeqprec (≲)	55
CP437	see code page 437	\curlyeqprec (≲)	62
\Cpa (†)	165	\curlyeqprec (≲)	60
\Cpe (⚡)	165	\curlyeqprec (≲)	57
\Cpi (ꝑ)	165	\curlyeqprec (≲)	64
\Cpo (⚡)	165	\curlyeqsucc (≿)	56
\Cpu (ꝑ)	165	\curlyeqsucc (≿)	55
\CR (⌚)	140, 141	\curlyeqsucc (≿)	62
\cr	240	\curlyeqsucc (≿)	60
\Cra (ꝑ)	165	\curlyeqsucc (≿)	57
\Cre (ꝑ)	165	\curlyeqsucc (≿)	64
Creative Commons licenses	28, 29	\curlyesh (⌚)	20
crescent (fge package option)	115	\curlyvee (⌚)	34
\creschAirpin (≪)	176	\curlyvee (⌚)	32
\Cri (⌚)	165	\curlyvee (⌚)	36
\Cro (ꝑ)	165	\curlyvee (⌚)	35
\Croatia (ԑ)	203	\curlyvee (⌚)	34
\Cross (†)	191	\curlyvee (⌚)	37
\Cross (†)	149	\curlyveedot (⌚)	34
\Cross (×)	155	\curlyveedownarrow (⌚)	33
\Cross (×)	156	\curlyveedownarrow (ԑ)	89
\Cross († vs. † vs. ×)	236	\curlyveeuparrow (⌚)	33
\cross (*)	169	\curlyveeuparrow (⌚)	89
cross ratio	see \textrecipie	\curlywedge (˄)	34
\crossb (బ)	20	\curlywedge (˄)	32
\CrossBoldOutline (†)	149	\curlywedge (˄)	36
\CrossClowerTips (❖)	149	\curlywedge (˄)	35
\crossd (ଳ)	20	\curlywedge (˄)	34
\CrossedBox (☒)	149	\curlywedge (˄)	37
\CrossedBox (☒)	149	\curlywedgedot (˄)	34
\Crossedbox (☒)	149	\curlywedgedownarrow (ԑ)	33
		\curlywedgedownarrow (⌚)	89
		\curlywedgeuparrow (⌚)	33
		\curlywedgeuparrow (ԑ)	33
		\curlywedgeuparrow (˄)	89
		\curlywedgeuparrow (˄)	89
		\curlyyyogh (ȝ)	20
		\curlyyz (ȝ)	20

\currency (⌚)	27
currency symbols	27, 28, 132, 135
\curvearrowbotleft (↷)	79
\curvearrowbotleft (↶)	89
\curvearrowbotleftright (↷↶)	79
\curvearrowbotleftright (↷↷)	89
\curvearrowbotright (↷)	79
\curvearrowbotright (↶)	89
\curvearrowdownup (⤠)	80
\curvearrowleft (↶)	79
\curvearrowleft (↷)	78
\curvearrowleft (↷)	89
\curvearrowleft (↶)	85
\curvearrowleft (↷)	81
\curvearrowleft (↷)	91
\curvearrowleftplus (↷)	91
\curvearrowleftright (↶↷)	79
\curvearrowleftright (↷↷)	89
\curvearrowleftright (↷↷)	80
\curvearrownesw (↷)	80
\curvearrownwse (↶)	80
\curvearrowright (↷)	79
\curvearrowright (↶)	78
\curvearrowright (↷)	89
\curvearrowright (↷)	85
\curvearrowright (↷)	81
\curvearrowright (↷)	91
\curvearrowrightplus (↷)	91
\curvearrowleftright (↷↷)	79
\curvearrowleftright (↷↷)	89
\curvearrowleftright (↷↷)	80
\curvearrowrightminus (↷)	91
\curvearrowsenw (↷)	80
\curvearrowswne (↶)	80
\curvearrowupdown (⤠)	80
cut time	171–175, 177
\CutLeft (✂)	147
cutoff subtraction	see \dotdiv
\CutRight (✂)	147
\CuttingLine (⋯)	147
\Cwa (₩)	165
\cwcirclearrow (⌚)	91
\cwcirclearrowdown (⌚⌚)	84
\cwcirclearrowleft (⌚⌚)	84
\cwcirclearrowright (⌚⌚)	84
\cwcirclearrowup (⌚⌚)	84
\Cwe (₩)	165
\cwgapcirclearrow (⌚⌚)	85
\cwgapcirclearrow (⌚⌚)	91
\Cwi (₩₩)	165
\cyleftarcarrow (⌚)	84
\cwnearcarrow (⤠)	84
\cwnwarccarw (↷)	85
\Cwo (₩)	165
\cwopencirclearrow (⌚⌚)	85
\cwopencirclearrow (⌚⌚)	92, 155
\cwoverarcarrow (↷)	85
\cwrightarcarrow (⌚)	85
\cwrightarcarrow (⌚)	91
\cwsearcarrow (⤠)	85
\cswarcarrow (⌚)	85
\cwunderarcarrow (↷)	85
\cwundercurvearrow (⤠)	91
\Cxa (⌚⌚)	165
\Cxe (⌚⌚)	165
\Cya (₩)	165
\Cyo (₩₩)	165
\cyprfamily	165
Cypriot	165
cypriot (package)	165, 256, 257
\CYRSH (III)	238
\Cza (ꝑꝑ)	165
\Czechia (cz)	203
\Czo (ꝑꝑ)	165
D	
D (□)	169
\D (▣)	25
d (esvect package option)	120
\d (ℳ)	169
\d (ℳ)	22
d (ℳ)	169
d'Alembert operator	see \laplac
\DA (⌚)	140
\dag (†)	16, 254
\dag (†)	16
\dagger (†)	32
\dagger (†)	36
\dagger (†)	37
\dalambert (□)	131
\daleth (߰)	103
\daleth (߰)	104
\daleth (߰)	103
\daleth (߰)	103
\daleth (߰)	104
dancers (package)	226, 256
dancing men	226–229
\danger (܂)	132
dangerous bend symbols	190
Danish runes	see normal runes
\dAnnoey (܂܂)	206
\DArrow (▣▣)	140
\dasharrow	see \dashrightarrow
\dasharrow (→)	85
\dasharrow (↔)	92
\dashcolon (፡)	64
\dasheddownarrow (↓)	80
\dashedleftarrow (←)	80
\dashedneararrow (↗)	80
\dashednarrow (↖)	80
\dashedrightarrow (→)	80
\dashedsearrow (↘)	80
\dashedswarrow (↖)	80
\dasheduparrow (↑)	80
\dashint (⨍)	241
\dashleftarrow (←)	78
\dashleftarrow (←)	85
\dashleftarrow (←)	81
\dashleftarrow (←)	92
\dashleftharpoondown (⇒)	93
\dashleftrightrightarrow (↔)	79
\dashrightarrow (↔)	78
\dashrightarrow (↔)	85
\dashrightarrow (↔)	81
\dashrightarrow (↔)	92
\dashrightharpoondown (⇒)	93
\DashV (≡)	56
\DashV (≡)	62
\DashV (≡)	61
\DashV (≡)	64
\Dashv (≡)	56
\Dashv (≡)	61
\Dashv (≡)	64
\dashv (≡)	62
\dashv (≡)	60
\dashv (≡)	64
\dashv (⊣)	54
\dashv (⊣)	61
\dashv (⊣)	58
\dashv (⊣)	64
\DashVDash (≠)	64
\dashVdash (≠)	64
\dashVv (≡)	56
\dashVv (≡)	62
\dashVv (≡)	60
database symbols	132
\davidsstar (܂܂)	150
\DavidStar (܂܂)	151
\DavidStarSolid (܂܂)	151
\dBาร ()	198
\dbar (ݔ)	239
\dbend (܂܂)	190
\dbkarow (↔)	91, 92
dblaccnt (package)	243
\dblcolon (::)	65
\DCa (܂)	141
\DCb (܂)	141
\DCc (܂܂)	141
\dcChangey (܂܂)	206
\DCd (܂܂)	141
\dChangey (܂܂)	206
\dCooley (܂܂)	206
\DD (܂܂)	140, 172
\ddag (‡)	16, 254
\ddag (‡)	16
\ddagger (‡)	32
\ddagger (‡)	36
\ddagger (‡)	37
\ddashint (≠)	241
\Ddashv (≡)	60

\ddddot (■)	115
\dddot (■)	114
\dddot (■)	115
\dddot (■)	114
\dddotstyle (■)	65
\ddigamma (F)	166
\DDohne (D)	172
\ddot (■)	115
\ddot (■)	114
\ddotdot (.)	35, 126
\ddotdot (.)	34, 126
\ddots (‘‘)	126
\ddots (‘‘)	125, 243
\ddots (‘‘)	126
\ddots (‘‘)	126
\ddots (‘‘)	126
\ddotseq (:=)	64
\Downarrow (¶)	91
\Downarrow (¶)	111
\downarrow (¶)	85
\downarrow (¶)	91
\downarrow (¶)	111
\doststyle (■)	65
\dtstyle (■)	65
\dttstyle (■)	65
\DE (L)	140
\DeclareFontFamily	234, 248
\DeclareFontShape	234, 248
\DeclareMathOperator	249
\DeclareMathOperator*	249
\declareslashed	240, 241
\DeclareUnicodeCharacter	254
\decocfourleft (¤)	152
\decocfourright (¤)	152
\decocone (✖)	152
decorative borders	218–226
\decosix (❖)	152
\decothreeleft (¤)	152
\decothreeleft (¤)	152
\decotwo (✖)	152
\decresChairpin (⇒)	176
Dedekind, Richard	238
definite-description operator (℩)	238
definition symbols	31, 244
\deg (deg)	99
\degree (°)	130
\degree (°)	136
degrees	see \textdegree
\DEL (Δ)	141
\DEL (Δ)	141
\Del ([Del])	140
\Del ([Del])	140
\Deleatur	see \Denarius
delimiters	106–114
text-mode	114
variable-sized	107–113
wavy-line	108–112
\Delta (Δ)	101
\delta (δ)	101
\deltaup (δ)	102
deminutum	see musixgre
demisemiquaver	see musical symbols
\demisemiquaver (♪)	175
\demisemiquaverDotted (♪.)	175
\demisemiquaverDottedDouble (♪..)	175
\demisemiquaverDottedDoubleDown (♪)	175
\demisemiquaverDottedDown (♪)	175
\demisemiquaverDown (♪)	175
\Denarius (ɔ)	27
\denarius (✖)	28
\Denmark (ø)	203
\dental (¤)	24
\Dep (✳)	171
derivative, partial	see \partial
Descartes's equal sign (∞)	see \rightpropto and \backpropto
\descnode (օ)	137
\det (det)	99
\devadvantage (⌚)	195
\Dfourier (‐o)	67
\Dfourier (‐)	62
\dfourier (‐‐)	67
\dfourier (‐‐‐)	62
\DFT (—)	123
\dft (—)	123
\DH (D)	21
\DH (D)	16, 253
\dh (ð)	21
\dh (ð)	16, 253
diacritics	see accents
\diaeresis (œ)	25
diæresis (œ)	see accents
\diagdown (＼)	130
\diagdown (＼)	130
\diagdown (＼)	131
\diagdown (＼)	58
\diagdown (＼)	132
\diagonal (／)	195
\diagup (／)	130
\diagup (／)	130
\diagup (／)	131
\diagup (／)	58
\diagup (／)	132
\diameter (Ø)	130
\diameter (Ø)	31
\diamond (◊)	131
\diamond (◊)	131
\diamond (◊)	40
\diamond (◊)	39
\diamond (◊)	155
\diamond (◊)	32
\diamond (◊)	40, 153
\diamond (◊)	40
\diamond (◊)	39
\diamond (◊)	41, 155
\diamondbackslash (◊)	39
\diamondbackslash (◊)	39
\diamondbar (◊)	40
\Diamondblack (◆)	130
\Diamondbotblack (◆)	155
\diamondbslash (◊)	40
\diamondcdot (◊)	40
\diamondcdot (◊)	155
\diamondcircle (◊)	40
\diamonddiamond (◊)	39
\diamondddiamond (◊)	39
\Diamondddot (◊)	130
\diamondddot (◊)	39
\diamondddot (◊)	39
\DiamonddotLeft (↔◊)	79
\DiamonddotLeft (↔◊)	79
\DiamonddotRight (↔◊)	79
\Diamonddotright (↔◊)	79
\diamonddots (,:)	34, 126
\DiamondLeft (↔◊)	79
\Diamondleft (↔◊)	79
\diamondleftarrow (↔)	91
\diamondleftarrowbar (↔)	91
\diamondleftarrowblack (◆)	155
\diamondminus (◊)	40
\diamondminus (◊)	39
\diamondminus (◊)	39
\diamondop (◊)	40
\diamondplus (⊕)	40
\diamondplus (⊕)	39
\diamondplus (⊕)	39
\DiamondRight (↔◊)	79
\Diamondright (↔◊)	79
\Diamondrightblack (◆)	155
diamonds	see rhombuses
\DiamondShadowA (◊)	155
\DiamondShadowB (◊)	155
\DiamondShadowC (◊)	155
\Diamondshape (◊)	155
\diamondslash (◊)	39
\diamondslash (◊)	39
\DiamondSolid (◆)	156
\diamondsuit (◊)	158
\diamondsuit (◊)	158

\diamondsuit (◊)	158	\ding{58} (⊕)	149	\ding{117} (◆)	156
\diamondsuit (◊)	158	\ding{59} (⊕)	149	\ding{118} (❖)	159
\diamondsuit (◊)	158	\ding{60} (❖)	149	\ding{119} (♦)	156
\diamondsuit (◊)	40	\ding{61} (†)	149	\ding{120} (l)	156
\diamondsuit (◊)	39	\ding{62} (†)	149	\ding{121} (l)	156
\diamondsuit (◊)	39	\ding{63} (†)	149	\ding{122} (l)	156
\diamondsuit (◊)	39	\ding{64} (☒)	149	\ding{123} (•)	18
\diamondsuit (◊)	39	\ding{65} (◊)	151	\ding{124} (•)	18
\diamondsuit (◊)	39	\ding{66} (⊕)	151	\ding{125} (“)	18
\diamondsuit (◊)	39	\ding{67} (⊕)	151	\ding{126} (”)	18
\diatop	26, 243	\ding{68} (❖)	151	\ding{161} (¶)	18
\diaunder	26, 243	\ding{69} (❖)	151	\ding{162} (•)	18
dice	192, 193, 232, 238	\ding{70} (◆)	151	\ding{163} (•)	18
dice (package)	232, 256	\ding{71} (◊)	151	\ding{164} (♥)	159
\dicei (□)	193	\ding{72} (★)	151	\ding{165} (♦)	159
\diceii (□)	193	\ding{73} (☆)	151	\ding{166} (♦)	159
\diceiii (□)	193	\ding{74} (⊗)	151	\ding{167} (♣)	159
\diceiv (□)	193	\ding{75} (☆)	151	\ding{168} (♣)	159
\dicev (□)	193	\ding{76} (★)	151	\ding{169} (♦)	159
\dicevi (□)	193	\ding{77} (★)	151	\ding{170} (♥)	159
dictionary symbols	18–21, 198	\ding{78} (☆)	151	\ding{171} (♠)	159
dictsym (package)	198, 256, 257	\ding{79} (★)	151	\ding{172} (①)	150
died	see \textdied	\ding{80} (★)	151	\ding{173} (②)	150
differential, inexact	. see \dbar	\ding{81} (★)	151	\ding{174} (③)	150
\Digamma (F)	166	\ding{82} (★)	151	\ding{175} (④)	150
\Digamma (F)	166	\ding{83} (★)	151	\ding{176} (⑤)	150
\digamma (F)	101, 166	\ding{84} (★)	151	\ding{177} (⑥)	150
\digamma (f)	166	\ding{85} (★)	151	\ding{178} (⑦)	150
\digamma (f)	105	\ding{86} (★)	151	\ding{179} (⑧)	150
\digamma (f)	166	\ding{87} (★)	151	\ding{180} (⑨)	150
digital logic gates	141	\ding{88} (★)	151	\ding{181} (⑩)	150
digits	see numerals	\ding{89} (★)	151	\ding{182} (①)	150
\dim (dim)	99	\ding{90} (✿)	151	\ding{183} (②)	150
\ding 18, 145, 147–151, 156, 159		\ding{91} (★)	151	\ding{184} (③)	150
\ding{33} (⤓)	147	\ding{92} (★)	151	\ding{185} (④)	150
\ding{34} (⤔)	147	\ding{93} (★)	151	\ding{186} (⑤)	150
\ding{35} (⤕)	147	\ding{94} (★)	151	\ding{187} (⑥)	150
\ding{36} (⤖)	147	\ding{95} (✿)	151	\ding{188} (⑦)	150
\ding{37} (⤗)	159	\ding{96} (✿)	151	\ding{189} (⑧)	150
\ding{38} (⤘)	159	\ding{97} (✿)	151	\ding{190} (⑨)	150
\ding{39} (⤙)	159	\ding{98} (✿)	151	\ding{191} (⑩)	150
\ding{40} (⤚)	159	\ding{99} (★)	151	\ding{192} (①)	150
\ding{41} (⤛)	159	\ding{100} (★)	151	\ding{193} (②)	150
\ding{42} (⤜)	148	\ding{101} (★)	151	\ding{194} (③)	150
\ding{43} (⤝)	148	\ding{102} (★)	151	\ding{195} (④)	150
\ding{44} (⤞)	148	\ding{103} (★)	151	\ding{196} (⑤)	150
\ding{45} (⤟)	148	\ding{104} (★)	151	\ding{197} (⑥)	150
\ding{46} (⤟)	148	\ding{105} (★)	151	\ding{198} (⑦)	150
\ding{47} (⤟)	148	\ding{106} (★)	151	\ding{199} (⑧)	150
\ding{48} (⤟)	148	\ding{107} (★)	151	\ding{200} (⑨)	150
\ding{49} (⤟)	148	\ding{108} (●)	156	\ding{201} (⑩)	150
\ding{50} (⤟)	148	\ding{109} (○)	156	\ding{202} (①)	150
\ding{51} (✓)	149	\ding{110} (■)	156	\ding{203} (②)	150
\ding{52} (✓)	149	\ding{111} (□)	156	\ding{204} (③)	150
\ding{53} (✗)	149	\ding{112} (□)	156	\ding{205} (④)	150
\ding{54} (✗)	149	\ding{113} (□)	156	\ding{206} (⑤)	150
\ding{55} (✗)	149	\ding{114} (□)	156	\ding{207} (⑥)	150
\ding{56} (✗)	149	\ding{115} (▲)	156	\ding{208} (⑦)	150
\ding{57} (✚)	149	\ding{116} (▼)	156	\ding{209} (⑧)	150

\ding{210} (❾)	150	\Dish (◎)	205
\ding{211} (❿)	150	\disin (€)	62
\ding{212} (→)	145	\disin (€)	64
\ding{213} (→)	145	disjoint union	31
\ding{214} (↔)	145	\disjquant (₩)	49
\ding{215} (↓)	145	\disjquant (₩)	49
\ding{216} (↖)	145	disjunction	see \vee
\ding{217} (→)	145	\displaystyle	241, 242, 244, 249
\ding{218} (↗)	145	ditto marks	see \textquotedbl
\ding{219} (→)	145	\div (÷)	32
\ding{220} (→)	145	\div (÷)	36
\ding{221} (→)	145	\div (÷)	35
\ding{222} (→)	145	\div (÷)	34
\ding{223} (→)	145	\div (÷)	37
\ding{224} (→)	145	\divdot (÷)	34
\ding{225} (→)	145	\divg (div)	100
\ding{226} (➢)	145	\divideontimes (※)	34
\ding{227} (➢)	145	\divideontimes (※)	32
\ding{228} (►)	145	\divideontimes (※)	36
\ding{229} (→)	145	\divideontimes (※)	35
\ding{230} (→)	145	\divideontimes (※)	37
\ding{231} (♦)	145	\Divides (/)	128
\ding{232} (→)	145	\divides ()	56
\ding{233} (→)	145	\divides (/)	58
\ding{234} (↔)	145	\DividesNot (✗)	128
\ding{235} (↔)	145	division	32, 117, 119, 125 long
\ding{236} (→)	145	non-commutative	125
\ding{237} (◇)	145	polynomial	117
\ding{238} (◇)	145	division times	see \divideontimes
\ding{239} (⇒)	145	divorced	see \textdivorced
\ding{241} (⇒)	145	\divslash (/)	35
\ding{242} (⌚)	145	\DJ (DJ)	16
\ding{243} (⌚)	145	\dj (d̄)	16
\ding{244} (⌚)	145	\DL (▽)	140
\ding{245} (⌚)	145	\dLaughey (☺)	206
\ding{246} (⌚)	145	\dlbari (†)	21
\ding{247} (⌚)	145	\DLE (▶)	141
\ding{248} (⌚)	145	\dlsh (↔)	79
\ding{249} (⌚)	145	\dlsh (↔)	89
\ding{250} (⌚)	145	\DM (◊)	140
\ding{251} (⌚)	145	\Dmesonminus (D⁻)	144
\ding{252} (⌚)	145	\Dmesonnull (D⁰)	144
\ding{253} (⌚)	145	\Dmesonplus (D⁺)	144
\ding{254} (⇒)	145	\dnbststile ()	65
\dingasterisk (✳)	132	\dNeutrey (☺)	206
dingautolist	150	\dNinja (❶)	206
dingbat (package)	147, 148, 159, 222, 236, 256, 257	\dnststile ()	66
dingbat symbols	145–159	\dntstile ()	66
\dInnocey (❻)	206	\dnntstile ()	66
\Diple (>)	197	\dNursey (☺)	206
\diple (>)	197	do not enter	see \noway
\Diple* (>)	197	does not divide	see \nmid
\diple* (>)	197	does not exist	see \nexists
\dipole (d̄)	144	does not imply	241
Dirac notation	107	\Dohne (Ø)	172
\Direct (D¹)	139	Dohse, Max	242
discount	see \textdiscount	dollar	see \textdollar
discretionary hyphen	252	dollar sign	see \\$
dominance	see \prec	negative	see \nprec
		negative weak	see \npreccurlyeq
		strict	see \Prec
		weak	see \preccurlyeq
\Dontwash (☒)	191	\Dotarrow (→)	122
\dot (◐)	115	\dotcong (≈)	60
\dot (◑)	114	\dotcup (⋎)	31, 239
\dot (‘)	169	\dotdiv (÷)	34
dot accent (◐ or ◑)	see accents	\Doteq	see \doteqdot
dot symbols	15, 125–127, 243	\Doteq (≠)	60
DotArrow (package)	122, 256, 257	\Doteq (÷)	57
		\Doteq (÷)	64
		\doteq (≠)	54
		\doteq (÷)	62
		\doteq (÷)	60
		\doteq (÷)	57
		\doteq (÷)	64
		\doteqdot (÷)	55
		\doteqdot (÷)	62
		\doteqdot (÷)	60
		\doteqdot (÷)	58
		\doteqdot (÷)	64
		\dotequiv (≡)	64
dotless <i>j</i> (j)	text mode	22	
dotless <i>i</i> (i)	math mode	114, 130	
	text mode	22	
dotless <i>j</i> (j)	math mode	114, 130	
	text mode	22	
\dotmedvert (·)	35		
\dotminus (÷)	62		
\dotminus (÷)	35		
\dotminus (÷)	35		
\dotminus (÷)	37		
\dotplus (+)	34		
\dotplus (+)	32		
\dotplus (+)	36		
\dotplus (+)	35		
\dotplus (+)	37		
\dots	16		
\dots (...)	254		
dots (ellipses)	15, 16, 125–127, 130, 243		
\dotsb (...)	125		
\dotsb (...)	126		

\dotsc (...)	125	\doublebarwedge (⤔)	34	\downharpoonleftbar (⤠)	93
\dotseq (÷)	56	\doublestar (*)	169	\downharpoonright (⤡)	80
\dotsi (...)	125	\doublethumb (⤢)	171	\downharpoonright (⤡)	79
\dotsim (~)	62	\doubletilde (⤤)	24	\downharpoonright (⤡)	90
\dotsim (~)	64	\doublevee (⤥)	35, 36	\downharpoonright (⤡)	88
\dotsint (⠄⠄⠄)	46	\doublevee (⤥)	34	\downharpoonright (⤡)	93
\dotsint (⠄⠄⠄)	49	\doublewedge (⤦)	35, 36	\downharpoonrightbar (⤠)	93
\dotsm (...)	125	\doublewedge (⤦)	34	\downharpoonsleftright (⤠)	93
\dotsm (...)	126	\Downarrow (⤧)	190	\downint (⤣)	53
\dotsminusdots (⠄⠄⠄)	60	\Downarrow (⤧)	78, 107	\downlcurvearrow (⤡)	85
\dotsminusdots (⠄⠄⠄)	64	\Downarrow (⤧)	85	\downleftcurvedarrow (⤤)	85
\dotso (...)	125	\Downarrow (⤧)	110	\downlsquigarrow (⤤)	85
dotted arrows	122	\Downarrow (⤧)	80	\downlsquigarrow (⤤)	80
dotted union (⤪)	249	\Downarrow (⤧)	91	\Downmapsto (⤠)	85
\dottedcircle (⤵)	155	\Downarrow (⤧)	111	\downmapsto (⤠)	85
\dottedsquare (⤶)	155	\downarrow .	249	\downmapsto (⤠)	80
\dottedtilde (⤤)	24	\downarrow (⤧)	78, 107	\downModels (⤧)	58
\dottimes (⤷)	34	\downarrow (⤧)	110	\downmodels (⤧)	60
\dottimes (⤷)	36	\downarrow (⤧)	85	\downmodels (⤧)	58
\dottimes (⤷)	35	\downarrow (⤧)	80	\downnp (⤧)	26
\dottimes (⤷)	37	\downarrow (⤧)	95	\downparentfill .	245
\double .	113	\downarrow (⤧)	111	\downpitchfork (⤧)	98
double acute (⤤) ... see accents		\downarrow (⤧)	91	\downpitchfork (⤧)	96
\doublebar (⤠)	169	\downarrowbar (⤠)	91	\downproto (⤧)	58
\doublebarint (⤤)	53	\downarrowbarred (⤧)	91	\downrcurvearrow (⤤)	85
\doublebarvee (⤧)	37	\downarrowtail (⤧)	85	\downrightcurvedarrow (⤤)	85
\doublebarwedge (⤧)	34	\downarrowtail (⤧)	80	\downrightcurvedarrow (⤤)	91
\doublebarwedge (⤧)	32	\downAssert (⤧)	60	\downrsquigarrow (⤤)	85
\doublebarwedge (⤧)	36	\downassert (⤧)	60	\downrsquigarrow (⤤)	80
\doublebarwedge (⤧)	35	\downbkarrow (⤧)	85	\downslice (⤧)	39
\doublebarwedge (⤧)	37	\downblackarrow (⤧)	89	\downspoon (⤧)	97
\doublecap .	see \Cap	\downblackspoon (⤧)	97	\downspoon (⤧)	96
\doublecap (⤧)	34	\downbow (⤧)	171	\downnt (⤧)	26
\doublecap (⤧)	35, 36	\downbracketfill .	245	\downtherefore (⤧)	126
\doublecap (⤧)	35	\downdasharrow (⤧)	89	\downtherefore (⤧)	34, 126
\doublecap (⤧)	37	\downdasharrow (⤧)	91	\downtouparrow (⤧)	79
\doublecovbond (⤧)	144	\downdownarrows (⤧)	79	\downtouparrow (⤧)	89
\doublecross (⤤)	169	\downdownarrows (⤧)	78	\downtriangleleftblack (⤧)	
\doublecup .	see \Cup	\downdownarrows (⤧)	89	154	
\doublecup (⤧)	34	\downdownarrows (⤧)	89	\downtrianglerightblack (⤧)	
\doublecup (⤧)	35, 36	\downdownarrows (⤧)	89	154	
\doublecup (⤧)	35	\downdownarrows (⤧)	85	\downuparrows (⤧)	79
\doublecup (⤧)	37	\downdownarrows (⤧)	80	\downuparrows (⤧)	85
\doublecurlyvee (⤥)	35	\downdownarrows (⤧)	91	\downuparrows (⤧)	80
\doublecurlywedge (⤦)	35	\downdownharpoons (⤧)	80	\downuparrows (⤧)	91
\doubledot (⠄)	169	Downes, Michael J.	99, 258	\downupcurvearrow (⤧)	85
\doubleeye (⠄)	169	\downfilledspoon (⤧)	96	\downupharpoons (⤧)	80
\doublefrown (⤤)	97	\downfishtail (⤧)	64	\downupharpoons (⤧)	88
\doublefrowneq (⤤)	97	\downfootline (⤧)	57	\downupharpoonsleftright (⤧)	
\doublepawns (⠄)	195	\downfree (⤧)	58	88	
\doubleplus (⠄)	169	\downharpoonccw (⤧)	83	\downupharpoonsleftright (⤧)	93
\doubleplus (⠄)	37	\downharpooncw (⤧)	83	\downupsquigarrow (⤤)	85
\doublesharp (⠄)	176	\downharpoonleft (⤧)	80	\downVDash (⤧)	60
\doublesmile (⠄)	97	\downharpoonleft (⤧)	79	\downVdash (⤧)	60
\doublesmileeq (⠄)	97	\downharpoonleft (⤧)	90	\downVdash (⤧)	58
\doublesqcap (⤶)	35, 36	\downharpoonleft (⤧)	88	\downvDash (⤧)	60
\doublesqcap (⤶)	35	\downharpoonleft (⤧)	93	\downvdash (⤧)	60
\doublesqcup (⤶)	35, 36				

\downvndash (\top)	58
\downwavearrow (\Downarrow)	85
\downwhitearrow (\Downarrow)	89
\downwhitearrow (\Downarrow)	91
\downY (\Downarrow)	35
\downY (\Downarrow)	34
\downzigzagarrow (\Downarrow)	89
\downzigzagarrow (\Downarrow)	85
\downzigzagarrow (\Downarrow)	91
Doyle, Sir Arthur Conan	229
dozenal (package)	128, 194, 256, 257
dozenal (base 12)	
numerals	128
tally markers	194
\dprime ("')	128
\DQ (\boxdot)	140
\dracma (Dr)	28
\draftingarrow (\rightarrow)	91
\drbkarow ($\rightarrow\rightarrow$)	91
\Dreizack ($\text{D}\ddot{\text{o}}$)	205
\droang ($\text{D}\ddot{\text{o}}$)	115
\drsh ($\text{D}\downarrow$)	79
\drsh ($\text{D}\downarrow$)	89
\drumclef (HH)	172
\drWalley ($\text{D}\ddot{\text{o}}\text{E}$)	206
\DS ($\text{D}\ddot{\text{o}}$)	172
\Ds ($\text{D}\ddot{\text{o}}$)	172
\ds ()	171
\dSadey ($\text{D}\ddot{\text{o}}$)	206
\dsaeronautical ($\text{D}\ddot{\text{o}}$)	198
\dsagricultural ($\text{D}\ddot{\text{o}}$)	198
\dsarchitectural ($\text{D}\ddot{\text{o}}$)	198
\dsbiological ($\text{D}\ddot{\text{o}}$)	198
\DSC (D^{sc})	139
\dschemical ($\text{D}\ddot{\text{o}}$)	198
\dscommercial ($\text{D}\ddot{\text{o}}$)	198
\dsdtstile (DDD)	66
\dSey ($\text{D}\ddot{\text{o}}$)	206
dsfont (package)	134, 256
\dsheraldical ($\text{D}\ddot{\text{o}}$)	198
\dsjuridical ($\text{D}\ddot{\text{o}}$)	198
\dSleepy ($\text{D}\ddot{\text{o}}$)	206
\dsliterary ($\text{D}\ddot{\text{o}}$)	198
\dsmathematical ($\text{D}\ddot{\text{o}}$)	198
\dsmedical ($\text{D}\ddot{\text{o}}$)	198
\dSmiley ($\text{D}\ddot{\text{o}}$)	206
\dsmilitary ($\text{D}\ddot{\text{o}}$)	198
\dsol ($\text{D}\ddot{\text{o}}$)	37
\dsrailways ($\text{D}\ddot{\text{o}}$)	198
dsserif (package)	134, 256
\dsststile (DDD)	66
\dststile (DDD)	66
\dststile (DDD)	66
\dsub ($\text{D}\triangleleft$)	41
\dtdtstile (DDD)	66
\dtimes (\times)	35, 36
\dtimes (\times)	38
\dtimes (\times)	34
\dTongey ($\text{D}\ddot{\text{o}}$)	206
\dtststile (DDD)	66
\dttstile (DDD)	66
\dtttstile (DDD)	66
\DU ($\text{D}\cap\text{U}$)	140
\dualmap (DD)	97
\dualmap (DD)	64
\duevolte ($\text{D}\ddot{\text{o}}$)	171
dunce cap	116
duodecimal (base 12)	
numerals	128
tally markers	194
DVI	29, 140, 246
.dvi files	252
\dVomey ($\text{D}\ddot{\text{o}}$)	206
\dWalley ($\text{D}\ddot{\text{o}}$)	206
\dWinkey ($\text{D}\ddot{\text{o}}$)	206
\dKey ($\text{D}\ddot{\text{o}}$)	206
\dz ($\text{D}\ddot{\text{o}}$)	21
E	
E (Π)	169
e (esvect package option)	120
\e (e)	105
\e (e)	128
e (M)	169
\epsilon-T _E X	107
\Earth (\oplus)	138
\Earth (δ)	138
\Earth (∇)	139
\earth (δ)	137
\eastcross (\ddagger)	149
\EastPoint (E^{p})	139
\Ecommerce (E)	27
\eggbeater (E)	205
\egsdot (\gg)	74
\EightAsterisk (*)	151
\EightFlowerPetal (F)	151
\EightFlowerPetalRemoved (F)	151
eight eighth note <i>see</i> musical symbols	
\eighthNote (J)	174
\eighthnote (J)	171
\eighthnote (J)	170
\eighthnote (J)	170
\eighthNoteDotted ($\text{J}.$)	174
\eighthNoteDottedDouble ($\text{J}..$)	174
\eighthNoteDottedDoubleDown ($\text{J}^{\text{..}}$)	174
\eighthNoteDottedDown (J')	174
\emptyset (+)	197
empty set	129–131
\emptysetset (\emptyset)	130
\emptysetset (\emptyset)	131
\emptysetset (\emptyset)	131
\emptysetset (\emptyset)	129
\emptysetsetoarr (\emptyset)	129
\emptysetsetoarrl (\emptyset)	129
\emptysetsetobar (\emptyset)	129
\emptysetsetocirc (\emptyset)	129
\EN (T)	140
\enclosecircle (C)	154
\enclosediamond (D)	154
\enclosesquare (S)	154
\enclosetriangle (A)	154
\End (End)	100
\End ([End])	140

\end{proof}	130, 132	\EOje (ゑ)	167	\EOpak (ゑ)	167
\ending (⊥)	195	\EOJI (ゑじ)	167	\EOPatron (ゑპ)	167
endofproofwd (package)	132, 256	\EOji (ゑじ)	167	\EOPatronII (ゑპ)	167
\eng (ゑ)	20	\EOjo (ゑ)	168	\Eope (ゑප)	167
engineering symbols	132, 136, 142	\EOju (ゑ)	168	\Eopenis (ゑပ)	167
\engma (ゑ)	21	\EOkak (ゑ)	168	\Eopi (ゑ)	167
\enleadertwodots (..)	126	\EOke (ゑ)	168	\EOPierce (ゑ)	167
\ENQ (ゑ)	141	\EOki (ゑ)	168	\EOPlant (ゑ)	167
entails	see \models	\EOkij (ゑ)	168	\EOPlay (ゑ)	167
\Enter (Enter)	140	\EOKing (ゑ)	168	\Eopo (ゑ)	167
enter	140, see also carriage return	\EOknottedCloth (ゑ)	168	\EOpriest (ゑ)	167
enumerate	194	\EOknottedClothStraps (ゑ)	168	\EOPrince (ゑ)	167
\Envelope (✉)	159	\EOko (ゑ)	168	\EOpu (ゑ)	167
envelopes	159, 201	\EOku (ゑ)	168	\EOpuu (ゑ)	168
\enya (ゑ)	21	\EOkuu (ゑ)	168	\EOpuk (ゑ)	168
\EOafter (ゑ)	167	\EOLetBlood (ゑ)	168	\EORain (ゑ)	168
\EOandThen (ゑ)	167	\EOloinCloth (ゑ)	168	\EOSa (ゑ)	168
\EOAppear (ゑ)	167	\EOLongLipII (ゑ)	168	\EOsa (ゑ)	168
\EOBeardMask (ゑ)	167	\EOLord (ゑ)	168	\EOSacrifice (ゑ)	168
\EOBeddeck (ゑ)	167	\EOLose (ゑ)	168	\EOSaw (ゑ)	168
\EOBlood (ゑ)	167	\EOMa (ゑ)	168	\EOScorpius (ゑ)	168
\EObrace (ゑ)	167	\EOMacaw (ゑ)	168	\EOset (ゑ)	168
\EObuilding (ゑ)	167	\EOMacawiI (ゑ)	168	\EOSi (ゑ)	168
\EObundle (ゑ)	167	\EOME (ゑ)	168	\EOSi (ゑ)	168
\EOChop (ゑ)	167	\EOMexNew (ゑ)	168	\EOSing (ゑ)	168
\EOChronI (ゑ)	167	\EOmi (ゑ)	168	\EOSini (ゑ)	168
\EOCloth (ゑ)	167	\EOMiddle (ゑ)	167	\EOSkin (ゑ)	168
\EODealWith (ゑ)	167	\EOmonster (ゑ)	167	\EOSky (ゑ)	168
\EODeer (ゑ)	167	\EOMountain (ゑ)	167	\EOSkyAnimal (ゑ)	168
\EOeat (ゑ)	167	\EOmuu (ゑ)	167	\EOSkyPillar (ゑ)	168
\EOflint (ゑ)	167	\EOna (ゑ)	167	\EOSnake (ゑ)	168
\EOflower (ゑ)	167	\EOne (ゑ)	167	\EOSo (ゑ)	168
\EOFold (ゑ)	167	\EOni (ゑ)	167	\EOSpan (ゑ)	168
\EOGod (ゑ)	167	\EOnow (ゑ)	167	\EOSprinkle (ゑ)	168
\EOGoUp (ゑ)	167	\EOnu (ゑ)	167	\EOstar (ゑ)	168
\EOgovernor (ゑ)	167	\EOnuu (ゑ)	167	\EOStarWarrior (ゑ)	167
\EOGuise (ゑ)	167	\EOofficerI (ゑ)	167	\EOstarWarrior (ゑ)	168
\EOHallow (ゑ)	167	\EOofficerII (ゑ)	167	\EOstep (ゑ)	167
\EOi (°)	168	\EOofficerIII (ゑ)	167	\EOSu (ゑ)	167
\EOii (° °)	168	\EOofficerIV (ゑ)	167	\EOSu (ゑ)	167
\EOiii (° ° °)	168	\EOpa (ゑ)	167	\EOSuu (ゑ)	167
\EOiv (°°°)	168				
\EOix (°°°)	168				
\EOja (ゑ)	167				
\EOjaguar (ゑ)	167				

\EOsuu (ሙ)	167	\EOwuu (ሙ)	168	\eqless (\lessdot)	74
\EOT (♦)	141	\EOx (ゑ)	168	\Eqcolon (==)	56
\EOta (თ)	167	\EOxi (ხ)	168	\Eqcolon (=:)	65
\Eote (თ)	167	\EOxii (ხ)	168	\eqcolon (=:)	65
\EOthrone (ቃ)	167	\EOxiii (ኩ)	168	\eqcolon (:=)	56
\Eoti (ቃ)	167	\EOxiv (ኩ)	168	\eqcolon (=:)	60
\EOTime (ቃ)	167	\EOxix (ኩ)	168	\eqgtr (ሮ)	74
\Eotime (ቃ)	167	\EOxv (ኩ)	168	\eqless (ሮ)	74
\EOTitle (ቃ)	167	\EOxvi (ኩ)	168	\eqplus (ሮ)	37
\EOTitleII (ቃ)	167	\EOxvii (ኩ)	168	\eqsim (ሮ)	64
\EOTitleIV (ቃ)	167	\EOxviii (ኩ)	168	\eqslantgtr (ሮ)	74
\Eoto (ወ)	167	\EOxx (ሮ)	168	\eqslantless (ሮ)	74
\Eotu (ወ)	167	\EOya (ያ)	168	\eqsim (ሮ)	56
\Eotuki (ቃ)	167	\EOyaj (ያ)	168	\eqsim (ሮ)	62
\Eotukpa (ቃ)	167	\EOye (ያ)	168	\eqsim (ሮ)	60
\Eoturtle (ቃ)	167	\EOYear (ሮ)	168	\eqsim (ሮ)	58
\Eotuu (ቃ)	167	\EOyuu (ሮ)	168	\eqsim (ሮ)	64
\Eotza (ቃ)	167	\EOzero (ሮ)	168	\eqslantgtr (ሮ)	71
\Eotze (ቃ)	167	\EP (€)	140	\eqslantgtr (ሮ)	70
\Eotzete (ቃ)	167	\eparsl (#)	64	\eqslantgtr (ሮ)	74
\Eotzi (ቃ)	167	Epi-Olmec script	167–168	\eqslantless (ሮ)	73
\Eotzu (ቃ)	167	epiolmec (package)	167, 168, 256, 257	\eqslantless (ሮ)	73
\Eotzuu (ቃ)	167	epsdice (package)	193, 256, 257	\eqslantless (ሮ)	72
\Eoundef (ቃ)	168	\epsdice (ሮ)	193	\eqslantless (ሮ)	74
\EOv (ሮ)	168	\epsi (ε)	21	\eqsmile (ሮ)	97
\EOvarBeardMask (ቃ)	168	\Epsilon (E)	101	\equal (=)	60
\EOvarja (ቃ)	168	\epsilon (ε)	101	\equal (=)	58
\EOvarji (ቃ)	168	\epsilon (ε)	102	\equal (=)	195
\EOvarki (ቃ)	168	\eqbump (\approx)	58	\equalclosed (ሮ)	58
\EOvarkuu (ቃ)	168	\eqbumped (\approx)	56	\equalleftarrow (ሮ)	91
\EOvarni (ቃ)	168	\eqbumped (\approx)	62	\equalparallel (#)	62
\EOvarpa (ቃ)	168	\eqcirc (==)	56	\equalparallel (#)	64
\EOvarSi (ቃ)	168	\eqcirc (==)	55	\equalrightarrow (ሮ)	91
\EOvarsi (ቃ)	168	\eqcirc (==)	62	\equalscolon (=:)	67
\EOvartza (ቃ)	168	\eqcirc (==)	60	\equalscoloncolon (==::)	67
\EOvarwuu (o o)	168	\eqcirc (==)	58	\equalsfill	31, 244
\EOvarYear (ቃ)	168	\eqcirc (==)	64	equidecomposable	239
\EOvi (ሮ)	168	\Eqcolon (==::)	56	equilibrium	see \rightleftharpoons
\EOvii (ሮ)	168	\Eqcolon (==::)	65	\Equiv (≣)	64
\EOviii (ሮ)	168	\Eqcolon (==)	56	\equiv (≣)	31, 54
\EOwa (ቃ)	168	\Eqcolon (==)	65	\equiv (≣)	60
\EOwe (ቃ)	168	\Eqcolon (==)	56	\equiv (≣)	58
\EOwi (ቃ)	168	\Eqcolon (==)	60	\equiv (≣)	64
\EOwo (ቃ)	168	\Eqcolon (==)	64	\Equivalence (≣)	128
		\Eqdef ($\stackrel{\text{def}}{=}$)	64	equivalence	see \equiv, \rightarrowleftarrow, and \threesim
		\Eqdot ($\stackrel{?}{=}$)	60	\equivclosed (ሮ)	58
		\Eqdot ($\stackrel{?}{=}$)	58	\equivDD (≣)	64
		\Eqdot ($\stackrel{?}{=}$)	64	\equivVert (#)	64
		\Eqeqq (==)	64	\equivVvert (#)	64
		\Eqeqq (==)	64	\eqparsl (#)	63
		\Eqfrown (\approx)	97	\er (ሮ)	20
		\Eqgr (\approx)	74		
		\Eqleftrightarrow (\leftrightarrow)	89		

\erf (erf)	100	exclusive or	238
\Eros (Ø)	139	\exists (Ξ)	104
\errbarblackcircle (◐) . .	154	\exists (Ξ)	104
\errbarblackdiamond (◑) . .	154	\exists (Ξ)	105
\errbarblacksquare (◑) . .	154	\exists (Ξ)	104
\errbarcircle (◑)	154	\exists (Ξ)	105
\errbardiamond (◑)	154	\exp (exp)	99
\errbarsquare (◑)	154	\experimental (X)	143
\errorsym (ᴱ)	144	\Explosionsafe (☒)	142
es-zet	see \ss	extarrows (package)	122, 256,
\ESC (←)	141	257	
\Esc (Esc)	140	extensible accents	117–121, 125,
escapable characters	15	244–245	
\esh (ʃ)	21	extensible arrows	117–123
\esh (ʃ)	20	extensible braces	117–120
esint (package)	46, 256	extensible symbols, creating	244–
esrelation (package)	95, 123, 256	245	
\Estatically (▲)	142	extensible tildes	117, 120
estimated	see \textestimated	extension characters	98, 99
\Estonia (🇪)	203	\externalsym (▣)	143
esvect (package)	120, 256	extpfeil (package)	122, 256, 257
\Eta (H)	101	extraipa (package)	24, 256
\eta (η)	101	\eye (‘)	169
\etameson (η)	144	\eye (👁)	159
\etamesonprime (η')	144	\EyesDollar (\$)	27
\etaup (η)	102	ezh	see \roundz
\ETB (₺)	141		
\eth (ð)	130		
\eth (ð)	21		
\eth (ð)	132		
\eth (ð)	20		
\ETX (♥)	141		
euflag (package)	205, 256, 257		
\euflag (🇪)	205		
eufrak (package)	134		
Euler Roman	102		
\Eulerconst (€)	105		
\EUR (€)	27		
\EURcr (€)	27		
\EURdig (€)	27		
\EURhv (€)	27		
\Euro (€)	27		
\euro	28		
\euro (€)	27		
euro signs	27, 28		
blackboard bold	135		
\eurologo (€)	28		
European countries	203		
eurosym (package)	28, 256, 257		
\EURtm (€)	27		
euscript (package)	134, 256, 257		
evaluated at	see \vert		
evil spirits	200		
\exciton (¬sh ⁺)	144		
\Exclam (!!	132		
exclusive disjunction			
... see \nletrightarrow			
\nequiv, and \oplus			
		\faArrowCircleORight (⊕)	146
		\faArrowCircleUp (⊕)	146
		\faArrowCircleRight (⊕)	146
		\faArrowCircleUp (⊕)	146
		\faArrowDown (⬇)	146
		\faArrowLeft (⬅)	146
		\faArrowRight (➡)	146
		\faArrows (❖)	146
		\faArrowsAlt (☒)	146
		\faArrowsH (↔)	146
		\faArrowsV (↑)	146
		\faArrowUp (↑)	146
		\faAsterisk (*)	209
		\faAt (@)	209
		\faAutomobile (🚗)	212
		\faBackward (◀)	209
		\faBalanceScale (⚖)	209
		\faBan (🚫)	209
		\faBank (🏛️)	212
		\faBarChart (📊)	209
		\faBarChart0 (📊)	212
		\faBarcode (barcode)	209
		\faBars (☰)	209
		\faBattery0 (🔋)	212
		\faBattery1 (🔋)	212
		\faBattery2 (🔋)	212
		\faBattery3 (🔋)	212
		\faBattery4 (🔋)	212
		\faBatteryEmpty (🔋)	209
		\faBatteryFull (🔋)	209
		\faBatteryHalf (🔋)	209
		\faBatteryQuarter (🔋)	209
		\faBatteryThreeQuarters (🔋)	209
		\faBed (🛏)	209
		\faBeer (🍺)	209
		\faBehance (Behance)	209
		\faBehanceSquare (Behance)	209
		\faBell (🔔)	209
		\faBell10 (🔔)	209
		\faBellSlash (↗)	209
		\faBellSlash0 (↖)	209
		\faBicycle (🚲)	209
		\faBinoculars (oculars)	209
		\faBirthdayCake (🎂)	209
		\faBitbucket ((Bitbucket))	209
		\faBitbucketSquare (Bitbucket)	209
		\faBitcoin (₿)	27
		\faBlackTie (👔)	209
		\faBold (.Bold)	209
		\faBolt (⚡)	209
		\faBomb (💣)	209
		\faBook (📖)	209
		\faBookmark (🔖)	209
		\faBookmark0 (🔖)	209
		\faBriefcase (💼)	209
		\faBtc (₿)	27
		\faBtc (Ƀ)	27

\faBug (🐞)	209
\faBuilding (🏢)	209
\faBuilding0 (🏢)	209
\faBullhorn (📢)	209
\faBullseye (🎯)	209
\faBus (🚌)	209
\faBuySellads (🅰)	209
\faCab (🚕)	212
\faCalculator (🧮)	209
\faCalendar (📅)	209
\faCalendarCheck0 (📅)	209
\faCalendarMinus0 (📅)	209
\faCalendar0 (📅)	209
\faCalendarPlus0 (📅)	210
\faCalendarTimes0 (📅)	210
\faCamera (📷)	210
\faCameraRetro (🕒)	210
\faCar (🚗)	210
\faCaretDown (▼)	210
\faCaretLeft (◀)	210
\faCaretRight (▶)	210
\faCaretSquare0Down (▣)	210
\faCaretSquare0Left (▢)	210
\faCaretSquare0Right (▢)	210
\faCaretSquare0Up (▢)	210
\faCaretUp (▲)	210
\faCartArrowDown (🛒)	210
\faCartPlus (🛒)	210
\faCc (💳)	210
\faCcAmex (💳)	210
\faCcDinersClub (⌚)	210
\faCcDiscover (💳)	210
\faCcJcb (JACK&MILLER)	210
\faCcMastercard (💳)	210
\faCcPaypal (PayPal)	210
\faCcStripe (stripe)	210
\faCcVisa (visa)	210
\faCertificate (🌟)	210
faces ..	132, 141, 160, 190, 191, 198, 200, 205–212, 215–218
\faChain (⛓)	212
\faChainBroken (⛓)	210
\faCheck (✓)	150
\faCheckCircle (✔)	150
\faCheckCircle0 (✔)	150
\faCheckSquare (☒)	150
\faCheckSquare0 (☒)	150
\faChevronCircleDown (⌄)	147
\faChevronCircleLeft (⌄)	147
\faChevronCircleRight (⌄)	147
\faChevronCircleUp (⌄)	147
\faChevronDown (⌄)	147
\faChevronLeft (⌲)	147
\faChevronRight (⌳)	147
\faChevronUp (⌄)	147
\faChild (🚼)	210
\faChrome (.chrome)	210
\faCircle (●)	157
\faCircle0 (○)	157
\faCircleONotch (○)	157
\faCircleThin (○)	157
\faClipboard (📋)	210
\faClock0 (🕒)	210
\faClone ((Clone))	210
\faClose (✖)	150
\faCloud (☁)	210
\faCloudDownload (☁)	210
\faCloudUpload (☁)	210
\faCny (¥)	27
\faCode (<>)	210
\faCodeFork (🍴)	210
\faCodepen (❖)	210
\faCoffee (☕)	210
\faCog (⚙)	210
\faCogs (⚙)	210
\faColumns (.ColumnStyle)	210
\faComment (💬)	210
\faCommenting (💬)	210
\faCommenting0 (💬)	210
\faCommento (💬)	210
\faComments (💬)	210
\faComments0 (💬)	210
\faCompass (🧭)	210
\faCompress (.compress)	210
\faConnectdevelop (❖)	211
\faContao (CMS)	211
\faContent (---	127
\faCopy (_COPY_)	212
\faCopyright (©)	28
\faCreativeCommons (cc)	28
\faCreditCard (💳)	211
\faCrop (✂)	211
\faCrosshairs (❖)	211
\faCss3 (_CSS3_)	211
\faCube (큐브)	211
\faCubes (큐브)	211
\faCut (✂)	212
\faCutlery (🍴)	211
\faDashboard (📊)	212
\faDashcube (큐브)	211
\faDatabase (🗄)	211
\faDedent (⤵)	212
\faDelicious (Delicious)	211
\faDesktop (💻)	211
\faDeviantart (DEV)	211
\faDiamond (❖)	211
\faDigg (digg)	211
\faDollar (\$)	27
\faDotCircle0 (●)	157
\faDownload (⬇)	211
\faDribbble (❖)	211
\faDropbox (Dropbox)	211
\faDrupal (Drupal)	211
\faEdit (✍)	212
\faEject (⏏)	211
\faEllipsisH (…)	211
\faEllipsisV (⋮)	211
\faEmpire (帝)	211
\faEnvelope (✉)	211
\faEnvelope0 (✉)	211
\faEnvelopeSquare (✉)	211
\faEraser (ลบ)	211
\faEur (€)	27
\faEur (€)	27
\faEuro (€)	27
\faExchange (💱)	211
\faExclamation (!)	211
\faExclamationCircle (❗)	211
\faExclamationTriangle (⚠)	211
\faExpand (↗)	211
\faExpeditedssl (TLS)	211
\faExternalLink (🔗)	211
\faExternalLinkSquare (🔗)	211
\faEye (👁)	211
\faEyedropper (eyedropper)	211
\faEyeSlash (⊘)	211
\faFacebook (fb)	211
\faFacebookF (fb)	212
\faFacebookOfficial (fb)	211
\faFacebookSquare (fb)	211
\faFastBackward (⏮)	211
\faFastForward (⏭)	211
\faFax (📠)	211
\faFeed (RSS)	212
\faFemale (👩)	208
\faFighterJet (✈)	208
\faFile (📄)	208
\faFileArchive0 (📁)	208
\faFileAudio0 (🎵)	208
\faFileCode0 (⚙)	208
\faFileExcel0 (xl)	208
\faFileImage0 (🖼)	208
\faFileMovie0 (🎥)	212
\faFileO (📄)	208
\faFilePdf0 (PDF)	208
\faFilePhoto0 (📸)	212
\faFilePicture0 (🖼)	212
\faFilePowerpoint0 (ppt)	208
\faFiles0 (📁)	208
\faFileSound0 (🔊)	212
\faFileText (📄)	208
\faFileText0 (📄)	208
\faFileVideo0 (🎥)	208
\faFileWord0 (WORD)	208
\faFileZip0 (ZIP)	212
\faFilm (🎞)	208
\faFilter (FilterWhere)	208
\faFire (🔥)	208
\faFireExtinguisher (滅火器)	208
\faFirefox (Firefox)	209
\faFlag (🚩)	209
\faFlagCheckered (🏴)	209
\faFlag0 (🚩)	209

\faFlash (⚡)	212
\faFlask (🧪)	209
\faFlickr (📷)	209
\faFloppy0 (💾)	209
\faFolder (📁)	209
\faFolder0 (📂)	209
\faFolderOpen (📂)	209
\faFolderOpen0 (📂)	209
\faFont (🅰)	209
\faFonticons (🌐)	209
\faForumbee (Bbw)	209
\faForward (▶)	209
\faFoursquare (📍)	209
\faFrown0 (☹)	209
\faFutbol0 (⚽)	209
\faGamepad (🎮)	209
\faGavel (⚖)	209
\faGbp (💷)	27
\faGe (🌐)	212
\faGear (⚙)	212
\faGears (⚙)	212
\faGenderless (⚲)	142
\faGetPocket (Bookmark)	209
\faGg (ᴳ)	209
\faGgCircle (ଓ)	209
\faGift (🎁)	209
\faGit (git)	209
\faGithub (🐙)	209
\faGithubAlt (😺)	209
\faGithubSquare (ଓ)	209
\faGitSquare (git)	209
\faGittip (♥)	212
\faGlass (喝水)	209
\faGlobe (🌐)	209
\faGoogle (גוגל)	209
\faGooglePlus (גוגל+)	209
\faGooglePlusSquare (גוגל+)	209
\faGoogleWallet (wallet)	209
\faGraduationCap (🎓)	209
\faGratipay (♥)	209
\faGroup (👥)	212
\faHackerNews (💡)	209
\faHandGrab0 (✋)	148
\faHandLizard0 (🦎)	148
\faHand0Down (👉)	148
\faHand0Left (👉)	148
\faHand0Right (👉)	148
\faHand0Up (👉)	148
\faHandPaper0 (✋)	148
\faHandPaper0 (✋)	148
\faHandPeace0 (✌)	148
\faHandPointer0 (✋)	148
\faHandRock0 (✊)	148
\faHandRock0 (✊)	148
\faHandScissors0 (✂)	148
\faHandSpock0 (🖖)	148
\faHandStop0 (✋)	148
\faHdd0 (💿)	209
\faHeader (HEADER)	209
\faHeadphones (🎧)	209
\faHeart (❤)	209
\faHeartbeat (❤)	209
\faHeart0 (♡)	209
\faHistory (ἱστορία)	209
\faHome (🏠)	209
\faHospital0 (🏥)	209
\faHotel (🏨)	212
\faHourglass (⏳)	209
\faHourglassEnd (⌚)	209
\faHourglassHalf (⌚)	210
\faHourglass0 (⌚)	210
\faHourglassStart (⌚)	210
\faHouzz (🏡)	210
\faHSquare (𝑯)	210
\faHtml5 (🌐)	210
\faICursor (ⓘ)	210
\faImage (🖼)	212
\faInbox (✉)	210
\faIndent (☰)	210
\faIndustry (⼯)	210
\faInfo (ⓘ)	210
\faInfoCircle (ⓘ)	210
\faInr (₹)	27
\faInr (₹)	27
\faInstagram (ଓ)	210
\faInstitution (🏛)	212
\faInternetExplorer (_EDGE)	210
\faIntersex (⚥)	142
\faIoxhost (🌐)	210
\faItalic (.Italic)	210
\faJoomla (Joomla)	210
\faJpy (¥)	27
\faJpy (¥)	27
\faJsfiddle (♾)	210
\faKey (🔑)	210
\faKeyboard0 (⌨)	210
\faKrw (₩)	27
\faKrw (₩)	27
\faLanguage (ଓ)	210
\faLaptop (💻)	210
\faLastfm (ଓ)	210
\faLastfmSquare (ଓ)	210
\faLeaf (leaf)	210
\faLeanpub (📘)	210
\faLegal (⚖)	212
\faLemon0 (🍋)	210
\faLevelDown (⬇)	210
\faLevelUp (⬆)	210
\faLifeBouy (生命的)	212
\faLifeRing (生命的)	210
\faLifeSaver (生命的)	212
\faLightbulb0 (💡)	210
\faLineChart (📈)	210
\faLink (🔗)	210
\faLinkedin (.linkedin)	210
\faLinkedinSquare (linkedin)	210
\faLinux (🐧)	210
\faList (☰)	210
\faListAlt (☰)	210
\faListOl (☰)	210
\faListUl (☰)	210
\fallingdotseq (⋮)	56
\fallingdotseq (⋮)	55
\fallingdotseq (⋮)	63
\fallingdotseq (⋮)	60
\fallingdotseq (⋮)	58
\fallingdotseq (⋮)	63
\FallingEdge (🕒)	136
\faLocationArrow (📍)	210
\faLock (🔒)	210
\faLongArrowDown (⬇)	146
\faLongArrowLeft (⬅)	146
\faLongArrowRight (➡)	146
\faLongArrowUp (⬆)	146
falsum	see \bot
\faMagic (🧙)	210
\faMagnet (🧲)	210
\faMailForward (✉)	212
\faMailReply (✉)	212
\faMailReplyAll (✉)	212
\faMale (🚹)	210
\faMap (gMaps)	210
\faMapMarker (📍)	210
\faMap0 (gMaps)	210
\faMapPin (📍)	210
\faMapSigns (📍)	211
\faMars (♂)	138, 142
\faMarsDouble (♂)	142
\faMarsStroke (♂)	142
\faMarsStrokeH (☿)	142
\faMarsStrokeV (♂)	142
\faMaxcdn (.maxcdn)	211
\faMeanpath (mean)	211
\faMedium (Ⓜ)	211
\faMedkit (💊)	211
\faMeh0 (☺)	211
\faMercury (☿)	138
\faMicrophone (🎤)	211
\faMicrophoneSlash (Slash)	211
\faMinus (⊖)	211
\faMinusCircle (⊖)	211
\faMinusSquare (⊖)	211
\faMinusSquare0 (⊖)	211
\faMobile (📱)	211
\faMobilePhone (📱)	212
\faMoney (💰)	211
\faMoon0 (🌙)	138
\faMortarBoard (🎓)	212
\faMotorcycle (🏍)	211
\faMousePointer (🖱)	211
\faMusic (🎵)	211
\faNavicon (☰)	212
\Fancontent (---	127

\fancy borders	218–226
\faNeuter (♀)	142
\faNewspaper0 (📰)	211
\fanncontent (━)	127
\fannquant (━)	127
\fannquantn (━)	127
\fannquantnn (━)	127
\fanoven (▣)	205
\fanquant (━)	127
\fanquants (━)	127
\fanquantnn (━)	127
\faObjectGroup (▣)	211
\faObjectUngroup (▣)	211
\faOdnoklassniki (❖)	211
\faOdnoklassnikiSquare (❖)	211
\faOpenCart (⤓)	211
\faOpenid (⌚)	211
\faOpera (ଓ)	211
\faOptinMonster (✉)	211
\faOutdent (▬)	211
\faPagelines (建档立)	211
\faPaintBrush (🖌)	211
\faPaperclip (📎)	211
\faPaperPlane (✈)	211
\faPaperPlane0 (✈)	211
\faParagraph (¶)	211
\faPaste (📋)	212
\faPause (⏸)	211
\faPaw (🐾)	211
\faPaypal (🅿)	211
\faPencil (✎)	147
\faPencilSquare (▣)	147
\faPencilSquare0 (▣)	147
\faPhone (📞)	211
\faPhoneSquare (▣)	211
\faPhoto (📸)	212
\faPicture0 (🖼)	211
\faPieChart (🥧)	211
\faPiedPiper (⚡)	211
\faPiedPiperAlt (⚡)	211
\faPinterest (❖)	211
\faPinterestP (❖)	211
\faPinterestSquare (❖)	211
\faPlane (✈)	208
\faPlay (▶)	208
\faPlayCircle (●)	208
\faPlayCircle0 (●)	208
\faPlug (🔌)	208
\faPlus (+)	208
\faPlusCircle (+)	208
\faPlusSquare (+)	208
\faPlusSquare0 (⊕)	208
\faPowerOff (ⓧ)	208
\faPrint (🖨)	208
\faPuzzlePiece (🧩)	208
\faQq (ʗ)	208
\faQrcode (QR)	208
\faQuant (━)	127
\faQuantn (━)	127
\faQuantnn (━)	127
\faQuestion (?)	208
\faQuestionCircle (⌚)	208
\faQuoteLeft (“)	208
\faQuoteRight (”)	208
\faRa (ଓ)	212
\faRandom (🎲)	208
\faRebel (❖)	208
\faRecycle (♻)	209
\faReddit (reddit)	209
\faRedditSquare (reddit)	209
\faRefresh (⟳)	209
\faRegistered (®)	28
\faRemove (✖)	150
\faRenren (人人)	209
\faReorder (☰)	212
\faRepeat (⟳)	146
\faReply (✉)	209
\faReplyAll (✉)	209
\faRetweet (🔁)	209
\faRmb (¥)	27
\faRoad (🛣)	209
\faRocket (🚀)	209
\faRotateLeft (↺)	146
\faRotateRight (↻)	146
\faRouble (₽)	27
\faRss (RSS)	209
\faRssSquare (RSS)	209
\faRub (₽)	27
\faRub (₽)	27
\faRuble (₽)	27
\faRupee (₹)	27
\faSafari (🌐)	209
\faSave (💾)	212
\faScissors (✂)	209
\faSearch (🔍)	209
\faSearchMinus (🔍)	209
\faSearchPlus (🔍)	209
\faSellsy (🛒)	209
\faSend (✉)	212
\faSend0 (✉)	212
\faServer (💻)	209
\faShare (🔗)	209
\faShareAlt (🔗)	209
\faShareAltSquare (🔗)	209
\faShareSquare (🔗)	209
\faShareSquare0 (🔗)	209
\faShekel (₪)	27
\faSheqel (₪)	27
\faShield (🛡)	209
\faShip (🚢)	209
\faShirtsinbulk (👕)	209
\faShoppingCart (🛒)	209
\faSignal (📶)	209
\faSignIn (➡)	209
\faSignOut (➡)	209
\faSimplybuilt (▣)	209
\faSitemap (网站地图)	209
\faSkyatlas (❖)	209
\faSkype (ଓ)	209
\faSlack (slack)	209
\faSliders (-slider)	209
\faSlideshare (slideshare)	209
\faSmile0 (☺)	209
\faSoccerBall0 (⚽)	212
\faSort (⬇)	209
\faSortAlphaAsc (⤒)	209
\faSortAlphaDesc (⤒)	209
\faSortAmountAsc (⤓)	209
\faSortAmountDesc (⤓)	209
\faSortAsc (↑)	209
\faSortDesc (↓)	209
\faSortDown (⬇)	212
\faSortNumericAsc (⤓)	209
\faSortNumericDesc (⤓)	209
\faSortUp (↑)	212
\faSoundcloud (☁)	209
\faSpaceShuttle (航天飞机)	210
\faSpinner (.spinner)	210
\faSpoon (🍴)	210
\faSpotify (.spotify)	210
\faSquare (▣)	157
\faSquare0 (□)	157
\faStackExchange (.StackExchange)	210
\faStackOverflow (.stackoverflow)	210
\faStar (★)	152
\faStarHalf (HALF)	152
\faStarHalfEmpty (HALF)	152
\faStarHalfFull (HALF)	152
\faStarHalf0 (★)	152
\faStarHalf0 (★)	152
\faStar0 (☆)	152
\faSteam (steam)	210
\faSteamSquare (steam)	210
\faStepBackward (⬅)	210
\faStepForward (➡)	210
\faStethoscope (ঔষধ)	210
\faStickyNote (sticky-note)	210
\faStickyNote0 (sticky-note)	210
\faStop (⏹)	210
\faStreetView (street-view)	210
\faStrikethrough (del)	210
\faStumbleupon (stumbleupon)	210
\faStumbleuponCircle (stumbleupon)	210
\faSubscript (x₂)	210
\faSubway (subway)	210
\faSuitcase (กระเป๋าเดินทาง)	210
\faSun0 (☀)	138
\faSuperscript (x²)	210
\faSupport (support)	212
\faTable (table)	210
\faTablet (tablet)	210

\faTachometer (⌚)	210
\faTag (>tag)	210
\faTags (tags)	210
\faTasks (tasklist)	210
\faTaxi (taxi)	210
\fatbslash (\`)	33
\fatbslash (\~)	63
\faTelevision (tv)	210
\faTencentWeibo (微博)	210
\faTerminal (>_)	210
\faTextHeight (T!)	210
\faTextWidth (T)	210
\faTh (grid)	210
\faThLarge (grid)	210
\faThList (grid)	210
\faThumbsDown (👎)	148
\faThumbs0Down (👎)	148
\faThumbsUp (👍)	148
\faThumbsUp (👍)	148
\faThumbTack (📌)	210
\faTicket (ticket)	210
\faTimes (✗)	150
\faTimes (✗)	150
\faTimesCircle (➊)	150
\faTimesCircle0 (➊)	150
\faTint (💧)	210
\faToggleDown (☒)	212
\faToggleLeft (☒)	212
\faToggleOff (Ѡ)	210
\faToggleOn (>O)	210
\faToggleRight (☒)	212
\faToggleUp (☒)	212
\faTrademark (TM)	28
\faTrain (train)	210
\faTransgender (⚧)	142
\faTransgender (⚧)	142
\faTransgenderAlt (⚧)	142
\faTrash (trash)	210
\faTrash0 (trash)	210
\faTree (tree)	210
\faTrello (trello)	210
\faTripadvisor (TripAdvisor)	210
\faTrophy (trophy)	210
\faTruck (truck)	211
\faTry (try)	27
\faTry (try)	27
\fatsemi (;)	33
\fatsemi (;)	36
\fatslash (\//)	33
\fatslash (\//)	62
\faTty (terminal)	211
\faTumblr (t)	211
\faTumblrSquare (t)	211
\faTurkishLira (₺)	27
\faTv (tv)	212
\faTwitch (twitch)	211
\faTwitter (twitter)	211
\faTwitterSquare (t)	211
\faUmbrella (umbrella)	211
\faUnderline (underline)	211
\faUndo (undo)	146
\faUndo (undo)	146
\faUniversity (university)	211
\faUnlink (unlink)	212
\faUnlock (unlock)	211
\faUnlockAlt (unlock)	211
\faUnsorted (unsorted)	212
\faUpload (upload)	211
\faUsd (\$)	27
\faUsd (\$)	27
\faUser (user)	211
\faUserMd (user)	211
\faUserPlus (user)	211
\faUsers (users)	211
\faUserSecret (user)	211
\faUserTimes (user)	211
\faVenus (VENUS)	138, 142
\faVenusDouble (VENUS)	142
\faVenusMars (VENUS)	142
\faViacoin (VIA)	27
\faVideoCamera (video)	211
\faVimeo (vimeo)	211
\faVimeoSquare (vimeo)	211
\faVine (vine)	211
\faVkontakte (vk)	211
\faVolumeDown (volume)	211
\faVolumeOff (volume)	211
\faVolumeUp (volume)	211
\faWarning (warning)	212
\faWechat (wechat)	212
\faWeibo (weibo)	211
\faWeixin (weixin)	211
\faWhatsapp (whatsapp)	211
\faWheelchair (wheelchair)	211
\faWifi (wifi)	211
\faWikipediaW (wikipedia)	211
\faWindows (windows)	211
\faWon (won)	27
\faWordpress (wordpress)	211
\faWrench (wrench)	211
\fAX (FAX)	142
\fax (fax)	142
\faXing (xing)	211
\faKingSquare (king)	211
\Faxmachine (fax)	142
\faYahoo (yahoo)	211
\faYc (yc)	212
\faYCombinator (yc)	211
\faYCombinatorSquare (yc)	212
\faYcSquare (yc)	212
\faYelp (yelp)	211
\faYen (yen)	27
\faYoutube (youtube)	211
\faYoutubePlay (youtube)	211
\faYoutubeSquare (youtube)	211
\fbowtie (bowtie)	63
fc (package)	17, 22
\fcdice (dice)	193
\fcfont (package)	256
\fcmp (;	37
\Fcontent (content)	127
\fcscore (score)	194
.fd files	13, 248, 255
\fdiagovnearrow (diagonal arrow)	91
\fdiagovrdiag (diagonal arrow)	132
\fdsymbol (package)	35, 36, 39, 40, 48, 49, 60, 61, 69, 73, 77, 84–88, 97, 98, 103, 105, 110, 111, 115, 118, 126, 129, 131, 153, 158, 170, 256, 257
feet	see \prime and \textquotesingle
\FEMALE (♀)	142
\Female (♀)	142
female	19, 137–139, 142, 207–212, 215–218
\female (♀)	142
\female (♀)	142
\FemaleFemale (♀)	142
\FemaleMale (♂)	142
\Ferli (ferli)	174
\fermata	178
\fermata (fermata)	177
\fermatadown (fermatadown)	171
\fermataup (fermataup)	171
\Fermi (fermi)	174
\fermiDistrib (fermidistribution)	143
\fermion (fermion)	143
fermions	143–144
feyn (package)	143, 256, 257
Feynman slashed character notation	240
Feynman-diagram symbols	143
\feyn{a} (a)	143
\feyn{c} (c)	143
\feyn{fd} (fd)	143
\feyn{flS} (flS)	143
\feyn{fly} (fly)	143
\feyn{fs} (fs)	143
\feyn{fu} (fu)	143
\feyn{fv} (fv)	143
\feyn{f} (f)	143
\feyn{g1} (g1)	143
\feyn{gd} (gd)	143
\feyn{glB} (glB)	143
\feyn{glS} (glS)	143
\feyn{glu} (glu)	143
\feyn{gl} (gl)	143
\feyn{gu} (gu)	143
\feyn{gvs} (gvs)	143
\feyn{gv} (gv)	143
\feyn{g} (g)	143

\feyn{hd} (\textbackslash)	143
\feyn{hs} (_)	143
\feyn{hu} (\textbackslash)	143
\feyn{h} (__)	143
\feyn{ms} (_)	143
\feyn{m} (\textbar)	143
\feyn{P} (\bullet)	143
\feyn{p} (\textcircled{p})	143
\feyn{x} (\textcircled{q})	143
fez	116
\FF (\textcircled{f})	141
fge (package)	94, 106, 115, 128, 133, 256, 257
\fgeA (\textcircled{V})	106
\fgebackslash (\textbackslash)	133
\fgebaracute (\textcircled{z})	133
\fgebarcap (\textcircled{z})	133
\fgec (\textcircled{z})	106
\fgecap (\textcircled{c})	133
\fgecapbar (\textcircled{c})	133
\fgecup (\textcircled{u})	133
\fgecupacute (\textcircled{u})	133
\fgecupbar (\textcircled{u})	133
\fged (\textcircled{p})	106
\fgee (\textcircled{d})	106
\fgeesett (g)	106
\fgeeta (\textcircled{y})	106
\fgef (\textcircled{J})	106
\fgef (\textcircled{f})	106
\fgeinfty (\textcircled{\infty})	133
\fgelangle (\textcircled{\langle})	133
\fgelb	106
\fgelb (\textcircled{y})	106
\fgeleftB (\textcircled{m})	106
\fgeleftC (\textcircled{o})	106
\fgeN (\textcircled{y})	106
\fgeoverU (\textcircled{y})	106
\fgerightarrow (\textcircled{\rightarrow})	94
\fgerightB (\textcircled{w})	106
\fges (f)	106
\fgestruckone (\textcircled{1})	128
\fgestruckzero (\textcircled{0})	128
\fgeU (\textcircled{U})	106
\fgeuparrow (\textcircled{\uparrow})	94
\fgeupbracket (\textcircled{u})	133
field (\mathbb{F})	see alphabets, math
\file (\textcircled{<=})	195
file extensions	
.dvi	252
.fd	13, 248, 255
.mf	13, 213, 246
.otf	170
.pdf	252
.sty	13
.tex	252, 254
.tfm	13, 134, 213, 235, 255
file symbols	208–212
\FilledBigCircle (\textcircled{●})	155
\FilledBigDiamondshape (\textdiamond)	156
\FilledBigSquare (\textsquare)	156
\FilledBigTriangleDown (\texttriangledown)	156
\FilledBigTriangleLeft (\texttriangleleft)	156
\FilledBigTriangleRight (\texttriangleright)	155
\FilledBigTriangleUp (\texttriangleup)	155
\FilledCircle (\textbullet)	155
\FilledCloud (\textcloud)	192
\filleddiamond (\textdiamond)	39
\FilledDiamondShadowA (\textdiamond)	155
\FilledDiamondShadowC (\textdiamond)	155
\FilledDiamondshape (\textdiamond)	155
\FilledHut (\texttriangleup)	192
\filledlargestar (\textstar)	153
\filledlozenge (\textdiamond)	153
\filledmedlozenge (\textdiamond)	153
\filledmedsquare (\textsquare)	39
\filledmedtriangledown (\texttriangledown)	39, 76
\filledmedtriangleleft (\texttriangleleft)	39, 76
\filledmedtriangleright (\texttriangleright)	39, 76
\filledmedtriangleup (\texttriangleup)	39, 76
\FilledRainCloud (\textcloud)	192
\FilledSectioningDiamond (\textdiamond)	192
\FilledSmallCircle (\textbullet)	155
\FilledSmallCircle (\textbullet)	156
\FilledSmallDiamondshape (\textdiamond)	155
\FilledSmallSquare (\textsquare)	155
\FilledSmallTriangleDown (\texttriangledown)	155
\FilledSmallTriangleLeft (\texttriangleleft)	155
\FilledSmallTriangleRight (\texttriangleright)	155
\FilledSmallTriangleUp (\texttriangleup)	155
\FilledSnowCloud (\textcloud)	192
\FilledSquare (\textsquare)	155
\filledsquare (\textsquare)	39
\FilledSquareShadowA (\textsquare)	155
\FilledSquareShadowC (\textsquare)	155
\filledsquarewithdots (.)	159
\filledstar (\textstar)	39
\FilledSunCloud (\textcloud)	192
\FilledTriangleDown (\texttriangledown)	155
\filledtriangledown (\texttriangledown)	39, 76
\FilledTriangleLeft (\texttriangleleft)	155
\filledtriangleleft (\texttriangleleft)	39, 76
\FilledTriangleRight (\texttriangleright)	155
\filledtriangleright (\texttriangleright)	39, 76
\FilledTriangleUp (\texttriangleup)	156
\filledtriangleup (\texttriangleup)	39, 76
\FilledWeakRainCloud (\textcloud)	192
finger, pointing	see fists
finite field (\mathbb{F})	see alphabets, math
\Finland (\textfinland)	203
\finpartvoice (\textfinpartvoice)	24
\finpartvoiceless (\textfinpartvoiceless)	24
\fint (f)	45
\fint (f)	53
\fint (f)	46
\fint (f)	48
\fint (f)	49
\fintsI (f)	51
\fintup (f)	51
\Finv (f)	104
\Finv (f)	104
\Finv (f)	105
\Finv (f)	105
\Finv (f)	105
\Fire (\textfire)	192, 206
\Fire (\texttriangle)	139
fish	219–220
fish hook	see \strictif
\fisheye (\textcircled{O})	154
fists	148, 213
\fivedots (..)	34, 126
\FiveFlowerOpen (\textcircled{*})	151
\FiveFlowerPetal (\textcircled{*})	151
\FiveStar (\textstar)	151
\FiveStarCenterOpen (\textstar)	151
\FiveStarConvex (\textstar)	151
\FiveStarLines (\textstar)	151
\FiveStarOpen (\textstar)	151
\FiveStarOpenCircled (\textcircled{*})	151
\FiveStarOpenDotted (\textstar)	151
\FiveStarOutline (\textstar)	151
\FiveStarOutlineHeavy (\textstar)	151
\FiveStarShadow (\textstar)	151
\Fixedbearing (\texttriangle)	142
\fixedddots (..)	125
\fixedvdots (:)	125
fixmath (package)	250

\fj (fj)	21
\FL (L)	140
\f1 (b)	173
\Flag (↑)	192
\flageolett (P)	171
flags 192, 205, 207–212, 229–230	
\flap (r)	21
\flapr (r)	20
\Flasche (Ø)	205
\flat (b)	170
\flat (b)	170
\flat (b)	170
\flat (b)	176
\flat (b)	170
\flat (b)	170
\flatflat (bb)	176
\Flatsteel (–)	142
fletched arrows	94, 145
flourons	152, 159, 218–219
\Florin (₱)	27
florin see \textflorin	
flourishes	159, 222
\floweroneleft (⌚)	152
\floweroneright (⌚)	152
flowers	151, 152, 207–208, 218–220
\fltns (△)	154
Flynn, Peter	239
\FM (₱)	140
\Fncontent (—)	127
\Fnnccontent (—)	127
\Fnnquant (π—)	127
\Fnnquantn (π—π)	127
\Fnnquantnn (π—π)	127
\Fnquant (π—)	127
\Fnquantn (π—π)	127
\Fnquantnn (π—π)	127
\fnsymbol	194
\Fog (✉)	192
\font	13
font encodings 13, 15–18, 21, 22, 25, 238, 243, 250–252, 256	
7-bit	13
8-bit	13
ASCII	256
Cyrillic	22
document	252
Latin 1	256
limiting scope of	13
LY1	13
OT1	13, 16, 22, 243, 250–252
OT2	238
T1	13, 15, 16, 18, 22, 251, 252
T2A	22, 238
T2B	22
T2C	22
T4	17, 21, 22, 25
T5	17, 22
TS1	238, 252
U	238
X2	22
fontawesome (package)	27, 28, 138, 142, 146–148, 150, 152, 157, 208, 211, 256, 257
fontdef.dtx (file)	239, 243
fontenc (package) 13, 16, 18, 22, 252	
\fontencoding	13
fonts	
Calligra	134
Charter	27, 54
Computer Modern 95, 235, 237, 251	
CountriesOfEurope	204
Courier	27
Emmentaler	176
Garamond	27, 54
Helvetica	27
“pi”	238
Soyombo	202
Symbol	102, 238
Times Roman	27, 237
Type 1	248, 249
Utopia	27, 54
Zapf Chancery	134
Zapf Dingbats	145, 150
\fontsize	235, 237
fontspec (package)	170, 255
\Football (⚽)	191
\forall (forall) (forall) (forall)	104
\forall (forall) (forall) (forall)	105
\forall (forall) (forall) (forall)	104
\forall (forall) (forall) (forall)	105
\forall (forall) (forall) (forall)	105
\Force (↓)	142
\Fork (!)	205
\forks (ψ)	65
\forksnot (ψ)	63
\forkv (ռ)	62
\forkv (ռ)	63
forte (f)	176, 188
\Fortune (⊗)	139
\Forward (►)	191
\ForwardToEnd (►!)	191
\ForwardToIndex (►►!)	191
\FourAsterisk (✚)	151
\FourCloverOpen (❀)	151
\FourCloverSolid (♣)	151
\Fourier (—○)	67
fourier (package)	28, 67, 102, 106, 113, 120, 148, 152, 191, 256
\fourier (○—)	67
Fourier transform (F) see alphabets, math	
\FourStar (◆)	151
\FourStarOpen (❖)	151
\fourth (///)	130
\fourvdots (⋮)	126
\Fquan (—□—)	127
\Fquantnn (—□—π)	127
\fracslash (/)	37
fractions	133
fraktur see alphabets, math	
\France (🇫)	203
frcursive (emf package option)	137
Freemason’s cipher	200
frege (package)	127, 256, 257
Frege logic symbols 94, 106, 127, 128, 133	
Frege, Gottlob	127
\frown (¬)	54
\frown (¬)	62
\frown (¬)	60, 98
\frown (¬)	97
\frown (¬)	63
frown symbols	97, 98
\frowneq (≡)	60, 98
\frowneq (≈)	97
\frowneqsmile (Ξ)	97
\frownie (⌚)	190
\frownsmile (⌚)	60, 98
\frownsmile (⌚)	97
\frownsmileeq (⊐)	97
\Frowny (⌚)	191
frowny faces	141, 190, 191, 205–212
\fryingpan (————)	205
\FS (L)	141
\fullmoon (○)	138
\fullmoon (○)	137
\fullnote (.)	170
\fullouterjoin (☒)	132
G	
\G (՞)	22
g (esvect package option)	120
g (X)	169
gaffing hook see \strictif	
\Game (⌚)	104
\Game (⌚)	104
\Game (⌚)	105
\Game (⌚)	105
\Game (⌚)	105
game-related symbols	158, 192, 193, 195–197, 208–212, 232–235
\Gamma (Γ)	101
\gamma (γ)	101
\gammamaup (γ)	102

\Ganz (o)	172
\GaPa (–)	172
Garamond (font)	27, 54
\garlicpress (✉)	205
\Gasstove (匚)	205
\gcd (gcd)	99
\GD (Ѱ)	140
\GE (≥)	140
\ge <i>see</i> \geq	
\ge (≥)	73
\ge (≥)	75
\Gemini (♊)	138
\Gemini (♊)	138
\Gemini (♊)	139
\gemini (♊)	137
genealogical symbols	190
\geneuro (€)	28
\geneuronarrow (€)	28
\geneurowide (€)	28
gensymb (package)	136
\Gentsroom (₩)	191
geometric shapes	139, 152–158, 182–187, 196, 197, 208–215, 231
\geq (≥)	71
\geq (≥)	70, 71
\geq (≥)	73
\geq (≥)	72
\geq (≥)	74, 75
\geqclosed (⊲)	73, 77
\geqclosed (⊳)	72, 76
\geqdot (≥)	73
\geqdot (≥)	72
\geqq (≥)	71
\geqq (≥)	70
\geqq (≥)	74
\geqq (≥)	73
\geqq (≥)	72
\geqq (≥)	75
\geqlant (≥)	75
\geqlant (≥)	70, 243
\geqlant (≥)	74
\geqlant (≥)	73
\geqlant (≥)	72
\geqlant (≥)	75
\geqlantdot (≥)	73
\geqlantdot (≥)	72
\geqlcc (≥)	73
german (keystroke package op- tion)	140
Germanic runes	169
\Germany (ドイ)	204
\gescc (⤒)	73
\gescc (⤒)	75
\gesdot (⤒)	73
\gesdot (⤒)	75
\gesdototo (⤒)	75
\gesdototol (⤒)	75
\gesl (≥)	73
\gesles (≤)	75
\gets <i>see</i> \leftarrow	
\gets (←)	86
\gg (»)	71
\gg (»)	70
\gg (»)	73
\gg (»)	72
\gg (»)	75
\ggcurly (»)	56
\ggcurly (»)	62
\ggg (»)	71
\ggg (»»)	70
\ggg (»» vs. »)	236
\ggg (»»)	74
\ggg (»»)	73
\ggg (»»)	72
\ggg (»»)	75
\gggnest (»)	75
\gggtr <i>see</i> \ggg	
\gggtr (»»)	73
\gggtr (»»)	72
\gggtr (»»)	75
ghosts	41, 124, 200
Gibbons, Jeremy	258
\gimel (ג)	103
\gimel (ל)	104
\gimel (ם)	103
\gimel (ׁ)	103
\gimel (ׂ)	104
\girl (♀)	138
\gla (×)	75
\glE (≡)	75
\gleichstark (≡)	63
\gl (×)	74
\glj (×)	75
globe	191
\glotstop (?)	20
\glottal (?)	21
\Gloves (⌚)	205
\Gluon (g)	143
\gluon (Ϝ)	136
gluons	143
\gnapprox (≈)	71
\gnapprox (≈)	70
\gnapprox (≈)	74
\gnapprox (≈)	73
\gnapprox (≈)	72
\gnapprox (≈)	75
\gneq (≥)	71
\gneq (≥)	70
\gneq (≥)	74
\gneq (≥)	73
\gneq (≥)	75
\gneqq (≥)	71
\gneqq (≥)	70
\gneqq (≥)	74
\gneqq (≥)	73
\gneqq (≥)	75
\gneqq (≥)	71
\gneqq (≥)	74
\gneqq (≥)	70
\gneqq (≥)	74
\gneqq (≥)	73
\gneqq (≥)	72
\gneqq (≥)	75
\grater (➤)	205
\grave (grave)	115
\grave (grave)	114
grave (grave) <i>see</i> accents	
\gravis (grave)	25
\graviton (g)	143
\GreatBritain (🇬)	204
greater-than signs <i>see</i> inequalities	
greatest lower bound <i>see</i> \sqcap	
\greatpumpkin (🎃)	41
\Greece (그리스)	204
Greek	17, 101, 102
blackboard bold	135
bold	101, 250
coins	28
letters	17, 101, 102, 135, 166, 250
numerals	166
polytonic	17, 101, 102
upright	17, 102
greek (babel package option)	17, 101, 102, 166
Green Dot <i>see</i> \Greenpoint and \PackingWaste	
\Greenpoint (⌚)	201
greenpoint (package)	213, 256
Gregorian music	172
\gregorianCclef (⌚)	172
\gregorianFclef (⌚⌚)	172
Gregorio, Enrico	114, 240
Griffith's separation vector (϶)	134
\grimace (☺)	191
Grüne Punkt <i>see</i> \Greenpoint and \PackingWaste	
\GS (↔)	141
\gsime (≥)	75
\gsiml (≥)	75

\Gt (>)	74	
\Gt (>)	75	
\gtcc (>)	74	
\gtcc (>)	75	
\gtcir (>)	74	
\gtcir (>)	75	
\gtlpar (>)	129	
\gtlpar (>)	129	
\gtquest (>)	74	
\gtr (>)	73	
\gtr (>)	72	
\gtrapprox (\~\~)	71	
\gtrapprox (\~\~)	70	
\gtrapprox (\~\~)	74	
\gtrapprox (\~\~)	73	
\gtrapprox (\~\~)	72	
\gtrapprox (\~\~)	74	
\gtrarr (\~\~)	74	
\gtrcc (>)	73	
\gtrclosed (>)	73, 77	
\gtrclosed (>)	72, 76	
\gtrdot (>)	71	
\gtrdot (>)	70	
\gtrdot (>)	36	
\gtrdot (>)	73	
\gtrdot (>)	72	
\gtrdot (>)	74	
\gtreqless (\~\~)	71	
\gtreqless (\~\~)	70	
\gtreqless (\~\~)	74	
\gtreqless (\~\~)	73	
\gtreqless (\~\~)	72	
\gtreqless (\~\~)	74	
\gtreqlesslant (\~\~)	74	
\gtreqlesslant (\~\~)	72	
\gtreqqless (\~\~\~\~)	71	
\gtreqqless (\~\~\~\~)	70	
\gtreqqless (\~\~\~\~)	74	
\gtreqqless (\~\~\~\~)	73	
\gtreqqless (\~\~\~\~)	72	
\gtreqqless (\~\~\~\~)	74	
\gtreqslantless (\~\~)	73	
\gtreqless (\~\~)	71	
\gtreqless (\~\~)	70	
\gtreqless (\~\~)	74	
\gtreqless (\~\~)	73	
\gtreqless (\~\~)	72	
\gtreqless (\~\~)	74	
\gtreqqless (\~\~\~\~)	74	
\gtreqqless (\~\~\~\~)	73	
\gtreqqless (\~\~\~\~)	72	
\gtreqqless (\~\~\~\~)	74	
\gtreqslantless (\~\~)	73	
\gtreqless (\~\~)	71	
\gtreqless (\~\~)	70	
\gtreqless (\~\~)	74	
\gtreqless (\~\~)	73	
\gtreqless (\~\~)	72	
\gtreqless (\~\~)	74	
\gtreqqless (\~\~\~\~)	74	
\gtreqqless (\~\~\~\~)	73	
\gtreqqless (\~\~\~\~)	72	
\gtreqqless (\~\~\~\~)	74	
\gtreqslantless (\~\~)	73	
\gtreqless (\~\~)	71	
\gtreqless (\~\~)	70	
\gtreqless (\~\~)	74	
\gtreqless (\~\~)	73	
\gtreqless (\~\~)	72	
\gtreqless (\~\~)	74	
\gtreqqless (\~\~\~\~)	74	
\gtreqqless (\~\~\~\~)	73	
\gtreqqless (\~\~\~\~)	72	
\gtreqqless (\~\~\~\~)	74	
\gtreqslantless (\~\~)	73	
\gtreqless (\~\~)	71	
\gtreqless (\~\~)	70	
\gtreqless (\~\~)	74	
\gtreqless (\~\~)	73	
\gtreqless (\~\~)	72	
\gtreqless (\~\~)	74	
\gtreqqless (\~\~\~\~)	74	
\gtreqqless (\~\~\~\~)	73	
\gtreqqless (\~\~\~\~)	72	
\gtreqqless (\~\~\~\~)	74	
\gtreqslantless (\~\~)	73	
\gtreqless (\~\~)	71	
\gtreqless (\~\~)	70, 243	
\gtreqsim (\~\~)	74	
\gtreqsim (\~\~)	73	
\gtreqsim (\~\~)	72	
\gtreqsim (\~\~)	74	
\gtreqsimslant (\~\~\~\~)	243	
\GU (A)	140	
\guillemetleft («)	18, 253	
\guillemetright (»)	18, 253	
\guillemotleft	<i>see</i> \guillemetleft	
\guillemotright	<i>see</i> \guillemetright	
\guilsingleleft (⟨)	18, 254	
\guilsingleright (⟩)	18, 254	
\gvcropped („)	143	
\gvertneqq (\~\~)	71	
\gvertneqq (\~\~)	70	
\gvertneqq (\~\~)	74	
\gvertneqq (\~\~)	74	
\gvertneqq (\~\~)	72	
\gvertneqq (\~\~)	74	
H		
H (N)	169	
\H (ő)	22	
h (esvect package option)	120	
\h (H)	169	
\h (ő)	22	
h (H)	169	
Hälsinge runes	<i>see</i> staveless runes	
\HA (—)	161	
\Ha (À)	161	
háček (ˇ)	<i>see</i> accents	
\Hades (Φ)	139	
\Hail (♫)	192	
\Halb (đ)	172	
half note	<i>see</i> musical symbols	
\HalfCircleLeft (◐)	156	
\HalfCircleRight (◑)	156	
\HalfFilledHut (◓)	192	
\halflength (‘)	26	
\halfNote (đ)	174	
\halfnote (đ)	170	
\halfNoteDotted (đ..)	174	
\halfNoteDottedDouble (đ..)	174	
\halfNoteDottedDoubleDown	(đ‘‘)	174
\halfNoteDottedDown (đ‘)	174	
\halfNoteDown (đ‘)	174	
\halfNoteRest (—)	176	
\halfNoteRestDotted (—.)	176	
\HalfSun (☼)	192	
Halloween symbols	41, 124	
hallownumber (package)	41, 98, 116, 123, 124, 256, 257	
Hamiltonian (H)	<i>see</i> alphabets, math	
\HandCuffLeft (⌚)	148	
\HandCuffLeftUp (⌚)	148	
\HandCuffRight (⌚)	148	
\HandCuffRightUp (⌚)	148	
\HandLeft (⌚)	148	
\HandLeftUp (⌚)	148	
\HandPencilLeft (⌚)	148	
\HandRight (⌚)	148	
\HandRightUp (⌚)	148	
hands	<i>see</i> fists	
hands (package)	213, 256	
\Handwash (🚿)	191	
\HaPa (▬)	172	
harmony (package)	172, 174, 256, 257	
harpoon (package)	94, 256, 257	
harpoons	78–80, 83, 84, 88, 90, 93–95, 231	
\hash (#)	130	
\hash (#)	62	
hash mark	<i>see</i> \# and \hash	
\hat (▀)	115	
\hat (▀)	114	
\hat[ash] (܂)	116	
\hat[beret] (܂)	116	
\hat[cowboy] (܂)	116	
\hat[crown] (܂)	116	
\hat[dunce] (܂)	116	
\hat[fez] (܂)	116	
\hat[santa] (܂)	116	
\hat[sombrero] (܂)	116	
\hat[tophat] (܂)	116	
\hat[witch] (܂)	116	
\hatatapprox (≈)	63	
\hateq (≡)	60	
\hateq (≡)	57	
\hausaB (߁)	21	
\hausab (߁)	21	
\hausaD (߁)	21	
\hausad (߁)	21	
\hausaK (߁)	21	
\hausak (߁)	21	
\HB (߁)	161	
\Hb (߁)	161	
\HBar (—)	156	
\hbar (ħ)	104, 239	
\hbar (ħ)	105	
\hbar (ħ)	105	
\hbar (ħ)	105	
\hbipropto (∞)	34	
\hbond (↔)	143	
\HC (߁)	161	
\Hc (߁)	161	
\hcrossing (×)	57	
\HCthousand (߁)	161	
\HD (߁)	161	
\Hd (߁)	161	
\hddotdot (..)	35, 126	
\hddotdot (..)	34, 126	

\hdots (…)	126
\hdots (…)	126
\Hdual (〃)	161
\HE (ゑ)	161
\He (ゑ)	161
heads	<i>see</i> faces
\Heart (♡)	191
heartctrbull (bullcntr package option)	194
\heartctrbull	194
hearts	139, 158, 159, 207–212
\heartsuit (♥)	158
\heavyqleft (‘‘)	205
\heavyqright (‘‘)	205
Hebrew	103, 104, 135
Helvetica (font)	27
\hemibelion (c)	28
\Herd (ゑ)	205
\HERMAPHRODITE (⚥)	142
\Hermaphrodite (⚥)	142
\Hermaphrodite (⚥)	142
\hermitmatrix (⊖)	131
\hermitmatrix (⊖)	132
\Heta (ῃ)	166
\heta (ῃ)	166
\hexago (◑)	157
\hexagocross (◑)	157
\hexagodot (◑)	157
\hexagofill (●)	157
\hexagofillha (◐)	157
\hexagofillhb (◑)	157
\hexagofillhl (◑)	157
\hexagofillhr (◑)	157
\hexagolineh (⊖)	157
\hexagolinev (◑)	157
\hexagolinevh (⊕)	157
\hexagon (◑)	154
\hexagon (◑)	152
\hexagonblack (◑)	154
hexagons	157–158
\Hexasteel (●)	142
\hexstar (*)	150
\HF (≈)	136
\HF (≂)	161
\Hf (≂)	161
\hfermion (◑)	143
\hfil	240
\HG (▽)	161
\Hg (ゑ)	161
\HH	174
\HH (ゑ)	161
\Hh (ゑ)	161
hhcount (package)	193, 194, 256
257	
\Hhundred (㌱)	161
\HI (㌱)	161
\Hi (ି)	161
\hiatus (ି)	198
\Hibl (ି)	161
\Hibp (ି)	161
\Hibs (ି)	161
\Hibw (ି)	161
\Hidalgo (ି)	139
hierogl (package)	161, 256, 257
hieroglyphics	161
\Higgsboson (ଆ)	143
Hilbert space (ି)	<i>see</i> alphabets, math
\hill (ଉ)	24
Hirst, Daniel	170
\HJ (ି)	161
\Hj (ଉ)	161
\HK (ି)	161
\Hk (ି)	161
\hknearrow (↗)	86
\hknearrow (↖)	91
\hknarrow (⤏)	86
\hknarrow (⤏)	91
\hksearrow (⤏)	91
\hksearrow (⤏)	86
\hksqrt (ୟ)	242
\hkswarow (⤏)	91
\hkswarow (⤏)	86
\HL (ି)	161
\Hl (ଉ)	161
\HM (ି)	161
\Hm (ଉ)	161
\Hman (ି)	161
\Hmillion (ୟ)	161
\hmleftpitchfork (—)	98
\hmrightpitchfork (—)	98
\Hms (ି)	161
\HN (ୟ)	161
\Hn (ୟ)	161
\HO (ଓ)	161
\Ho (ଓ)	161
\hole (h ⁺)	143
\HollowBox (□)	149
Holmes, Sherlock	229
Holt, Alexander	1, 255
\holter (ି)	125
holtpolt (package)	125, 256
\hom (hom)	99
\Home (Home)	140



\Homer (ହମେର)	198
\Hone (ହନେ)	161
hook accent (ᬁ)	<i>see</i> accents
\hookb (ବ)	20
\hookd (ଦ)	21
\hookd (ଦ)	20
\hookdownarrow (ନ୍ତା)	85
\hookdownminus (ନ୍ତିମ୍ବ)	131
\hookdownminus (ନ୍ତିମ୍ବ)	131
\hookg (ଗ୍ରୀକ ଗ୍ରୀକ)	20
\hookh (ହୀପ୍ରୀଟିକ ହୀପ୍ରୀଟିକ)	20
\hookheng (ଫ୍ରେଣ୍ଡଲ୍ ଫ୍ରେଣ୍ଡଲ୍)	20
\hookleftarrow (ଲୋକ୍ଟାର୍ରୋ)	78
\hookleftarrow (ଲୋକ୍ଟାର୍ରୋ)	89
\hookleftarrow (ଲୋକ୍ଟାର୍ରୋ)	85
\hookleftarrow (ଲୋକ୍ଟାର୍ରୋ)	81
\hookleftarrow (ଲୋକ୍ଟାର୍ରୋ)	95
\hookleftarrow (ଲୋକ୍ଟାର୍ରୋ)	91
\hooknearrow (ଲୋକ୍ଟାର୍ରୋ)	85
\hooknwarrow (ଲୋକ୍ଟାର୍ରୋ)	85
\hookrevepsilon (ସ୍ରୀପ୍ରେଷିପ୍ରୋନ୍ତିମ୍ବ)	20
\hookrightarrow (ଲୋକ୍ଟାର୍ରୋ)	78
\hookrightarrow (ଲୋକ୍ଟାର୍ରୋ)	89
\hookrightarrow (ଲୋକ୍ଟାର୍ରୋ)	85
\hookrightarrow (ଲୋକ୍ଟାର୍ରୋ)	81
\hookrightarrow (ଲୋକ୍ଟାର୍ରୋ)	95
\hookrightarrow (ଲୋକ୍ଟାର୍ରୋ)	91
\hooksearrow (ଲୋକ୍ଟାର୍ରୋ)	85
\hookswarrow (ଲୋକ୍ଟାର୍ରୋ)	85
\hookuparrow (ଉୁପାର୍କ୍ଷୀର୍ଣ୍ଣାର୍କ୍ଷାର୍କ୍ଷ)	85
\hookupminus (ଉୁପମିନ୍ବ)	36
\hookupminus (ଉୁପମିନ୍ବ)	131
Horn, Berthold	135
\hoshi (ହୋଶି)	197
\hourglass (ସାର୍କ୍ଷାର୍କ୍ଷ)	36
\hourglass (ସାର୍କ୍ଷାର୍କ୍ଷ)	41
\house (ଘାର୍)	154
\HP (ହେପ୍ପାର୍କ୍ଷ)	161
\Hp (ହେପ୍ପାର୍କ୍ଷ)	161
\hpause (ହେପ୍ପାର୍କ୍ଷ)	171
\Hplural (ହେପ୍ପାର୍କ୍ଷ)	161
\Hplus (ହେପ୍ପାର୍କ୍ଷ)	161
\HQ (ହେପ୍ପାର୍କ୍ଷ)	161
\Hq (ହେପ୍ପାର୍କ୍ଷ)	161
\Hquery (ହେପ୍ପାର୍କ୍ଷ)	161
\HR (ହେପ୍ପାର୍କ୍ଷ)	161
\Hr (ହେପ୍ପାର୍କ୍ଷ)	161
\hrectangle (କାର୍ଯ୍ୟକ୍ଷାର୍କ୍ଷ)	154
\hrectangleblack (କାର୍ଯ୍ୟକ୍ଷାର୍କ୍ଷ)	154
\HS (ହେପ୍ପାର୍କ୍ଷ)	161
\Hs (ହେପ୍ପାର୍କ୍ଷ)	161
\hs (ହେପ୍ପାର୍କ୍ଷ)	171
\Hscribe (ହେପ୍ପାର୍କ୍ଷ)	161

\Hslash ()	161	\iddots ()	243
\hslash (\hbar)	104	\idotsint ($\int \cdots \int$)	43
\hslash (\hbar)	105	\idotsint ($\int \cdots \int$)	45
\hslash (\hbar)	105	\idotsint ($\int \cdots \int$)	53
\hslash (\hbar)	105	\idotsint ($\int \cdots \int$)	53
\Hsv (\curvearrowleft)	161	\idotsint ($\int \cdots \int$)	48, 49
\HT (\circ)	141	\idotsint ($\int \cdots \int$)	47
\HT (\equiv)	161	\iff <i>see</i> \Longleftrightarrow	
\Ht (Δ)	161	\ifsym (package)	136, 155, 156, 192, 236, 238, 256, 257
\Hten (\cap)	161	\igo (package)	196, 256
\Hthousand ($\ddot{\text{A}}$)	161	\igocircle (\bullet)	196
\Htongue (\curvearrowright)	161	\igocircle (\odot)	196
\HU ($\ddot{\text{I}}$)	161	\igocross (\times)	196
\Hu ($\ddot{\text{I}}$)	161	\igocross (\otimes)	196
Hungarian umlaut ($\ddot{\text{U}}$)	<i>see</i> accents	\igonone (\bullet)	196
\Hungary (\bullet)	204	\igonone (\odot)	196
\Hut (\triangle)	192	\igosquare (\square)	196
\HV (\parallel)	161	\igosquare (\square)	196
\Hv (\bowtie)	161	\igotriangle (\triangle)	196
\hv (hv)	20	\igotriangle (\triangle)	196
\Hvbar ()	161	\iiint (\iiiiii)	43
\HW (\circledR)	161	\iiint (\iiiiii)	45
\Hw (H_w)	161	\iiint (\iiiiii)	53
\HX (\bowtie)	161	\iiint (\iiiiii)	46
\Hx ($\ddot{\text{I}}$)	161	\iiint (\iiiiii)	48
\HXthousand ($\ddot{\text{J}}$)	161	\iiint (\iiiiii)	47
\HY ($\ddot{\text{J}}$)	161	\iiint (\iiiiii)	49
\Hy ($\ddot{\text{H}}$)	161	\iiintsl (\iiiiii)	51
\Hygiea ($\ddot{\text{Y}}$)	139	\iiintup (\iiiiii)	51
hyphen, discretionary	252	\iiint (\iiiiii)	44
\hyphenbullet (\bullet)	132	\iiint (\iiiiii)	43
\HZ (H_z)	161	\iiint (\iiiiii)	44
\Hz (Hz)	161	\iiint (\iiiiii)	45
\hzigzag ($\sim\sim$)	132	\iiint (\iiiiii)	53
I			
\I (I)	169	\iiint (\iiiiii)	46
\i	22	\iiintup (\iiiiii)	51
\i (i)	169	\iinfin (∞)	131
\i (i)	22	\iinfin (∞)	128
\i (i)	169	\iint (\iint)	44
\ialign	240, 242, 244	\iint (\iint)	43
\IB (I_B)	140	\iint (\iint)	44
\ibar ($\dot{\text{i}}$)	21	\iint (\iint)	45
IBM PC	141, 199, 251	\iint (\iint)	53
\IC (I^c)	139	\iint (\iint)	46
\Iceland (\bullet)	204	\iint (\iint)	49
Icelandic staves	199	\iint (\iint)	47
\IceMountain (Δ)	192	\iint (\iint)	50
\Id (Id)	100	\iintsl (\iint)	51
\id (id)	100	\iintup (\iint)	51
\iddots (\cdots)	126	\IJ (I_{J})	16
\ij (ij)			
\Im (\Im)	100, 104	\int (\int)	45
\Im (Im)	100	\int (\int)	44
\Im (\Im)	105	\int (\int)	44
\im (im)	100	\int (\int)	44
\im (j)	105	\int (\int)	44
\imageof ($\bullet\circ$)	97	\int (\int)	44
\imageof ($\bullet\circ$)	63	\int (\int)	44
\imath (i)	104, 114	\int (\int)	44
\imath (i)	105	\int (\int)	44
\impliedby <i>see</i> \Longleftarrow		\int (\int)	44
\implies <i>see</i> \Longrightarrow and \vdash		\int (\int)	44
impulse train	<i>see</i> sha	\int (\int)	44
\in (\in)	104	\in (\in)	104
\in (\in)	104	\in (\in)	105
\in (\in)	105	\in (\in)	105
\in (\in)	104	\in (\in)	104
\in (\in)	63	inches	<i>see</i> \second and \textquotedbl
independence		\incoherent ($\perp\!\!\!\perp$)	67
probabilistic	241	\increment (Δ)	132
statistical	241	independence	
stochastic	<i>see</i> \bot	probabilistic	241
\independent ($\perp\!\!\!\perp$)	242	statistical	241
\Industry (\bowtie)	191	stochastic	<i>see</i> \bot
inequalities	15, 70–75	\independent ($\perp\!\!\!\perp$)	242
inexact differential	<i>see</i> \dbar	\inf (inf)	99
\inf (inf)	99	infimum	<i>see</i> \inf and \sqcap
infinity	128, 130, 131, 133, 241	infinity	128, 130, 131, 133, 241
\Info (I)	191	\Info (I)	191
\Info (I)	201	information symbols	191
informator symbols	195	\informator (I)	195
\infty (∞)	130	\infty (∞)	130
\infty (∞)	130	\infty (∞)	131
\infty (∞)	131	\infty (∞)	131
\infty (∞)	131	\infty (∞)	128
\ING (I^g)	169	\ing (I^g)	169
\Ing (I^g)	169	\ing (I^g)	169
\ing (I^g)	169	\inipartvoice (I)	24
\inipartvoiceless (I)	24	\inipartvoiceless (I)	24
\injlim (inj lim)	99	\injlim (inj lim)	99
\Innocey (I^n)	206	\Innocey (I^n)	206
\inplus (E)	55	\inplus (E)	55
\inplus (e)	62	\inplus (e)	62
inputenc (package)	254	\Ins (Ins)	140
\Ins (Ins)	140	\int (\int)	45
\int (\int)	44	\int (\int)	44
\int (\int)	44	\int (\int)	44

\int (\int)	43	\intup (\int)	51	\IroningI (\square)	191
\int (\int)	53	\intx (\int)	50	\IroningII (\square)	191
\int (\int)	49	\intxsl (\int)	52	\IroningIII (\square)	191
\int (\int)	47	\intxup (\int)	52	irony mark (\circ)	238
\int (\int)	50	\inva (\mathfrak{e})	20	irrational numbers (\mathbb{J})	see alphabets, math
\intBar (\int)	49	\invamp (\mathfrak{F})	33	\Irritant (\times)	192
\intBar (\int)	50	\invamp (\mathfrak{F})	38	\isindot ($\dot{\epsilon}$)	63
\intbar (\int)	49	\invbackneg (\leftarrow)	131	\isinE (\in)	63
\intbar (\int)	50	 \INVd (INVd)	141	\isinobar ($\bar{\epsilon}$)	63
\intBarsl (\int)	51	\invdiameter (diam)	190	\isins (ϵ)	63
\intbarsl (\int)	51	\inve (\mathfrak{o})	21	\isinvb (\in)	63
\intBarup (\int)	51	inverse limit	see \varprojlim	\ismodeledby ($=\!$)	239
\intbarup (\int)	51	\inversebullet (\blacksquare)	132	ISO character entities	252
\intcap ($\int\!\!\!\cap$)	53	\inversewhitecircle (\blacksquare)	154	\isoent (package)	252
\intcap ($\int\!\!\!\cap$)	50	\InversTransformHoriz ($\bullet\circ$)	66	Isthmian script	167–168
\intcapsl ($\int\!\!\!\cap$)	52	\InversTransformVert ($\bullet\circ$)	66	italic	15, 16, 28, 246, 248, 250, 252
\intcapup ($\int\!\!\!\cap$)	52	inverted symbols	18–21, 25, 238–239	\Italy (Italy)	204
\intclockwise (\int)	53	inverters	141	J	
\intclockwise (\int)	49	\invf (\mathfrak{j})	20	J (\natural)	169
\intclockwise (\int)	54	\invglotstop (\mathfrak{s})	20	\j (\diamond)	169
\intclockwise (\int)	50	 \invh (INVh)	20	\j (\mathfrak{J})	22
\intclockwisesl (\int)	51	\INVl (INVl)	141	j (\diamond)	169
\intclockwiseup (\int)	51	\invlazys (\sim)	37	\JackStar ($\clubsuit\spadesuit$)	151
\intctrcclockwise (\int)	49	\invlegr (\mathfrak{l})	20	\JackStarBold ($\clubsuit\spadesuit$)	151
\intcup ($\int\!\!\!\cup$)	53	\invvm (invm)	20	Jewish star	150, 151
\intcup ($\int\!\!\!\cup$)	50	\invneg (\neg)	55	\jmath (\mathfrak{J})	104, 114
\intcups1 ($\int\!\!\!\cup$)	52	\invneg (\neg)	131	\jmath (\mathfrak{j})	105
\intcupup ($\int\!\!\!\cup$)	52	\invnot (\neg)	131	\jmath (\mathfrak{j})	105
\INTEGER (\mathbb{Z})	100	\invnot (\neg)	131	\Joch (Joch)	192
\Integer (\mathbb{Z})	100	\invnot (\neg)	131	\Join (\bowtie)	54, 55
integers (\mathbb{Z})	see alphabets, math	\invnot (\neg)	131	\Join (\bowtie)	36, 60
integrals	42–54, 131, 241	\invnot (\neg)	132	\Join (\bowtie)	35
product	54	 \INVr (INVr)	141	\Join (\bowtie)	132
integrals (wasysym package option)	44	\invr (\mathfrak{i})	20	\joinrel	239
\interaction (\bowtie)	143	\invscr (\mathfrak{v})	20	joint denial	see \downarrowarrow
\intercal (\top)	32	\invscripta (\mathfrak{v})	20	\Jpsimeson (\mathcal{Y})	143
\intercal (\top)	36, 105	\invsmileface (SMILE)	205	\junicode (package)	255, 256
\intercal (\top)	35	 \INVu (INVu)	141	\Junicode.ttf (file)	255
\intercal (\top)	104	\invv (\mathfrak{A})	20	\Juno (\mathfrak{Y})	139
\intercal (\top)	37, 105	\invw (\mathfrak{M})	21	\Jupiter (\mathcal{Y})	138
interior	see \mathring	\invwhitelowerhalfcircle ($\text{white}\square$)	154	\Jupiter (\mathfrak{Z})	138
\interleave ($\parallel\parallel$)	33	 \invwhiteupperhalfcircle ($\text{white}\square$)	154	\Jupiter (\mathfrak{L})	139
\interleave ($\parallel\parallel$)	37	\invy (\mathfrak{x})	21	\jupiter (\mathfrak{Y})	137
\internalsym (\boxdot)	143	\IO (\mathfrak{v})	140	K	
intersection	see \cap	\ion (\textcircledcirc)	143	\K (γ)	169
\Interval (Interval)	192	\ionicbond (\oplus)	143	\k (\textcircledleftarrow)	169
\intlarhk (\int)	53	\Iota (\mathfrak{I})	101	\k (\textcircledright)	25
\intlarhk (\int)	50	\iotaota (\mathfrak{t})	101	\k (\textcircledleftarrow)	22
\intlarhksl (\int)	52	iota, upside-down	238	k (\textless)	169
\intlarhkup (\int)	52	\iotaau (\mathfrak{t})	102	\Kaonminus (K^-)	143
\intprod (\rightarrow)	35, 36, 131	\ipagamma (\mathfrak{g})	21	\Kaonnull (K^0)	144
\intprod (\rightarrow)	37	\iperatal (peratal)	198	\Kaonplus (K^+)	144
\intprod (\rightarrow)	35, 36, 131	\Ireland (\mathfrak{s})	204	\Kappa (\mathfrak{K})	101
\intprod (\rightarrow)	37			\kappa (κ)	101
\ints1 (\int)	51				
\intup (\int)	49				

\kappaappa (κ)	102
\ker (\ker)	99
\kernelcontraction (\approx) . . .	62
\kernelcontraction (\approx) . . .	63
ket	107
\Keyboard ()	140
keyboard symbols	140
keys, computer	140
keystroke (package)	140, 256, 257
\keystroke ()	140
king	196, 233–235
\Knife ()	205
knight	196, 233–235
knitting (package)	202, 256, 257
knitting symbols	202
\Knoblauchpresse ()	205
knot (package)	222, 226, 256
knots	222–226
Knuth, Donald E.	13, 95, 250, 258
symbols by	190
\Kochtopf ()	205
\Koppa (P)	166
\koppa (\mathfrak{p})	166
\Kr ()	174
\kreuz (\star)	190
Kronecker product	see \otimes
Kronecker sum	see \oplus
\Kronos (Φ)	139
kroužek (\circledast)	see accents
\kside (\gg)	195
L	
\L (L)	16
\l (\mathfrak{l})	16
1 (\mathfrak{f})	169
\labdentalnas (m)	20
\labvel	24
\Ladiesroom ()	191
Lagrangian (\mathcal{L})	see alphabets, math
\Lambda (Λ)	101
\lambda (λ)	101
\lambdabdbar ($\bar{\lambda}$)	130
\lambdabdbar ($\bar{\lambda}$)	131
\lambdabdashslash ($\bar{\lambda}$)	130
\lambdabdashslash ($\bar{\lambda}$)	131
\lambdadbaup (λ)	102
Lamport, Leslie	255, 258
\land	see \wedge
\land (\wedge)	36
\land (\wedge)	37
land masses	203
\landdownint (\int)	53
\landdownint (\int)	46
\landdownint (\int)	49
\Landdownint (\int)	47
\landupint (\int)	53
\landupint (\int)	46
\landupint (\int)	49
\landupint (\int)	47
\landupint (\int)	53
\landupint (\int)	48, 49
\landupint (\int)	47
\Langle (\langle)	135
\lAngle ($\langle\!\langle$)	113
\lAngle ($\langle\!\langle$)	110
\lAngle ($\langle\!\langle$)	111
\langle (\langle)	31, 107
\langle (\langle)	110
\langle (\langle)	109
\langle (\langle)	112
\langlebar ($\langle\!\langle$)	109
\langledot (\cdot)	110
\langledot (\langle)	107
\laplac (\square)	132
\Laplace ($\bullet\!\!-\!\!\circ$)	67
\laplace ($\circ\!\!-\!\!\bullet$)	67
Laplace transform (\mathcal{L})	see alphabets, math
Laplacian (Δ)	see \Delta
Laplacian (∇^2)	see \nabla
\largeblackcircle (\bullet)	153
\largeblacksquare (\blacksquare)	153
\largeblackstar (\star)	153
\largecircle (\circlearrowleft)	153
\largecircle (\circlearrowright)	153
largectrbull (bullcntr package option)	194
\largectrbull	194
\largediamond (\lozenge)	153
\largeiamond (\lozenge)	153
\largepencil ()	147
\largepentagram (\star)	153
\LargerOrEqual (\geq)	128
\largeesquare (\square)	153
\largeesquare (\square)	153
\largestar (\star)	153
\largestarofdavid (\star)	153
\largetriangledown (∇)	77, 153
\largetriangledown (∇)	76
\largetriangleleft (\triangleleft)	76
\largetriangleright (\triangleright)	76
\largetriangleup (\triangle)	77, 153
\largetriangleup (\triangle)	76
\largewhitestart (\star)	153
\LArrow ()	140
\larrowfill	122
\Laserbeam ()	142
\lat (\rightarrow)	74
\late (\geq)	74
\LaTeX	1, 13, 18, 22, 54, 99, 107, 125, 130, 145, 194, 205, 213, 234, 235, 238–245, 249–252, 254–258
\LaTeX2e	1, 13, 15, 16, 28, 32, 54, 67, 78, 116, 125, 130, 135, 158, 170, 213, 234–236, 238, 239, 241, 243, 248, 250–254, 258
\latexsym (package)	32, 54, 67, 78, 130, 235, 256, 257
\latfric (\mathfrak{f})	20
Latin 1	13, 252–253, 256
\Latvia ()	203
\Laughey ()	206
laundry symbols	191
\LB ($\{$)	140
\lb (\mathbf{lb})	100
\Lbag (\mathcal{L})	106
\lbag (\mathcal{L})	106
\lbag (\mathcal{L})	36
\lbag (\mathcal{L})	107
\lblackbowtie (\bowtie)	36
\lblkbrbrak (\mathfrak{l})	107
\lBrace ($\left\{$)	111
\lbrace ($\left\{$)	110
\lbrace ($\{$)	111
\lbrace ($\left\{$)	109
\lbrace ($\left\{$)	111
\lBrack ($\left\langle\!\!\left\langle$)	135
\lBrack ($\left\langle\!\!\left\langle$)	113
\lBrack ($\left\langle\!\!\left\langle$)	110
\lBrack ($\left\langle\!\!\left\langle$)	111
\lBrack ($\left\langle\!\!\left\langle$)	111
\lBrack ($\left\langle\!\!\left\langle$)	111
\lBrack ($\left\langle\!\!\left\langle$)	110
\lBrack ($\left\langle\!\!\left\langle$)	111
\lBrack ($\left\langle\!\!\left\langle$)	107
\lBrackubar ($\overline{\langle\!\!\langle}$)	107
\lBrackultick ($\langle\!\!\langle\!$)	107
\Lbrbrak (\mathfrak{l})	107
\lbrbrak ($\left\langle\!\!\left\langle$)	111

LCD numerals	136	\Leftarrow (↔)	81	\lefthand (⌚)	148
\lceil	113	\Leftarrow (↔)	91	\leftharpoonaccent (⤠)	115
\lceil	107	\leftarrow (←)	79	\leftharpoonccw (⤒)	83
\lceil	110	\leftarrow (←)	78	\leftharpooncw (⤓)	83
\lceil	109	\leftarrow (←)	84	\leftharpoondown (⤔)	80
\lceil	111	\leftarrow (←)	81	\leftharpoondown (⤕)	78
\lceil	80	\leftarrow (←)	95	\leftharpoondown (⤖)	90
\lceil	80	\leftarrow (←)	91	\leftharpoondown (⤗)	88
\lceil	80	\leftarrow accent (⤠)	115	\leftharpoondown (⤘)	93
\lceil	80	\leftarrowapprox (⤐)	91	\leftharpoondownbar (⤙)	93
\lceil	80	\leftarrowbackapprox (⤐)	91	\leftharpoonsupdown (⤚)	93
\lceil	80	\leftarrowbsimilar (⤐)	91	\leftharpoonup (⤔)	80
\lceil	74	\leftarrowless (⤐)	74	\leftharpoonup (⤕)	78
\lceil	91	\leftarrowonoplus (⤔)	91	\leftharpoonup (⤖)	90
\lceil	91	\leftarrowplus (⤐)	91	\leftharpoonup (⤗)	88
\lceil	91	\leftarrowshortrightarrow (⤐)	91	\leftharpoonup (⤘)	93
\lceil	91	\leftarrowtail (⤐)	89	\leftharpoonupbar (⤙)	93
\lceil	89	\leftarrowtail (⤐)	84	\leftharpoonupdash (⤚)	93
\lceil	81	\leftarrowtail (⤐)	81	\leftarrowcurvearrow (⤐)	86
\lceil	91	\leftarrowtail (⤐)	91	\leftleftarrows (⤐)	79
\lceil	89	\leftarrowtail (⤐)	89	\leftleftarrows (⤐)	78
\lceil	89	\leftarrowtail (⤐)	84	\leftleftarrows (⤐)	89
\lceil	89	\leftarrowtail (⤐)	81	\leftleftarrows (⤐)	84
\lceil	91	\leftarrowtail (⤐)	91	\leftleftarrows (⤐)	81
\lceil	89	\leftarrowtriangle (⤐)	89	\leftleftarrows (⤐)	92
\lceil	79	\leftarrowtriangle (⤐)	79	\leftleftharpoons (⤐)	80
\lceil	89	\leftarrowtriangle (⤐)	89	\leftlsquigarrow (⤐)	86
\lceil	91	\leftarrowtriangle (⤐)	91	\leftlsquigarrow (⤐)	81
\lceil	91	\leftarrowx (⤐)	91	\Leftmapsto (⤐)	84
\lceil	60	\leftassert (⤐)	60	\Leftmapsto (⤐)	84
\lceil	60	\leftassert (⤐)	60	\leftmapsto (⤐)	81
\lceil	80	\leftbarharpoon (⤐)	80	\leftModels (⤐)	57
\lceil	84	\leftbkarrow (⤐)	84	\leftmodels (⤐)	60
\lceil	92	\leftbkarrow (⤐)	92	\leftmodels (⤐)	57
\lceil	89	\leftblackarrow (⤐)	89	\leftmoon (⤐)	138
\lceil	97	\leftblackspoon (⤐)	97	\leftmoon (⤐)	138
\lceil	98	\leftbroom (⤐)	98	\leftouterjoin (⤐)	132
\lceil	152	\LEFTCIRCLE (⤐)	152	\leftp (⤐)	26
\lceil	152	\LEFTcircle (⤐)	152	\leftpitchfork (⤐)	98
\lceil	152	\Leftcircle (⤐)	152	\leftpitchfork (⤐)	96
\lceil	86	\leftcurvedarrow (⤐)	86	\leftpointright (⤐)	148
\lceil	92	\leftcurvedarrow (⤐)	92	\leftproto (⤐)	57
\lceil	89	\leftdasharrow (⤐)	89	\leftrccurvearrow (⤐)	86
\lceil	92	\leftdasharrow (⤐)	92	\Leftrightarrow (⤐)	78
\lceil	92	\leftdblarrow (⤐)	92	\Leftrightarrow (⤐)	84
\lceil	63	\leftdbltail (⤐)	63	\Leftrightarrow (⤐)	81
\lceil	92	\leftdotarrow (⤐)	92	\Leftrightarrow (⤐)	92
\lceil	86	\leftdowncurvedarrow (⤐)	86	\Leftrightarrow (⤐)	79
\lceil	92	\leftdowncurvedarrow (⤐)	92	\Leftrightarrow (⤐)	78
\lceil	112	\leftevaw (⤐)	112	\Leftrightarrow (⤐)	84
\lceil	96	\leftfilledspoon (⤐)	96	\Leftrightarrow (⤐)	81
\lceil	63	\leftfishtail (⤐)	63	\Leftrightarrow (⤐)	95
\lceil	60	\leftfootline (⤐)	60	\Leftrightarrow (⤐)	92
\lceil	57	\leftfootline (⤐)	57	\Leftrightarrowaccent (⤠)	115
\lceil	57	\leftfree (⤐)	57	\Leftrightarrowcircle (⤐)	92
\lceil	34	\lefthalfcap (⤐)	34	\Leftrightarroweq (⤐)	79
\lceil	34	\lefthalfcup (⤐)	34	\Leftrightarroweq (⤐)	89
\lceil	79	\Leftrightarrows (⤐)	79		

\leftarrowrightarrows (\leftrightarrow)	78	\leftsquigarrow (\leftrightsquigarrow)	79	\leqq (\leqq)	73
\leftarrowrightarrows (\Lsh)	89	\leftsquigarrow (\Lsh)	79	\leqq (\leqslant)	72
\leftarrowrightarrows (\Lsh)	84	\leftsquigarrow (\rightsquigarrow)	89	\leqq (\leqq)	75
\leftarrowrightarrows (\Lsh)	81	\leftsquigarrow (\rightsquigarrow)	85	\leqqslant (\leqqslant)	75
\leftarrowrightarrows (\Lsh)	92	\leftsquigarrow (\rightsquigarrow)	92	\leslant (\leqslant)	70
\leftarrowrightarrowTriangle (\leftrightarrow)	89	\leftt (\leftarrow)	26	\leqslant (\leqslant)	74
\leftarrowrightarrowtriangle (\leftrightarrow)	79	\lefttail (\leftarrow)	63	\leqslant (\leqslant)	73
\leftarrowrightarrowtriangle (\leftrightarrow)	89	\lefttherefore (\therefore)	126	\leqslant (\leqslant)	72
\leftarrowrightarrowtriangle (\leftrightarrow)	92	\lefttherefore (\therefore)	34, 126	\leqslant (\leqslant)	75
\leftarrowrightarrowtriangle (\leftrightarrow)	92	\leftthreearrows (\equiv)	92	\leqslantdot (\leqslant)	73
\leftarrowrightarrowblackarrow (\leftrightarrow)	89	\leftthreetimes ($\wedge\wedge\wedge$)	130	\leqslantdot (\leqslant)	72
\leftarrowrightarrowblackspoon ($\bullet\bullet$)	97	\leftthreetimes ($\wedge\wedge$)	32	\leqslcc (\leqslcc)	73
\leftarrowrightarrowcurvearrow (\curvearrowleft)	86	\leftthreetimes (\wedge)	36	\lesscc (\lesscc)	74
\leftarrowrightarrowharpoon (\leftarrow)	80	\leftthreetimes (\wedge)	35	\lesscc (\lesscc)	75
\leftarrowrightarrowharpoondowndown (\leftarrow)	94	\leftthreetimes (\wedge)	34	\lesdot (\lessdot)	73
\leftarrowrightarrowharpoondownup (\leftarrow)	88	\leftthreetimes (\wedge)	37	\lesdot (\lessdot)	75
\leftarrowrightarrowharpoondownup (\leftarrow)	83	\leftthumbsdown ($\leftarrow\!\!\!\uparrow$)	148	\lesdoto (\lessdot)	75
\leftarrowrightarrowharpoondownup (\leftarrow)	94	\leftthumbsup ($\leftarrow\!\!\!\uparrow$)	148	\lesdotor (\lessdot)	75
\leftarrowrightarrowharpoons (\Leftarrow)	80	\leftrightarrowarrow ($\rightarrow\!\!\!\circlearrowright$)	79	\lesg (\lessg)	73
\leftarrowrightarrowharpoons (\Leftarrow)	79	\leftrightarrowarrow ($\rightarrow\!\!\!\circlearrowright$)	89	\lesges (\lessges)	75
\leftarrowrightarrowharpoons (\Leftarrow)	90	\Lefttorque ($\leftarrow\!\!\!\curvearrowright$)	142	\less ($<$)	73
\leftarrowrightarrowharpoons (\Leftarrow)	88	\Leftturn ($\leftarrow\!\!\!\circlearrowright$)	190	\less ($<$)	72
\leftarrowrightarrowharpoons (\Leftarrow)	83	\leftupcurvedarrow ($\leftarrow\!\!\!\curvearrowright$)	85	less-than signs	see inequalities
\leftarrowrightarrowharpoons (\Leftarrow)	93	\leftVDash ($\leftarrow\!\!\! $)	60	\lessapprox (\lessapprox)	71
\leftarrowrightarrowharpoonsdown (\Leftarrow)	93	\leftVdash ($\leftarrow\!\!\! $)	60	\lessapprox (\lessapprox)	70
\leftarrowrightarrowharpoonsfill	122	\leftVdash ($\leftarrow\!\!\! $)	57	\lessapprox (\lessapprox)	74
\leftarrowrightarrowharpoonsup (\Leftarrow)	93	\leftvDash ($\leftarrow\!\!\! $)	60	\lessapprox (\lessapprox)	73
\leftarrowrightarrowharpoonupdown (\leftarrow)	88	\leftvdash ($\leftarrow\!\!\! $)	60	\lessapprox (\lessapprox)	72
\leftarrowrightarrowharpoonupdown (\leftarrow)	83	\leftvdash ($\leftarrow\!\!\! $)	57	\lessapprox (\lessapprox)	75
\leftarrowrightarrowharpoonupdown (\leftarrow)	93	\leftwave ($\leftarrow\!\!\!\uparrow\!\!\!\uparrow$)	112	\lesscc (\lesscc)	73
\leftarrowrightarrowharpoonupup (\leftarrow)	93	\leftwavearrow ($\leftarrow\!\!\!\curvearrowright$)	84	\lessclosed (\lessclosed)	73, 77
\Leftrightline ($=$)	57	\leftwavearrow ($\leftarrow\!\!\!\curvearrowright$)	92	\lessclosed (\lessclosed)	72, 76
\Leftrightline ($-$)	57	\leftwhitearrow (\leftarrow)	89	\lessdot (\lessdot)	71
\Leftrightspoon ($\circ\circ$)	97	\leftwhitearrow (\leftarrow)	92	\lessdot (\lessdot)	70
\Leftrightsquigarrow (\leftrightsquigarrow)	79	\leftwhiteroundarrow ($\leftarrow\!\!\!\curvearrowright$)	89	\lessdot (\lessdot)	36
\Leftrightsquigarrow (\leftrightsquigarrow)	78	\leftY (\leftarrow)	35	\lessdot (\lessdot)	73
\Leftrightsquigarrow (\leftrightarrow)	89	\leftY (\leftarrow)	34	\lessdot (\lessdot)	75
\Leftrightsquigarrow (\leftrightarrow)	85	\leftzigzagarrow (\leftrightsquigarrow)	89	\lesseqgtr (\lessgtr)	71
\Leftrightsquigarrow (\leftrightarrow)	81	legal symbols	15, 16, 28, 29, 253	\lesseqgtr (\lessgtr)	70
\Leftrightsquigarrow (\leftrightarrow)	92	\legm (w)	20	\lesseqgtr (\lessgtr)	74
\Leftrightwavearrow (\leftrightarrow)	84	\legr (l)	20	\lesseqgtr (\lessgtr)	73
\leftrsquigarrow ($\leftarrow\!\!\!\curvearrowright$)	85	\length ($:!$)	26	\lesseqgtr (\lessgtr)	72
\leftrsquigarrow ($\leftarrow\!\!\!\curvearrowright$)	81	\Leo (\mathcal{Q})	138	\lesseqgtr (\lessgtr)	75
\leftrsquigarrow ($\leftarrow\!\!\!\curvearrowright$)	92	\Leo (\mathfrak{Q})	139	\lesseqgtrslant (\lessgtr)	73
\LeftScissors (\bowtie)	147	\leo (\mathcal{Q})	137	\lesseqgtrslant (\lessgtr)	72
\leftslice (\triangleleft)	33	\leq (\leq)	71	\lesseqgqgtr (\lessgtr)	71
\leftslice (\triangleleft)	36	\leq (\leq)	70, 71	\lesseqgqgtr (\lessgtr)	70
\leftslice (\triangleleft)	57	\leq (\leq)	73	\lesseqgqgtr (\lessgtr)	74
\leftspoon ($\circ-$)	97	\leq (\leq)	72	\lesseqgqgtr (\lessgtr)	73
\leftspoon ($\circ-$)	96	\leqdot (\leq)	73	\lesseqgqgtr (\lessgtr)	72
		\leqdot (\leq)	72	\lesseqgqgtr (\lessgtr)	75
		\leqq (\leqq)	71	\lesseqqlantgtr (\lessgtr)	73
		\leqq (\leqq)	70	\lessgtr (\lessgtr)	71
		\leqq (\leqq)	74	\lessgtr (\lessgtr)	70
				\lessgtr (\lessgtr)	74
				\lessgtr (\lessgtr)	73

\lessgtr (§)	72	\lgwhtcircle (○)	154	\lilyGlyph{...} (↑)	187
\lessgtr (§)	75	\lgwhtsquare (□)	153	\lilyGlyph{...} (↓)	187
\lessneqqgtr (§)	72	\lgwhtsquare (□)	154	\lilyGlyph{...} (↓)	187
\LessOrEqual (≤)	128	\LHD (◀)	33	\lilyGlyph{...} (↑)	187
\lessssim (≲)	71	\lhd (◁)	32, 33	\lilyGlyph{...} (↑)	187
\lessssim (≲)	70, 243	\lhd (▷)	73	\lilyGlyph{...} (↑)	187
\lessssim (≲)	74	\lhd (▷)	72, 76	\lilyGlyph{...} (↑)	187
\lessssim (≲)	73	\lhd (▷)	37, 155	\lilyGlyph{...} (↑)	187
\lessssim (≲)	72	\lhd bend (§)	190	\lilyGlyph{...} (↑)	187
\lessssim (≲)	75	\lhook (‘)	99	\lilyGlyph{...} (↑)	187
\lessssimslant (≲)	243	\lhookdownarrow (↓)	85	\lilyGlyph{...} (↑)	187
\Letter (✉)	142	\lhookdownarrow (↓)	81	\lilyGlyph{...} (↑)	187
\Letter (✉)	192	\lhookleftarrow (↔)	85	\lilyGlyph{...} (↑)	187
\Letter (✉ vs. ✉)	236	\lhookleftarrow (↔)	81	\lilyGlyph{...} (↑)	187
letter-like symbols	104–106, 208–212	\lhooknearrow (↗)	85	\lilyGlyph{...} (↑)	187
letters .	see alphabets, 239, 240	\lhooknearrow (↗)	81	\lilyGlyph{...} (↑)	187
barred	239	\lhooknarrow (↖)	85	\lilyGlyph{...} (↑)	187
non-ASCII	16	\lhooknarrow (↖)	81	\lilyGlyph{...} (↑)	187
slashed	240	\lhookrightarrow (↔)	85	\lilyGlyph{...} (↑)	187
variant Greek	103	\lhookrightarrow (↔)	81	\lilyGlyph{...} (↑)	187
variant Latin	103	\lhookswarrow (↙)	85	\lilyGlyph{...} (↑)	187
\levaw (♪)	112	\lhookswarrow (↙)	81	\lilyGlyph{...} (↑)	187
\LF (¤)	141	\lhookuparrow (↑)	85	\lilyGlyph{...} (↑)	188
\fbowtie (▣)	63	\lhookuparrow (↑)	81	\lilyGlyph{...} (↑)	188
\filet (♪)	108	\Libra (♎)	138	\lilyGlyph{...} (↑)	188
\lfloor (⌋)	113	\Libra (♎)	139	\lilyGlyph{...} (↑)	188
\lfloor (⌊)	107	\libra (♎)	137	\lilyGlyph{...} (↑)	188
\lfloor (⌊)	110	Lie derivative (Lie)	see alphabets, math	\lilyGlyph{...} (↑)	188
\lfloor (⌊)	109	\Liechtenstein ()	203	\lilyGlyph{...} (↑)	188
\lfloor (⌊)	111	life-insurance symbols	121, 244	\lilyGlyph{...} (↑)	188
\lftborder (└)	197	\lightbulb (♀)	248	\lilyGlyph{...} (↑)	188
\lftbotcorner (└)	197	\lightbulb.mf (file)	246, 247	\lilyGlyph{...} (↑)	188
\ltimes (✖)	63	\lightbulb.sty (file)	248	\lilyGlyph{...} (↑)	188
\lfttopcorner (⊸)	197	\lightbulb10.2602gf (file)	246	\lilyGlyph{...} (↑)	188
\LG (⊗)	140	\lightbulb10.dvi (file)	246	\lilyGlyph{...} (↑)	188
\lg (lg)	99	\lightbulb10.mf (file)	246–248	\lilyGlyph{...} (↑)	188
\lblkcircle (●)	153	\lightbulb10.tfm (file)	248	\lilyGlyph{...} (↑)	188
\lblkcircle (●)	154	\Lightning (⚡)	142	\lilyGlyph{...} (↑)	188
\lblksquare (■)	153	\Lightning (⚡)	192	\lilyGlyph{...} (↑)	188
\lblksquare (■)	154	\Lightning (⚡ vs. ⚡)	236	\lilyGlyph{...} (↑)	188
\lgE (⩵)	75	\lightning (⚡)	79	\lilyGlyph{...} (↑)	188
\lggroup (()	108	\lightning (⚡ vs. ⚡)	236	\lilyGlyph{...} (↑)	188
\lggroup (()	110	\lightning (⚡)	84	\lilyGlyph{...} (↑)	188
\lggroup (()	109	\lightning (⚡)	81	\lilyGlyph{...} (↑)	188
\lggroup (()	111	\lightning (⚡)	190	\lilyGlyph{...} (↑)	188
\gwhtcircle (○)	153	\Lilith (∅)	139	\lilyAccent (→)	176
		\lilyDynamics{f} (f)	176	\lilyDynamics{f} (f)	176
		\lilyDynamics{m} (m)	176	\lilyDynamics{m} (m)	176
		\lilyDynamics{p} (p)	176	\lilyDynamics{p} (p)	176
		\lilyDynamics{r} (r)	176	\lilyDynamics{r} (r)	176
		\lilyDynamics{s} (s)	176	\lilyDynamics{s} (s)	176
		\lilyDynamics{z} (z)	176	\lilyDynamics{z} (z)	176
		\lilyEspressivo (↔)	176	\lilyEspressivo (↔)	176
		\lilyGlyph{...} (x)	187	\lilyGlyph{...} (x)	187

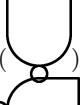
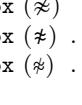


\lll (««)	72	\longoint (◊)	53
\lll (««)	75	\longoint (◊)	53
\llless	see \lll	\LongPulseHigh (□)	136
\llless (««)	73	\LongPulseLow (□)	136
\llless (««)	72	\Longrightarrow (→)	78
\llless (««)	75	\Longrightarrow (→)	80
\llnest (««)	75	\Longrightarrow (→)	84
\llparenthesis (⟨)	106	\Longrightarrow (→)	90
\llparenthesis (⟨)	107	\longrightarrow (→)	80
\lltriangle (△)	154	\longrightarrow (→)	78
\LMex	243	\longrightarrow (→)	84
\lmoustache (ʃ)	108	\longrightarrow (→)	95
\lmoustache (ʃ)	110	\longrightarrow (→)	90
\lmoustache (ʃ)	109	\longrightfootline (→)	60
\lmoustache (ʃ)	111	\longrightharpoondown (→)	95
\ln (ln)	99	\longrightharpoonup (→)	95
\lnapprox (≈)	71	\longrightsquigarrow (~~)	85
\lnapprox (≈)	70	\Longleftarrow (←)	78
\lnapprox (≈)	74	\Longleftarrow (←)	80
\lnapprox (≈)	73	\Longleftarrow (←)	84
\lnapprox (≈)	72	\Longleftarrow (←)	92
\lnapprox (≈)	75	\Longleftarrow (←)	80
\lneq (≤)	71	\Longleftarrow (←)	78
\lneq (≤)	70	\Longleftarrow (←)	95
\lneq (≤)	74	\Longleftarrow (←)	92
\lneq (≤)	73	\longleftfootline (←)	60
\lneq (≤)	75	\longleftharpoondown (→)	95
\lneqq (≤≤)	71	\longleftharpoonup (→)	95
\lneqq (≤≤)	70	\Longleftarrow (←)	78
\lneqq (≤≤)	74	\Longleftarrow (←)	80
\lneqq (≤≤)	73	\Longleftarrow (←)	84
\lneqq (≤≤)	72	\Longleftarrow (←)	92
\lneqq (≤≤)	75	\Longleftarrow (←)	80
\lnot	see \neg	\Longleftarrow (←)	78
\lnot (¬)	131	\Longleftarrow (←)	84
\lnot (¬)	131	\Longleftarrow (←)	95
\lnot (¬)	132	\Longleftarrow (←)	92
\lnsim (≈)	71	\Longleftarrow (←)	92
\lnsim (≈)	70	\Longleftarrow (←)	85
\lnsim (≈)	74	\Longleftarrow (←)	92
\lnsim (≈)	73	\Longleftarrow (←)	84
\lnsim (≈)	72	\Longleftarrow (←)	92
\lnsim (≈)	75	\Longleftarrow (←)	80
\lnot	see \neg	\Longleftarrow (←)	78
\lnot (¬)	131	\Longleftarrow (←)	84
\lnot (¬)	131	\Longleftarrow (←)	95
\lnot (¬)	132	\Longleftarrow (←)	92
\lnsim (≈)	71	\Longleftarrow (←)	92
\lnsim (≈)	70	\Longleftarrow (←)	85
\lnsim (≈)	74	\Longleftarrow (←)	92
\lnsim (≈)	73	\Longleftarrow (←)	84
\lnsim (≈)	72	\Longleftarrow (←)	92
\lnsim (≈)	74	\Longleftarrow (←)	80
\log (log)	99, 249	\Longmapsto (→)	79
log-like symbols	99, 100, 249	\Longmapsfrom (←)	60, 84
logic (package)	141	\Longmapsfrom (←)	92
logic gates	141	\Longmapsfrom (←)	79
logical operators		\Longmapsfrom (←)	60, 84
and	see \wedge	\Longmapsfrom (←)	95
not	see \neg and \sim	\Longmapsfrom (←)	92
or	see \vee	\Longmapsto (→)	79
\logof (⊗)	55	\Longmapsto (→)	84
		\Longmapsto (→)	90
		\Longmapsto (→)	95
		\lozenge (◊)	130
		\lozenge (◊)	153
		\lozenge (◊)	153
		\lozenge (◊)	153
		\lozenge (◊)	155
		\lozengedot (◊)	153
		\lozengeminus (◊)	153
		\lozengeminus (◊)	41
		lozenges	see rhombuses
		\Lparen (⟨)	135

\lParen (()	112
\lparen (()	111
\lparen (()	111
\Lparengtr (ﯗ)	107
\lparenless (﹤)	107
\lrarc (,)	132
\lrbblacktriangle (﴿)	154
\lrcorner (,)	106
\lrcorner („)	106
\lrcorner („)	106
\lrcorner ()	110
„	
\lrcorner ()	109
„	
\lrcorner („)	107
\lrJoin	see \Join
\lrtimes (ﷺ)	56
\lrtimes (ﷺ)	36
\lrtriangle (﴿)	154
\lrtrianglereq (ﴽ)	77
\lsem ([])	111
[]	
\lsem ([])	109
\lsemantic	see \ldbrack
\lsf (ﷸ)	171
\lsfz (﷯)	171
\Lsh (ﻦ)	79
\Lsh (ﻨ)	78
\Lsh (ﻩ)	89
\Lsh (ﻪ)	85
\Lsh (ﻪ)	80
\Lsh (ﻪ)	90
\lsime (ﻂ)	74
\lsimg (ﻂ)	74
\lsqhook (ﻚ)	63
\Lsteel (ﻞ)	142
\Lt (ﻆ)	74
\Lt (ﻆ)	74
\ltcc (ﻆ)	74
\ltcc (ﻆ)	74
\ltcirk (ﻆ)	74
\ltcirk (ﻆ)	74
\lttimes (ﻂ)	34
\lttimes (ﻂ)	32
\lttimes (ﻂ)	36
\lttimes (ﻂ)	35, 36
\lttimes (ﻂ)	34
\lttimes (ﻂ)	37
\lttimesblack (ﻂ)	36
\ltlarr (ﻂ)	74
\ltquest (ﻆ)	74
\ltripple	113
\ltrivb (ﻆ)	77
\LU (ﻉ)	140
LuaLaTeX	170
Luecking, Dan	242
\Luxembourg ()	203
\lVert ()	108
\lVert ()	113
\lVert ()	110
\lvert ()	108
\lvert ()	110
\lvertneqq (ﻂ)	71
\lvertneqq (ﻂ)	70
\lvertneqq (ﻂ)	74
\lvertneqq (ﻂ)	74
\lvertneqq (ﻂ)	72
\lvertneqq (ﻂ)	74
\lVvert ()	110
\Lvzigzag (ﻢ)	107
\lvzigzag (ﻢ)	107
\lwave (ﻢ)	112
\lWavy (ﻢ)	109
\lwavey (ﻢ)	109
\lz (ﻊ)	20
M	
\M	17
\M („)	197
\m	17
\m („)	197
m (ﻢ)	169
\ma (ﻂ)	197
\Macedonia (.)	203
\macron (ﻢ)	25
macron (ﻢ)	see accents
[ﻢ]	
\Maggie (ﻢ)	198
magic (package)	233, 256
Magic: The Gathering symbols	233
[ﻢ]	
magical signs	199
\magnon (ﻢ)	144
majuscules	101
\makeatletter	242
\makeatother	242
\MALE (ﻮ)	142
\Male (ﻮ)	142
male	137–139, 142, 207–212, 215–218
\male (ﻮ)	142
\male (ﻮ)	142
\MaleMale (ﻮ)	142
\Malta ()	203
\maltese (ﻢ)	16
\maltese (ﻢ)	131
\maltese (ﻢ)	131
\maltese (ﻢ)	131
\manboldkidney (ﻮ)	190
\manconcentriccircles (ﻰ)	190
\manconcentricdiamond (ﻰ)	190
\mancone (ﻮ)	190
\mancube (ﻰ)	190
\manarrow (ﻮ)	190
\ManFace (ﻮ)	191
\manfilledquartercircle (ﻰ)	190
manfnt (package)	190, 256, 257
\manhpennib (_)	190
\manimpossiblecube (ﻰ)	190
\mankidney (ﻮ)	190
\manhpenkidney (ﻮ)	190
\manpenkidney (ﻮ)	190
\manquadrifolium (ﻰ)	190
\manquartercircle (ﻰ)	190
\manrotatedquadrifolium (ﻰ)	190
\manrotatedquartercircle (ﻰ)	190
\manstar (ﻰ)	190
\mantiltppenib (_)	190
\mantriangledown (ﻮ)	190
\mantriangleright (ﻮ)	190
\mantriangleup (ﻮ)	190
\manvpennib (_)	190
map symbols	213–215
\Mappedfromchar ()	98
\mappedfromchar ()	98
maps	203
\Mapsdown (ﻰ)	85
\mapsdown (ﻰ)	89
\mapsdown (ﻰ)	85
\mapsdown (ﻰ)	90
\Mapsfrom (ﻰ)	79
\Mapsfrom (ﻰ)	89
\Mapsfrom (ﻰ)	85
\Mapsfrom (ﻰ)	90
\Mapsfrom (ﻰ)	79
\mapsfrom (ﻰ)	89
\mapsfrom (ﻰ)	85
\mapsfrom (ﻰ)	95
\mapsfrom (ﻰ)	90
\Mapsfromchar ()	99
\Mapsfromchar ()	98
\mapsfromchar ()	99
\mapsfromchar ()	98
\mapsfromchar ()	99
\mapsfromchar ()	99
\Mapsto (ﻰ)	79
\Mapsto (ﻰ)	89
\Mapsto (ﻰ)	86

\Mapsto (⇒)	90
\mapsto (→)	78
\mapsto (↔)	89
\mapsto (↪)	85
\mapsto (↪)	81
\mapsto (↪)	95
\mapsto (↪)	90
\Mapstochar ()	99
\Mapstochar (⌚)	98
\Mapstochar ()	99
\Mapstochar ()	99
\Mapsup (↑↑)	86
\mapsup (↑)	89
\mapsup (↑)	86
\mapsup (↑)	90
\marcato (Ⓐ)	176
\marcatoDown (Ⓑ)	176
	
\Marge (ℳ)	198
\markera (ℳ)	195
\markerb (ℳ)	195
married see \textmarried	
\Mars (♂)	138
\Mars (♂)	138
\Mars (♂)	139
\mars (♂)	137
marvosym (package)	26, 27, 128, 138, 140, 142, 147, 149, 191, 201, 236
masonic cipher	200
\mate (#)	195
material biconditional	
see \leftrightarrow and \equiv	
material conditional see \rightarrow and \supset	
material equivalence	
see \leftrightarrow and \equiv	
material implication see \rightarrow and \supset	
material nonimplication	
... see \nrightarrow and \nsupset	
math alphabets	134
mathabx (package)	31, 34, 38, 44, 56, 57, 68, 71, 76, 79, 80, 99, 104, 106, 108, 114, 119, 128, 130, 138, 195, 235, 236, 256, 257
\mathaccent	239, 240
\mathbat (⤠)	41
\mathbb	134, 135
\mathbbb	134
\mathbbm	134
\mathbbmss	134
\mathbbmtt	134
mathbbol (package)	134, 135
\mathbf	250
\mathbin	249
\mathbold	250
mathcal (euscript package option)	134
\mathcal	134, 137
\mathcent (¢)	104
\mathchoice	241
\mathclose	249
\mathcloud (ℳ)	41
\mathcolon (:)	126
mathcomp (package)	127
mathdesign (package)	27, 38, 54, 105, 112, 133, 256
\mathdollar (\$)	31
\mathdollar (\$)	105
mathdots (package)	114, 125, 126, 243, 256, 257
\mathds	134
\mathellipsis (...)	31
\mathellipsis (...)	126
mathematical symbols	31–135
\mathfrak	134
\mathghost (ℳ)	41
\mathit	134
\mathleftbat (⤠)	41
\mathleftghost (⤡)	41
\mathnormal	134
\mathop	249
\mathopen	249
\mathord	249
\mathpalette	241, 242
\mathparagraph (¶)	31
\mathparagraph (¶)	105
\mathpunct	249
\mathratio (:)	126
\mathrel	239, 249
\mathrightbat (⤠)	41
\mathrightghost (⤡)	41
\mathring (⌚)	115
\mathring (⌚)	114, 116
\mathrm	134
mathrsfs (package)	134, 256
mathscr (euscript package option)	134
\mathscr (urwchancal package option)	134
\mathscr	134
\mathsection (\$)	31
\mathsection (\$)	132
\mathslash (⧲)	110
\mathslash (/)	111
mathspec (package)	101
mathspec.sty (file)	101
\mathsterling (£)	104
\mathsterling (£)	31
\mathsterling (£)	105
mathtools (package)	31, 65, 95, 119, 121, 256, 257
\mathunderscore (_)	31
\mathvisible (_)	132
\mathwitch (ℳ)	41
\mathwitch* (ℳ)	41
\max (max)	99
\maxima (ℳ)	171
Maxwell-Stefan diffusion coefficient	see \DH
\maxwellDistrib (ℳ)	144
\maya	128
Mayan numerals	128
\Mb (ℳ)	197
\mb (ℳ)	197
\Mbb (ℳ)	197
\mBb (ℳ)	197
\mbB (ℳ)	197
\mbb (ℳ)	197
mbboard (package)	134, 135, 256
\mbbx (ℳ)	197
\mbox	241, 242
\MC (ℳ)	139
\mdblkcircle (●)	154
\mdblkdiamond (◆)	40
\mdblkdiamond (◆)	154
\mdblklozenge (◆)	153
\mdblklozenge (◆)	154
\mdblksquare (■)	40
\mdblksquare (■)	154
\mdlgblkcircle (●)	40
\mdlgblkcircle (●)	154
\mdlgblkdiamond (◆)	40
\mdlgblkdiamond (◆)	154
\mdlgblklozenge (◆)	153
\mdlgblklozenge (◆)	154
\mdlgblksquare (■)	40
\mdlgblksquare (■)	154, 155
\mdlgwhtcircle (○)	40
\mdlgwhtcircle (○)	41
\mdlgwhtdiamond (◇)	40
\mdlgwhtdiamond (◇)	154
\mdlgwhtlozenge (◇)	153
\mdlgwhtlozenge (◇)	154
\mdlgwhtsquare (□)	40
\mdlgwhtsquare (□)	154, 155
\mdsblkcircle (●)	154
\mdsblksquare (■)	154
\mdsmwhtcircle (○)	154
\mdsmwhtsquare (□)	154
\mdwhtcircle (○)	154
\mdwhtdiamond (◇)	40
\mdwhtdiamond (◇)	154
\mdwhtlozenge (◇)	153
\mdwhtlozenge (◇)	154

\mdwhtsquare (□)	40	\medstar (☆)	39
\mdwhtsquare (□)	155	\medstarofdavid (◊)	153
mdwmath (package)	121, 256,	\medtriangledown (▽)	39, 77
257		\medtriangledown (▽)	39, 76
\measangledtosw (Ⓐ)	129	\medtriangleleft (◀)	39, 77
\measangledtose (Ⓑ)	129	\medtriangleleft (◀)	39, 76
\measangleldtosw (Ɣ)	129	\medtriangleleft (▷)	39, 77
\measangleldtose (Ɣ)	129	\medtriangleleft (▷)	39, 76
\measanglerltonw (⤒)	129	\medtriangleup (△)	39, 77
\measanglerdtose (⤒)	129	\medtriangleup (△)	39, 76
\measanglerutone (⤒)	129	\medvert (⊤)	34, 35
\measanglelultonw (⤒)	129	\medvertdot (⊤)	34
\measanglelurtone (⤒)	129	\medwhitestar (☆)	39
\measeq (≡)	63	\medwhitestar (☆)	155
\measuredangle (⦵)	130	Mellin transform (ℳ)	see alphabets, math
\measuredangle (⦵)	129	membership	see \in
\measuredangle (⦵)	129	\Mercury (☿)	138
\measuredangle (⦵)	129	\Mercury (♀)	138
\measuredangleleft (⦶)	129	\Mercury (♁)	139
\measuredangleleft (⦶)	129	\mercury (☿)	137
\measuredrightangle (⦷)	129	\merge (ℳ)	33
\measuredrightangle (⦷)	129	\merge (ℳ)	36
\measuredrightangle (⦷)	129	METAFONT	13, 135, 245–249
\measuredrightangledot (⦸)	129	METAFONTbook symbols	190
mechanical scaling	246, 248	\metalbond (ℳ)	144
\medbackslash (＼)	35, 36	\meterC (C)	173
\medbackslash (＼)	34, 35	\meterCThree (C₃)	173
\medblackcircle (●)	40	\meterCThreeTwo (C₂³)	173
\medblackdiamond (◆)	40	\meterCutC (₡)	173
\medblacklozenge (❖)	153	\meterCZ (CZ)	173
\medblacksquare (■)	40	\meter0 (○)	173
\medblackstar (★)	40	\meterplus (⊕)	171
\medblackstar (★)	155	\method (ℳ)	144
\medblacktriangledown (▼)	39,	metre (package)	25, 114, 197,
77			256, 257
\medblacktriangleleft (◀)	39,	\metre	197
77		metrical symbols	197, 198
\medblacktriangleright (▷)	39, 77	mezzo (m)	176, 188
\medblacktriangleup (▲)	39,	.mf files	13, 213, 246
77		\mglgwhtcircle (○)	155
\medbullet (●)	33	\mglgwhtlozenge (❖)	155
\medcirc (○)	33	\mho (ℳ)	130
\medcircle (○)	39	\mho (ℳ)	103
\medcircle (○)	34	miami (emf package option)	137
\meddiamond (◊)	39	micro	see \textmu
\meddiamond (◊)	39	\micro (μ)	136
media control symbols	191,	Microsoft® Windows®	252
208–212		\mid ()	54, 109
medieval runes	169	\mid ()	60
\medlozenge (❖)	153	\mid ()	63
\medlozenge (❖)	153	\midbarvee (∨)	37
\medslash (／)	35, 36, 39	\midbarwedge (Ⓐ)	37
\medslash (／)	34	\midcir (∮)	97
\medsquare (□)	39	\midcir (∮)	64
\medsquare (□)	39	\middle	107
\medsquare (□)	39	\middlebar (▬)	115
\medstar (★)	40	\middleslash (⌿)	115

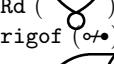
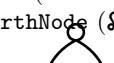
\modtwosum (Σ)	49
\modtwosum ($\bar{\Sigma}$)	50
moduli space	<i>see alphabets, math</i>
\Moldova (,)	203
monetary symbols	27, 28, 135
\Montenegro (.)	203
monus	<i>see \dotdiv</i>
\moo (\pm)	33
\moo (\pm)	36
\Moon (\mathbb{C})	138
\Moon (\mathfrak{D})	138
\Moon (\mathfrak{D})	139
moon	137–139, 200, 215–218
\MoonPha	200
moonphase (package)	215, 256
\Mordent ($\text{M}\ddot{\text{o}}$)	171
\mordent ($\text{M}\ddot{\text{o}}$)	171
\morepawns (>)	195
\moreroom (\circ)	195
\Mountain (\blacktriangle)	192
mouse	<i>see \ComputerMouse</i>
\MoveDown (\blacktriangledown)	191
\overlay	242, 243
\MoveUp (\blacktriangle)	191
\mp (\mp)	32
\mp (\mp)	36
\mp (\mp)	35
\mp (\mp)	35
\mp (\mp)	37
\Mu (M)	101
\mu (μ)	101
multiline braces	120
\multimap (\multimap)	55, 56
\multimap (\multimap)	62
\multimap (\multimap)	97
\multimap (\multimap)	96
\multimap (\multimap)	64
\multimapboth ($\multimap\multimap$)	56
\multimapboth ($\multimap\multimap$)	62
\multimapboth ($\multimap\multimap$)	67
\multimapbothvert (I)	56
\multimapbothvert (I)	62
\multimapdot (\multimap)	56
\multimapdot (\multimap)	62
\multimapdotboth ($\multimap\multimap$)	56
\multimapdotboth ($\multimap\multimap$)	62
\multimapdotbothA ($\multimap\multimap$)	56
\multimapdotbothA ($\multimap\multimap$)	62
\multimapdotbothAvert (I)	56
\multimapdotbothAvert (I)	62
\multimapdotbothB ($\multimap\multimap$)	56
\multimapdotbothB ($\multimap\multimap$)	62
\multimapdotbothBvert (I)	56
\multimapdotbothBvert (I)	62
\multimapdotbothvert (I)	56
\multimapdotbothvert (I)	62
\multimapdotinv (\multimap)	56
\multimapdotinv (\multimap)	62
\multimapinv (\multimap)	56
\multimapinv (\multimap)	62
\multimapinv (\multimap)	97
\multimapinv (\multimap)	64
multiple accents per character	243
\MultiplicationDot (·)	128
multiplicative disjunction	<i>see \bindnasrepma, \invamp, and \parr</i>
\Mundus ($\text{M}\ddot{\text{o}}$)	191
\muon (μ)	144
\musCorchea (d)	173
\musCorcheaDotted (d)	173
\musDoubleFlat (\flat)	173
\musDoubleSharp (\sharp)	173
\musEighth (d)	173
\musEighthDotted (d)	173
Museum of Icelandic Sorcery and Witchcraft	200
\musFlat (\flat)	173
\musFusa (d)	173
\musFusaDotted (d)	173
\musHalf (d)	173
\musHalfDotted (d)	173
musical symbols	170–189, 207–212
musicography (package)	173, 256, 257
\musixgre (package)	172
\musixlit (package)	172
\musixer (package)	172
MusiXTEX	171–174
\musixtex (package)	256, 257
\musMeter	173
\musMinim (d)	173
\musMinimDotted (d)	173
\musNatural (\natural)	173
\musNatural (musNatural)	173
\musQuarter (d)	173
\musQuarterDotted (d)	173
\musSegno (S)	173
\musSemibreve (o)	173
\musSemibreveDotted (o)	173
\musSemiminim (d)	173
\musSeminiminimDotted (d)	173
\musSharp (\sharp)	173
\musSixteenth (d)	173
\musSixteenthDotted (d)	173
\musSixtyFourth (d)	173
\musSixtyFourthDotted (d)	173
\musThirtySecond (d)	173
\musThirtySecondDotted (d)	173
\musWhole (s)	173
\musWholeDotted (s)	173
\muu (μ)	102
\MVAt (@)	191
\MVComma (,)	128
\MVDivision (/)	128
\MVEight (8)	128
\MVFive (5)	128
\MVFour (4)	128
\MVLefBracket (()	128
\MVMinus (-)	128
\VMMultiplication (×)	128
\MVNine (9)	128
\MVOne (1)	128
\MVPeriod (.)	128
\MVPplus (+)	128
\MVRightArrow (→)	128
\MVRightBracket ())	128
\MVSSeven (7)	128
\MVSix (6)	128
\MVThree (3)	128
\MVTwo (2)	128
\MVZero (0)	128
 N	
n (ṇ)	169
\na (ḥ)	173
\nabla (∇)	130
\nabla (▽)	131
\nabla (▽)	132
\nacwcirclearrowdown (▷)	86
\nacwcirclearrowleft (◁)	86
\nacwcirclearrowright (▷)	86
\nacwcirclearrowup (▷)	86
\nacwgapcirclearrow (▷)	87
\nacwleftarcarrow (↶)	86
\nacwneararcarrow (↖)	86
\nacwnwarccarow (↖)	86
\nacwopencclearrow (◁)	87
\nacwoverarcarrow (⤠)	86
\nacwrightarcarrow (⤢)	86
\nacwsearcarrow (⤣)	86
\nacwsuarccarow (⤤)	86
\nacwunderarcarrow (⤥)	86
\NAK (§)	141
NAND gates	141
	
\NANDd ()	141
	
\NAND1 ()	141
	
\NANDr ()	141
	
\NANDu ()	141
\napprox (≈)	57
\napprox (≠)	61
\napprox (≈)	58

\napprox (\approx)	65	\nbumppeqq ($\not\approx$)	61	\ndashleftarrow ($\leftarrow\!\!\!/\right)$	87
\napproxeq (\approxeq)	56	\ncirceq (\circlearrowleft)	61	\ndashleftarrow ($\leftarrow\!\!\!/\right)$	83
\napproxeq (\approx)	61	\ncirceq (\circlearrowright)	59	\ndashrightarrow ($\rightarrow\!\!\!/\right)$	87
\napproxeq (\approx)	58	\ncirclearrowleft (\circlearrowleft) . .	87	\ndashrightarrow ($\rightarrow\!\!\!/\right)$	83
\napproxeqq (\approxeq)	65	\ncirclearrowleft (\circlearrowright) . .	83	\nDashV ($\not\parallel$)	57
\napproxident (\approx)	62	\ncirclearrowright (\circlearrowleft) . .	87	\nDashV ($\not\parallel$)	62
\narceq ($\not\approx$)	62, 98	\ncirclearrowright (\circlearrowright) . .	83	\nDashv ($\not\parallel$)	57
\nAssert ($\not\#$)	62	\ncirmid (\circlearrowleft)	97	\nDashv ($\not\#$)	62
\nassert ($\#$)	62	\nclosedeql ($\not\equiv$)	59	\ndashV ($\not\parallel$)	57
\nasymp (\ast)	56	\nclosure ($\not\in$)	62, 98	\ndashV ($\not\parallel$)	62
\nasymp (\ast)	62, 98	\ncong ($\not\cong$)	57	\ndashv ($\not\parallel$)	57
\nasymp (\ast)	97	\ncong ($\not\cong$)	55	\ndashv ($\not\parallel$)	62
\nasymp (\ast)	65	\ncong ($\not\cong$)	63	\ndashv ($\not\parallel$)	59
\Natal (\mathbb{N})	139	\ncong ($\not\cong$)	61	\ndashVv ($\not\parallel$)	57
nath (package)	107, 113, 256	\ncong ($\not\cong$)	59	\ndashVv ($\not\parallel$)	61
\NATURAL (\mathbb{N})	100	\ncong ($\not\cong$)	65	\nDashv ($\not\equiv$)	61
\Natural (\mathbb{N})	100	\ncongdot ($\not\cong$)	65	\nDdownarrow ($\not\Downarrow$)	87
\natural (\natural)	170	\ncurlyeqprec ($\not\prec$)	57	\nddttstile ($\not\parallel$)	66
\natural (\natural)	170	\ncurlyeqprec ($\not\prec$)	61	\ndiagdown (\times)	59
\natural (\natural)	170	\ncurlyeqprec ($\not\prec$)	59	\ndiagup (\times)	59
\natural (\natural)	176	\ncurlyeqsucc ($\not\succ$)	57	\ndivides (+)	59
\natural (\natural)	170	\ncurlyeqsucc ($\not\succ$)	61	\nDoteq ($\not\equiv$)	61
\natural (\natural)	170	\ncurlyeqsucc ($\not\succ$)	59	\nDoteq ($\not\equiv$)	59
natural numbers (\mathbb{N})	see alphabets, math	\ncurvearrowdownup (\curvearrowdown) . .	82	\ndoteq ($\not\equiv$)	61
\nbackapprox ($\not\approx$)	58	\ncurvearrowleft (\curvearrowleft) . .	87	\ndoteq ($\not\equiv$)	59
\nbackapproxeq ($\not\approx$)	58	\ncurvearrowleft (\curvearrowleft) . .	83	\ndoublefrown ($\not\smile$)	97
\nbackccong ($\not\cong$)	61	\ncurvearrowleftright ($\curvearrowleft\curvearrowright$) . .	82	\ndoublefrownneq ($\not\cong$)	97
\nbackccong ($\not\cong$)	58	\ncurvearrownwesw ($\curvearrownw\curvearrowsw$) . .	82	\ndoublesmile ($\not\smile$)	97
\nbackeqsim ($\not\approx$)	58	\ncurvearrownwse ($\curvearrownw\curvearrowse$) . .	82	\ndoublesmilee ($\not\smile$)	97
\nbacksim ($\not\sim$)	56	\ncurvearrowright (\curvearrowright) . .	87	\nDownarrow (\Downarrow)	87
\nbacksim ($\not\sim$)	61	\ncurvearrowright (\curvearrowright) . .	83	\nDownarrow (\Downarrow)	82
\nbacksim ($\not\sim$)	58	\ncurvearrowrightleft ($\curvearrowright\curvearrowleft$) . .	82	\ndownarrow (\Downarrow)	87
\nbacksimeq ($\not\equiv$)	56	\ncurvearrowsenw ($\curvearrowse\curvearrownw$) . .	82	\ndownarrow (\Downarrow)	82
\nbacksimeq ($\not\equiv$)	61	\ncurvearrowswne ($\curvearrowsw\curvearrowne$) . .	82	\ndownarrowtail (\Downarrow)	87
\nbacksimeq ($\not\equiv$)	59	\ncurvearrowupdown ($\curvearrowup\curvearrowdown$) . .	82	\ndownarrowtail (\Downarrow)	82
\nbacktriplesim ($\not\approx$)	59	\ncwcirclearrowdown (\circlearrowleft) . .	86	\ndownAssert ($\not\exists$)	61
\nBarv ($\overline{\text{A}}$)	62	\ncwcirclearrowleft (\circlearrowleft) . .	86	\ndownassert ($\not\exists$)	61
\nbarV ($\overline{\text{A}}$)	62	\ncwcirclearrowright (\circlearrowright) . .	86	\ndownbkarrow ($\not\Downarrow$)	87
\nbdleftarcarrow ($\not\leftarrow$)	86	\ncwcirclearrowup (\circlearrowright) . .	86	\downblackspoon ($\not\Downarrow$)	97
\nbdnearcarroW ($\not\leftarrow$)	86	\ncwgapcirclearrow (\circlearrowright) . .	87	\ndowndownarrows ($\not\Downarrow$)	87
\nbdnwarcarrow ($\not\leftarrow$)	86	\ncwleftarcarrow ($\not\leftarrow$)	86	\ndowndownarrows ($\not\Downarrow$)	82
\nbdoverarcarrow ($\not\leftarrow$)	86	\ncwnearcarroW ($\not\leftarrow$)	86	\ndownfilledspoon ($\not\Downarrow$)	96
\nbdrightarcarrow ($\not\rightarrow$)	86	\ncwopencirclearrow (\circlearrowright) . .	87	\downfootline ($\not\Downarrow$)	59
\nbdsearcarrow ($\not\rightarrow$)	86	\ncwoverarcarrow ($\not\leftarrow$)	86	\downfree ($\not\Downarrow$)	59
\nbdswarcarrow ($\not\leftarrow$)	86	\ncwrightarcarrow ($\not\rightarrow$)	87	\downharpoonccw ($\not\Downarrow$)	84
\nbdunderarcarrow ($\not\leftarrow$)	86	\ncwsearcarrow ($\not\leftarrow$)	87	\downharpooncw ($\not\Downarrow$)	84
\nblackwhitespoon ($\not\leftrightarrow$)	97	\ncwswarcarrow ($\not\leftarrow$)	87	\downharpoonleft ($\not\Downarrow$)	88
\NBSP (~)	141	\ncwunderarcarrow ($\not\leftarrow$)	87	\downharpoonright ($\not\Downarrow$)	88
\NBSP (~)	141	\ndasharrow ($\not\rightarrow$)	87	\downlcurvearrow ($\not\Downarrow$)	87
\nBumpeq ($\not\approx$)	56	\ndasharrow ($\not\rightarrow$)	83	\downleftcurvedarrow ($\not\Downarrow$)	87
\nBumpeq ($\not\approx$)	61	\ndasheddownarrow ($\not\downarrow$)	82	\downlsquigarrow ($\not\Downarrow$)	87
\nBumpeq ($\not\approx$)	59	\ndashedleftarrow ($\not\leftarrow$)	82	\downlsquigarrow ($\not\Downarrow$)	82
\nBumpeq ($\not\approx$)	65	\ndashedneararrow ($\not\leftarrow$)	82	\nDownmapsto ($\not\exists$)	87
\nbumppeq ($\not\approx$)	56	\ndashednarrowarrow ($\not\leftarrow$)	82	\nDownmapsto ($\not\exists$)	87
\nbumppeq ($\not\approx$)	61	\ndashedrightarrow ($\not\rightarrow$)	82	\nDownmapsto ($\not\exists$)	82
\nbumppeq ($\not\approx$)	59	\ndashedsearrow ($\not\rightarrow$)	82	\nDownModels ($\not\exists$)	59
\nbumppeq ($\not\approx$)	65	\ndashedswarrow ($\not\leftarrow$)	82	\nDownmodels ($\not\exists$)	61
		\ndasheduparrow ($\not\uparrow$)	82	\nDownmodels ($\not\exists$)	59

\ndownpitchfork (₩)	98	\neharpoonnw (↗)	88	\neswarrows (↗)	80
\ndownpitchfork (₩)	96	\neharpoonse (↙)	88	\neswbiproto (♂)	35
\ndownrcurvearrow (⤤)	87	\nelcurvearrow (⤥)	86	\neswcrossing (⤦)	59
\downrightcurvedarrow (⤧)	87	\nelsquigarrow (⤨)	80	\neswcurvearrow (⤩)	86
\downrightcurvedarrow (⤧)	87	\nemapsto (⤪)	80	\neswharpoonnwse (⤪)	88
\downrsquigarrow (⤤)	87	\neModels (⤫)	57	\neswharpoonnwse (⤪)	83
\downrsquigarrow (⤤)	82	\nemodels (⤫)	57	\neswharpoons (⤭)	88
\downspoon (⤤)	97	\nenearrows (⤮)	85	\neswharpoons (⤭)	83
\downspoon (⤤)	96	\nenearrows (⤮)	80	\neswharpoonsenw (⤯)	88
\downuparrows (⤪)	87	\neovnarrow (⤰)	91	\neswharpoonsenw (⤯)	83
\downuparrows (⤪)	82	\neovsearrow (⤰)	91	\Neswline (⤱)	57
\downupcurvearrow (⤤)	87	\nepitchfork (⤦)	96	\neswline (⤲)	57
\downupharpoons (⤪)	88	\Neptune (Ѱ)	138	\Netherlands (⤴)	203
\downupharpoons (⤪)	84	\Neptune (Ѱ)	138	neumes	172
\downupharpoonsleftright (⤪)	88	\Neptune (Ѱ)	139	\neuter (♀)	142
\downuppsquigarrow (⤤)	87	\neptune (⤧)	137	\Neutral (օ)	142
\downvDash (⤰)	61	\neq (≠)	57	\Neutrey (⤒)	206
\downVdash (⤰)	61	\neq (≠)	70	\neutrino (ν)	144
\downVdash (⤰)	61	\neq (≠)	63	\neutron (n°)	144
\downVdash (⤰)	59	\neq (≠)	62	\neVdash (⤱)	57
\downvDash (⤰)	61	\neq (≠)	59	\nevDash (⤱)	57
\downvDash (⤰)	61	\neqbump (≠)	65	new (old-arrows package option)	95
\downvDash (⤰)	59	\neqcirc (≠)	59	\newextarrow	122
\downwavearrow (⤤)	87	\neqcirc (≠)	61	\newmetrics	198
\dststile (⤠⤠)	66	\neqdot (≠)	59	\newmoon (●)	138
\dtstile (⤠⤠)	66	\neqdot (≠)	61	\newmoon (●)	137
\dttstile (⤠⤠⤠)	66	\neqfrown (⤤)	59	\newtie (⤧)	22
\ndualmap (⤠⤠)	97	\neqsim (≠)	61	\nexists (⤩)	104
\NE (≠)	140	\neqsim (≠)	59	\nexists (⤩)	104
\ne	see \neq	\neqsim (⤤)	65	\nexists (⤩)	105
\ne (≠)	62	\neqlantgr (⤤)	71	\nexists (⤩)	105
\ne (≠)	59	\neqlantgr (⤤)	73	\nexists (⤩)	104
\ne (≠)	65	\neqlantgr (⤤)	72	\nexists (⤩)	105
\Nearrow (⤡)	79	\neqlantgr (⤤)	74	\nfallingdotseq (⤩)	61
\Nearrow (⤢)	89	\neqlantless (⤤)	71	\nfallingdotseq (⤩)	59
\Nearrow (⤢)	85	\neqlantless (⤤)	73	\nforksnot (⤣)	65
\Nearrow (⤢)	80	\neqlantless (⤤)	72	\nfrown (⤤)	61, 98
\Nearrow (⤢)	90	\neqlantless (⤤)	74	\nfrown (⤤)	97
\nearrow (⤣)	79	\neqsmile (≠)	97	\nfrowneq (≠)	61, 98
\nearrow (⤣)	78, 242	\nequal (≠)	61	\nfrowneq (≠)	97
\nearrow (⤤)	85	\nequal (≠)	59	\nfrowneqsmile (≠)	97
\nearrow (⤤)	80	\nequalclosed (≠)	59	\nfrownsmile (≠)	61, 98
\nearrow (⤤)	95	\nequiv (≠)	56	\nfrownsmile (≠)	97
\nearrow (⤤)	91	\nequiv (≠)	63	\nfrownsmileeq (≠)	97
\nearrowcorner (⤣)	89	\nequiv (≠)	61	\NG (⠄)	140
\nearrowtail (⤤)	85	\nequiv (≠)	59	\NG (⠄)	169
\nearrowtail (⤤)	80	\nequiv (≠)	65	\NG (⠄)	16
\nebkarrow (⤤)	85	\nequivclosed (≠)	59	\ng (⠄)	169
\nefilledspoon (⤤)	96	\nercurvearrow (⤤)	86	\ng (⠄)	16
\nefootline (⤤)	57	\nersquigarrow (⤨)	80	\nge (⤭)	75
\nefree (⤤)	57	\nespoon (⤧)	96	\ngeq (⤩)	71
\neg (⤤)	130	\Neswarrow (⤤)	85	\ngeq (⤩)	70, 71
\neg (⤤)	131	\Neswarrow (⤤)	80	\ngeq (⤩)	74
\neg (⤤)	131	\neswarrow (⤤)	242	\ngeq (⤩)	73
\neg (⤤)	132	\neswarrow (⤤)	85	\ngeq (⤩)	72
negation	see \neg and \sim	\neswarrow (⤤)	80	\ngeq (⤩)	74, 75
\neharpoonccw (⤤)	83	\neswarrow (⤤)	91	\ngeqclosed (⤩)	73, 77
\neharpooncw (⤤)	83	\neswarrows (⤭)	85	\ngeqclosed (⤩)	72, 76

\ngeqdot (#)	73	\ngtrsim (#)	75	\niupsilon (v)	20
\ngeqdot (#)	72	\nhateq (#)	62	\niv (L)	107
\ngeqq (≠)	71	\nhateq (#)	59	\nj (n)	20
\ngeqq (≠)	70	\nHdownarrow (‡)	90	\nkarta (package)	213, 256
\ngeqq (≠)	74	\nHdownarrow (‡)	93	\nlccleararrowdown (∅)	82
\ngeqq (≠)	73	\nhknearrow (↗)	87	\nlccleararrowleft (∅)	82
\ngeqq (≠)	72	\nhknarrow (↖)	87	\nlccleararrowright (∅)	82
\ngeqq (≠)	75	\nhksearrow (↘)	87	\nlccleararrowup (∅)	82
\ngeqlant (≠)	70	\nhkswarrow (↙)	87	\nlcurvearrowdown (⤒)	82
\ngeqlant (≠)	74	\nhookdownarrow (‡)	87	\nlcurvearrowleft (⤐)	82
\ngeqlant (≠)	73	\nhookleftarrow (↶)	87	\nlcurvearrowne (⤑)	82
\ngeqlant (≠)	72	\nhookleftarrow (↶)	83	\nlcurvearrownw (⤑)	82
\ngeqlant (≠)	75	\nhooknearrow (↗)	87	\nlcurvearrowright (⤓)	82
\ngeqlantdot (≠)	73	\nhooknarrow (↖)	87	\nlcurvearrowse (⤑)	82
\ngeqlantdot (≠)	72	\nhookrightarrow (↷)	87	\nlcurvearrowsw (⤑)	82
\ngeqlcc (#)	73	\nhookrightarrow (↷)	83	\nlcurvearrowup (⤓)	82
\ngescc (#)	74	\nhooksearrow (↘)	87	\nle (⤔)	75
\ngesdot (#)	74	\nhookswarrow (↙)	87	\nleadsto (⤏)	88
\ngesl (≖)	74	\nhookuparrow (‡)	87	\nleadsto (⤏)	83
\ngets (↔)	87	\nhpar (¶)	65	\nLeftarrow (↔)	79
\ngets (↔)	83	\nHuparrow (‡)	90	\nLeftarrow (↔)	78
\ngets (↔)	93	\nHuparrow (‡)	93	\nLeftarrow (↔)	90
\ngg (⤓)	70	\nhVvert (##)	37	\nLeftarrow (↔)	86
\ngg (⤓)	73	\ni (Ξ)	104, 240	\nLeftarrow (↔)	82
\ngg (⤓)	72	\ni (Ξ)	60	\nLeftarrow (↔)	93
\ngg (⤓)	75	\ni (Ξ)	105	\nleftarrow (⤏)	79
\nggg (⤓)	73	\ni (Ξ)	104	\nleftarrow (⤏)	78
\nggg (⤓)	72	\ni (Ξ)	64	\nleftarrow (⤏)	90
\ngtcc (#)	73	\nialpha (α)	20	\nleftarrow (⤏)	86
\ngtr (†)	71	\nibar	see \ownsbar	\nleftarrow (⤏)	82
\ngtr (⤓)	70	\nibeta (β)	20	\nleftarrow (⤏)	93
\ngtr (⤓)	74	\nibLeft (⤓)	147	\nleftarrowtail (⤏)	86
\ngtr (⤓)	73	\nibRight (⤓)	147	\nleftarrowtail (⤏)	82
\ngtr (⤓)	72	nibs	147, 148	\nleftAssert (⤏)	61
\ngtr (⤓)	75	\nibSolidLeft (⤓)	147	\nleftassert (⤏)	61
\ngtrapprox (⤓)	71	\nibSolidRight (⤓)	147	\nleftbkarw (⤏)	86
\ngtrapprox (⤓)	70	nicefrac (package)	133, 256, 257	\nleftblackspoon (⤏)	97
\ngtrapprox (⤓)	73	niceframe (package)	219–222, 226	\nleftcurvedarrow (⤏)	88
\ngtrcc (#)	73	\NiceReapey (⤓)	206	\nleftdowncurvedarrow (⤏)	87
\ngtrclosed (⤏)	73, 77	\nichi (χ)	20	\nleftfilledspoon (⤏)	96
\ngtrclosed (⤏)	72, 76	\niepsilon (ε)	20	\nleftfootline (⤏)	61
\ngtrdot (⤏)	73	\nigamma (γ)	20	\nleftfootline (⤏)	58
\ngtrdot (⤏)	72	\niota (ι)	20	\nleftfree (⤏)	58
\ngtreqless (≖)	73	\nilambda (λ)	20	\nleftharpoonccw (⤏)	84
\ngtreqless (≖)	72	\nimageof (⤏)	97	\nleftharpooncw (⤏)	84
\ngtreqlesslant (≖)	73	\nin (%;">)	61, 105	\nleftharpoondown (⤏)	88
\ngtreqlesslant (≖)	72	\nin (%;">)	104	\nleftharpoonup (⤏)	88
\ngtreqqless (≖)	73	\Ninja (⤓)	206	\nleftlcurvearrow (⤏)	87
\ngtreqqless (≖)	72	\niobar (⃉)	64	\nleftleftarrows (⤏)	86
\ngtreqqless (≖)	73	\niomega (ω)	20	\nleftleftarrows (⤏)	82
\ngtreqqlantless (≖)	73	\niphil (φ)	20	\nleftlsquigarrow (⤏)	87
\ngtrless (≖)	70	\niplus (⊕)	55	\nleftmapsto (⤏)	86
\ngtrless (≖)	73	\niplus (⊕)	62	\nleftmapsto (⤏)	86
\ngtrless (≖)	72	\nis (϶)	64	\nleftmapsto (⤏)	82
\ngtrless (≖)	75	\nisd (϶)	62	\nleftModels (⤏)	58
\ngtrsimeq (⤓)	71	\nisd (϶)	64	\nleftmodels (⤏)	61
\ngtrsimeq (⤓)	70	\nisigma (σ)	20	\nleftmodels (⤏)	58
\ngtrsimeq (⤓)	73	\nitheta (θ)	20	\nleftpitchfork (⤏)	98

\nleftpitchfork (=)	96	\nleqq ($\not\equiv$)	70	\nll (<<)	75
\nleftrcurvearrow (\nwarrow)	87	\nleqq ($\not\equiv$)	74	\nLleftarrow ($\not\Leftarrow$)	86
\nLeftrightarrowW (\leftrightarrow)	90	\nleqq ($\not\equiv$)	73	\nLleftarrow ($\not\Leftarrow$)	82
\nLeftrightarrow ($\Leftarrow\Rightarrow$)	79	\nleqq ($\not\equiv$)	72	\nlll (<<<)	73
\nLeftrightarrow ($\Leftarrow\Rightarrow$)	78	\nleqq ($\not\equiv$)	75	\nlll (<<<)	72
\nLeftrightarrow ($\Leftarrow\Rightarrow$)	90	\nleqslant ($\not\leq$)	70	\nlongdashv ($\overleftarrow{}$)	62
\nLeftrightarrow ($\Leftarrow\Rightarrow$)	86	\nleqslant ($\not\leq$)	74	\nlongleadsto (\rightsquigarrow)	87
\nLeftrightarrow ($\Leftarrow\Rightarrow$)	82	\nleqslant ($\not\leq$)	73	\nLongleftarrow ($\Leftarrow\Leftarrow$)	86
\nLeftrightarrow ($\Leftarrow\Rightarrow$)	93	\nleqslant ($\not\leq$)	72	\nLongleftarrow ($\Leftarrow\Leftarrow$)	86
\nLeftrightarrow ($\Leftarrow\Rightarrow$)	79	\nleqslant ($\not\leq$)	75	\nlongleftfootline ($\overleftarrow{}$)	61
\nLeftrightarrow ($\Leftarrow\Rightarrow$)	31, 78	\nleqslant ($\not\leq$)	73	\nLongleftarrowrightarrow ($\Leftarrow\Leftarrow\Rightarrow\Rightarrow$)	86
\nLeftrightarrow ($\Leftarrow\Rightarrow$)	90	\nleqslantdot ($\not\leq$)	73	\nLongleftarrowrightarrow ($\Leftarrow\Leftarrow\Rightarrow\Rightarrow$)	86
\nLeftrightarrow ($\Leftarrow\Rightarrow$)	86	\nleqslantdot ($\not\leq$)	72	\nlongleftsquigarrow ($\rightsquigarrow\rightsquigarrow$)	87
\nLeftrightarrow ($\Leftarrow\Rightarrow$)	82	\nleqlcc ($\not\leq$)	73	\nlongleftwavearrow ($\rightsquigarrow\rightsquigarrow$)	86
\nLeftrightarrow ($\Leftarrow\Rightarrow$)	93	\nlescc ($\not\leq$)	73	\nLongmapsfrom ($\Leftarrow\Leftarrow$)	61, 86
\nLeftrightarrows ($\not\leq$)	86	\nlesdot ($\not\leq$)	73	\nLongmapsfrom ($\Leftarrow\Leftarrow$)	61, 86
\nLeftrightarrows ($\not\leq$)	82	\nlesg ($\not\leq$)	73	\nLongmapsto ($\not\mapsto$)	86
\nLeftrightblackspoon ($\bullet\bullet$)	97	\nless ($\not<$)	71	\nlongmapsto ($\mapsto\mapsto$)	86
\nLeftrightcurvearrow (\nwarrow)	87	\nless ($\not<$)	70	\nLongrightarrow ($\Rightarrow\Rightarrow$)	86
\nLeftrightharpoonupdown (\nwarrow)	88	\nless ($\not<$)	74	\nLongrightarrow ($\Rightarrow\Rightarrow$)	86
\nleftrightharpoonupdown (\nwarrow)	84	\nless ($\not<$)	73	\nlongrightfootline ($\overrightarrow{}$)	61
\nleftrightharpoons ($\not\leq$)	88	\nless ($\not<$)	72	\nlongrightsquigarrow ($\rightsquigarrow\rightsquigarrow$)	87
\nleftrightharpoons ($\not\leq$)	84	\nless ($\not<$)	75		
\nleftrightharpoonupdown (\nwarrow)	88	\nlessapprox ($\not\leq\approx$)	71	\nlongrightwavearrow ($\rightsquigarrow\rightsquigarrow$)	86
\nleftrightharpoonupdown (\nwarrow)	84	\nlessapprox ($\not\leq\approx$)	70	\nltcc ($\not\mathcal{C}$)	74
\nleftrightharpoonupdown (\nwarrow)	88	\nlessapprox ($\not\leq\approx$)	73	\nMapsdown ($\not\mathcal{D}$)	87
\nleftrightharpoonupdown (\nwarrow)	84	\nlesscc ($\not\leq$)	73	\nmapsdown ($\not\mathcal{D}$)	87
\nleftrightharpoonupdown (\nwarrow)	88	\nlessclosed ($\not\leq$)	73, 77	\nMapsfrom ($\not\mathcal{F}$)	87
\nleftrightharpoonupdown (\nwarrow)	84	\nlessclosed ($\not\leq$)	72, 76	\nmapsfrom ($\not\mathcal{F}$)	87
\nLeftrightline (=)	58	\nlessdot ($\not<$)	73	\nMapsto ($\not\mapsto$)	87
\nLeftrightline (-)	58	\nlessdot ($\not<$)	72	\nmapsto ($\mapsto\mapsto$)	87
\nleftrightspoon ($\circ\circ$)	97	\nlesseqgr ($\not\leq$)	73	\nmapsto ($\mapsto\mapsto$)	83
\nleftrightsquigarrow (\leftrightarrow)	87	\nlesseqgr ($\not\leq$)	72	\nMapsup ($\not\mathcal{M}$)	87
\nleftrightsquigarrow (\leftrightarrow)	83	\nlesseqgrslant ($\not\leq$)	74	\nmapsup ($\not\mathcal{M}$)	87
\nleftrightwavearrow (\leftrightarrow)	86	\nlesseqgrslant ($\not\leq$)	72	\nmnid ($\not\mathcal{M}$)	55
\nleftsquigarrow (\nwarrow)	87	\nlesseqgtr ($\not\geq$)	73	\nmnid ($\not\mathcal{M}$)	63
\nleftsquigarrow (\nwarrow)	82	\nlesseqgtr ($\not\geq$)	73	\nmnid ($\not\mathcal{M}$)	61
\nleftspoon ($\circ\circ$)	97	\nlesseqgtr ($\not\geq$)	72	\nmnid ($\not\mathcal{M}$)	59
\nleftspoon ($\circ\circ$)	96	\nlesseqgtrslant ($\not\geq$)	72	\nmnid ($\not\mathcal{M}$)	65
\nleftsquigarrow (\nwarrow)	87	\nlesseqgtrslant ($\not\geq$)	73	\nmnidcir ($\not\mathcal{M}$)	97
\nleftupcurvedarrow (\nwarrow)	87	\nlessgtr ($\not>$)	70	\nmodels ($\not\mathcal{M}$)	62
\nleftVDash (#)	61	\nlessgtr ($\not>$)	73	\nmodels ($\not\mathcal{M}$)	59
\nleftVdash (#)	61	\nlessgtr ($\not>$)	72	\nmultimap ($\not\bowtie$)	97
\nleftVdash (#)	59	\nlessgtr ($\not>$)	75	\nmultimap ($\not\bowtie$)	96
\nlefttvDash (#)	61	\nlesssim ($\not\approx$)	71	\nmultimapinv ($\not\circ\circ$)	97
\nlefttvDash (#)	61	\nlesssim ($\not\approx$)	70	\nNN ($\not\mathcal{N}$)	140
\nleftvdash (#)	61	\nlesssim ($\not\approx$)	73	\nnntstile ($\not\Box\Box$)	66
\nleftvdash (#)	58	\nlesssim ($\not\approx$)	75	\nNearrow ($\not\nearrow$)	86
\nleftwavearrow (\leftrightarrow)	86	\nlhookdownarrow ($\not\downarrow$)	82	\nNearrow ($\not\nearrow$)	82
\nleq ($\not\leq$)	71	\nlhookleftarrow ($\not\leftarrow$)	83	\nnearrow ($\not\nearrow$)	79
\nleq ($\not\leq$)	70, 71	\nlhooknearrow ($\not\leftarrow$)	83	\nnearrow ($\not\nearrow$)	89
\nleq ($\not\leq$)	74	\nlhooknwarrow ($\not\leftarrow$)	82	\nnearrow ($\not\nearrow$)	86
\nleq ($\not\leq$)	73	\nlhookrightarrow ($\not\rightarrow$)	82	\nnearrow ($\not\nearrow$)	82
\nleq ($\not\leq$)	72	\nlhooksearrow ($\not\rightarrow$)	82	\nnearrowtail ($\not\rightarrow$)	86
\nleq ($\not\leq$)	75	\nlhookswarrow ($\not\rightarrow$)	82	\nnearrowtail ($\not\rightarrow$)	82
\nleqclosed (#)	73, 77	\nlhookuparrow ($\not\uparrow$)	82	\nnebkarrow ($\not\rightarrow$)	87
\nleqclosed (#)	72, 76	\nll (<<)	70	\nnfilledspoon ($\not\circ\circ$)	96
\nleqdot ($\not\leq$)	73	\nll (<<)	73	\nnfootline ($\not\rightarrow$)	59
\nleqdot ($\not\leq$)	72	\nll (<<)	72	\nnefree ($\not\rightarrow$)	59

\nneharpoonccw (↗)	84	\nnwmodels (❖)	59	\notbot (⊤)	104
\nneharpooncw (↖)	84	\nnwnwarrows (❖)	87	\notbot (⊤)	131
\nneharpoonnw (↙)	88	\nnwnwarrows (❖)	82	\notchar (ຍ)	64
\nneharpoonse (↘)	88	\nnwpitchfork (❖)	96	\NotCongruent (≠)	128
\nnelcurvearrow (↖)	87	\nnwrcurvearrow (↘)	88	\notdivides (∤)	57
\nnelsquigarrow (↭)	82	\nnwrsquigarrow (↭)	82	\notequiv (≡)	57
\nnemapsto (⤠)	82	\nNwsearrow (⤠)	87	\notin (∉)	104
\nneModels (❖)	59	\nNwsearrow (⤠)	82	\notin (∉)	104
\nnemodels (❖)	59	\nnwsearrow (⤠)	87	\notin (∉)	105
\nnenearrows (⤠)	87	\nnwsearrow (⤠)	82	\notin (∉)	62
\nnenearrows (⤠)	82	\nnwsearrows (⤠)	87	\notin (∉)	105
\nnepitchfork (↗)	96	\nnwsearrows (⤠)	82	\notin (∉)	104
\nnercurvearrow (⤠)	87	\nnwsecurvearrow (⤠)	88	\notin (∉)	65
\nnersquigarrow (↭)	82	\nnwseharpoonnsw (⤠)	88	\notni (Þ)	104
\nnespoon (⤠)	96	\nnwseharpoonnsw (⤠)	84	\notowner (Þ)	104
\nNeswarrow (⤠)	87	\nnwseharpoons (⤠)	88	\notowns see \notowner and	
\nNeswarrow (⤠)	82	\nnwseharpoons (⤠)	84	\notni	
\nneswarrow (⤠)	87	\nnwseharpoonswne (⤠)	88	\notperp (⊥)	57
\nneswarrow (⤠)	82	\nnwseharpoonswne (⤠)	84	\notslash (⌇)	139
\nneswarrows (⤠)	87	\nNwseline (⤠)	59	\notsmallin (∉)	105
\nneswarrows (⤠)	82	\nNwseline (⤠)	59	\notsmallowns (Þ)	105
\nneswcurvearrow (⤠)	87	\nnwspoon (⤠)	96	\nottop (⊤)	104
\nneswharpoonnwse (⤠)	88	\nnwVdash (⤠)	59	\nottop (⊤)	131
\nneswharpoonnwse (⤠)	84	\nnwvdash (⤠)	59	\NoTumbler (⤠)	191
\nneswharpoons (⤠)	88	no entry see \noway		\novelty (N)	195
\nneswharpoons (⤠)	84	\NoBleech (△)	191	\noway (◐)	191
\nneswharpoonsew (⤠)	88	\NoChemicalCleaning (○)	191	\nowns (Þ)	61, 105
\nneswharpoonsew (⤠)	84	noeuro (wasysym package option)	27	\nowns (Ξ)	105
\nNeswline (⤠)	59	nointegrals (wasysym package op-		\nowns (ȝ)	104
\nneswline (⤠)	59	tion)	44	\nparallel (⤠)	55
\nneVdash (⤠)	59	\NoIroning (⤠)	191	\nparallel (⤠)	63
\nnevdash (⤠)	59	non-commutative division	125	\nparallel (⤠)	61
\nni (϶)	62	nonbreaking space	141	\nparallel (⤠)	59
\nni (϶)	105	NOR gates	141	\nparallel (⤠)	65
\nni (϶)	65			\nparallelslant (⤠)	67
\nnststile (⤠)	66	\NORd (⤠)	141	\nperp (⊥)	62
\nntstile (⤠)	65			\nperp (⊥)	59
\nnttstile (⤠)	65	\norigof (⤠)	97	\npitchfork (⤠)	98
\nNwarrow (⤠)	87			\npitchfork (⤠)	96
\nNwarrow (⤠)	82	\NORl (⤠)	141	\nplus (⊕)	33
\nnarrow (⤠)	79	norm see \lVert and \rVert		\nplus (⊕)	36
\nnarrow (⤠)	89	normal runes	169	\nolimits (⌇)	52
\nnarrow (⤠)	87			\nolimits (⌇)	50
\nnarrow (⤠)	82	\NORr (⤠)	141	\nolimitsl (⌇)	52
\nnarrowtail (⤠)	87			\nolimitsup (⌇)	52
\nnarrowtail (⤠)	82	\NorthNode (⤠)	139	\nprec (≺)	57
\nnwbkarrown (⤠)	87			\nprec (≺)	55
\nnwfilledspoon (⤠)	96	\NORu (⤠)	141	\nprec (≺)	63
\nnwfootline (⤠)	59	\Norway (⤠)	203	\nprec (≺)	61
\nnwfree (⤠)	59	\NoSun (◐)	192	\nprec (≺)	59
\nnwharpoonccw (⤠)	84	\Not (⌐)	64	\nprecapprox (≾)	57
\nnwharpooncw (⤠)	84	not see \neg		\nprecapprox (≿)	56
\nnwharpoonne (⤠)	88	\not	57, 241	\nprecapprox (≿)	61
\nnwharpoonsw (⤠)	88	\notequal (≠ vs. ≡)	57	\nprecapprox (≿)	59
\nnwlcurvearrow (⤠)	87	\notasymp (≈)	57	\preccurlyeq (≾)	57
\nnwlsquigarrow (⤠)	82	\notbackslash (⤠)	139	\preccurlyeq (≿)	56
\nnwmapsto (⤠)	82			\preccurlyeq (≿)	61
\nnwModels (❖)	59			\preccurlyeq (≿)	59

\npreccurlyeq (⌚)	65	\nrightfilledspoon (+)	96	\nseharpoonw (✖)	84
\npreceq (⌚)	57	\nrightfootline (➕)	61	\nseharpoonne (ණ)	88
\npreceq (⌚)	55	\nrightfootline (➕)	59	\nseharpoonsw (✖)	88
\npreceq (⌚)	63	\nrightfree (➕)	59	\nselcurvearrow (☒)	87
\npreceq (⌚)	61	\nrightharpoonccw (➕)	84	\nselsquigarrow (☒)	82
\npreceq (⌚)	59	\nrightharpooncw (➕)	84	\nsemapsto (ණ)	82
\npreceq (⌚)	65	\nrightharpoondown (➕)	88	\nseModels (❖)	58
\npreceqq (⌚)	56	\nrightharpoonup (➕)	88	\nsemmodels (❖)	58
\npreceqq (⌚)	61	\nrightlcurvearrow (➕)	87	\nsenarrows (❖)	86
\nprecsim (⌚)	57	\nrightleftarrows (>#)	87	\nsenarrows (❖)	82
\nprecsim (⌚)	56	\nrightleftarrows (>#)	82	\nsenwcurvearrow (☒)	87
\nprecsim (⌚)	61	\nrightleftcurvearrow (➕)	87	\nsewharpoons (❖)	88
\nprecsim (⌚)	59	\nrightleftharpoons (#)	88	\nsewharpoons (❖)	84
\nR (ණ)	140	\nrightleftharpoons (#)	84	\nsepitchfork (☒)	96
\nrcirclearrowdown (∅)	82	\nrightleftsquigarrow (↔)	87	\nsercurvearrow (ණ)	87
\nrcirclearrowleft (∅)	82	\nrightlsquigarrow (➕)	87	\nsersquigarrow (ණ)	82
\nrcirclearrowright (∅)	82	\nrightlsquigarrow (➕)	82	\nsesearrows (❖)	86
\nrcirclearrowup (∅)	82	\nRightmapsto (⇒)	87	\nsesearrows (❖)	82
\nrcurvearrowdown (⌚)	82	\nrightmapsto (⇒)	87	\nsespoon (♾)	96
\nrcurvearrowleft (⌚)	82	\nrightmapsto (⇒)	82	\nseVdash (❖)	58
\nrcurvearrowright (⌚)	82	\nrightModels (#)	59	\nsevDash (☒)	58
\nrcurvearrowse (⌚)	82	\nrightmodels (#)	61	\nshortdowntack (⤔)	62
\nrcurvearrownw (⌚)	82	\nrightmodels (#)	59	\nshortlefttack (⤓)	62
\nrcurvearrowright (⌚)	82	\nrightpitchfork (#)	98	\nshortmid (⤑)	55
\nrcurvearrowsw (⌚)	82	\nrightpitchfork (#)	96	\nshortmid (⤒)	63
\nrcurvearrowup (⌚)	82	\nrightrcurvearrow (➕)	87	\nshortmid (⤒)	61
\nRelbar (=)	59	\nrightrightarrows (#)	87	\nshortmid (⤒)	59
\nrelbar (+)	59	\nrightrightarrows (#)	82	\nshortmid (⤒)	65
\nrestriction (†)	88	\nrightrsquigarrow (↔)	87	\nshortparallel (⤏)	55
\nrestriction (†)	84	\nrightrsquigarrow (↔)	82	\nshortparallel (⤏)	63
\nrhookdownarrow (‡)	82	\nrightspoon (↝)	97	\nshortparallel (⤏)	61
\nrhookleftarrow (↔)	82	\nrightspoon (↝)	96	\nshortparallel (⤏)	59
\nrhooknearrow (⤴)	82	\nrightsquigarrow (↔)	87	\nshortparallel (⤏)	65
\nrhooknarrow (⤴)	82	\nrightsquigarrow (↔)	83	\nshortrighttack (⤓)	62
\nrhookrightarrow (↔)	82	\nrightupcurvedarrow (⤑)	87	\nshortuptack (⤔)	62
\nrhooksearrow (⤴)	82	\nrightVDash (#)	61	\nsm (☒)	57
\nrhookswarrow (⤴)	82	\nrightVdash (#)	61	\nsm (☒)	55
\nrhookuparrow (↑)	82	\nrightVdash (#)	59	\nsm (♾)	63
\nRightarrow (⇒)	79	\nrightvDash (#+)	61	\nsm (⤑)	61
\nRightarrow (⇒)	78	\nrightvdash (⤏)	61	\nsm (⤑)	59
\nRightarrow (⇒)	90	\nrightvdash (⤏)	59	\nsm (⤑)	65
\nRightarrow (⇒)	87	\nrightwavearrow (↔)	87	\nsm (⤑)	62
\nRightarrow (⇒)	83	\nrisingdotseq (#)	61	\nsm (⤑)	65
\nRightarrow (⇒)	93	\nrisingdotseq (#)	58	\nsm (⤑)	57
\nrightarrow (↔)	79	\nRightarrow (⇒)	86	\nsm (⤑)	56
\nrightarrow (↔)	78	\nRightarrow (⇒)	82	\nsm (⤑)	61
\nrightarrow (↔)	90	\nnsdtstile (☰)	65	\nsm (⤑)	59
\nrightarrow (↔)	87	\nSearrow (⤑)	86	\nsm (⤑)	65
\nrightarrow (↔)	82	\nSearrow (⤑)	82	\nsmile (+)	61, 98
\nrightarrow (↔)	93	\nsearrow (ණ)	86	\nsmile (⤑)	97
\nrightarrowtail (⤑)	87	\nsearrow (ණ)	82	\nsmileeq (≠)	61, 98
\nrightarrowtail (⤑)	83	\nsearrowtail (ණ)	86	\nsmileeq (≠)	97
\nrightAssert (#)	61	\nsearrowtail (ණ)	82	\nsmileeqfrown (⤑)	97
\nrightassert (⤏)	61	\nsearrowtail (ණ)	86	\nsmilefrown (⤑)	61, 98
\nrightbkarow (⤑)	87	\nsebkarrow (ණ)	86	\nsmilefrown (⤑)	97
\nrightblackspoon (⤐)	97	\nsefilledspoon (♾)	96	\nsmilefrowneq (⤑)	97
\nrightcurvedarrow (⤑)	87	\nsefootline (ණ)	58	\nnsqdoublefrown (⤑)	97
\nrightdowncurvedarrow (ණ)	87	\nsefree (ණ)	58	\nnsqdoublefrown (⤑)	97
	87	\nseharpoonccw (ණ)	84	\nnsqdoublesmile (⤑)	97

\nsqdoublesmileeq (⌚)	97	\nSubset (⌚)	68	\nsupseteq (⌚)	69
\nsqeqfrown (⌚)	97	\nSubset (⌚)	69	\nsupseteq (⌚)	69
\nsqeqlsmile (⌚)	97	\nSubset (⌚)	68	\nsupseteq (⌚)	68
\nsqfrown (⌚)	97	\nsubset (⌚)	68	\nsupseteq (⌚)	69
\nsqfrownreq (⌚)	97	\nsubset (⌚)	69	\nsupseteqq (⌚)	68
\nsqfrownreqsmile (⌚)	97	\nsubset (⌚)	69	\nsupseteqq (⌚)	67
\nsqfrownsmile (⌚)	97	\nsubset (⌚)	68	\nsupseteqq (⌚)	69
\nsqsmile (⌚)	97	\nsubset (⌚)	69	\nsupseteqq (⌚)	69
\nsqsmileeq (⌚)	97	\nsubseteq (⌚)	68	\nsupseteqq (⌚)	68
\nsqsmileeqfrown (⌚)	97	\nsubseteq (⌚)	67	\nsupseteqq (⌚)	70
\nsqsmilefrown (⌚)	97	\nsubseteq (⌚)	69	\nswarrow (↗)	86
\nSqsubset (⌚)	69	\nsubseteq (⌚)	69	\nswarrow (↗)	82
\nSqssubset (⌚)	68	\nsubseteq (⌚)	68	\nswarrow (↖)	86
\nSqSubset (⌚)	68	\nsubseteq (⌚)	69	\nswarrow (↖)	82
\nSqsubset (⌚)	68	\nsubseteqq (⌚)	68	\nswarrowtail (↗)	86
\nSqsubset (⌚)	68	\nsubseteqq (⌚)	68	\nswarrowtail (↗)	82
\nSqsubset (⌚)	69	\nsubseteqq (⌚)	69	\nswbkarro (↖)	86
\nSqsubset (⌚)	68	\nsubseteqq (⌚)	69	\nswfilledspoon (↗)	96
\nSqsubset (⌚)	68	\nsubseteqq (⌚)	68	\nswfootline (↗)	59
\nSqsubset (⌚)	69	\nsubseteqq (⌚)	69	\nswfree (↗)	59
\nSqsubseteq (⌚)	68	\nsubseteqq (⌚)	57	\nsharpoonccw (↗)	84
\nSqsubseteq (⌚)	69	\nsubseteqq (⌚)	55	\nsharpooncw (↗)	84
\nSqsubseteq (⌚)	68	\nsubseteqq (⌚)	63	\nsharpoonnw (↗)	88
\nSqsubseteq (⌚)	69	\nsubseteqq (⌚)	61	\nsharpoonse (↗)	88
\nSqsubseteqq (⌚)	68	\nsubseteqq (⌚)	59	\nswlcurvearrow (↗)	87
\nSqsubseteqq (⌚)	69	\nsubseteqq (⌚)	65	\nswlsquigarrow (↗)	82
\nSqsubseteqq (⌚)	68	\nsubseteqq (⌚)	57	\nswmapsto (↗)	82
\nSqsupset (⌚)	69	\nsuccapprox (⌚)	57	\nswModels (↗)	59
\nSqsupset (⌚)	68	\nsuccapprox (⌚)	56	\nswmodels (↗)	59
\nSqSupset (⌚)	68	\nsuccapprox (⌚)	61	\nswnearrows (↗)	86
\nSqSupset (⌚)	68	\nsuccapprox (⌚)	59	\nswnearrows (↗)	82
\nSqsupset (⌚)	68	\nuccurlyeq (⌚)	57	\nswnecurvearrow (↗)	87
\nSqsupset (⌚)	68	\nuccurlyeq (⌚)	56	\nswneharpoons (↗)	88
\nSqsupset (⌚)	69	\nuccurlyeq (⌚)	61	\nswneharpoons (↗)	84
\nSqsupset (⌚)	68	\nuccurlyeq (⌚)	59	\nswpitchfork (↗)	96
\nSqsupset (⌚)	69	\nuccurlyeq (⌚)	65	\nswrcurvearrow (↗)	87
\nSqsupseteq (⌚)	68	\nsuccseq (⌚)	57	\nswrsquigarrow (↗)	82
\nSqsupseteq (⌚)	68	\nsuccseq (⌚)	55	\nswspoon (↗)	96
\nSqsupseteq (⌚)	69	\nsuccseq (⌚)	63	\nswswallows (↗)	86
\nSqsupseteq (⌚)	68	\nsuccseq (⌚)	61	\nswswallows (↗)	82
\nSqsupseteq (⌚)	69	\nsuccseq (⌚)	59	\nswVdash (↗)	59
\nSqsupseteqq (⌚)	68	\nsuccseq (⌚)	65	\nswvDash (↗)	59
\nSqsupseteqq (⌚)	68	\nsuccseqq (⌚)	56	\nNT (⌐)	140
\nSqsupseteqq (⌚)	68	\nsuccseqq (⌚)	61	\ntdtstile (▀)	66
\nSqsupseteqq (⌚)	68	\nsuccsim (⌚)	57	ntheorem (package)	130
\nSqsupseteqq (⌚)	69	\nsuccsim (⌚)	56	\nthickapprox (⌚)	56
\nSqsupseteqq (⌚)	68	\nsuccsim (⌚)	61	\nto (⤠)	87
\nSqsupseteqq (⌚)	69	\nsuccsim (⌚)	59	\nto (⤠)	83
\nSquigarrowdownup (⤠)	82	\nSupset (⌚)	68	\ntriangleeq (⌚)	77
\nSquigarrowleftright (⤠)	82	\nSupset (⌚)	68	\ntriangleeq (⌚)	76
\nSquigarrowownesw (⤠)	82	\nSupset (⌚)	69	\ntriangleleft (⌚)	76
\nSquigarrowownwse (⤠)	82	\nSupset (⌚)	68	\ntriangleleft (⌚)	75
\nSquigarrowrightleft (⤠)	82	\nSupset (⌚)	69	\ntriangleleft (⌚)	77
\nSquigarrowsenw (⤠)	82	\nSupset (⌚)	69	\ntriangleleft (⌚)	77
\nSquigarrowswe (⤠)	82	\nSupset (⌚)	68	\ntriangleleft (⌚)	77
\nSquigarrowupdown (⤠)	82	\nSupset (⌚)	69	\ntriangleleft (⌚)	77
\nSststile (▀)	65	\nSupset (⌚)	69	\ntriangleleft (⌚)	77
\nstareq (⌚)	61	\nSupset (⌚)	68	\ntriangleleft (⌚)	72, 76
\nststile (▀)	65	\nSupset (⌚)	69	\ntrianglelefteq (⌚)	76
\nsttstile (▀)	66	\nSupseteq (⌚)	68	\ntrianglelefteq (⌚)	75
\nSubset (⌚)	68	\nSupseteq (⌚)	67	\ntrianglelefteq (⌚)	77

\ntrianglelefteq (⌚)	77	Isthmian	168	\nuprcurvearrow (↷)	87
\ntrianglelefteq (⌚)	72, 76	LCD	136	\nuprightcurvearrow (↗)	87
\ntrianglelefteq (⌚)	77	Linear B	164	\nuprsquigarrow (⤒)	88
\ntrianglelefteqslant (⌚)	75	Mayan	128	\nuprsquigarrow (⤓)	82
\ntriangleright (▷)	76	old-style	29	\nupspoon (⤔)	97
\ntriangleright (▷)	75	segmented	136	\nupspoon (⤕)	96
\ntriangleright (▷)	77	\NumLock ([Num])	140	\nupuparrows (⤖)	87
\ntriangleright (▷)	77	\nUparrow (↑)	86	\nupuparrows (⤖)	83
\ntriangleright (▷)	77	\nUparrow (↑)	82	\nupVDash (⤗)	61
\ntriangleright (▷)	72, 76	\nuparrow (↑)	86	\nupVdash (⤗)	61
\ntrianglerighteq (⌚)	76	\nuparrow (↑)	82	\nupVdash (⤗)	59
\ntrianglerighteq (⌚)	75	\nuparrowtail (⤘)	86	\nupvDash (⤗)	61
\ntrianglerighteq (⌚)	77	\nuparrowtail (⤘)	82	\nupvDash (⤗)	61
\ntrianglerighteq (⌚)	77	\nupAssert (⤙)	61	\nupvDash (⤗)	59
\ntrianglerighteq (⌚)	72, 76	\nupassert (⤙)	61	\nupwavearrow (⤒)	87
\ntrianglerighteq (⌚)	77	\nupbkarrow (⤖)	86	\Nursey (⤙)	206
\ntrianglerighteqslant (⌚)	75	\nupblackspoon (⤔)	97	\nuup (v)	102
\ntriplefrown (⤖)	97	\nUpdownarrow (⤖)	86	\nUparrow (⤖)	87
\ntriplesim (⤖)	61	\nUpdownarrow (⤖)	82	\nvardownwavearrow (⤒)	87
\ntriplesim (⤖)	59	\nupdownarrow (⤖)	86	\nvargeq (⤖)	71
\ntriplesmile (⤖)	97	\nupdownarrow (⤖)	82	\nvarhookdownarrow (⤖)	87
\ntststile (⤖)	66	\nupdownarrow (⤖)	86	\nvarhookleftarrow (⤘)	87
\ttstile (⤖)	66	\nupdownarrows (⤖)	86	\nvarhooknearrow (⤘)	87
\tttstile (⤖)	66	\nupdownarrows (⤖)	82	\nvarhooknarrow (⤘)	87
\twoheaddownarrow (⤖)	86	\nupdowncurvearrow (⤖)	87	\nvarhookrightarrow (⤘)	87
\twoheaddownarrow (⤖)	82	\nupdownharpoonleftright (⤖)	88	\nvarhooksearrow (⤘)	87
\twoheadleftarrow (⤘)	56	88	\nvarhookswarrow (⤘)	87
\twoheadleftarrow (⤘)	86	\nupdownharpoonrightleft (⤖)	84	\nvarhookuparrow (⤖)	87
\twoheadleftarrow (⤘)	82	88	\nvarisinobar (⤖)	65
\twoheadnearrow (⤘)	86	\nupdownharpoonrightleft (⤖)	84	\nvarleftrightwavearrow (⤘)	87
\twoheadnearrow (⤘)	82	\nupdownharpoons (⤖)	88	\nvarleftwavearrow (⤘)	87
\twoheadnarrow (⤘)	86	\nupdownharpoons (⤖)	84	\nvarleq (⤖)	71
\twoheadnarrow (⤘)	82	\nupdownharpoonsleftright (⤖)	88	\nvarniobar (⤖)	65
\twoheadrightarrow (⤘)	56	88	\nvarparallel (⤖)	56
\twoheadrightarrow (⤘)	86	\nUpdownline (⤖)	59	\nvarparallelinv (⤖)	56
\twoheadrightarrow (⤘)	82	\nupdownline (⤖)	59	\nvarrightwavearrow (⤘)	87
\twoheadsearrow (⤘)	86	\nupdownsquigarrow (⤖)	87	\nvartriangleleft (⤘)	77
\twoheadsearrow (⤘)	82	\nupdownwavearrow (⤖)	87	\nvartriangleright (⤘)	77
\twoheadswarrow (⤘)	86	\nupfilledspoon (⤖)	96	\nvarupdownwavearrow (⤖)	87
\twoheadswarrow (⤘)	82	\nupfootline (⤖)	59	\nvarupwavearrow (⤖)	87
\twoheaduparrow (⤖)	86	\nupfree (⤖)	59	\nVbar (⤗)	62
\twoheaduparrow (⤖)	82	\nupharpoonccw (⤖)	84	\nvBar (⤗)	62
\twoheaduparrow (⤖)	86	\nupharpooncw (⤖)	84	\nVDash (⤗)	57
\twoheaduparrow (⤖)	82	\nupharpoonleft (⤖)	88	\nVDash (⤗)	55
\twoheaduparrow (⤖)	86	\nupharpoonright (⤖)	88	\nVDash (⤗)	63
\Nu (N)	101	\nuplcurvearrow (⤖)	87	\nVDash (⤗)	62
\nu (ν)	101	\nupleftcurvedarrow (⤖)	87	\nVDash (⤗)	59
nuclear power plant .	see \SNPP	\nuplsquigarrow (⤖)	87	\nVDash (⤗)	65
\nucleus (⤘)	144	\nuplsquigarrow (⤖)	82	\nVdash (⤗)	57
\Nudelholz (⤘⤘)	205	\nUpmapsto (⤖)	87	\nVdash (⤗)	63
\NUL (⤘)	141	\nupmapsto (⤖)	87	\nVdash (⤗)	62
\NUL (⤘)	141	\nupmapsto (⤖)	82	\nVdash (⤗)	59
null infinity	see alphabets, math	\nupModels (⤗)	59	\nVdash (⤗)	65
null set	129–131	\nupmodels (⤖)	61	\nvDash (⤗)	57
number sets	see alphabets, math	\nupmodels (⤖)	59	\nvDash (⤗)	55
number sign .	see \textnumero	\nuppitchfork (⤖)	98	\nvDash (⤗)	63
numbers	see numerals	\nuppitchfork (⤖)	96	\nvDash (⤗)	62
numerals	29, 128, 136, 150, 188,				
	196, 197, 213–215, 233				
circled .	150, 196, 197, 233				
Epi-Olmec	168				

\nvDash (#)	59	\nwfreetrue (↖)	57	\oblong (□)	40
\nvDash (≠)	65	\nwharpoonccw (↖)	83	\obot (⊕)	38
\nvdash (≠)	57	\nwharpooncw (↖)	83	\obot (⊖)	40
\nvdash (≠)	55	\nwharpoonne (↖)	88	\obot (⊕)	41
\nvdash (≠)	63	\nwharpoonsw (↖)	88	\obrbrak (⊍)	132
\nvdash (≠)	62	\nwhiteblackspoon (≠)	97	\obslash (⊗)	33
\nvdash (≠)	59	\nlcurvearrow (↑)	86	\obslash (⊗)	40
\nvdash (≠)	65	\nlsquigarrow (↖)	80	\obslash (⊗)	40
\nvdash (≠)	61	\nwmapsto (↑)	80	\obslash (⊗)	41
\nveeq (≠)	61	\nwModels (⊗)	58	\oc ()	31
\nvinfty (∞)	128	\nwmodels (⊗)	57	\ocirc (◎)	38
\nVleftarrow (↔)	90	\nwnwarrows (↖)	85	\ocirc (◎)	39
\nVleftarrow (↔)	93	\nwnwarrows (↖)	80	\ocirc (◎)	39
\nVleftarrow (↔)	93	\nwvnearrow (⊗)	91	\ocircle (○)	33
\nVleftarrow (↔)	93	\npitchfork (⊗)	96	\ocoasterisk (⊗)	38
\nVleftarrowtail (↔)	93	\nrcurvearrow (↖)	86	\ocommatopright (⊤)	115
\nVleftarrowtail (↔)	93	\nrsquigarrow (↖)	80	\octagon (○)	152
\nVleftrightarrow (↔)	93	\Nwsearrow (↖)	85	octonions (○)	see alphabets, math
\nVleftrightarrow (↔)	93	\Nwsearrow (↖)	80	\Octosteel (●)	142
\nVleftrightarrow (↔)	93	\nwsearrow (↖)	242	\od (✉)	24
\nVrightarrow (↔)	90	\nwsearrow (↖)	85	\odash (⊖)	40
\nVrightarrow (↔)	93	\nwsearrow (↖)	80	\odiv (÷)	38
\nVrightarrow (↔)	93	\nwsearrow (↖)	91	\odiv (÷)	41
\nVrightarrow (↔)	93	\nwsearrows (↖)	85	\odot (⊙)	38
\nVrightarrow (↔)	93	\nwsearrows (↖)	80	\odot (⊙)	32
\nVrightarrowtail (↔)	93	\nwsebiproto (✉)	35	\odot (⊙)	40
\nVrightarrowtail (↔)	93	\nwsecrossing (⊕)	58	\odot (⊙)	39
\nVtwoheadleftarrow (↔)	93	\nwsecurvearrow (↖)	86	\odot (⊙)	41
\nvtwoheadleftarrow (↔)	93	\nwseharpoonnesw (↖)	88	\odotslashdot (⊗)	41
\nVtwoheadleftarrowtail (↔)	93	\nwseharpoonnesw (↖)	83	\odplus (⊕)	38
\nVtwoheadleftarrowtail (↔)	93	\nwseharpoons (⊗)	88	\OE (Œ)	16, 254
\nVtwoheadleftarrowtail (↔)	93	\nwseharpoons (⊗)	83	\oe (œ)	16, 254
\nVtwoheadrightarrow (↔)	93	\nwseharpoonswne (↖)	88	\oequal (⊖)	40
\nvtwoheadrightarrow (↔)	93	\nwseharpoonswne (↖)	83	\Ofen (▣)	205
\nVtwoheadrightarrowtail (↔)	93	\Nwseline (⊗)	58	\officialeuro (€)	28
\nVtwoheadrightarrowtail (↔)	93	\nwseline (↖)	58	\offinterlineskip	240
\nVtwoheadrightarrowtail (↔)	93	\nwspoon (↖)	96	ogonek (package)	25, 256, 257
\nVvash (≠)	57	\nwvdash (⊗)	58	ogonek (✉)	see accents
\nVvDash (=)	61	\nwvDash (⊗)	58	\ogreaterthan (⊗)	33
\Narrow (↖)	79	\o (ø)	16	\ogreaterthan (⊗)	40
\Narrow (↖)	89	\o (o)	16	\ogreaterthan (⊗)	41
\Narrow (↖)	85	\o (ɔ)	101	\ohill (☷)	24
\Narrow (↖)	80	\o (ɔ̄)	169	ohm	see \textohm
\Narrow (↖)	91	\oast (⊗)	39	\ohm (Ω)	136
\narrow (↖)	79	\oast (⊗)	39	\Ohne (⊍)	174
\narrow (↖)	78, 242	\oasterisk (⊗)	38	\OHORN (Ӯ)	17
\narrow (↖)	85	\obackslash (⊗)	38	\ohorn (օ)	17
\narrow (↖)	80	\obackslash (⊗)	39	\oiint (fff)	45
\narrow (↖)	95	\obackslash (⊗)	39	\oiint (fff)	52
\narrow (↖)	91	\obar (⊗)	33	\oiint (fff)	48
\narrowcorner (↖)	89	\obar (⊗)	40	\oiint (fff)	54
\narrowtail (↖)	85	\obar (Φ)	41	\oiint (fff)	49
\narrowtail (↖)	80	\obelus (—)	197	\oiintclockwise (fff)	45
\nbkarrow (↖)	85	\obelus (—)	197	\oiinctrclockwise (fff)	45
\nedgeq (≠)	61	\obelus* (÷)	197	\oiintsl (fff)	51
\nwfilledspoon (↖)	96	\obelus* (÷)	197	\oiintup (fff)	51
\nfootline (↖)	57	\oblong (□)	33		

\oiint (§)	45	\omegaup (ω)	102
\oiint (ƒ)	44	\Omicron (Ο)	101
\oiint (ƒ)	46	\omicron (ο)	101
\oiint (ƒ)	52	\ominus (⊖)	38
\oiint (ƒ)	46	\ominus (⊖)	32
\oiint (ƒ)	48	\ominus (⊖)	40
\oiint (ƒ)	54	\ominus (⊖)	40
\oiint (ƒ)	47	\ominus (⊖)	39
\oiint (ƒ)	49	\ominus (⊖)	41
\oiintclockwise (ƒ)	46	\onlymove (□)	195
\oiintcclockwise (ƒ)	46	\oo (oo)	197
\ointsl (ʃ)	51	\oo (oo)	20
\ointup (ʃ)	51	\oalign	240
\oint (ʃ)	45	\open (.)	26
\oint (ʃ)	44	open unit disk (𝔻)	see alphabets, math
\oint (ʃ)	44	\openJoin (×)	56
\oint (ʃ)	43	\openo (օ)	21
\oint (ʃ)	53	\openo (օ)	20
\oint (ʃ)	48	\openo (օ)	21
\oint (ʃ)	47	\opentimes (×)	56
\oint (ʃ)	49	OpenType	170
\ointclockwise (ʃ)	45	operators	31–34, 38, 39
\ointclockwise (ʃ)	53	binary	32–41
\ointclockwise (ʃ)	46	logical	see logical operators
\ointclockwise (ʃ)	49	set	see set operators
\ointclockwise (ʃ)	54	unary	31
\ointcclockwise (ʃ)	45	\operp (⊕)	41
\ointcclockwise (ʃ)	53	oplotsymb (package)	157–159, 256, 257
\ointcclockwise (ʃ)	46	\oplus (⊕)	38
\ointcclockwise (ʃ)	49	\oplus (⊕)	31, 32, 238
\ointcclockwise (ʃ)	54	\oplus (⊕)	40
\ointcclockwise (ʃ)	49	\oplus (⊕)	39
\ointcclockwisesl (ʃ)	51	\oplus (⊕)	39
\ointcclockwiseup (ʃ)	51	\oplus (⊕)	41
\ointsl (ʃ)	51	\opluslhrim (⊕)	37
\ointup (ʃ)	51	\oplusrhrim (⊕)	37
\olcross (⊗)	41	\opposbishops (■)	195
old-arrows (package)	95, 256	\Opposition (♂)	139
old-style numerals	29	\opposition (օ)	137
\oldDWinkey (⌚)	206	optical scaling	246
\oldGclef (ગ)	172	options	see package options
\oldIm (ઝ)	100	\OR (∨)	140
\oldRe (ર)	100	or	see \vee
\oldstylenums	29	OR gates	141
\oldWinkey (⌚)	206	\orbit (⟳)	144
\oleft (⊕)	38	\ORd (ઉ)	141
\oleft (⊕)	40	\right (⊕)	38
\lessthan (⊗)	33	\right (⊕)	40
\lessthan (⊗)	40	\origof (↔)	97
\lessthan (⊗)	41	\origof (↔)	64
Olschok, Marc	238	orisclus	see musixgre
\OM (ω)	140	\ORl (ઉ)	141
\Omega (Ω)	101		
\omega (ω)	101		

\overgroup (119
\overgroup (118
\overgroup (118
\overleftarrow (119
\overleftarrow (95, 117
\overleftbroom (123
\overleftflutteringbat (124
\overleftharp (94
\overleftharardown (94
\overleftharpoon (118
\overleftharpoon (118
\overleftharpoon (119
\overleftpitchfork (123
\overleftrightarrow (119
\overleftrightarrow (95, 118
\overleftswishingghost (124
\overleftwitchonbroom (124
\overleftwitchonbroom* (124
\overleftwitchonpitchfork	
(124
\overleftwitchonpitchfork*	
(124
\overline (31, 114, 117
\overlinesegment (118
\overlinesegment (118
\overparen (119
\overparenthesis (244, 245
\Overrightarrow (117
overrightarrow (package)	117, 256
\overrightarrow (119
\overrightarrow (95, 117
\overrightbroom (123
\overrightflutteringbat (124
\overrightharp (94
\overrightharardown (94
\overrightharpoon (118
\overrightharpoon (118
\overrightharpoon (119
\overrightpitchfork (123
\overrightswishingghost (124
\overrightwitchonbroom (124
\overrightwitchonbroom*	
(124
\overrightwitchonpitchfork	
(124
\overrightwitchonpitchfork*	
(124
\overring (26
\overscriptleftarrow (123
\overscriptleftarrow	
(123
\overscriptrightarrow (123
\overset	239
\overt (39
\overt (39
\ovhook (115
\ovoid (38
\owedge (33
\owedge (40
\owns	
see \ni	
\owns (104
\owns (60, 105
\owns (105
\owns (104
\owns (64
\ownsbar (104
P	
\P (169
\P (16, 253
\P (16
\p (169
\p (.	197
\p (169
\p@	243
package options	
a (esvect)	120
arrows (boisik)	90
b (esvect)	120
bbgreek (mathbbol)	135
boondox (emf)	137
c (esvect)	120
cal (emf)	137
calligra (emf)	137
chorus (emf)	137
cmr (emf)	137
crescent (fge)	115
d (esvect)	120
e (esvect)	120
f (esvect)	120
fourier (emf)	137
frcursive (emf)	137
g (esvect)	120
german (keystroke)	140
greek (babel)	17, 101, 102, 166
h (esvect)	120
heartctrbull (bullcntr)	194
integrals (wasysym)	44
largectrbull (bullcntr)	194
mathcal (euscript)	134
mathscr (euscript)	134
mathscr (urwchancal)	134
miamia (emf)	137
new (old-arrows)	95
noeuro (wasysym)	27
nointegrals (wasysym)	44
polutonikogreek (babel)	17, 101, 102
rsfs (emf)	137
sans (dsfont)	134
scaled (CountriesOfEurope)	204
scr (rsfso)	134
smallctrbull (bullcntr)	194
smartctrbull (bullcntr)	194
upint (stix)	42, 43, 50, 52
utf8x (inputenc)	254
varg (txfonts/pxfonts)	103
packages	
abrases	120, 256, 257
accents	114, 244, 256, 257
actuarialangle	121, 244, 256, 257
actuarialsymbol	244
adforn	146, 151, 152, 159, 256, 257
adfsymbols	146, 149, 151, 156, 256
allrunes	169, 256
\mathcal{AM} S	13, 16, 32, 43, 55, 67, 70, 75, 78, 79, 95, 99, 101, 103, 104, 106, 108, 114, 118, 121, 125, 129, 130, 135, 235, 236, 255
amsbsy	250
amsfonts	130, 134
amsmath	13, 53, 99, 114, 239, 249
amssymb	13, 114, 130, 134, 166, 256, 257
amstext	241, 242
apl	140, 256
ar	136, 256, 257
arcs	25, 256, 257
arev	146–150, 158, 171, 205, 256
ascii	141, 251, 256, 257
astrosym	215, 256
babel	17, 101, 102, 166
bartel-chess-fonts	233, 234, 256
bding	145, 147–149, 151, 156, 159, 236, 256, 257
bbm	134, 256
bbold	134, 256
bclogo	207, 208, 256, 257
begriff	127, 256
bigints	47, 256, 257
bm	250, 256, 257

- boisik 36, 40,
 49, 62, 63, 69, 74, 77, 89,
 90, 103–106, 115, 129, 131,
 153, 158, 166, 170, 256, 257
 braket 107
 bullcntr 194, 256, 257
 bullenum 194
 calligra 134, 256, 257
 calrsfs 134
 cancel 117
 ccicons 29, 256, 257
 ccllicenses 29, 256, 257
 centernot 241
 chancery 256
 chemarr 121, 256, 257
 chemarrow 94, 122, 256
 $\text{G}\ddot{\text{I}}\text{P}\text{A}2\text{e}$ 27, 100, 135, 200,
 201
 china2e 134, 256, 257
 clock 193, 256, 257
 cmll 31, 38, 54, 67, 106, 256
 cmupint 52, 53, 256, 257
 colonequals 31, 67, 256, 257
 combelow 26, 256, 257
 cookingsymbols 205, 256,
 257
 countriesofeurope 203, 256,
 257
 cryst 231, 256
 cypriot 165, 256, 257
 dancers 226, 256
 dblaccnt 243
 dice 232, 256
 dictsym 198, 256, 257
 dingbat 147, 148, 159, 222,
 236, 256, 257
 DotArrow 122, 256, 257
 dozenal 128, 194, 256, 257
 dsfont 134, 256
 dsserif 134, 256
 emf 137, 256, 257
 endofproofwd 132, 256
 epiolmec 167, 168, 256, 257
 epsdice 193, 256, 257
 esint 46, 256
 esrelation 95, 123, 256
 esvect 120, 256
 euflag 205, 256, 257
 eufrak 134
 eurosym 28, 256, 257
 euscript 134, 256, 257
 extarrows 122, 256, 257
 extpfeil 122, 256, 257
 extraipa 24, 256
 fc 17, 22
 fclfont 256
 fdsymbol 35, 36, 39,
 40, 48, 49, 60, 61, 69, 73,
 77, 84–88, 97, 98, 103, 105,
 110, 111, 115, 118, 126, 129,
 131, 153, 158, 170, 256, 257
 feyn 143, 256, 257
 fge 94, 106, 115, 128, 133,
 256, 257
 fixmath 250
 fontawesome 27,
 28, 138, 142, 146–148, 150,
 152, 157, 208, 211, 256, 257
 fontenc 13, 16, 18, 22, 252
 fontspec 170, 255
 fourier 28, 67, 102, 106, 113,
 120, 148, 152, 191, 256
 frege 127, 256, 257
 gensymb 136
 go 197, 256
 graphics 94, 238
 graphicx 25, 235, 238, 243
 greenpoint 213, 256
 halloweenmath 41, 98, 116,
 123, 124, 256, 257
 hands 213, 256
 harmony 172, 174, 256, 257
 harpoon 94, 256, 257
 hhcount 193, 194, 256, 257
 hieroglf 161, 256, 257
 holtpolt 125, 256
 ifsym 136, 155, 156, 192,
 236, 238, 256, 257
 igo 196, 256
 inputenc 254
 isoent 252
 junicode 255, 256
 keystroke 140, 256, 257
 knitting 202, 256, 257
 knot 222, 226, 256
 latexsym 32, 54, 67, 78, 130,
 235, 256, 257
lilyglyphs 170, 174–182,
 187–189
 lilyglyphs 256
 linearA 161, 256, 257
 linearb 164, 165, 256, 257
 logic 141
 longdiv 117
 magic 233, 256
 manfnt 190, 256, 257
 marvosym 26,
 27, 128, 138, 140, 142, 147,
 149, 191, 201, 236
 mathabx 31, 34, 38, 44,
 56, 57, 68, 71, 76, 79, 80,
 99, 104, 106, 108, 114, 119,
 128, 130, 138, 195, 235, 236,
 256, 257
 mathbbol 134, 135
 mathcomp 127
 mathdesign 27, 38, 54, 105,
 112, 133, 256
 mathdots 114, 125, 126,
 243, 256, 257
 mathrsfs 134, 256
 mathspx 101
 mathtools 31, 65, 95, 119,
 121, 256, 257
 mbboard 134, 135, 256
 mdwmath 121, 256, 257
 metre 25, 114, 197, 256, 257
 milstd 141, 256, 257
 mismath 100, 256
 MnSymbol 31, 34,
 35, 39, 47, 48, 57–59, 68, 72,
 76, 80–84, 96, 97, 103, 104,
 109, 115, 117, 118, 126, 129,
 131, 153, 158, 170, 256, 257
 moonphase 215, 256
 musicography 173, 256, 257
 musixgre 172
 musixlit 172
 musixper 172
 musixtex 256, 257
 nath 107, 113, 256
 nicefrac 133, 256, 257
 niceframe 219–222, 226
 nkarta 213, 256
 ntheorem 130
 ogonek 25, 256, 257
 old-arrows 95, 256
 oplotsymbi 157–159, 256,
 257
 overrightarrow 117, 256
 phaistos 160, 256, 257
 phonetic 21, 24, 239, 256
 pict2e 137
 pifont 18, 145,
 147–151, 156, 159, 213, 219,
 230, 238, 256, 257
 pigpen 200, 256, 257
 pmboxdraw 199, 256, 257
 polynom 117
 prodint 54, 256
 protosem 160, 256, 257
 psnfss 150
 PSTricks 208
 pxfonts 31, 33, 45,
 56, 68, 70, 79, 98, 102–104,
 130, 134, 158, 235, 251
 realhats 116, 256, 257
 recycle 201, 256
 relsize 25
 rotating 29, 140
 rsfso 134, 256
 rubikcube 212, 256, 257
 sarabian 166, 256, 257
 savesym 235
 scaleref 243

\PencilLeft (⌚)	147	\PHbow (🏹)	160	\PHplumedHead (⚡)	160
\PencilLeftDown (⌚)	147	\PHbullLeg (🐂)	160	\PHram (🐏)	160
\PencilLeftUp (⌚)	147	\PHcaptive (虍)	160	\PHrosette (🏵)	160
\PencilRight (⌚)	147	\PHcarpentryPlane (镱)	160	\PHsaw (YNAMI)	160
\PencilRightDown (⌚)	147	\PHcat (🐈)	160	\PHshield (🛡)	160
\PencilRightUp (⌚)	147	\PHchild (👶)	160	\PHship (⛵)	160
pencils	147, 148	\PHclub (棒)	160	\PHsling (🏹)	160
\pentago (◇)	157	\PHcolumn (עמוד)	160	\PHsmallAxe (🗡)	160
\pentagocross (⊗)	157	\PHcomb (, ,	160	\PHstrainer (笊)	160
\pentagodot (◎)	157	\PHdolium (🏺)	160	\PHtattooedHead (.`,)	160
\pentagofill (●)	157	\PHdove (🕊)	160	\PHtiara (มง)	160
\pentagofillha (◑)	157	\PHeagle (🦅)	160	\PHtunny (`,)	160
\pentagofillhb (◑)	157	\PHflute (笛)	160	\PHvine (🌿)	160
\pentagofillhl (◑)	157	\PHgauntlet (🧤)	160	\PHwavyBand (波)	160
\pentagofillhr (◑)	157	\PHgrater (`,)	160	\PHwoman (`,)	160
\pentagolineh (◑)	157	\PHhelmet (兜)	160	physical symbols	136
\pentagolinev (◑)	157	\PHhide (`,)	160	\Pi (Π)	101
\pentagolinevh (◑)	157	\PHhorn (🎺)	160	\pi (π)	101
\pentagon (◇)	155	\Phi (Φ)	101	\pi (π)	102
\pentagon (◇)	152	\phi (φ)	101	“pi” fonts	238
\pentagonblack (●)	155	\phimeson (φ)	144	piano (p)	176, 188
pentagons	157–158	\phimesonnull (φ°)	144	\Pickup (⦿)	142
\Pentagram (★)	139	\phiup (φ)	102	pict2e (package)	137
\pentagram (★)	39	\PHlid (`,)	160	pifont (package)	18, 145,
\pentam (—○—○— —○—○—)	198	\PHlily (`,)	160	147–151, 156, 159, 213, 219,	
\pentdot (፤)	169	\PHmanacles (镣)	160	230, 238, 256, 257	
\penteye (+:+)	169	\PHmattock (`,)	160	pigpen (package)	200, 256, 257
people	see faces	\Phone (☎)	159	pigpen cipher	200
percent sign	see %	\phone (☎)	190	{\pigpenfont A} (ㄱ)	200
percussion	172	\PhoneHandset (📞)	159	{\pigpenfont B} (ㄴ)	200
\permil (‰)	30	phonetic (package)	21, 24, 239,	{\pigpenfont C} (ㄷ)	200
\Perp (¶)	56	256	18–21	{\pigpenfont D} (ㄹ)	200
\Perp (॥)	62	phonetic symbols	18–21	{\pigpenfont E} (ㅁ)	200
\Perp (ヰ)	67	\phonon (ຝ)	144	{\pigpenfont F} (ㅂ)	200
\perp (⊥)	54, 242	\photon (ຝ)	136	{\pigpenfont G} (ັ)	200
\perp (⊥)	60	photons	136, 143–144	{\pigpenfont H} (ິ)	200
\perp (⊥)	58	\PHoxBack (`,)	160	{\pigpenfont I} (ີ)	200
\perp (⊥)	64	\PHpapyrus (`,)	160	{\pigpenfont J} (ຶ)	200
\perps (⊥)	132	\PHpedestrian (`,)	160	{\pigpenfont K} (ື)	200
\perthousand (‰)	136	\PHplaneTree (`,)	160	{\pigpenfont L} (ຸ)	200
\Pfanne (₌)	205			{\pigpenfont M} (ົ)	200
\Pfund (฿)	27			{\pigpenfont N} (ົ)	200
\PgDown (Page ↓)	140			{\pigpenfont O} (ົ)	200
\PgUp (Page ↑)	140			{\pigpenfont P} (ົ)	200
phaistos (package)	160, 256, 257			{\pigpenfont Q} (ົ)	200
Phaistos disk	160			{\pigpenfont R} (ົ)	200
pharmaceutical prescription	see textrecipe			{\pigpenfont S} (ົ)	200
\PHarrow (↗)	160				
\phase (⏣)	137				
phasor	137				
\PHbee (🐝)	160				
\PHbeehive (🐝)	160				
\PHboomerang (➤)	160				

\pigpenfont{T} (>)	200
\pigpenfont{U} (<)	200
\pigpenfont{V} (^)	200
\pigpenfont{W} (v)	200
\pigpenfont{X} (>)	200
\pigpenfont{Y} (<)	200
\pigpenfont{Z} (^)	200
pilcrow	see \P
\pionminus (π^-)	144
\pionnull (π^0)	144
\pionplus (π^+)	144
pipe	see \textpipe
\Pisces (♓)	138
\Pisces (♓)	139
\Pisces (♓)	138
\pisces (♓)	137
\Pisymbol	213–234, 238
\Pisymbol{astrosym}{0} (○)	215
\Pisymbol{astrosym}{1} (♀)	215
\Pisymbol{astrosym}{2} (♀)	215
\Pisymbol{astrosym}{3} (♂)	215
\Pisymbol{astrosym}{4} (♂)	215
\Pisymbol{astrosym}{5} (♈)	215
\Pisymbol{astrosym}{6} (♉)	215
\Pisymbol{astrosym}{7} (♊)	215
\Pisymbol{astrosym}{8} (♋)	215
\Pisymbol{astrosym}{9} (♌)	215
\Pisymbol{astrosym}{10} (♍)	215
\Pisymbol{astrosym}{11} (♎)	215
\Pisymbol{astrosym}{12} (♏)	215
\Pisymbol{astrosym}{13} (♐)	215
\Pisymbol{astrosym}{14} (♑)	215
\Pisymbol{astrosym}{15} (♒)	215
\Pisymbol{astrosym}{16} (♓)	215
\Pisymbol{astrosym}{17} (♏)	215
\Pisymbol{astrosym}{18} (♏)	215
\Pisymbol{astrosym}{19} (♑)	215
\Pisymbol{astrosym}{20} (♒)	216
\Pisymbol{astrosym}{21} (♓)	216
\Pisymbol{astrosym}{22} (♓)	216
\Pisymbol{astrosym}{23} (♑)	216
\Pisymbol{astrosym}{24} (♓)	216
\Pisymbol{astrosym}{25} (♏)	216
\Pisymbol{astrosym}{26} (♏)	216
\Pisymbol{astrosym}{27} (♒)	216
\Pisymbol{astrosym}{28} (♓)	216
\Pisymbol{astrosym}{29} (⊕)	216
\Pisymbol{astrosym}{30} (♂)	216
\Pisymbol{astrosym}{31} (♓)	216
\Pisymbol{astrosym}{32} (♏)	216
\Pisymbol{astrosym}{33} (✳)	216
\Pisymbol{astrosym}{34} (♏)	216
\Pisymbol{astrosym}{35} (♑)	216
\Pisymbol{astrosym}{36} (♏)	216
\Pisymbol{astrosym}{37} (♉)	216
\Pisymbol{astrosym}{38} (□)	216
\Pisymbol{astrosym}{39} (○)	216
\Pisymbol{astrosym}{40} (●)	216
\Pisymbol{astrosym}{41} (♒)	216
\Pisymbol{astrosym}{42} (♓)	216
\Pisymbol{astrosym}{43} (♏)	216
\Pisymbol{astrosym}{44} (♑)	216
\Pisymbol{astrosym}{45} (♒)	216
\Pisymbol{astrosym}{46} (♓)	216
\Pisymbol{astrosym}{47} (♏)	216
\Pisymbol{astrosym}{48} (♓)	216
\Pisymbol{astrosym}{49} (♋)	216
\Pisymbol{astrosym}{50} (♑)	216
\Pisymbol{astrosym}{51} (♓)	216
\Pisymbol{astrosym}{52} (♒)	216
\Pisymbol{astrosym}{53} (♓)	216
\Pisymbol{astrosym}{54} (♉)	216
\Pisymbol{astrosym}{55} (♏)	216
\Pisymbol{astrosym}{56} (♓)	216
\Pisymbol{astrosym}{57} (♏)	217
\Pisymbol{astrosym}{58} (♒)	217
\Pisymbol{astrosym}{59} (Ⓛ)	217
\Pisymbol{astrosym}{60} (✳)	217
\Pisymbol{astrosym}{61} (△)	217
\Pisymbol{astrosym}{62} (□)	217
\Pisymbol{astrosym}{63} (⊤)	217
\Pisymbol{astrosym}{64} (Ω)	217
\Pisymbol{astrosym}{65} (❀)	217
\Pisymbol{astrosym}{66} (ƙ)	217
\Pisymbol{astrosym}{67} (Ⓛ)	217

\Pisymbol{astrosym}{169} (★)	216
\Pisymbol{astrosym}{178} (†)	216
\Pisymbol{astrosym}{179} (○)	216
\Pisymbol{astrosym}{180} (▽)	216
\Pisymbol{astrosym}{181} (└)	216
\Pisymbol{astrosym}{182} (＊)	216
\Pisymbol{astrosym}{183} (△)	216
\Pisymbol{astrosym}{184} (□)	216
\Pisymbol{astrosym}{185} (×)	216
\Pisymbol{astrosym}{186} (δ)	216
\Pisymbol{astrosym}{187} (ø)	216
\Pisymbol{astrosym}{188} (⌚)	216
\Pisymbol{astrosym}{189} (Ⓛ)	216
\Pisymbol{astrosym}{190} (♀)	216
\Pisymbol{astrosym}{191} (＊)	216
\Pisymbol{astrosym}{200} (○)	216
\Pisymbol{astrosym}{201} (♀)	216
\Pisymbol{astrosym}{202} (♀)	216
\Pisymbol{astrosym}{203} (⊕)	216
\Pisymbol{astrosym}{204} (↑)	216
\Pisymbol{astrosym}{205} (↳)	217
\Pisymbol{astrosym}{206} (↑)	217
\Pisymbol{astrosym}{207} (↑)	217
\Pisymbol{astrosym}{208} (↑↑)	217
\Pisymbol{astrosym}{209} (⊖)	217
\Pisymbol{astrosym}{210} (⌚)	217
\Pisymbol{astrosym}{211} (▽)	217
\Pisymbol{astrosym}{212} (○)	217
\Pisymbol{astrosym}{213} (⊗)	217
\Pisymbol{astrosym}{214} (⌚)	217
\Pisymbol{astrosym}{215} (⊖)	217
\Pisymbol{astrosym}{216} (□)	217
\Pisymbol{astrosym}{217} (△)	217
\Pisymbol{astrosym}{218} (ℳ)	217
\Pisymbol{astrosym}{219} (↗)	217
\Pisymbol{astrosym}{220} (⊗)	217
\Pisymbol{astrosym}{221} (⊗⊗)	217
\Pisymbol{astrosym}{222} (⊗)	217
\Pisymbol{astrosym}{223} (↑)	217
\Pisymbol{astrosym}{224} (↑↑)	217
\Pisymbol{astrosym}{225} (↑↑)	217
\Pisymbol{astrosym}{226} (△)	217
\Pisymbol{astrosym}{227} (≈)	217
\Pisymbol{astrosym}{228} (⊗⊗)	217
\Pisymbol{astrosym}{229} (⊕)	217
\Pisymbol{astrosym}{230} (⌚)	217
\Pisymbol{astrosym}{231} (⊖)	217
\Pisymbol{astrosym}{232} (△)	217
\Pisymbol{astrosym}{233} (＊)	217
\Pisymbol{astrosym}{234} (⌚)	217
\Pisymbol{astrosym}{235} (↖)	217
\Pisymbol{astrosym}{236} (⌚)	217
\Pisymbol{astrosym}{237} (○)	217
\Pisymbol{astrosym}{238} (□)	217
\Pisymbol{astrosym}{239} (○)	217
\Pisymbol{astrosym}{240} (●)	217
\Pisymbol{astrosym}{241} (◎)	217
\Pisymbol{astrosym}{242} (●)	217
\Pisymbol{astrosym}{243} (●)	218
\Pisymbol{astrosym}{244} (ℳ)	218
\Pisymbol{astrosym}{245} (○)	218
\Pisymbol{astrosym}{246} (●)	218
\Pisymbol{astrosym}{247} (●)	218
\Pisymbol{astrosym}{248} (⌚)	218
\Pisymbol{astrosym}{249} (⌚)	218
\Pisymbol{astrosym}{250} (＊)	218
\Pisymbol{astrosym}{251} (＊)	218
\Pisymbol{astrosym}{252} (△)	218
\Pisymbol{astrosym}{253} (□)	218
\Pisymbol{astrosym}{254} (△)	218
\Pisymbol{astrosym}{255} (⌚)	218
\Pisymbol{cryst}{0} (◐)	..	231
\Pisymbol{cryst}{2} (◑)	..	231
\Pisymbol{cryst}{3} (▲)	..	231
\Pisymbol{cryst}{4} (◆)	..	231
\Pisymbol{cryst}{5} (▬)	..	231
\Pisymbol{cryst}{6} (●)	..	231
\Pisymbol{cryst}{7} (▬)	..	231
\Pisymbol{cryst}{8} (→)	..	231
\Pisymbol{cryst}{9} (→)	..	231
\Pisymbol{cryst}{10} (◐)	..	231
\Pisymbol{cryst}{12} (◑)	..	231
\Pisymbol{cryst}{15} (◆)	..	231
\Pisymbol{cryst}{20} (△)	..	231

\Pisymbol{dancers}{250} (ժ	228	\Pisymbol{dice3d}{114} (ը	232	\Pisymbol{dingbat}{101} (.	222
\Pisymbol{dancers}{251} (ժ	228	\Pisymbol{dice3d}{115} (ը	232	\Pisymbol{dingbat}{102} (լ	222
\Pisymbol{dancers}{252} (ժ	228	\Pisymbol{dice3d}{116} (ը	232	\Pisymbol{dingbat}{103} (—	222
\Pisymbol{dancers}{253} (ժ	229	\Pisymbol{dice3d}{117} (ը	232	\Pisymbol{dingbat}{104} (լ	222
\Pisymbol{dancers}{254} (ժ	229	\Pisymbol{dice3d}{118} (ը	232	\Pisymbol{fselch}{0} (՞)	233
\Pisymbol{dancers}{255} (ժ	229	\Pisymbol{dice3d}{119} (ը	232	\Pisymbol{fselch}{1} (՞)	233
\Pisymbol{dice3d}{49} (օ)	232	\Pisymbol{dice3d}{120} (ը	232	\Pisymbol{fselch}{2} (՞)	233
\Pisymbol{dice3d}{50} (օ)	232	\Pisymbol{dingbat}{69} (՞	222	\Pisymbol{fselch}{3} (՞)	233
\Pisymbol{dice3d}{51} (օ)	232	\Pisymbol{dingbat}{70} (՞	222	\Pisymbol{fselch}{4} (՞)	233
\Pisymbol{dice3d}{52} (օ)	232	\Pisymbol{dingbat}{71} (՞	222	\Pisymbol{fselch}{5} (՞)	233
\Pisymbol{dice3d}{53} (օ)	232	\Pisymbol{dingbat}{72} (՞	222	\Pisymbol{fselch}{6} (՞)	233
\Pisymbol{dice3d}{54} (օ)	232	\Pisymbol{dingbat}{74} (՞	222	\Pisymbol{fselch}{7} (՞)	233
\Pisymbol{dice3d}{97} (օ)	232	\Pisymbol{dingbat}{75} (՞	222	\Pisymbol{fselch}{8} (՞)	233
\Pisymbol{dice3d}{98} (օ)	232	\Pisymbol{dingbat}{76} (՞	222	\Pisymbol{fselch}{9} (՞)	233
\Pisymbol{dice3d}{99} (օ)	232	\Pisymbol{dingbat}{77} (՞	222	\Pisymbol{fselch}{10} (՞)	233
\Pisymbol{dice3d}{100} (օ)	232	\Pisymbol{dingbat}{97} (՞	222	\Pisymbol{fselch}{11} (՞)	233
\Pisymbol{dice3d}{101} (օ)	232	\Pisymbol{dingbat}{98} (՞	222	\Pisymbol{fselch}{12} (՞)	233
\Pisymbol{dice3d}{102} (օ)	232	\Pisymbol{dingbat}{99} (՞	222	\Pisymbol{fselch}{13} (՞)	233
\Pisymbol{dice3d}{103} (օ)	232	\Pisymbol{dingbat}{100} (՞	222	\Pisymbol{fselch}{14} (՞)	233
\Pisymbol{dice3d}{104} (օ)	232			\Pisymbol{fselch}{15} (՞)	233
\Pisymbol{dice3d}{105} (օ)	232			\Pisymbol{fselch}{16} (՞)	234
\Pisymbol{dice3d}{106} (օ)	232			\Pisymbol{fselch}{17} (՞)	234
\Pisymbol{dice3d}{107} (օ)	232			\Pisymbol{fselch}{18} (՞)	234
\Pisymbol{dice3d}{108} (օ)	232			\Pisymbol{fselch}{19} (՞)	234
\Pisymbol{dice3d}{109} (օ)	232			\Pisymbol{fselch}{20} (՞)	234
\Pisymbol{dice3d}{110} (օ)	232			\Pisymbol{fselch}{21} (՞)	234
\Pisymbol{dice3d}{111} (օ)	232			\Pisymbol{fselch}{22} (՞)	234
\Pisymbol{dice3d}{112} (օ)	232			\Pisymbol{fselch}{23} (՞)	234
\Pisymbol{dice3d}{113} (օ)	232			\Pisymbol{fselch}{24} (՞)	234

\Pisymbol{fselch}{103} (▣) 234	\Pisymbol{fselch}{129} (▣) 234	\Pisymbol{fselch}{204} (▣) 234
\Pisymbol{fselch}{104} (▣) 234	\Pisymbol{fselch}{130} (▣) 234	\Pisymbol{fselch}{210} (▣) 234
\Pisymbol{fselch}{105} (▣) 234	\Pisymbol{fselch}{131} (▣) 234	\Pisymbol{fselch}{216} (▣) 234
\Pisymbol{fselch}{106} (▣) 234	\Pisymbol{fselch}{132} (▣) 234	\Pisymbol{fselch}{222} (▣) 234
\Pisymbol{fselch}{107} (▣) 234	\Pisymbol{fselch}{133} (▣) 234	\Pisymbol{fselch}{228} (▣) 234
\Pisymbol{fselch}{108} (▽) 234	\Pisymbol{fselch}{134} (▣) 234	\Pisymbol{fselch}{234} (▣) 234
\Pisymbol{fselch}{109} (▽) 234	\Pisymbol{fselch}{135} (▣) 234	\Pisymbol{fselch}{240} (▣) 234
\Pisymbol{fselch}{110} (▽) 233	\Pisymbol{fselch}{136} (▣) 234	\Pisymbol{fselch}{246} (▣) 234
\Pisymbol{fselch}{111} (▽) 233	\Pisymbol{fselch}{137} (▣) 234	\Pisymbol{greenpoint}{71}	(◐)
\Pisymbol{fselch}{112} (▣) 233	\Pisymbol{fselch}{138} (▣) 234	\Pisymbol{hands}{65} (☞) .	213
\Pisymbol{fselch}{113} (▢) 233	\Pisymbol{fselch}{139} (▣) 234	\Pisymbol{hands}{66} (☞) .	213
\Pisymbol{fselch}{114} (▢) 233	\Pisymbol{fselch}{140} (▣) 234	\Pisymbol{hands}{67} (☞) .	213
\Pisymbol{fselch}{115} (▢) 233	\Pisymbol{fselch}{141} (▣) 234	\Pisymbol{hands}{68} (☞) .	213
\Pisymbol{fselch}{116} (▢) 233	\Pisymbol{fselch}{142} (▣) 234	\Pisymbol{knot1}{48}	(□) 222
\Pisymbol{fselch}{117} (▢) 233	\Pisymbol{fselch}{143} (▣) 234	\Pisymbol{knot1}{49}	(◐) 222
\Pisymbol{fselch}{118} (▢) 233	\Pisymbol{fselch}{144} (▢) 234	\Pisymbol{knot1}{50}	(◐) 222
\Pisymbol{fselch}{119} (▢) 233	\Pisymbol{fselch}{145} (○) 234	\Pisymbol{knot1}{51}	(◆) 222
\Pisymbol{fselch}{120} (▢) 233	\Pisymbol{fselch}{151} (○) 234	\Pisymbol{knot1}{52}	(●) 222
\Pisymbol{fselch}{121} (▢) 233	\Pisymbol{fselch}{157} (●) 234	\Pisymbol{knot1}{53}	(□) 222
\Pisymbol{fselch}{122} (▢) 233	\Pisymbol{fselch}{163} (○) 234	\Pisymbol{knot1}{58}	(□) 222
\Pisymbol{fselch}{123} (▢) 233	\Pisymbol{fselch}{169} (○) 234	\Pisymbol{knot1}{59}	(□) 223
\Pisymbol{fselch}{124} (▣) 233	\Pisymbol{fselch}{175} (●) 234	\Pisymbol{knot1}{60}	(□) 223
\Pisymbol{fselch}{125} (▢) 233	\Pisymbol{fselch}{180} (×) 234	\Pisymbol{knot1}{61}	(□) 223
\Pisymbol{fselch}{126} (▢) 234	\Pisymbol{fselch}{186} (×) 234	\Pisymbol{knot1}{62}	(≡) 223
\Pisymbol{fselch}{127} (▢) 234	\Pisymbol{fselch}{192} (×) 234	\Pisymbol{knot1}{63}	(=) 223
\Pisymbol{fselch}{128} (▢) 234	\Pisymbol{fselch}{198} (×) 234	\Pisymbol{knot1}{64}	(◐) 223

\Pisymbol{knot1}{75} (⤵)	223	\Pisymbol{knot2}{63} (⤶)	223	\Pisymbol{knot2}{105} (⤷)	223
\Pisymbol{knot1}{76} (⤶)	223	\Pisymbol{knot2}{64} (⤸)	223	\Pisymbol{knot3}{48} (⤹)	223
\Pisymbol{knot1}{77} (⤹)	223	\Pisymbol{knot2}{65} (⤹)	223	\Pisymbol{knot3}{49} (⤺)	223
\Pisymbol{knot1}{78} (⤻)	223	\Pisymbol{knot2}{66} (⤻)	223	\Pisymbol{knot3}{50} (⤻)	223
\Pisymbol{knot1}{79} (⤼)	223	\Pisymbol{knot2}{67} (⤼)	223	\Pisymbol{knot3}{51} (⤻)	223
\Pisymbol{knot1}{80} (⤽)	223	\Pisymbol{knot2}{68} (⤽)	223	\Pisymbol{knot3}{52} (⤻)	223
\Pisymbol{knot1}{81} (⤾)	223	\Pisymbol{knot2}{69} (⤾)	223	\Pisymbol{knot3}{53} (⤻)	223
\Pisymbol{knot1}{82} (⤿)	223	\Pisymbol{knot2}{70} (⤿)	223	\Pisymbol{knot3}{58} (⤻)	223
\Pisymbol{knot1}{83} (⤿)	223	\Pisymbol{knot2}{71} (⤿)	223	\Pisymbol{knot3}{59} (⤻)	223
\Pisymbol{knot1}{84} (⤿)	222	\Pisymbol{knot2}{72} (⤿)	223	\Pisymbol{knot3}{60} (⤻)	223
\Pisymbol{knot1}{85} (⤿)	222	\Pisymbol{knot2}{73} (⤿)	223	\Pisymbol{knot3}{61} (⤻)	223
\Pisymbol{knot1}{86} (⤿)	222	\Pisymbol{knot2}{74} (⤿)	223	\Pisymbol{knot3}{62} (⤻)	224
\Pisymbol{knot1}{87} (⤿)	222	\Pisymbol{knot2}{75} (⤿)	223	\Pisymbol{knot3}{63} (⤻)	224
\Pisymbol{knot1}{88} (⤿)	222	\Pisymbol{knot2}{76} (⤿)	223	\Pisymbol{knot3}{64} (⤿)	224
\Pisymbol{knot1}{96} (⤿)	222	\Pisymbol{knot2}{77} (⤿)	223	\Pisymbol{knot3}{65} (⤿)	224
\Pisymbol{knot1}{97} (⤿)	222	\Pisymbol{knot2}{78} (⤿)	223	\Pisymbol{knot3}{66} (⤿)	224
\Pisymbol{knot1}{98} (⤿)	223	\Pisymbol{knot2}{79} (⤿)	223	\Pisymbol{knot3}{67} (⤿)	224
\Pisymbol{knot1}{99} (⤿)	223	\Pisymbol{knot2}{80} (⤿)	223	\Pisymbol{knot3}{68} (⤿)	223
\Pisymbol{knot1}{100} (⤿)	223	\Pisymbol{knot2}{81} (⤿)	223	\Pisymbol{knot3}{69} (⤿)	223
.....	223	\Pisymbol{knot2}{82} (⤿)	223	\Pisymbol{knot3}{70} (⤿)	223
\Pisymbol{knot1}{101} (⤿)	223	\Pisymbol{knot2}{83} (⤿)	223	\Pisymbol{knot3}{71} (⤿)	223
.....	223	\Pisymbol{knot2}{84} (⤿)	223	\Pisymbol{knot3}{72} (⤿)	223
\Pisymbol{knot1}{102} (⤿)	223	\Pisymbol{knot2}{85} (⤿)	223	\Pisymbol{knot3}{73} (⤿)	223
.....	223	\Pisymbol{knot2}{86} (⤿)	223	\Pisymbol{knot3}{74} (⤿)	223
\Pisymbol{knot1}{103} (⤿)	223	\Pisymbol{knot2}{87} (⤿)	223	\Pisymbol{knot3}{75} (⤿)	223
.....	223	\Pisymbol{knot2}{88} (⤿)	223	\Pisymbol{knot3}{76} (⤿)	223
\Pisymbol{knot1}{104} (⤿)	223	\Pisymbol{knot2}{96} (⤿)	223	\Pisymbol{knot3}{77} (⤿)	223
.....	223	\Pisymbol{knot2}{97} (⤿)	223	\Pisymbol{knot3}{78} (⤿)	224
\Pisymbol{knot1}{105} (⤿)	223	\Pisymbol{knot2}{98} (⤿)	223	\Pisymbol{knot3}{79} (⤿)	224
.....	223	\Pisymbol{knot2}{99} (⤿)	223	\Pisymbol{knot3}{80} (⤿)	224
\Pisymbol{knot2}{48} (⤹)	223	\Pisymbol{knot2}{100} (⤿)	223	\Pisymbol{knot3}{81} (⤿)	224
\Pisymbol{knot2}{49} (⤺)	223	223	\Pisymbol{knot3}{82} (⤿)	224
\Pisymbol{knot2}{50} (⤻)	223	\Pisymbol{knot2}{101} (⤿)	223	\Pisymbol{knot3}{83} (⤿)	224
\Pisymbol{knot2}{51} (⤻)	223	223	\Pisymbol{knot3}{84} (⤿)	223
\Pisymbol{knot2}{52} (⤻)	223	\Pisymbol{knot2}{102} (⤿)	223	\Pisymbol{knot3}{85} (⤿)	223
\Pisymbol{knot2}{53} (⤻)	223	223	\Pisymbol{knot3}{86} (⤿)	223
\Pisymbol{knot2}{58} (⤻)	223	\Pisymbol{knot2}{103} (⤿)	223	\Pisymbol{knot3}{87} (⤿)	223
\Pisymbol{knot2}{59} (⤻)	223	223	\Pisymbol{knot3}{88} (⤿)	223
\Pisymbol{knot2}{60} (⤻)	223	\Pisymbol{knot2}{104} (⤿)	223		
\Pisymbol{knot2}{61} (⤻)	223				
\Pisymbol{knot2}{62} (⤻)	223				

\Pisymbol{knot3}{96} 	223
\Pisymbol{knot3}{97} 	223
\Pisymbol{knot3}{98} 	223
\Pisymbol{knot3}{99} 	223
\Pisymbol{knot3}{100} 	.
.....	223
\Pisymbol{knot3}{101} 	.
.....	224
\Pisymbol{knot3}{102} 	.
.....	224
\Pisymbol{knot3}{103} 	.
.....	224
\Pisymbol{knot3}{104} 	.
.....	224
\Pisymbol{knot3}{105} 	.
.....	224
\Pisymbol{knot4}{48} 	224
\Pisymbol{knot4}{49} 	224
\Pisymbol{knot4}{50} 	224
\Pisymbol{knot4}{51} 	224
\Pisymbol{knot4}{52} 	224
\Pisymbol{knot4}{53} 	224
\Pisymbol{knot4}{58} 	224
\Pisymbol{knot4}{59} 	224
\Pisymbol{knot4}{60} 	224
\Pisymbol{knot4}{61} 	224
\Pisymbol{knot4}{62} 	224
\Pisymbol{knot4}{63} 	224
\Pisymbol{knot4}{64} 	224
\Pisymbol{knot4}{65} 	224
\Pisymbol{knot4}{66} 	224
\Pisymbol{knot4}{67} 	224
\Pisymbol{knot4}{68} 	224
\Pisymbol{knot4}{69} 	224
\Pisymbol{knot4}{70} 	224
\Pisymbol{knot4}{71} 	224
\Pisymbol{knot4}{72} 	224
\Pisymbol{knot4}{73} 	224
\Pisymbol{knot4}{74} 	224
\Pisymbol{knot4}{75} 	224
\Pisymbol{knot4}{76} 	224
\Pisymbol{knot5}{48} 	224
\Pisymbol{knot5}{49} 	224
\Pisymbol{knot5}{50} 	224
\Pisymbol{knot5}{51} 	224
\Pisymbol{knot5}{52} 	224
\Pisymbol{knot5}{53} 	224
\Pisymbol{knot5}{58} 	224
\Pisymbol{knot5}{59} 	224
\Pisymbol{knot5}{60} 	224
\Pisymbol{knot5}{61} 	224
\Pisymbol{knot5}{62} 	224
\Pisymbol{knot5}{63}	224
\Pisymbol{knot5}{64}	224
\Pisymbol{knot5}{65}	225
\Pisymbol{knot5}{66}	225
\Pisymbol{knot5}{67}	225
\Pisymbol{knot5}{68}	224
\Pisymbol{knot5}{69}	224
\Pisymbol{knot5}{70}	224
\Pisymbol{knot5}{71}	224
\Pisymbol{knot5}{72}	224
\Pisymbol{knot5}{73}	224
\Pisymbol{knot5}{74}	224
\Pisymbol{knot5}{75}	224
\Pisymbol{knot5}{76}	224
\Pisymbol{knot5}{77}	224
\Pisymbol{knot5}{78}	224
\Pisymbol{knot5}{79}	224
\Pisymbol{knot5}{80}	224
\Pisymbol{knot5}{81}	224
\Pisymbol{knot5}{82}	224
\Pisymbol{knot5}{83}	224
\Pisymbol{knot5}{84}	224
\Pisymbol{knot5}{85}	224
\Pisymbol{knot5}{86}	224
\Pisymbol{knot5}{87}	224
\Pisymbol{knot5}{88}	224
\Pisymbol{knot5}{89}	224
\Pisymbol{knot5}{90}	224
\Pisymbol{knot5}{91}	224
\Pisymbol{knot5}{92}	224
\Pisymbol{knot5}{93}	224
\Pisymbol{knot5}{94}	224
\Pisymbol{knot5}{95}	224
\Pisymbol{knot5}{96}	224
\Pisymbol{knot5}{97}	224
\Pisymbol{knot5}{98}	224
\Pisymbol{knot5}{99}	224
\Pisymbol{knot5}{100}	.
.....	224
\Pisymbol{knot5}{101}	.
.....	224
\Pisymbol{knot5}{102}	.
.....	224
\Pisymbol{knot5}{103}	.
.....	224
\Pisymbol{knot5}{104}	.
.....	225
\Pisymbol{knot5}{105}	.
.....	225
\Pisymbol{knot6}{48}	225

\Pisymbol{knot6}{49} (225	\Pisymbol{knot6}{98} (225	\Pisymbol{knot7}{79} (225
\Pisymbol{knot6}{50} (225	\Pisymbol{knot6}{99} (225	\Pisymbol{knot7}{80} (225
\Pisymbol{knot6}{51} (225	\Pisymbol{knot6}{100} (.	\Pisymbol{knot7}{81} (225
\Pisymbol{knot6}{52} (225	\Pisymbol{knot6}{101} (.	\Pisymbol{knot7}{82} (225
\Pisymbol{knot6}{53} (225	\Pisymbol{knot6}{102} (.	\Pisymbol{knot7}{83} (226
\Pisymbol{knot6}{58} (225	\Pisymbol{knot6}{103} (.	\Pisymbol{knot7}{84} (225
\Pisymbol{knot6}{59} (225	\Pisymbol{knot6}{104} (.	\Pisymbol{knot7}{85} (225
\Pisymbol{knot6}{60} (225	\Pisymbol{knot6}{105} (.	\Pisymbol{knot7}{86} (225
\Pisymbol{knot6}{61} (225	\Pisymbol{knot7}{48} (225	\Pisymbol{knot7}{87} (225
\Pisymbol{knot6}{62} (225	\Pisymbol{knot7}{49} (225	\Pisymbol{knot7}{88} (225
\Pisymbol{knot6}{63} (225	\Pisymbol{knot7}{50} (225	\Pisymbol{knot7}{96} (225
\Pisymbol{knot6}{64} (225	\Pisymbol{knot7}{51} (225	\Pisymbol{knot7}{97} (225
\Pisymbol{knot6}{65} (225	\Pisymbol{knot7}{52} (225	\Pisymbol{knot7}{98} (225
\Pisymbol{knot6}{66} (225	\Pisymbol{knot7}{53} (225	\Pisymbol{knot7}{99} (225
\Pisymbol{knot6}{67} (225	\Pisymbol{knot7}{58} (225	\Pisymbol{knot7}{100} (.
\Pisymbol{knot6}{68} (225	\Pisymbol{knot7}{59} (225	\Pisymbol{knot7}{101} (.
\Pisymbol{knot6}{69} (225	\Pisymbol{knot7}{60} (225	\Pisymbol{knot7}{102} (.
\Pisymbol{knot6}{70} (225	\Pisymbol{knot7}{61} (225	\Pisymbol{knot7}{103} (.
\Pisymbol{knot6}{71} (225	\Pisymbol{knot7}{62} (225	\Pisymbol{knot7}{104} (.
\Pisymbol{knot6}{72} (225	\Pisymbol{knot7}{63} (225	\Pisymbol{knot7}{105} (.
\Pisymbol{knot6}{73} (225	\Pisymbol{knot7}{64} (225	\Pisymbol{magic}{48} (233
\Pisymbol{knot6}{74} (225	\Pisymbol{knot7}{65} (225	\Pisymbol{magic}{49} (233
\Pisymbol{knot6}{75} (225	\Pisymbol{knot7}{66} (225	\Pisymbol{magic}{50} (233
\Pisymbol{knot6}{76} (225	\Pisymbol{knot7}{67} (226	\Pisymbol{magic}{51} (233
\Pisymbol{knot6}{77} (225	\Pisymbol{knot7}{68} (225	\Pisymbol{magic}{52} (233
\Pisymbol{knot6}{78} (225	\Pisymbol{knot7}{69} (225	\Pisymbol{magic}{53} (233
\Pisymbol{knot6}{79} (225	\Pisymbol{knot7}{70} (225	\Pisymbol{magic}{54} (233
\Pisymbol{knot6}{80} (225	\Pisymbol{knot7}{71} (225	\Pisymbol{magic}{55} (233
\Pisymbol{knot6}{81} (225	\Pisymbol{knot7}{72} (225	\Pisymbol{magic}{56} (233
\Pisymbol{knot6}{82} (225	\Pisymbol{knot7}{73} (225	\Pisymbol{magic}{57} (233
\Pisymbol{knot6}{83} (225	\Pisymbol{knot7}{74} (225	\Pisymbol{magic}{66} (233
\Pisymbol{knot6}{84} (225	\Pisymbol{knot7}{75} (225	\Pisymbol{magic}{71} (233
\Pisymbol{knot6}{85} (225	\Pisymbol{knot7}{76} (225	\Pisymbol{magic}{82} (233
\Pisymbol{knot6}{86} (225	\Pisymbol{knot7}{77} (225	\Pisymbol{magic}{84} (233
\Pisymbol{knot6}{87} (225	\Pisymbol{knot7}{78} (225	\Pisymbol{magic}{85} (233
\Pisymbol{knot6}{88} (225	\Pisymbol{knot7}{79} (225	\Pisymbol{magic}{87} (233
\Pisymbol{knot6}{96} (225	\Pisymbol{knot7}{80} (225	\Pisymbol{magic}{88} (233
\Pisymbol{knot6}{97} (225	\Pisymbol{knot7}{81} (225	\Pisymbol{magic}{90} (233

\Pisymbol{nkarta}{178} (⌚) 214	\Pisymbol{nkarta}{208} (♾) 214	\Pisymbol{nkarta}{238} (ⓘ) 214
\Pisymbol{nkarta}{179} (♾) 214	\Pisymbol{nkarta}{209} (〽) 214	\Pisymbol{nkarta}{239} (ܵ) 214
\Pisymbol{nkarta}{180} (◻) 214	\Pisymbol{nkarta}{210} (ܶ) 214	\Pisymbol{nkarta}{240} (ܷ) 214
\Pisymbol{nkarta}{181} (ܸ) 214	\Pisymbol{nkarta}{211} (ܹ) 214	\Pisymbol{nkarta}{241} (ܻ) 214
\Pisymbol{nkarta}{182} (ܺ) 214	\Pisymbol{nkarta}{212} (ܻ) 214	\Pisymbol{nkarta}{242} (ܻ) 214
\Pisymbol{nkarta}{183} (ܻ) 214	\Pisymbol{nkarta}{213} (ܻ) 214	\Pisymbol{nkarta}{243} (ܻ) 214
\Pisymbol{nkarta}{184} (ܻ) 214	\Pisymbol{nkarta}{214} (ܻ) 214	\Pisymbol{nkarta}{244} (ܻ) 214
\Pisymbol{nkarta}{185} (ܻ) 214	\Pisymbol{nkarta}{215} (ܻ) 214	\Pisymbol{nkarta}{245} (ܻ) 214
\Pisymbol{nkarta}{186} (ܻ) 214	\Pisymbol{nkarta}{216} (ܻ) 214	\Pisymbol{nkarta}{246} (ܻ) 214
\Pisymbol{nkarta}{187} (ܻ) 214	\Pisymbol{nkarta}{217} (ܻ) 214	\Pisymbol{nkarta}{247} (ܻ) 214
\Pisymbol{nkarta}{188} (ܻ) ..	214	\Pisymbol{nkarta}{218} (ܻ) 214	\Pisymbol{nkarta}{248} (ܻ) 214
\Pisymbol{nkarta}{189} (ܻ) 215	\Pisymbol{nkarta}{219} (ܻ) 214	\Pisymbol{nkarta}{249} (ܻ) 214
\Pisymbol{nkarta}{190} (ܻ) 215	\Pisymbol{nkarta}{220} (ܻ) 214	\Pisymbol{nkarta}{250} (ܻ) 214
\Pisymbol{nkarta}{191} (ܻ) 215	\Pisymbol{nkarta}{221} (ܻ) 214	\Pisymbol{nkarta}{251} (ܻ) 214
\Pisymbol{nkarta}{192} (ܻ) 215	\Pisymbol{nkarta}{222} (ܻ) 214	\Pisymbol{nkarta}{252} (ܻ) 215
\Pisymbol{nkarta}{193} (ܻ) 213	\Pisymbol{nkarta}{223} (ܻ) 214	\Pisymbol{nkarta}{253} (ܻ) 215
\Pisymbol{nkarta}{194} (ܻ) 213	\Pisymbol{nkarta}{224} (ܻ) 214	\Pisymbol{nkarta}{254} (ܻ) 215
\Pisymbol{nkarta}{195} (ܻ) 213	\Pisymbol{nkarta}{225} (ܻ) 214	\Pisymbol{smfpr10}{34} () ..	229
\Pisymbol{nkarta}{196} (ܻ) 213	\Pisymbol{nkarta}{226} (ܻ) 214	\Pisymbol{smfpr10}{35} (ܻ) 229
\Pisymbol{nkarta}{197} (ܻ) ..	213	\Pisymbol{nkarta}{227} (ܻ) 214	\Pisymbol{smfpr10}{36} (ܻ) 229
\Pisymbol{nkarta}{198} (ܻ) 213	\Pisymbol{nkarta}{228} (ܻ) 214	\Pisymbol{smfpr10}{42} (ܻ) 229
\Pisymbol{nkarta}{199} (ܻ) 213	\Pisymbol{nkarta}{229} (ܻ) 214	\Pisymbol{smfpr10}{46} (ܻ) 229
\Pisymbol{nkarta}{200} (ܻ) 213	\Pisymbol{nkarta}{230} (ܻ) 214	\Pisymbol{smfpr10}{48} (ܻ) 229
\Pisymbol{nkarta}{201} (ܻ) 213	\Pisymbol{nkarta}{231} (ܻ) 214	\Pisymbol{smfpr10}{49} (ܻ) 229
\Pisymbol{nkarta}{202} (ܻ) 213	\Pisymbol{nkarta}{232} (ܻ) 214	\Pisymbol{smfpr10}{50} (ܻ) 229
\Pisymbol{nkarta}{203} (ܻ) 213	\Pisymbol{nkarta}{233} (ܻ) ..	214	\Pisymbol{smfpr10}{51} (ܻ) 229
\Pisymbol{nkarta}{204} (ܻ) 213	\Pisymbol{nkarta}{234} (ܻ) ..	214	\Pisymbol{smfpr10}{52} (ܻ) 229
\Pisymbol{nkarta}{205} (ܻ) 214	\Pisymbol{nkarta}{235} (ܻ) 214	\Pisymbol{smfpr10}{53} (ܻ) 229
\Pisymbol{nkarta}{206} (ܻ) 214	\Pisymbol{nkarta}{236} (ܻ) 214	\Pisymbol{smfpr10}{54} (ܻ) 229
\Pisymbol{nkarta}{207} (ܻ) ..	214	\Pisymbol{nkarta}{237} (ܻ) 214		

\Pisymbol{umranda}{7} (Ⓐ) 219
\Pisymbol{umranda}{8} (Ⓑ) 219
\Pisymbol{umranda}{9} (Ⓒ) 219
\Pisymbol{umranda}{10} (Ⓓ) 219
\Pisymbol{umranda}{11} (Ⓔ) 219
\Pisymbol{umranda}{12} (Ⓕ) 219
\Pisymbol{umranda}{13} (Ⓖ) 219
\Pisymbol{umranda}{14} (Ⓗ) 219
\Pisymbol{umranda}{15} (Ⓛ) 220
\Pisymbol{umranda}{16} (Ⓜ) 220
\Pisymbol{umranda}{17} (Ⓝ) 220
\Pisymbol{umranda}{18} (Ⓣ) 220
\Pisymbol{umranda}{19} (Ⓤ) 220
\Pisymbol{umranda}{20} (ⓁⓁ) 220
\Pisymbol{umranda}{21} (ⓂⓂ) 220
\Pisymbol{umranda}{22} (ⓁⓁⓁ) 220
\Pisymbol{umranda}{23} (ⓂⓂⓂ) 220
\Pisymbol{umranda}{24} (ⓁⓁⓁⓁ) 220
\Pisymbol{umranda}{25} (ⓂⓂⓂⓂ) 220
\Pisymbol{umranda}{26} (ⓁⓁⓁⓁⓁ) 220
\Pisymbol{umranda}{27} (ⓂⓂⓂⓂⓂ) 220
\Pisymbol{umranda}{28} (ⓁⓁⓁⓁⓁⓁ) 220
\Pisymbol{umranda}{29} (ⓂⓂⓂⓂⓂⓂ) 220
\Pisymbol{umranda}{30} (ⓁⓁⓁⓁⓁⓁⓁ) 220
\Pisymbol{umranda}{31} (ⓂⓂⓂⓂⓂⓂⓂ) 220
\Pisymbol{umranda}{32} (ⓁⓁⓁⓁⓁⓁⓁⓁ) 220
\Pisymbol{umranda}{33} (Ⓐ) 220
\Pisymbol{umranda}{34} (Ⓑ) 219
\Pisymbol{umranda}{35} (Ⓒ) 219
\Pisymbol{umranda}{36} (Ⓓ) 219
\Pisymbol{umranda}{37} (Ⓔ) 219
\Pisymbol{umranda}{38} (Ⓕ) 219
\Pisymbol{umranda}{39} (Ⓖ) 219
\Pisymbol{umranda}{40} (Ⓗ) 219
\Pisymbol{umranda}{41} (Ⓛ) 219
\Pisymbol{umranda}{42} (Ⓜ) 219
\Pisymbol{umranda}{43} (Ⓣ) 219
\Pisymbol{umranda}{44} (Ⓤ) 219
\Pisymbol{umranda}{45} (ⓁⓁ) 219
\Pisymbol{umranda}{46} (ⓂⓂ) 219
\Pisymbol{umranda}{47} (ⓁⓁⓁ) 219
\Pisymbol{umranda}{48} (ⓂⓂⓂ) 219
\Pisymbol{umranda}{49} (ⓉⓉⓉ) 220
\Pisymbol{umranda}{50} (ⓊⓊⓊ) 220
\Pisymbol{umranda}{51} (ⓁⓁⓁ) 220
\Pisymbol{umranda}{52} (ⓂⓂⓂ) 220
\Pisymbol{umranda}{53} (ⓉⓉⓉ) 220
\Pisymbol{umranda}{54} (ⓊⓊⓊ) 220
\Pisymbol{umranda}{55} (ⓁⓁⓁ) 220
\Pisymbol{umranda}{56} (ⓂⓂⓂ) 220
\Pisymbol{umranda}{57} (Ⓛ) 220
\Pisymbol{umranda}{58} (Ⓜ) 220
\Pisymbol{umranda}{59} (Ⓣ) 220
\Pisymbol{umranda}{60} (Ⓤ) 220
\Pisymbol{umranda}{61} (ⓁⓁ) 220
\Pisymbol{umranda}{62} (ⓂⓂ) 220
\Pisymbol{umranda}{63} (ⓉⓉ) 220
\Pisymbol{umranda}{64} (ⓊⓊ) 220
\Pisymbol{umranda}{65} (ⓁⓁⓁ) 220
\Pisymbol{umranda}{66} (ⓂⓂⓂ) 220
\Pisymbol{umranda}{67} (ⓉⓉⓉ) 220
\Pisymbol{umranda}{68} (ⓊⓊⓊ) 219
\Pisymbol{umranda}{69} (ⓁⓁⓁ) 219
\Pisymbol{umranda}{70} (ⓂⓂⓂ) 219
\Pisymbol{umranda}{71} (ⓉⓉⓉ) 219
\Pisymbol{umranda}{72} (ⓊⓊⓊ) 219
\Pisymbol{umranda}{73} (ⓁⓁⓁ) 219
\Pisymbol{umranda}{74} (ⓂⓂⓂ) 219
\Pisymbol{umranda}{75} (ⓉⓉⓉ) 219
\Pisymbol{umranda}{76} (ⓊⓊⓊ) 219
\Pisymbol{umranda}{77} (ⓁⓁⓁ) 219
\Pisymbol{umranda}{78} (ⓂⓂⓂ) 219
\Pisymbol{umranda}{79} (ⓉⓉⓉ) 219
\Pisymbol{umranda}{80} (ⓊⓊⓊ) 219
\Pisymbol{umranda}{81} (ⓁⓁⓁ) 219

\Pisymbol{umranda}{82} (✿) .	\Pisymbol{umrandb}{5} (▣) ..	\Pisymbol{umrandb}{31} (▨) ..
..... 219 220 221
\Pisymbol{umranda}{83} (❀) .	\Pisymbol{umrandb}{6} (▤) ..	\Pisymbol{umrandb}{32} (▤) ..
..... 220 220 221
\Pisymbol{umranda}{84} (❀*) .	\Pisymbol{umrandb}{7} (▥) ..	\Pisymbol{umrandb}{33} (▥) ..
..... 220 220 221
\Pisymbol{umranda}{85} (❀*) .	\Pisymbol{umrandb}{8} (▦) ..	\Pisymbol{umrandb}{34} (▦) ..
..... 220 220 221
\Pisymbol{umranda}{86} (〽) .	\Pisymbol{umrandb}{9} (▨) ..	\Pisymbol{umrandb}{35} (▨) ..
..... 220 220 221
\Pisymbol{umranda}{87} (〽) .	\Pisymbol{umrandb}{10} (▤) ..	\Pisymbol{umrandb}{36} (▤) ..
..... 220 221 221
\Pisymbol{umranda}{88} (〽) .	\Pisymbol{umrandb}{11} (▤) ..	\Pisymbol{umrandb}{37} (▤) ..
..... 220 221 221
\Pisymbol{umranda}{89} (〽) .	\Pisymbol{umrandb}{12} (▨) ..	\Pisymbol{umrandb}{38} (▨) ..
..... 220 221 221
\Pisymbol{umranda}{90} (〽) .	\Pisymbol{umrandb}{13} (▨) ..	\Pisymbol{umrandb}{39} (▨) ..
..... 220 221 221
\Pisymbol{umranda}{91} (〽) .	\Pisymbol{umrandb}{14} (▨) ..	\Pisymbol{umrandb}{40} (▨) ..
..... 220 221 221
\Pisymbol{umranda}{92} (〽) .	\Pisymbol{umrandb}{15} (▨) ..	\Pisymbol{umrandb}{41} (▨) ..
..... 220 221 221
\Pisymbol{umranda}{93} (〽) .	\Pisymbol{umrandb}{16} (▨) ..	\Pisymbol{umrandb}{42} (▨) ..
..... 220 221 220
\Pisymbol{umranda}{94} (▣) .	\Pisymbol{umrandb}{17} (▨) ..	\Pisymbol{umrandb}{43} (▨) ..
..... 220 221 220
\Pisymbol{umranda}{95} (▣) .	\Pisymbol{umrandb}{18} (▨) ..	\Pisymbol{umrandb}{44} (✳) ..
..... 220 221 220
\Pisymbol{umranda}{96} (▣) .	\Pisymbol{umrandb}{19} (▨) ..	\Pisymbol{umrandb}{45} (✳) ..
..... 220 221 220
\Pisymbol{umranda}{97} (▣) .	\Pisymbol{umrandb}{20} (▨) ..	\Pisymbol{umrandb}{46} (✳) ..
..... 220 221 220
\Pisymbol{umranda}{98} (▣) .	\Pisymbol{umrandb}{21} (▨) ..	\Pisymbol{umrandb}{47} (✳) ..
..... 220 221 220
\Pisymbol{umranda}{99} (▣) .	\Pisymbol{umrandb}{22} (▨) ..	\Pisymbol{umrandb}{48} (▨) ..
..... 220 221 220
\Pisymbol{umranda}{100} (▣) .	\Pisymbol{umrandb}{23} (▨) ..	\Pisymbol{umrandb}{49} (▨) ..
..... 220 221 220
\Pisymbol{umranda}{101} (▣) .	\Pisymbol{umrandb}{24} (▨) ..	\Pisymbol{umrandb}{50} (▨) ..
..... 220 221 220
\Pisymbol{umrandb}{0} (▨) ..	\Pisymbol{umrandb}{25} (▨) ..	\Pisymbol{umrandb}{51} (▨) ..
..... 220 221 220
\Pisymbol{umrandb}{1} (▨) ..	\Pisymbol{umrandb}{26} (▨) ..	\Pisymbol{umrandb}{52} (▨) ..
..... 220 221 221
\Pisymbol{umrandb}{2} (▨) ..	\Pisymbol{umrandb}{27} (▨) ..	\Pisymbol{umrandb}{53} (▨) ..
..... 220 221 221
\Pisymbol{umrandb}{3} (▨) ..	\Pisymbol{umrandb}{28} (▨) ..	\Pisymbol{umrandb}{54} (▨) ..
..... 220 221 221
\Pisymbol{umrandb}{4} (▨) ..	\Pisymbol{umrandb}{29} (▨) ..	\Pisymbol{umrandb}{55} (▨) ..
..... 220 221 221
	\Pisymbol{umrandb}{30} (▨) ..	\Pisymbol{umrandb}{56} (▨) ..
 221 221

\Pisymbol{WebOMintsGD}{67}	
(⌚)	218
\Pisymbol{WebOMintsGD}{68}	
(⌚)	218
\Pisymbol{WebOMintsGD}{69}	
(⌚)	218
\Pisymbol{WebOMintsGD}{70}	
(⌚)	218
\Pisymbol{WebOMintsGD}{71}	
(⌚)	218
\Pisymbol{WebOMintsGD}{72}	
(⌚)	218
\Pisymbol{WebOMintsGD}{73}	
(⌚)	218
\Pisymbol{WebOMintsGD}{74}	
(⌚)	218
\Pisymbol{WebOMintsGD}{75}	
(⌚)	218
\Pisymbol{WebOMintsGD}{76}	
(⌚)	219
\Pisymbol{WebOMintsGD}{77}	
(⌚)	219
\Pisymbol{WebOMintsGD}{78}	
(⌚)	219
\Pisymbol{WebOMintsGD}{79}	
(⌚)	219
\Pisymbol{WebOMintsGD}{80}	
(⌚)	219
\Pisymbol{WebOMintsGD}{81}	
(⌚)	219
\Pisymbol{WebOMintsGD}{82}	
(⌚)	219
\Pisymbol{WebOMintsGD}{83}	
(⌚)	219
\Pisymbol{WebOMintsGD}{84}	
(⌚)	219
\Pisymbol{WebOMintsGD}{85}	
(⌚)	219
\Pisymbol{WebOMintsGD}{86}	
(⌚)	219
\Pisymbol{WebOMintsGD}{87}	
(⌚)	218
\Pisymbol{WebOMintsGD}{88}	
(⌚)	218
\Pisymbol{WebOMintsGD}{89}	
(⌚)	218
\Pisymbol{WebOMintsGD}{90}	
(⌚)	218
\Pisymbol{WebOMintsGD}{91}	
(⌚)	218
\Pisymbol{WebOMintsGD}{93}	
(⌚)	218
\Pisymbol{WebOMintsGD}{97}	
(⌚)	218
\Pisymbol{WebOMintsGD}{98}	
(⌚)	218
\Pisymbol{WebOMintsGD}{99}	
(⌚)	218
\Pisymbol{WebOMintsGD}{100}	
(⌚)	218
\Pisymbol{WebOMintsGD}{101}	
(⌚)	218
\Pisymbol{WebOMintsGD}{102}	
(⌚)	218
\Pisymbol{WebOMintsGD}{103}	
(⌚)	218
\Pisymbol{WebOMintsGD}{104}	
(⌚)	218
\Pisymbol{WebOMintsGD}{105}	
(⌚)	218
\Pisymbol{WebOMintsGD}{106}	
(⌚)	218
\Pisymbol{WebOMintsGD}{107}	
(⌚)	218
\Pisymbol{WebOMintsGD}{109}	
(⌚)	218
\Pisymbol{WebOMintsGD}{110}	
(⌚)	218
\Pisymbol{WebOMintsGD}{111}	
(⌚)	218
\Pisymbol{WebOMintsGD}{112}	
(⌚)	218
\Pisymbol{WebOMintsGD}{113}	
(⌚)	219
\Pisymbol{WebOMintsGD}{114}	
(⌚)	219
\Pisymbol{WebOMintsGD}{115}	
(⌚)	219
\Pisymbol{WebOMintsGD}{116}	
(⌚)	219
\Pisymbol{WebOMintsGD}{117}	
(⌚)	219
\Pisymbol{WebOMintsGD}{118}	
(⌚)	219
\Pisymbol{WebOMintsGD}{119}	
(⌚)	219
\Pisymbol{WebOMintsGD}{120}	
(⌚)	219
\Pisymbol{WebOMintsGD}{121}	
(⌚)	219
\Pisymbol{WebOMintsGD}{122}	
(⌚)	219
\pitchfork (⌚)	130
\pitchfork (⌚)	55
\pitchfork (⌚)	62
\pitchfork (⌚)	98
\pitchfork (⌚)	96
\pitchfork (⌚)	64
pitchforks	55, 96, 98, 123, 124, 130
Pitman's base 12 symbols	128, 194
\piup (π)	102
\planck (h)	21
\Plane (✈)	159
planets	137–139, 215–218
\plasmon (e)	144
playing cards	158
Plimsoll line	240, <i>see also</i> “texttt“string“minuso
\Plus (⊕)	149
\plus (*)	169
\plus (+)	35
\plus (+)	35
plus-or-minus sign	<i>see</i> \pm
\PlusCenterOpen (⊕)	149
\pluscirc (⊕)	34
\pluscirc (⊕)	36
\plusdot (+)	35
\plusdot (+)	37
\pluseqq (±)	37
\plushat (†)	37
\PlusOutline (⊕)	149
plusses	149, 159, 213–215
\plussim (±)	37
\plussubtwo (±)	37
\PlusThinCenterOpen (⊕)	149
\plustrif (*)	36
\plustrif (*)	37
\Pluto (♃)	138
\Pluto (♄)	138
\Pluto (♃)	139
\pluto (♃)	137
\pm (±)	32
\pm (±)	36
\pm (±)	35
\pm (±)	35
\pm (±)	37
\pm (±)	197
\pmb	250
pmbboxdraw (package)	199, 256, 257
\pmod	99
\pod	99
\pointer (◊)	190
pointing finger	<i>see</i> fists
\PointingHand (☞)	191
\pointint (⌚)	53
\pointint (⌚)	50
\pointints1 (⌚)	52
\pointintup (⌚)	52
\pointright (⌚)	148
\Poland (🇵🇱)	203
\polariton (ԑ)	144
\polaron (ԑ)	144
\polishhook („)	26
\polter (████)	125
plutonikogreek (babel package option)	17, 101, 102
polygons	152–155, 157–158, 182–187, 213–215, 231
polynom (package)	117

polynomial division	117	\precnapprox (\approx)	64	proper subset/superset	see \subsetneq/\supsetneq
polytonic Greek	17, 101, 102	\precneq (\preccurlyeq)	57	proper vertices	143
\portato ($\textcircled{.}$)	176	\precneq (\preccurlyeq)	60, 61	\PropertyLine (\textcircled{P})	132
\portatoDown ($\textcircled{-}$)	176	\precneq (\preccurlyeq)	64	\propfrom (∞)	61
\Portugal (\textcircled{P})	203	\precneqq ($\preccurlyeq\!\!\!$)	56	\proto (α)	130
\Poseidon ($\textcircled{*}$)	139	\precneqq ($\preccurlyeq\!\!\!$)	62	\proto (∞)	54
\positron (e^+)	144	\precneqq ($\preccurlyeq\!\!\!$)	60, 61	\proto (∞)	60
\postalmark (\textcircled{T})	132	\precneqq ($\preccurlyeq\!\!\!$)	64	\proto (∞)	58
\Postbox (\textcircled{m})	201	\precnsim (\approx)	57	\proto (∞)	64
PostScript	102, 135, 145, 238, 248, 249	\precnsim (\approx)	55	\protein (\textcircled{P})	143
PostScript fonts	145	\precnsim (\approx)	62	proto-Semitic symbols	160
\pot (\textcircled{p})	205	\precnsim (\approx)	60	\proton (p^+)	143
\Pound ($\textcircled{\$}$)	27	\precnsim (\approx)	59	protosem (package)	160, 256, 257
\pounds	16	\precnsim (\approx)	64	\ProvidesPackage	256
\pounds (£)	252, 253	\precsim (\lesssim)	56	\PrtSc ([PrtSc])	140
power set	see alphabets, math	\precsim (\lesssim)	55	\prurel (\textcircled{r})	63
\powerset (\wp)	104	\precsim (\lesssim)	62	\prurel (\textcircled{s})	64
\Pp (:)	197	\precsim (\lesssim)	60	\ps (\textcircled{w})	197
\pp (:)	197	\precsim (\lesssim)	58	pseudographics	199
\ppp (:)	197	\precsim (\lesssim)	64	\Psi (Ψ)	101
\Ppp (:)	197	prescription	see \textrecipe	\psi (ψ)	101
\pppp (:)	197	present-value symbols	121, 244	\psiup (ψ)	102
\Pffff (:)	197	\prime (\prime)	130	\psnfss (package)	150
\Pfffff (:)	197	\prime (\prime)	131	\PSTricks (package)	208
\Pffffff (:)	197	\prime (\prime)	131	\Psyche (\textcircled{Y})	139
\Pr (\textbf{Pr})	99	\prime (\prime)	128	\Pu (.)	172
\Prec (\ll)	64	primes	128, 130, 131	\pullback ($\textcircled{.}$)	35
\prec (\prec)	54	\Printer (\textcircled{p})	140	\pullback ($\textcircled{.}$)	64
\prec (\prec)	60	printer's fist	see fists	pullback diagrams	242
\prec (\prec)	58	printer's flowers	see fleurons and flowers	pulse diagram symbols	136
\prec (\prec)	64	probabilistic independence	241	\PulseHigh ($\textcircled{\text{U}}$)	136
\precapprox (\approx)	56	probability limit (\textbf{plim})	see $\lim_{n \rightarrow \infty}$ \DeclareMathOperator	\PulseLow ($\textcircled{\text{L}}$)	136
\precapprox (\approx)	55	\prod (\prod)	43	\pumpkin ($\textcircled{\text{G}}$)	41
\precapprox (\approx)	62	\prod (\prod)	48	pumpkins	41
\precapprox (\approx)	60	\prod (\prod)	48	punctuation	18
\precapprox (\approx)	58	\prod (\prod)	50	punctum	see musixgre
\precapprox (\approx)	64	\PRODI	54	\Purierstab ($\textcircled{!}$)	205
\preccurlyeq (\preccurlyeq)	56	\PRODI (\prod)	54	\pushout (\textcircled{F})	35
\preccurlyeq (\preccurlyeq)	55	\Prodi	54	\pushout (\textcircled{F})	64
\preccurlyeq (\preccurlyeq)	62	\Prodi (\prod)	54	pushout diagrams	242
\preccurlyeq (\preccurlyeq)	60	\prodi	54	\pwedge (Δ)	21
\preccurlyeq (\preccurlyeq)	58	\prodi (\prod)	54	\pxfonts (package)	31, 33, 45, 56, 68, 70, 79, 98, 102–104, 130, 134, 158, 235, 251
\preccurlyeq (\preccurlyeq)	64	prodint (package)	54, 256	\Pxp (:)	197
\preccurlyeq (\preccurlyeq)	56	product integrals	54	\pxp (:)	197
\preccurlyeq (\preccurlyeq)	58	\proffline (\curvearrowright)	132		
\preccurlyeq (\preccurlyeq)	64	\profsurf (\curvearrowleft)	132		
\preceq (\preccurlyeq)	54	Project Gutenberg	238		
\preceq (\preccurlyeq)	60	projective space (\mathbb{P})	see alphabets, math		
\preceq (\preccurlyeq)	56	\projlim ($\textbf{proj lim}$)	99		
\preceq (\preccurlyeq)	60	pronunciation symbols	see phonetic symbols		
\precnapprox (\approx)	57	proof, end of	130, 132		
\precnapprox (\approx)	55				
\precnapprox (\approx)	62				
\precnapprox (\approx)	60				
\precnapprox (\approx)	59				

Q

Q.E.D.	130, 132
\QED (\blacksquare)	132
\Qoppa (\textcircled{Q})	166
\qoppa (\textcircled{q})	166
\qoppa (\textcircled{q})	166
\qp (\textcircled{f})	171
\qprime (\textcircled{m})	128
\QQ (\textcircled{M})	140

	R		
\qqs (⌚)	171	\rblackbowtie (⋈) 36	
\qs (⌚)	171	\rlblkbrbrak (⌚) 107	
\qside (⌚)	195	\rBrace (⌚) 112	
\quaddot (⌚)	169	\rbrace (⌚) 110	
\quadeye (⌚)	169	\rbrace (⌚) 111	
\Quadrad (⌚)	114	\rbrace (⌚) 109	
\quadrad (⌚)	114	\rbrace (⌚) 112	
\Quadras (⌚)	114	\Rbrack (⌚) 135	
\quadras (⌚)	114	\rBrack (⌚) 113	
\quadrupole (⌘)	143	\rBrack (⌚) 110	
\quark (q)	143	\rBrack (⌚) 111	
\quarkb (b)	143	\rBrack (⌚) 112	
\quarkc (c)	143	\rBrack (⌚) 110	
\quarkd (d)	143	\rBrack (⌚) 113	
\quarks (s)	143	\rBrack (⌚) 111	
\quarkt (t)	143	\rBrack (⌚) 112	
\quarku (u)	143	\rBrack (⌚) 110	
quarter note see musical symbols		\rBrack (⌚) 111	
\quarterNote (♪)	174	\rBrack (⌚) 107	
\quarternote (♪)	171	\rBrack (⌚) 107	
\quarternote (♪)	170	\rBrack (⌚) 107	
\quarternote (♪)	170	\rBrack (⌚) 107	
\quarterNoteDotted (♪.)	174	\rBrack (⌚) 107	
\quarterNoteDottedDouble (♪..)	174	\rBrack (⌚) 107	
\quarterNoteDottedDoubleDown (♪..)	174	\rBrack (⌚) 107	
\quarterNoteDottedDown (♪..)	174	\rBrack (⌚) 107	
\quarterNoteDown (♪)	174	\rBrack (⌚) 107	
quasi-quotation marks (⌜ ⌞) see \ulcorner and \urcorner		\rceil (⌚) 24	
quaternions (ℍ) see alphabets, math		\rceil (⌚) 113	
quaver see musical symbols		\rcceil (⌚) 107	
\quaver (♪)	174	\rcceil (⌚) 110	
\quaverDotted (♪.)	175	\rcceil (⌚) 109	
\quaverDottedDouble (♪..)	175	\rcceil (⌚) 112	
\quaverDottedDoubleDown (♪..)	175	\ranglebar (⌚) 109	
\quaverDottedDown (♪..)	175	\rangledot (⌚) 110	
\quaverDown (♪)	175	\rangledot (⌚) 107	
\quaverRest (⌚)	176	\rangledownzigzagarrow (⌚) 129	
\quaverRestDotted (⌚)	176	\rank (rank) 100	
queen 196, 233–235		\RArrow (→) 140	
\questeq (⌚)	64	\rarrowfill 122	
\Question (??)	132	\ratio (:)	67
quilisma see musixgre		\RATIONAL (Q) 100	
\Quincunx (⚊)	139	\Rational (Q) 100	
Quine corners (⌜ ⌞) see \ulcorner and \urcorner		rational numbers (ℚ) see alphabets, math	
quotation marks 15, 18, 29, 205, 251, 254		rationalized Planck constant see \hbar	
\quotedblbase („)	18, 254	Raw Font Tables 13, 134	
\quotesinglbase („)	18, 254	\RB (⌚) 140	
		\Rbag (⌚) 106	
		\rbag (⌚) 106	
		\rbag (⌚) 36	
		\rbag (⌚) 107	

\rcurvyangle (>)	107
\rdbrack ([])	108
\rdiagovdiag (×)	132
\rdiagovsearrow (⤳)	91
\Rdsh (↳)	85
\Rdsh (↳)	91
\Re (\textbf{Re})	100
\Re (\mathfrak{R})	100, 104
\Re (\mathfrak{R})	105
\REAL (\mathbb{R})	100
\Real (\mathbb{R})	100
real numbers (\mathbb{R})	see alphabets, math
realhats (package)	116, 256, 257
recipe	see \textrecipie
\recorder (⌚)	190
\Rectangle (▮)	156
\RectangleBold (▮)	156
rectangles	156, 182–187, 213–215
\RectangleThin (▮)	156
\Rectpipe (▣)	142
\Rectsteel (▣)	142
recycle (package)	201, 256
\recycle (♻)	205
	
\recycle (♻)	201
\Recycling (♻)	201
recycling symbols . . .	201, 205, 207–213
reduced quadrupole moment	see \rqp
\reference (<i>R</i>)	143
\reflectbox	238, 239
registered trademark	15, 28, 253
\Reibe (▣)	205
relational database symbols	132
relational symbols	54
binary	55–58, 60, 62–75, 96–98
negated binary	55–59, 61, 63, 65
triangle	75–77
\relationleftproject (▣)	123
\relationlifting (▣)	123
\relationrightproject (▣)	123
relations	123
\Relbar (=)	98, 239
\Relbar (≡)	58
\Relbar (≈)	99
\relbar (—)	98, 239
\relbar (—)	58
\relbar (≈)	99
relsize (package)	25
\Request (?)	201
\resistivity (₩)	143
\resizebox	94, 235
\Respondens (~)	197
\respondens (~)	197
response (R)	255
\restoresymbol	235
\restrictbarb (↓)	95
\restrictbarup (↑)	95
\restriction (↑)	79
\restriction (↑)	88
\restriction (↑)	83
\restriction (↑)	94
restrictions	79, 83, 84, 88, 93–95
\restrictmallet (↓)	95
\restrictmalletup (↑)	95
\restrictwand (↓)	95
\restrictwandup (↑)	95
rests	see musical symbols
retracting	see \textretracting
\Retrograde (R)	139
\Return (➡)	140
return	see carriage return
\revangle (Δ)	129
\revangle (Δ)	129
\revangleubar (Δ)	129
\revaw (��)	112
\revD (ⓘ)	21
\revddots (⋮)	243
\reve (ゑ)	20
\reveject (ゑ)	20
\revemptyset (∅)	131
\revemptyset (∅)	129
\revepsilon (϶)	20
\revepsilon (϶)	239
reverse solidus	see \textbackslash
\reverseallabreve (ঠ)	171
\reverseC (ঠ)	171
reversed symbols	238–239
\reversedvideobend (⤵)	190
\reversemathcloud (⤶)	41
\reversemathwitch (⤷)	41
\reversemathwitch* (⤷)	41
\revglotstop (ঁ)	21
\revmeasuredangle (া)	129
\revnmid (⌢)	64
\revsphericalangle (▷)	129
\Rewind (◀)	191
\RewindToIndex (◀◀)	191
\RewindToStart (◀)	191
\rbowtie (⋈)	64
\rfilet (��)	108
\rfloor (⌋)	113
\rfloor (⌋)	107
\rfloor (⌋)	110
\rfloor (⌋)	109
\rfloor (⌋)	111
\rtimes (☒)	64
\rgroup ()}	108
\rgroup ()}	110
\rgroup ()}	109
\rgroup ()}	111
\RHD (▶)	33
\rhd (▷)	32, 33
\rhd (▷)	74
\rhd (▷)	72, 76
\rhd (▷)	37, 155
\Rho (P)	101
\rho (ρ)	101
\rho (ρ)	102
\rhombus (◇)	157
\rhombuscross (☒)	157
\rhombusdot (◊)	157
rhombuses	32, 34, 39–41, 79, 130, 153–159, 182–187, 190, 192, 213–215, 231
\rhombusfill (◆)	157
\rhombusfillha (◆)	157
\rhombusfillhb (◆)	157
\rhombusfillhl (◆)	157
\rhombusfillhr (◆)	157
\rhombuslineh (◊)	157
\rhombuslinev (◊)	157
\rhombuslinevh (◊)	157
\homesonminus (ℓ⁻)	143
\homesonnull (ℓ⁰)	143
\homesonplus (ℓ⁺)	143
\rhook (՚)	99
\rhookdownarrow (↓)	86
\rhookdownarrow (↓)	81
\rhookleftarrow (↔)	86
\rhookleftarrow (↔)	81
\rhooknearrow (↗)	86
\rhooknearrow (↗)	81
\rhooknarrow (↖)	85
\rhooknarrow (↖)	81
\rhookrightarrow (↔)	85
\rhookrightarrow (↔)	81
\rhooksearrow (↘)	85
\rhooksearrow (↘)	81
\rhookswarrow (↙)	85
\rhookswarrow (↙)	80
\rhookuparrow (↑)	85
\rhookuparrow (↑)	80
\rhoup (ϙ)	102

\right	107, 108, 112, 113, 235,	\rightcurvedarrow (\rightsquigarrow)	85
	237	\rightcurvedarrow (\rightsquigarrow)	91
\rightangle (L)	\rightdasharrow ($\rightarrow\!\!\!\rightarrow$)	89
\rightangle (L)	\rightdasharrow ($\rightarrow\!\!\!\rightarrow$)	91
\rightangle (L)	\rightdbltail ($\rightarrow\!\!\!\rightarrow$)	64
\rightangle (L)	\RightDiamond (\blacklozenge)	156
\rightanglemedot (L)	\rightdotarrow ($\rightarrow\!\!\!\rightarrow$)	91
\rightanglemedot (L)	\rightdowncurvedarrow (\hookleftarrow)	85
\rightanglemedot (L)	\rightdowncurvedarrow (\hookleftarrow)	91
\rightanglesqr (L)	\rightevaw (⌚)	112
\rightanglesqr (L)	\rightfilledspoon (\rightarrow)	96
\rightanglesqr (L)	\rightfishtail (\rightarrow)	63
\rightanglesquare (L)	\rightfootline (\rightarrow)	60
\RIGHTarrow (►)	\rightfootline (\rightarrow)	58
\Rightarrow (⇒)	\rightfree (\rightarrow)	58
\Rightarrow (⇒)	\righthalfcap (\cap)	35
\Rightarrow (⇒)	\righthalfcup (\cup)	35
\rightarrowarrow (→)	\righthand (\textcircled{w})	148
\rightarrowarrow (→)	\rightharpoonaccent (✉)	115
\rightarrowarrow (→)	\rightharpoonccw (\rightarrow)	83
\rightarrowarrow (→)	\rightharpooncw (\rightarrow)	83
\rightarrowarrow (→)	\rightharpoondown (\rightarrow)	80
\rightarrowarrow (→)	\rightharpoondown (\rightarrow)	78
\rightarrowarrowapprox (≈)	\rightharpoondown (\rightarrow)	90
\rightarrowarrowbackapprox (≈)	\rightharpoondown (\rightarrow)	88
\rightarrowarrowbar (→)	\rightharpoondown (\rightarrow)	93
\rightarrowarrowbar (→)	\rightharpoondownbar (\rightarrow)	93
\rightarrowarrowbsimilar (≈)	\rightharpoonsupdown (⇒)	93
\rightarrowarrowcircle (⊕)	\rightharpoonup (\rightarrow)	80
\rightarrowarrowdiamond (→)	\rightharpoonup (\rightarrow)	78
\rightarrowarrowgtr (gg)	\rightharpoonup (\rightarrow)	90
\rightarrowarrowonoplus (⊕)	\rightharpoonup (\rightarrow)	88
\rightarrowarrowplus (→)	\rightharpoonup (\rightarrow)	93
\rightarrowarrowshortleftarrow (⇄)	\rightharpoonupbar (\rightarrow)	93
\rightarrowarrowsimilar (≈)	\rightharpoonupdash (⇒)	93
\rightarrowarrowupset (⇒)	\rightimply (⇒)	63
\rightarrowarrowtail (→)	\rightcurvearrow (↷)	85
\rightarrowarrowtail (→)	\rightleftarrows (⇄)	79
\rightarrowarrowtail (→)	\rightleftarrows (⇄)	78
\rightarrowarrowtail (→)	\rightleftarrows (⇄)	89
\rightarrowarrowtail (→)	\rightleftarrows (⇄)	85
\rightarrowarrowtail (→)	\rightleftarrows (⇄)	80
\rightarrowarrowtail (→)	\rightleftharpoon (\rightarrow)	80
\rightarrowarrowtail (→)	\rightleftharpoons (\rightleftharpoons)	79
\rightarrowarrowtail (→)	\rightleftharpoons (\rightleftharpoons)	78
\rightarrowarrowtail (→)	\rightleftharpoons (\rightleftharpoons)	89
\rightarrowarrowtail (→)	\rightleftharpoons (\rightleftharpoons)	85
\rightarrowarrowTriangle (→)	\rightleftharrows (⇄)	80
\rightarrowarrowtriangle (→)	\rightleftharrows (⇄)	91
\rightarrowarrowtriangle (→)	\rightleftcurvearrow (↷)	85
\rightarrowarrowtriangle (→)	\rightleftharpoon (\rightarrow)	80
\rightarrowarrowtriangle (→)	\rightleftharpoons (\rightleftharpoons)	88
\rightarrowarrowx (≈)	\rightleftharpoons (\rightleftharpoons)	90
\rightAssert ()	\rightleftharpoons (\rightleftharpoons)	79
\rightassert (†)	\rightleftharpoons (\rightleftharpoons)	78
\rightbarharpoon (⇒)	\rightleftharpoons (\rightleftharpoons)	90
\rightbkarrow (→)	\rightleftharpoons (\rightleftharpoons)	88
\rightbkarrow (→)	\rightleftharpoons (\rightleftharpoons)	83
\rightblackarrow (→)	\rightleftharpoons (\rightleftharpoons)	93
\rightblackspoon (→)	\rightleftharpoons (\rightleftharpoons)	93
\rightbroom (→)	\rightleftharpoonsdown (⇒)	93
\RIGHTCIRCLE (⦿)	\rightleftharpoonsfill	122
\RIGHTcircle (⦿)	\rightleftharpoonsup (⇒)	93
\Rightcircle (⦿)	\rightleftsquigarrow (↔)	85
		\rightlsquigarrow (↷)	85
		\rightmapsto (⇒)	85
		\rightmapsto (→)	85
		\rightModels (=)	58
		\rightmodels (=)	60
		\rightmodels (=)	58
		\rightmoon (☽)	138
		\rightmoon (☽)	138
		\rightmoon (☽)	137
		\rightouterjoin (⤻)	132
		\righttp (\textcircled{z})	26
		\rightpentagon (◇)	155
		\rightpentagonblack (◆)	155
		\rightpitchfork (⤼)	98
		\rightpitchfork (⤼)	96
		\rightpointleft (⤻)	148
		\rightpointright (⤻)	148
		\rightproto (∞)	57
		\rightcurvearrow (↶)	85
		\rightrightarrows (⤼)	79
		\rightrightarrows (⤼)	78
		\rightrightarrows (⤼)	89
		\rightrightarrows (⤼)	84
		\rightrightarrows (⤼)	80
		\rightrightarrows (⤼)	91
		\rightrightharpoons (⇒)	80
		\rightrsquigarrow (↷)	85
		\rightrsquigarrow (↷)	80
		\RightScissors (✂)	147
		\rightslice (▷)	33
		\rightslice (▷)	36
		\rightslice (▷)	57
		\rightspoon (⊖)	97
		\rightspoon (⊖)	96
		\rightspoon (⊖)	79
		\rightspoon (⊖)	78
		\rightspoon (⊖)	91
		\rightspoon (⊖)	89
		\rightspoon (⊖)	91, 92
		\rightt (⊣)	26
		\righttail (⊣)	63
		\righttherefore (∴)	126
		\righttherefore (∴)	34, 126
		\rightthreearrows (⤼)	89
		\rightthreearrows (⤼)	91
		\rightthreetimes (⤼)	130
		\rightthreetimes (⤼)	32
		\rightthreetimes (⤼)	36
		\rightthreetimes (⤼)	35
		\rightthreetimes (⤼)	34
		\rightthreetimes (⤼)	37
		\rightthumbsdown (⤻)	148
		\rightthumbsup (⤻)	148
		\righttoleftarrow (⤻)	79
		\righttoleftarrow (⤻)	89
		\Righttorque (⟳)	142

$\backslash rightturn (\circlearrowright)$	190	rotated symbols	18–21, 25, 238–239
$\backslash rightupcurvedarrow (\curvearrowright)$	85	rotating (package)	29, 140
$\backslash rightVDash (\Vdash)$	60	$\backslash rotm (\text{ui})$	21
$\backslash rightVdash (\Vdash)$	60	$\backslash rotOmega (\wp)$	21
$\backslash rightVdash (\Vdash)$	57	$\backslash rotr (\text{.l})$	21
$\backslash rightvDash (\Vdash)$	60	$\backslash rotvara (\text{d})$	21
$\backslash rightvdash (\vdash)$	60	$\backslash rotw (\text{M})$	21
$\backslash rightvdash (\vdash)$	57	$\backslash roty (\text{A}^\wedge)$	21
$\backslash rightwave (\swarrow)$	112	$\backslash RoundedLsteel (\text{L})$	142
$\backslash rightwavearrow (\rightsquigarrow)$	84	$\backslash RoundedLsteel (\text{L})$	142
$\backslash rightwavearrow (\rightsquigarrow)$	91	$\backslash RoundedTsteel (\text{T})$	142
$\backslash rightwhitearrow (\Rightarrow)$	89	$\backslash RoundedTsteel (\text{T})$	142
$\backslash rightwhitearrow (\Rightarrow)$	91	$\backslash RoundedTTsteel (\text{I})$	142
$\backslash rightwhiteroundarrow (\Rightarrow)$	89	$\backslash roundz (\text{z})$	21
$\backslash rightY (\succ)$	35	$\backslash Rparen (\text{)})$	135
$\backslash rightY (\succ)$	34	$\backslash rParen (\text{)})$	111
$\backslash rinforzando ()$	176	$\backslash rparen (\text{)})$	110
$\backslash ring (\text{ring})$	116	$\backslash rparen ()$	111
ring (\textring)	see accents	$\backslash rparenegrntr (\text{)}>$	107
ring equal to	see $\backslash circeq$	$\backslash Rparenless (\text{)}>$	107
ring in equal to	see $\backslash eqcirc$	$\backslash rppolint (\text{f})$	53
ring sum	see $\backslash oplus$	$\backslash rppolint (\text{f})$	50
$\backslash ringplus (\text{+})$	37	$\backslash rppolintsl (\text{f})$	51
$\backslash riota (\text{i})$	131	$\backslash rppolintup (\text{f})$	51
$\backslash riota (\text{i})$	21	$\backslash rqm (\text{I})$	241
$\backslash rip (\pm)$	195	$\backslash RR (\text{*})$	169
$\backslash risingdotseq (\equiv)$	56	$\backslash rrangle (\text{ })$	109
$\backslash risingdotseq (\equiv)$	55	$\backslash rrangle (\text{ })$	107
$\backslash risingdotseq (\equiv)$	63	$\backslash rrbracket (\text{ })$	108
$\backslash risingdotseq (\equiv)$	60	$\backslash rrbracket (\text{ })$	113
$\backslash risingdotseq (\equiv)$	57	$\backslash rrceil (\text{ })$	106
$\backslash risingdotseq (\equiv)$	63	$\backslash RRelbar (\text{ })$	99
$\backslash rJoin (\bowtie)$	56	$\backslash Rrelbar (\text{ })$	99
$\backslash rJoin (\bowtie)$	36	$\backslash rrfloor (\text{ })$	106
$\backslash RK (\dashv)$	140	$\backslash rrhD (\text{ })$	212
$\backslash rlap$	26, 156, 242	$\backslash rrhDa (\text{ })$	212
$\backslash rmoustache (\text{`})$	108	$\backslash rrhDap (\text{ })$	212
$\backslash rmoustache (\text{`})$	111	$\backslash rrhDp (\text{ })$	212
$\backslash rmoustache (\text{`})$	109	$\backslash rrhDs (\text{ })$	212
$\backslash rmoustache (\text{`})$	111	$\backslash rrhDsp (\text{ })$	212
$\backslash R0 (\rho)$	140	$\backslash rrhDw (\text{ })$	212
rock/paper/scissors	148	$\backslash rrhDwp (\text{ })$	212
$\backslash rollingpin (\text{--o--o})$	205	$\backslash rrhE (\text{ })$	212
Roman coins	28	$\backslash rrhEp (\text{ })$	212
$\backslash Romania (\bullet)$	203	$\backslash rrhF (\text{ })$	212
Romanian comma-belo accent (,	see accents	$\backslash rrhFp (\text{ })$	212
rook	196, 233–235		
roots	see $\backslash sqrt$		
roshambo	148		
$\backslash rot (\text{rot})$	100		
$\backslash rotatebox$	25, 238, 239, 243		

\rrparenthesis ()	106
\rrparenthesis ()	107
\RS (▲)	141
\rsem ([])	111
\rsem ([])	109
\rsemantic	see \rdbrack
rsfs (emf package option)	137
rsfso (package)	134, 256
\Rsh (⤠)	79
\Rsh (⤡)	78
\Rsh (⤢)	89
\Rsh (⤣)	84
\Rsh (⤤)	80
\Rsh (⤥)	91
\rsolbar (⤧)	37
\rsqhook (⤨)	63
\rsub (⤧)	41
\rtborder (⤦)	197
\rbtbotcorner (⤦)	197
\rtimes (⤧)	34
\rtimes (⤨)	32
\rtimes (⤩)	36
\rtimes (⤪)	35, 36
\rtimes (⤫)	34
\rtimes (⤬)	37
\rtimesblack (⤧)	36
\rtriltri (⤧)	77
\rtriple	113
\rttopcorner (⤦)	197
\RU (C)	140
Rubik's Cube	212
rubikcube (package)	212, 256, 257
\ruledelayed (⤧)	63
runes	169
Anglo-Frisian	169
Danish	see normal runes
Germanic	169
Hälsinge	see staveless runes
long-branch	see normal runes
medieval	169
normal	169
short-twigs	169
staveless	169
Swedo-Norwegian	see short-twigs runes
\rupee (₹)	28
\RV (ϕ)	140
\rVert ()	113
\rVert ()	108
\rVert ()	110
\rvvert ()	108
\rvvert ()	110
\rVvert ()	110
\Rzigzag ()	107
\rvzigzag ()	107
\rWalley (⤧)	206
\rwave (⤧)	112
\rWavy (⤧)	109
\rwavey (⤧)	109
S	
S ({})	169
\S (\$)	16, 253
\S (\$)	16
\s (⤧)	169
s ({})	169
\sA (⤧)	202
\SAa (⤧)	166
\SAb (⤧)	166
\SAd (⤧)	166
\SAdd (⤧)	166
\Sadey (⤧)	206
\sadface (⤧)	205
\SAf (⤧)	166
safety-related symbols	142
\Saftpresse (⤧)	205
\SAg (⤧)	166
\SAGa (⤧)	166
\Sagittarius (⤧)	139
\Sagittarius (⤧)	138
\sagittarius (⤧)	137
\SAh (⤧)	166
\SAhd (⤧)	166
\SAhu (⤧)	166
\SAk (⤧)	166
\SAl (⤧)	166
\SAlq (⤧)	166
\SAM (⤧)	166
\samebishops (⤧)	195
\Sampi (⤧)	166
\Sampi (⤧)	166
\sampli (⤧)	166
\sampli (⤧)	166
\SAN (⤧)	166
sans (dsfont package option)	134
\sansLmirrored (⤧)	132
\sansLturned (⤧)	132
\SAo (⤧)	166
\Sappho (⤧)	139
\SAq (⤧)	166
\SAr (⤧)	166
\sarabfamily	166
sarabian (package)	166, 256, 257
\SAs (⤧)	166
\SAsa (⤧)	166
\scn (N)	20
\scoh (⤧)	67
\Scorpio (⤧)	139
\Scorpio (⤧)	138
\scorpio (⤧)	137
\scpolint (⤧)	53
\satellitedish (⤧)	159
satisfies	see \models
\Saturn (⤧)	138
\Saturn (⤧)	139
\Saturn (⤧)	138
\saturn (⤧)	137
\SavedStyle	243
savesym (package)	235
\savesymbol	235
\SAw (⤧)	166
\SAy (⤧)	166
\SAz (⤧)	166
\SAzd (⤧)	166
\Sborder (⤧)	159
\scalebox	235
scaled (CountriesOfEurope package option)	204
scalarel (package)	243
scaling	246, 248
mechanical	246, 248
optical	246
\scd (D)	21
\scg (G)	21
\Schaler (⤧)	205
\Schneebesen (⤧)	205
\SchrodingersCat (⤧)	206
\Schussel (⤧)	205
\schwa (ə)	21
\schwa (ə)	20
Schwartz distribution spaces	see alphabets, math
\sci (i)	20
scientific symbols	136–144, 231
\ScissorHollowLeft (⤧)	147
\ScissorHollowRight (⤧)	147
\ScissorLeft (⤧)	147
\ScissorLeftBrokenBottom (⤧)	147
\ScissorLeftBrokenTop (⤧)	147
\ScissorRight (⤧)	147
\ScissorRightBrokenBottom (⤧)	147
scissors	147, 208–212
\scn (N)	20
\scoh (⤧)	67
\Scorpio (⤧)	139
\Scorpio (⤧)	138
\scorpio (⤧)	137
\scpolint (⤧)	53

\scpolint (§)	50
\scpolintsl (§)	51
\scpolintup (§)	51
scr (rsfso package option)	134
\scr (R)	20
script letters	see alphabets, math
\scripta (a)	20
\scriptg (g)	20
\scriptscriptstyle	241
\scriptstyle	241
\scriptv (v)	20
\Scroll ([Scroll])	140
\scross (X)	159
\scrossvh (*)	159
scsnowman (package)	207, 256, 257
\scsnowman (♂)	207
\scsnowman (✉)	207
\scu (U)	20
\scurel (↷)	62
\scurel (↶)	63
\scy (Y)	20
\sddtstile (☰)	66
\sDep (✿)	171
\sdststile (☰)	66
\sdtstile (☰)	66
\sdttstile (☰)	66
seagull	see \textseagull
\Searrow (⤙)	79
\Searrow (⤚)	89
\Searrow (⤛)	84
\Searrow (⤜)	80
\Searrow (⤝)	91
\searrow (⤗)	79
\searrow (⤘)	78, 242
\searrow (⤙)	84
\searrow (⤚)	80
\searrow (⤜)	95
\searrow (⤞)	91
\searrowtail (⤗)	84
\searrowtail (⤚)	80
\sebkarrow (⤙)	84
\sec (sec)	99
\Sech (♪)	172
\sech (sech)	100
\SechBL (♪)	172
\SechBl (♪)	172
\SechBR (♪)	172
\SechBr (♪)	172
\second (〃)	130
seconds, angular	see \second
\secstress (,)	26
section mark	see \S
\SectioningDiamond (◊)	192
\sector (▽)	131
sedenions (\$)	see alphabets, math
\sefilledspoon (⤠)	96
\sefootline (⤡)	57
\sefree (⤢)	57
Segletes, Steven B.	243
segmented numerals	136
	171
\Segno (⠃)	171
\segno (⠃)	171
\seharpoonccw (⤣)	83
\seharpooncw (⤤)	83
\seharpoonne (⤥)	88
\seharpoonsw (⤦)	88
\seight (⠇)	169
\selcurvearrow (⤧)	85
\selectfont	13
\selsquigarrow (⤨)	80
semaf.fd (file)	230
semantic valuation	108, 113
semaphor (package)	229, 230, 256
semaphore symbols	229–230
\semapsto (⤩)	80
semibreve	see musical symbols
\semibreve (⦿)	175
\semibrevedotted (⦿.)	175
semidirect products	32, 34, 130
semiquaver	see musical symbols
\semiquaver (♪)	175
\semiquaverdotted (♪.)	175
\semiquaverdotteddouble (♪..)	175
\semiquaverdotteddoubledown (♪..)	175
\semiquaverdotteddown (♪)	175
\semiquaverdown (♪)	175
\semiquaverrest (⠄)	176
\semiquaverrestdotted (⠄.)	176
\Semisextile (☒)	139
\Semisquare (⦿)	139
semitic transliteration	21, 25
\seModels (⤈)	57
\semodels (⤈)	57
semtrans (package)	21, 25, 256, 257
\senwarrows (⤙)	84
\senwarrows (⤚)	80
\sencurvearrow (⤧)	85
\senharpoons (⤣)	88
\senharpoons (⤤)	83
\seovnearrow (⤧)	91
\SePa (⠄)	172
\separated (⤊)	57
separation vector (⤏)	134
\sepitchfork (⤋)	96
\seppawns (○○)	195
\Serbia (◐)	204
\sercurvearrow (⤤)	85
\SerialInterface (☒)	140
\SerialPort (⤒)	140
\sersquigarrow (⤨)	80
\sesearrows (⤪)	84
\sesearrows (⤫)	80
\sespoon (⤠)	96
\Sesquiquadrate (☒)	139
set interior	see \mathring{m}
set operators	
intersection	see \cap
membership	see \in
union	see \cup
\setBold	250
\setminus (\setminus)	32
\setminus (\setminus)	35
\setminus (\setminus)	35
\setminus (\setminus)	37
\seVdash (⤋)	57
\sevdash (⤋)	57
\Sextile (☒)	139
\Sey (⠃)	206
\sfive (⠃)	169
\sfour (⠃)	169
SGML	252
\sgn (sgn)	100
\sh (#)	173
sha (III)	238
\Shake (⤋)	171
\shake (⤋)	171
\Shakel (⤋)	171
\Shakene (⤋)	171
\Shakenw (⤋)	171
\Shakesw (⤋)	171
\sharp (#)	170
\sharp (#)	170
\sharp (#)	170
\sharp (#)	176
\sharp (#)	170
\sharp (#)	170
\sharp (#)	176
\sharpArrowboth (⤔)	176
\sharpArrowdown (⤔)	176
\sharpArrowup (⤔)	176
Sharpe, Michael	25
\sharpSlashslashslashstem (#)	176
\sharpSlashslashstem (#)	176

\shfermion()	143
\Shift ([Shift Up])	140
\shift (\$)	31
\Shilling (\$)	27
\shneg (\$)	31
short-twig runes	169
\shortcastling (O-O)	195
\shortdownarrow (\$\downarrow)	79
\shortdowntack (\$\tau)	61
\shortdowntack (\$\bar{\tau})	63
\ShortFifty (\$\underline{50})	191
\ShortForty (\$\underline{40})	191
\shortleftarrow (\$\leftarrow)	79
\shortlefttack (\$\vdash)	61
\shortlefttack (\$\dashv)	63
\shortmid (\$)	55
\shortmid (\$\mid)	62
\shortmid (\$\lvert)	60
\shortmid (\$\lvert)	35
\shortmid (\$\mid)	63
\ShortNinetyFive (\$\underline{95})	191
\shortparallel (\$\parallel)	55
\shortparallel (\$\parallel)	62
\shortparallel (\$\parallel)	60
\shortparallel (\$\parallel)	57
\shortparallel (\$\parallel)	63
\ShortPulseHigh (\$\llcorner)	136
\ShortPulseLow (\$\lrcorner)	136
\shortrightarrow (\$\rightarrow)	79
\shortrightarrowleftarrow (\$\rightleftarrows)	91
\shortrightarrowtack (\$\vdash)	60
\ShortSixty (\$\underline{60})	191
\ShortThirty (\$\underline{30})	191
\shortuparrow (\$\uparrow)	79
\shortuptack (\$\perp)	60
\shortuptack (\$\perp)	63
\showclock	192
\shpos (\$\downarrow)	31
shuffle (package)	38, 256, 257
\shuffle (\$\sqcup)	37
\shuffle (\$\sqcup)	38
shuffle product (\$\sqcup)	38
\SI (*)	141
\Sieb (\$\overline{\square})	205
\sieve (\$\overline{\square})	205
\Sigma (\$\Sigma)	101
\sigma (\$\sigma)	101
\sigmaup (\$\sigma)	102
\sim (\$\sim)	54, 240, 243, 251
\sim (\$\sim)	60
\sim (\$\sim)	57
\sim (\$\sim)	63
\simbot (\$\smile)	106
\simcolon (\$\sim:)	67
\simcoloncolon (\$\sim::)	67
\simeq (\$\simeq)	54
\simeq (\$\simeq)	60
\simeq (\$\simeq)	57
\simeqq (\$\simeqeq)	67
\simeqeq (\$\simeqeq)	245
\simeqeq (\$\simeqeq)	37
\simpsons	198, 256
Simpsons characters	198
\simrdots (\$\sim\cdot\cdot\cdot)	62
\simrdots (\$\sim\cdot\cdot\cdot)	63
\sin (\$\sin)	99
\sincoh (\$\sinh)	67
\sinewave (\$\sim)	131
\sinewave (\$\sim)	132
\sinh (\$\sinh)	99
\SixFlowerAlternate (\$\blacktriangleleft)	151
\SixFlowerAltPetal (\$\blacktriangleleft)	151
\SixFlowerOpenCenter (\$\blacktriangleleft)	151
\SixFlowerPetalDotted (\$\circledast)	151
\SixFlowerPetalRemoved (\$\blacktriangleleft)	151
\SixFlowerRemovedOpenPetal (\$\blacktriangleleft)	151
\SixStar (\$\star)	151
\SixteenStarLight (\$\star)	151
sixteenth note	see musical symbols
\sixteenthNote (\$\mathfrak{n}\$)	174
\sixteenthnote (\$\mathfrak{n}\$)	171
\sixteenthNoteDotted (\$\mathfrak{n}.)	174
\sixteenthNoteDottedDouble (\$\mathfrak{n}..)	174
\sixteenthNoteDottedDoubleDown (\$\mathfrak{n}..)	174
\sixteenthNoteDottedDown (\$\mathfrak{n}..)	174
\sixteenthNoteDown (\$\mathfrak{n})	174
skak (package)	195, 196, 256, 257
skull (package)	195, 256, 257
\skull (\$\mathfrak{Q})	41
\skull (\$\mathfrak{Q})	205
\skull (\$\mathfrak{Q})	195
skulls	41, 195, 205, 233
\slash (/)	251
\slashb (\$\mathfrak{b})	20
\slashc (\$\mathfrak{c})	20
\slashd (\$\mathfrak{d})	20
\slashdiv (\$\mathfrak{z})	34
\slashed (package)	240, 241
\slashed	240, 241
slashed letters	240
slashed.sty (file)	241
\slashu (\$\mathfrak{y})	20
\Sleepy (\$\mathfrak{s})	206
\Sleet (\$\mathfrak{S})	192
\sliding (\$\mathfrak{L})	24
\Slovakia (\$\mathfrak{L})	204
\Slovenia (\$\mathfrak{L})	204
\smallaltoclef (\$\mathfrak{B})	171
\smallawint (\$f)	42
\smallawintsl (\$f)	42
\smallawintup (\$f)	42
\smallbassclef (\$\mathfrak{C})	171
\smallblackcircle (\$\bullet)	39
\smallblackdiamond (\$\blacklozenge)	39
\smallblacklozenge (\$\blacklozenge)	153
\smallblacksquare (\$\blacksquare)	39
\smallblackstar (\$\star)	39
\smallblacktriangledown (\$\blacktriangledown)	39, 77
\smallblacktriangleleft (\$\blacktriangleleft)	39, 77
\smallblacktriangleleft (\$\blacktriangleleft)	155
\smallblacktriangleright (\$\blacktriangleright)	39, 77
\smallblacktriangleright (\$\blacktriangleright)	155
\smallblacktriangleup (\$\blacktriangleup)	39, 77
\smallblacktriangleup (\$\blacktriangleup)	77
\smallbosonloop (\$\mathfrak{B})	143
\smallbosonloopA (\$\mathfrak{B})	143
\smallbosonloopV (\$\mathfrak{B})	143
\SmallCircle (\$\circ)	155
\smallcircle (\$\circ)	39
\smallcirfnint (\$f)	42
\smallcirfnintsl (\$f)	42
\smallcirfnintup (\$f)	42
\SmallCross (\$\times)	155
smallctrbull (bullcntr package option)	194
\smallctrbull	194
\smalldiamond (\$\diamond)	39
\smalldiamond (\$\diamond)	39
\SmallDiamondshape (\$\diamond)	155
\smalldivslash (\$/)	36
\smallfint (\$f)	42
\smallfintsl (\$f)	42
\smallfintup (\$f)	42
\smallfrown (\$\sim)	55
\smallfrown (\$\sim)	62
\smallfrown (\$\sim)	60, 98
\smallfrown (\$\sim)	97
\smallfrown (\$\sim)	63

\SmallHBar (–)	155
\smalliiint (fff)	42
\smalliiints1 (fff)	42
\smalliiintup (fff)	42
\smalliiint (fff)	42
\smalliiints1 (fff)	42
\smalliiintup (fff)	42
\smalliiint (ff)	42
\smalliiints1 (ff)	42
\smalliiintup (ff)	42
\smallin (ε)	105
\smallin (ε)	63
\smallint (f)	131
\smallint (f)	131
\smallint (f)	42
\smallintBar (f)	42
\smallintbar (f)	42
\smallintBarsl (f)	42
\smallintbarsl (f)	42
\smallintBarup (f)	42
\smallintbarup (f)	42
\smallintcap (f)	42
\smallintcapsl (f)	42
\smallintcapup (f)	42
\smallintclockwise (f)	42
\smallintclockwisesl (f)	42
\smallintclockwiseup (f)	42
\smallintcup (f)	42
\smallintcups1 (f)	42
\smallintcupup (f)	42
\smallintlarhk (f)	42
\smallintlarhks1 (f)	42
\smallintlarhkup (f)	42
\smallints1 (f)	42
\smallintup (f)	42
\smallintx (f)	42
\smallintxsl (f)	42
\smallintxup (f)	42
\SmallLowerDiamond (◆)	155
\smalllowint (f)	42
\smalllowints1 (f)	42
\smalllowintup (f)	42
\smalllozenge (◊)	153
\smalllozenge (◊)	153
\smallni (϶)	63
\smallnpoint (϶)	42
\smallnpoints1 (϶)	42
\smallnpointup (϶)	42
\smalloiint (fff)	42
\smalloiints1 (fff)	42
\smalloiintup (fff)	42
\smalloint (f)	42
\smallointctrcclockwise (f)	42
\smallointctrcclockwisesl (f)	42
\smallointctrcclockwiseup (f)	42
\smallointsl (f)	42
\smallointup (f)	42
\smallowns (϶)	105
\smallpencil (铅笔)	147
\smallpointint (϶)	42
\smallpointints1 (϶)	42
\smallpointintup (϶)	42
\smallprod (Π)	34
\SmallRightDiamond (♦)	155
\smallrppoint (f)	42
\smallrppoints1 (f)	42
\smallrppointup (f)	42
\smallscpolint (f)	42
\smallscpolints1 (f)	42
\smallscpolintup (f)	42
\smallsetminus (⊖)	32
\smallsetminus (⊖)	36
\smallsetminus (⊖)	36
\smallsetminus (⊖)	35
\smallsetminus (⊖)	37
\smallsmile (⌣)	55
\smallsmile (⌣)	62
\smallsmile (⌣)	60, 98
\smallsmile (⌣)	97
\smallsmile (⌣)	63
\smallsqint (f)	42
\smallsqints1 (f)	42
\smallsqintup (f)	42
\SmallSquare (□)	155
\smallsquare (□)	39
\smallsquare (□)	39
\smallstar (★)	39
\smallsumint (f)	42
\smallsumints1 (f)	42
\smallsumintup (f)	42
\smalltrebleclef (♪)	171
\SmallTriangleDown (▽)	155
\smalltriangledown (▽)	38
\smalltriangledown (▽)	39, 77
\smalltriangledown (▽)	39, 76
\SmallTriangleLeft (◀)	155
\smalltriangleleft (◀)	38
\smalltriangleleft (◀)	40, 77
\smalltriangleleft (◀)	39, 76
\smalltriangleleft (◀)	154
\SmallTriangleRight (▶)	155
\smalltriangleright (▶)	38
\smalltriangleright (▶)	40, 77
\smalltriangleright (▶)	39, 76
\smalltriangleright (▶)	154
\SmallTriangleUp (△)	155
\smalltriangleup (△)	38
\smalltriangleup (△)	40, 77
\smalltriangleup (△)	39, 76
\smalltriangleup (△)	154
\Snow (❄)	192
\SnowCloud (☃)	192
\Snowflake (❄)	151

\squad (□)	157
\squadcross (⊗)	157
\squaddot (⊕)	157
\squadfill (■)	157
\squadfillha (▣)	157
\squadfillhb (▣)	157
\squadfillhl (▣)	157
\squadfillhr (▣)	157
\squadlineh (☲)	157
\squadlinev (☷)	157
\squadlinevh (☷)	157
\Square (□)	139
\Square (□)	149
\Square (□)	156
\Square (□)	155
\Square (□)	156
\Square (□ vs. □ vs. □) . .	236
\square (□)	34
\square (□)	130
\square (□)	153
\square (□)	40
\square (□)	197
\square (□)	39
\square (□)	155
square impulse	136
square root	see \sqrt
hooked	see \hksqrt
\squarebotblack (▣)	154
\SquareCastShadowBottomRight (▣)	156
\SquareCastShadowTopLeft (□)	156
\SquareCastShadowTopRight (□)	156
\squarecrossfill (▣)	154
\squaredots (,:)	126
\squaredots (,:)	34, 126
\squarehfill (▣)	154
\squarehvfill (▣)	154
\squareleftblack (▣)	154
\squarellblack (▣)	154
\squarellquad (▣)	154
\squarelrbblack (▣)	154
\squarelrrquad (▣)	154
\squareneswfill (▣)	154
\squarenwsefill (▣)	154
\Squarepipe (□)	142
\squarerightblack (▣)	154
squares	153–157, 159, 182–187, 196, 197, 213–215, 219–220, 231
\SquareShadowA (□)	155
\SquareShadowB (▣)	155
\SquareShadowBottomRight (▣)	156
\SquareShadowC (□)	155
\SquareShadowTopLeft (□)	156
\SquareShadowTopRight (□)	156
\SquareSolid (■)	156
\Squaresteel (■)	142
\squaretopblack (▣)	154
\squareulblack (▣)	154
\squareulquad (▣)	154
\squareurblack (▣)	154
\squareurquad (▣)	154
\squarevfill (▣)	154
\squarewithdots (☒)	159
\squeezers (▲)	205
\squigarrowdownup (↖) . .	80
\squigarrowleftright (↔) . .	80
\squigarrownesw (↔)	80
\squigarrownwse (↓)	80
\squigarrowrightleft (↗) . .	80
\squigarrowsenw (↖)	80
\squigarrowswne (↗)	80
\squigarrowupdown (↓) . . .	80
\squoval (○)	154
\splus (⊕)	34
\splus (⊕)	36
\SS (SS)	16, 140
\ss (ß)	16
\ssdtstile (▣)	66
\ssearrow (↘)	79
\ssearrow (↘)	89
\sseven (§)	169
\ssix (§)	169
\sslash (//)	33
\sslash (//)	36
\sslash (//)	37
\sststile (▣)	66
\sststile (▣)	66
\sststile (▣)	66
\sswarro (↙)	79
\sswarro (↙)	89
\staccatissimo (↑)	176
stackengine (package)	243
\stackengine	243
\stackrel	31, 239, 244
standard state	240
\star (★)	32, 244
\star (*)	169
\star (*)	40, 153
\star (★)	40
\star (*)	39
\star (★)	41
Star of David	150, 151
\stareq (≡)	60
\stareq (≡)	63
starfont (package)	139, 256, 257
\starlet (☆)	157
\starletcross (✿)	157
\starletedot (☆)	157
\starletfill (★)	157
\starletfillha (★)	157
\starletfillhb (★)	157
\starletfillhl (★)	157
\starletfillhr (★)	157
\starletlineh (☆)	157
\starletlinev (☆)	157
\starletlinevh (☆)	157
\starofdavid (◊)	153
\starredbullet (•)	152
stars	130, 139, 150–155, 157–158, 213–215
\stater (⌚)	28
\Station (St)	139
statistical independence . .	241
\staveI (☰)	199
\staveII (☱)	199
\staveIII (☲)	199
\staveIV (☵)	199
\staveIX (☴)	199
\staveL (☶)	199
\staveL (☶)	200
staveless runes	169
\staveLI (☳)	199
\staveLII (☳)	199
\staveLIII (☳)	199
\staveLIV (☴)	199
\staveLIX (☵)	200
\staveLV (☴)	199
\staveLVI (☲)	200
\staveLVII (☴)	200
\staveLVIII (☲)	200
\staveLX (☳)	200
\staveLXI (☴)	200
\staveLXII (☵)	200
\staveLXIII (☳)	200
\staveLXIV (☲)	200
\staveLXV (☴)	200
\staveLXVI (☵)	200
\staveLXVII (☲)	200
\staveLXVIII (☳)	200
staves	199
staves (package)	199, 256

\subsetplus (⊊)	69	\sum (\sum)	43	\supseteqq (⊍)	69
\subsetplusseq (⊍)	68	\sum (\sum)	48	\supseteqq (⊍)	68
\subsetplusseq (⊍)	69	\sum (\sum)	48	\supseteqq (⊍)	69
subsets	67–70	\sum (\sum)	50	\supsetneq (⊎)	68
\subsim (≿)	70	\sumint (ʃ)	53	\supsetneq (⊎)	67
\subsub (≿)	70	\sumint (ʃ)	48	\supsetneq (⊎)	69
\subsup (≿)	70	\sumint (ʃ)	48	\supsetneq (⊎)	69
\Succ (⤠)	64	\sumint (ʃ)	50	\supsetneq (⊎)	68
\succ (⤡)	54	\sumintsl (ʃ)	51	\supsetneq (⊎)	69
\succ (⤢)	60	\sumintup (ʃ)	51	\supsetneqq (⊎)	68
\succ (⤢)	57	\Summtree (🌳)	206	\supsetneqq (⊎)	67
\succ (⤢)	63	\Summit (▲)	192	\supsetneqq (⊎)	69
\succapprox (≿)	56	\SummitSign (✚)	192	\supsetneqq (⊎)	68
\succapprox (≿)	55	\Sun (○)	138	\supsetneqq (⊎)	69
\succapprox (≿)	62	\Sun (○)	139	\supsetplus (⊕)	68
\succapprox (≿)	60	\Sun (○)	138	\supsetplus (⊕)	69
\succapprox (≿)	57	\Sun (○)	192	\supsetplus (⊕)	69
\succapprox (≿)	64	\Sun (○ vs. ☀ vs. ○)	236	\supsetplused (⊕)	68
\succcurlyeq (⪻)	56	sun	137–139, 159, 190, 192, 207–208, 233, 236	\supsetplused (⊕)	69
\succcurlyeq (⪻)	55	\sun (օ)	138	\supsim (≿)	69
\succcurlyeq (⪻)	62	\sun (օ)	190	\supsub (⌞)	69
\succcurlyeq (⪻)	60	\SunCloud (ঃ)	192	\supsup (⌞)	70
\succcurlyeq (⪻)	57	\SunshineOpenCircled (ঃ)	159	\surd (√)	130
\succcurlyeq (⪻)	64	\sup (sup)	99	\surface (Φ)	144
\succdot (⤣)	56	\supdsub (⌚)	70	\SurveySign (△)	192
\succeq (⪻)	54	\supedot (⌚)	70	\svrexample (Ϣ)	144
\succeq (⪻)	60	superscripts	see new symbols used in	\svrphoton (f)	144
\succeq (⪻)	57	supersets	67–70	svrsymbols (package)	143, 256, 257
\succnapprox (≿)	57	\suphsol (⌞)	70	\Swallow (↗)	79
\succnapprox (≿)	55	\suphsub (⌞)	69	\Swallow (↗)	89
\succnapprox (≿)	62	\suplarr (⤣)	69	\Swallow (↗)	84
\succnapprox (≿)	61	\supmult (⌚)	69	\Swallow (↗)	80
\succnapprox (≿)	59	supremum	see \sup	\Swallow (↗)	91
\succnapprox (≿)	64	\Supset (⊕)	68	\swallow (↖)	79
\succneq (⪻)	57	\Supset (⊕)	67	\swallow (↖)	242
\succneq (⪻)	61	\Supset (⊕)	69	\swallow (↖)	84
\succneq (⪻)	64	\Supset (⊕)	69	\swallow (↖)	80
\succneqq (⪻)	56	\Supset (⊕)	68	\swallow (↖)	95
\succneqq (⪻)	62	\Supset (⊕)	69	\swallow (↖)	91
\succneqq (⪻)	61	\supset (⌚)	68	\swallowtail (↗)	84
\succneqq (⪻)	64	\supset (⌚)	67	\swallowtail (↗)	80
\succnsim (≿)	57	\supset (⌚)	69	\swbkarrown (↵)	84
\succnsim (≿)	55	\supset (⌚)	68	\Sweden (🇸)	204
\succnsim (≿)	62	\supset (⌚)	69	Swedo-Norwegian runes	see short-twig runes
\succnsim (≿)	61	\supsetapprox (≿)	69	\swfilledspoon (✓)	96
\succnsim (≿)	59	\supsetcirc (⊕)	69	\swfootline (↙)	57
\succnsim (≿)	64	\supsetdot (⌚)	69	\swfree (↙)	57
\succsim (≿)	56	\supseteq (⊍)	68	\swsharpoonccw (↙)	83
\succsim (≿)	55	\supseteq (⊍)	67	\swsharpooncw (✓)	83
\succsim (≿)	62	\supseteq (⊍)	69	\swsharpoonnw (✓)	88
\succsim (≿)	60	\supseteq (⊍)	68	\swsharpoonse (↙)	88
\succsim (≿)	57	\supseteqq (⊍)	69	\Switzerland (🇨)	204
\succsim (≿)	64	\supseteqq (⊍)	68	\swlcurvearrow (↤)	85
such that	239, 240	\supseteqq (⊍)	67	\swlsquigarrown (↤)	80
\suchthat (⊍)	240	\supseteqq (⊍)	69	\swmapsto (↗)	80

\swModels (»)	57	dingbat	145–159
\swmodels (»)	58	dot	15, 125–127, 243
\swnearrows (↗)	84	electrical	136
\swnearrows (↖)	81	engineering	132, 136, 142
\swnecurvearrow (↔)	85	Epi-Olme	167–168
\swneharpoons (↙)	88	extensible	94, 117–124, 137, 237, 244–245
\swneharpoons (↘)	83	Feynman diagram	143
swords	191	file	208–212
\swords (✗)	205	Frege logic	94, 106, 127, 128, 133
\swpitchfork (✗)	96	frown	97, 98
\swrcurvearrow (↶)	86	game-related	158, 192, 193, 195–197, 208–212, 232–235
\swrsquigarrow (↷)	81	gates, digital logic	141
\swspoon (⤵)	96	genealogical	190
\swwarrows (⤶)	84	general	190
\swwarrows (⤷)	81	Go stones	196, 197
swung dash	see \sim	Halloween	41, 124
\swVdash (⊤)	58	information	191
\swvDash (⊤)	58	informator	195
\syl (⌺)	24	inverted	18–21, 25, 238–239
\syllabic (,)	26	Isthmian	167–168
\symA (Ⓐ)	134	keyboard	140
\symAE (Ā)	135	knitting	202
\symB (Ⓑ)	134	Knuth's	190
\symbol{bishop} (♝)	196	laundry	191
Symbol (font)	102, 238	legal	15, 16, 28, 29, 253
symbols	15–160, 170–213, 215, 232, 233, 235, 237, 244, 249–250, 253	letter-like	104–106, 208–212
actuarial	121, 244	life insurance	121, 244
alpine	192	linear logic	31–33, 38, 39, 43, 47–49, 54, 67, 104, 105
ancient language	160–169	linguistic	18–21
annuity	121, 244	log-like	99, 100, 249
APL	63–64, 139, 140	logic	141
astrological	137–139, 215–218	<i>Magic: The Gathering</i>	233
astronomical	137–139, 200, 215–218	magical signs	199
Begriffsschrift	127	map	213–215
biological	142	maps	203
block-element	199	mathematical	31–135
body-text	15–30	media control	191, 208–212
bold	250	METAFONTbook	190
box-drawing	199	metrical	197, 198
chess	195, 196, 233–235	miscellaneous	130, 131, 133, 159, 190–208, 212
cipher	200	monetary	27, 28, 135
clock	190–193, 207–208	musical	170–189, 207–212
communication	142	non-commutative division	125
computer	208–212	particle physics	143–144
computer hardware	140	Phaistos disk	160
contradiction	31, 98	phonetic	18–21
cooking	205, 208–212	physical	136
countries	203	Pitman's base 12	128, 194
crystallography	231	present value	121, 244
currency	27, 28, 132, 135	proto-Semitic	160
dangerous bend	190	pulse diagram	136
database	132	recycling	201, 205, 207–213
definition	31, 244	relational	54
dictionary	18–21, 198	relational database	132
		reversed	238–239
		rotated	18–21, 25, 238–239
		runes	169
		safety-related	142
		scientific	136–144, 231
		semaphore	229–230
		Simpsons characters	198
		smile	97, 98
		Soyombo	202
		spoon	96, 97
		staves	199
		subset and superset	67–70
		technological	136–144
		TeXbook	190
		transliteration	21
		upside-down	18–21, 25, 238–239, 250–251
		variable-sized	43–54, 235, 237
		weather	192, 207–208
		Web	208–212
		yin-yang	191, 205, 207–208, 219–220
		zodiacal	137–139, 215–218
		<i>symbols.tex</i> (file)	235, 256
		\symC (Ⓒ)	134
		\symking (♔)	196
		\symknight (♚)	196
		\symOE (Ǿ)	135
		\sympawn (♙)	196
		\symqueen (♕)	196
		\symrook (♖)	196
		\symUE (Ӯ)	135
		\SYN (‐)	141
		T	
		T (↑)	169
		\T	17
		\T (⌺)	25
		\T (⊗)	197
		\t (⌺)	22
		\t (⊗)	197
		t (↑)	169
		t4phonet (package)	21, 25, 256, 257
		\Tab (☒)	140
		\tabcolsep	239
		\tachyon (t)	144
		tacks	54, 104
		\tailed (d)	20
		tailed z	see \roundz
		\tailinvr (լ)	20
		\taill (լ)	20
		\tailn (ն)	20
		\tailr (ր)	20
		\tails (ը)	20
		\tailt (տ)	20

\tailz (z.)	20	symbols from	190	\textbottomtiebar (▀)	22
\Takt	174	\text	31, 241, 242	\textbraceleft	15
\talloblong (⌚)	33	\textacutedbl (")	26	\textbraceright	15
\talloblong (⌚)	40	\textacuteemacron (ˊ)	22	\textbrevemacron (ˇ)	22
\talloblong (⌚)	41	\textacuteewedge (ˋ)	22	\textbrokenbar (⌚)	29, 253
\tally (⊤ ⊥ ⊨ ⊩)	194	\textadvancing (՞)	22	\textbullet (•)	15
tally markers	164, 192, 194	\textAlpha (A)	17	\textbullet (•)	15, 254
\tan (tan)	99	\textalpha (α)	17	\textbullseye (⦿)	18
\tanh (tanh)	99	\textaolig (ؠ)	19	\textcelsius (°C)	136, 254
\Tape (⌚)	159	\textara (ܵ)	169	\textceltpal (ܶ)	18
\Taschenuhr (⌚)	192	\textarc	169	\textcent (ܼ)	27, 253
Tate-Shafarevich group	<i>see</i> sha	\textarl	169	\textcentoldstyle (ܼ)	27
\Tau (T)	101	\textarm	169	\textChi (ܵ)	17
\tau (τ)	101	\textarn	169	\textchi (ܵ)	17, 18
\tauleptonminus (τ⁻)	144	\textart	169	\textcircled (ܰ)	22
\tauleptonplus (τ⁺)	144	\textasciacute (ܲ)	26, 253	\textcircledP	28
\Taurus (♉)	138	\textascibreve (ܲ)	26	\textcircledP (ܰ)	28
\Taurus (♉)	139	\textascicaron (ܲ)	26	\textcircumacute (ܲ)	22
\Taurus (♉)	138	\textascicircum	15	\textcircumdot (ܲ)	22
\taurus (♉)	137	\textascicircum (ܲ)	15, 251,	\textcloseepsilon (ܵ)	18
tautology	<i>see</i> \top	254	254	\textcloseomega (ܵ)	18
\tauup (τ)	102	\textasciidieresis (ܲ)	26, 253	\textcloserevepsilon (ܵ)	18
\tcentigrade (°C)	127	\textasciigrave (ܲ)	26	\textcolonmonetary (ܼ)	27
\tcmu (μ)	127	\textasciimacron	252	\textcommatailz (ܵ)	18
\tcohm (Ω)	127	\textasciimacron (ܲ)	26, 253	textcomp (package)	13, 15,
\tcpertenthousand (‰)	127	\textasciitilde	15	16, 22, 26–29, 78, 114, 133,	
\tcpershousand (‰)	127	\textasciitilde (ܲ)	15, 251,	136, 170, 190, 235, 251, 252,	
\td (▀)	24	254	257	\textcopyleft	28
\tdststile ()	65	\textasteriskcentered (*)	15	\textcopyleft (ܰ)	28
\tdststile ()	66	\textasteriskcentered (*)	15	\textcopyright (ܼ)	15, 28
\tdtstile ()	66	\textbabygamma (ܵ)	18	\textcopyright (ܼ)	15, 28, 253
\tdttstile ()	66	\textbackslash	15	\textcorner (ܲ)	18
technological symbols	136–144	\textbackslash	15	\textcrb (ܼ)	18
\Telefon (☎)	142	\textbar	15	\textcrd (ܼ)	21
\Telephone (☎)	192	\textbar ()	250, 251	\textcrd (ܼ)	18
\Telephone (ܰ)	201	\textbarb (ܼ)	18	\textcrg (ܼ)	18
Tennent, Bob	31	\textbarc (ܼ)	18	\textcrh (ܼ)	21
tensor product	<i>see</i> \otimes	\textbard (ܼ)	18	\textcrh (ܼ)	18
\Tent (ܵ)	192	\textbardbl ()	15	\textcrinvglotstop (ܼ)	19
\tenuto (▬)	176	\textbardbl ()	15	\textcrlambda (ܼ)	19
\Terminus (⊗)	197	\textbardotlessj (ܼ)	18	\textcrtwo (ܼ)	19
\terminus (⊗)	197	\textbarg	18	\textctc (ܼ)	19
\Terminus* (⊕)	197	\textbarglotstop (?)	18	\textctd (ܼ)	19
\terminus* (⊕)	197	\textbari (ܼ)	18	\textctdctzlig (ܼ)	19
\Terra (ܼ)	139	\textbarl (ܼ)	18	\textctesh (ܼ)	19
\tesh (ܼ)	20	\textbaro (ܼ)	18	\textctinvglotstop (ܼ)	19
testfont.dvi (file)	248	\textbarrevglotstop (ܼ)	18	\textctj (ܼ)	19
testfont.tex (file)	246, 248	\textbaru (ܼ)	18	\textctjvar (ܼ)	19
\tetartemorion (ܼ)	28	\textbeltl (ܼ)	18	\textctn (ܼ)	19
teubner (package)	28, 127, 166, 198, 256, 257	\textbentailyogh (ܼ)	19	\textctstretchc (ܼ)	19
TeX	13, 76, 77, 94, 126, 134, 137, 199, 235, 238–246, 248, 249, 251, 252, 255, 258	\textBeta (B)	17	\textctstretchcvar (ܼ)	19
.tex files	252, 254	\textbeta (β)	17, 18	\textctt (ܼ)	19
TeXbook, The	239–243, 245, 249	\textbigcircle (ܰ)	15	\textcttctclig (ܼ)	19
		\textbigcircle (ܰ)	15	\textctturnt (ܼ)	20
		\textbktailgamma (γ)	19	\textctyogh (ܼ)	19
		\textblank (ܼ)	29	\textctz (ܼ)	19
		\textblock (▀)	199	\textcurrency (ܼ)	27, 253
		\textborn (*)	190	\textcypr	165

\textknit{Q} (ꝝ)	202	\textmicro (ꝫ)	17	\textpmhg	161
\textknit{q} (ꝗ)	202	\textmidacute (ꝑ)	23	\textpolhook (ꝏ)	23
\textknit{R} (ꝑ)	202	\textminus (–)	133	\textprimstress (')	19
\textknit{r} (Ꝓ)	202	\textMu (M)	17	\textproto	160
\textknit{S} (Ꝕ)	202	\textmu (μ)	136, 253	\textPsi (Ψ)	17
\textknit{s} (ꝕ)	202	\textmu (μ)	17	\textpsi (ψ)	17
\textknit{T} (Ꝙ)	202	\textmugreek (ꝑ)	17	\textqplig (ꝑp)	20
\textknit{t} (ꝙ)	202	\textmusicalnote (♪)	170	\textquestiondown	15
\textknit{U} (Ꝛ)	202	\textnaira (ꝩ)	27	\textquotedbl (")	18, 250
\textknit{u} (ꝛ)	202	\textnineoldstyle (9)	29	\textquotedblleft	15
\textknit{V} (Ꝝ)	202	\textnrleg (ꝑ)	20	\textquotedblright	15
\textknit{v} (ꝝ)	202	\textNu (N)	17	\textquotefleft	15
\textknit{W} (Ꝟ)	202	\textnu (ν)	17	\textquotefright	15
\textknit{w} (ꝟ)	202	\textnumero (Nº)	29	\textquotesingle (')	29, 250
\textknit{X} (Ꝡ)	202	\textObar dotlessj (J)	19	\textquotestraightbase (,)	29
\textknit{x} (ꝡ)	202	\textObullseye (○)	20	\textquotestraightdblbase („)	
\textknit{Y} (Ꝣ)	202	\textohm (Ω)	136		29
\textknit{y} (ꝣ)	202	\textOlyoghlig (ȝ)	19	\textraiseglotstop (?)	19
\textknit{Z} (Ꝥ)	202	\textOmega (Ω)	17	\textraisevibyi (l)	19
\textknit{z} (ꝥ)	202	\textomega (ω)	17, 19	\textraising (ꝑ)	23
\textLambda (Λ)	17	\textOmicron (O)	17	\textramshorns (ꝑ)	19
\textlambda (λ)	17, 18	\textomikron (o)	17	\texttriangle ()	114, 251
\textlangue (⟨)	114, 251	\textonehalf (½)	133, 253	\textrbrackdbl (])	114
\textlbrackdbl (])	114	\textoneoldstyle	29	\textrecipe (R)	29, 237
\textleaf (ꝧ)	190	\textoneoldstyle (1)	29	\textrectangle (°)	20
\textleftarrow (←)	78	\textonequarter (¼)	133, 253	\textreferencemark (※)	29, 31
\textlengthmark (:)	18	\textonesuperior (¹)	133, 253	\textregistered (®)	15, 28
\textless	15	\textopenbullet (○)	29	\textregistered (®)	15, 28,
\textless (<)	250, 251	\textopencorner (‘)	19	253	
\textlfblock (█)	199	\textopeno (○)	21	\textretracting (ꝑ)	23
\textlfshookrlig (ѣ)	19	\textopeno (○)	19	\textretractingvar (↝)	20
\textlhdbend (ꝑ)	190	\textordfeminine (²)	15	\textrevapostrophe (‘)	19
\textlhookfour (ꝑ)	19	\textordfeminine (³)	15, 253	\textreve (϶)	19
\textlhookp (p)	19	\textordmasculine (⁰)	15	\textrevespsilon (϶)	19
\textlhookt (t)	18	\textordmasculine (⁹)	15, 253		
\textlhti (ı)	20	\textovercross (ꝑ)	23	\textreversedvideobend (ꝑ)	
\textlhtlongi (ı)	18	\textoverw (ꝑ)	23		190
\textlhtlongy (ȳ)	18	\textpalhook (ꝑ)	19	\textrevglotstop (ꝑ)	19
\textlinb	164, 165	\textpalhooklong (ꝑ)	20	\textrevscl (ѧ)	20
\textlira (ƒ)	27	\textpalhookvar (ѧ)	20	\textrevscr (ѧ)	20
\textlnot (¬)	133, 253	\textparagraph (¶)	15	\textrevyogh (ȝ)	19
\textlonglegr (ր)	19	\textparagraph (¶)	15	\textRho (P)	17
\textlooptoprevesh (լ)	20	\textperiodcentered (·)	15	\textrho (ρ)	17
\textlowering (ꝑ)	23	\textperiodcentered (·)	15, 253	\textrhooka (ա)	20
\textlowrise (ꝑ)	23	\textpertenthousand (‰)	15	\textrhooke (է)	20
\textlptr (՞)	19	\textpertenthousand (‰)	15	\textrhoekepsilon (ε)	20
\textlquill (՞)	114	\textperthousand (‰)	15	\textrhookopeno (զ)	20
\textltailm (ն)	19	\textperthousand (‰)	15	\textrhookrevespsilon (Յ)	19
\textltailn (ն)	21	\textpeso (P)	27	\textrhookschwa (Յ)	19
\textltailn (ն)	19	\textPhi (Φ)	17	\textrhoticity (՞)	19
\textltilde (՞)	19	\textphi (φ)	17, 19	\textrightarrow (→)	78
\textltshade (█)	199	\textPi (Π)	17	\textringmacron (᳕)	23
\textlyoghlig (ȝ)	19	\textpi (π)	17	\textrisefall (᳔)	23
\textmarried (ଓ)	190	\textpilcrow (¶)	29	\textroundcap (᳔)	23
\textmho (U)	136	\textpipe ()	21	\textrptr (՞)	19
		\textpipe ()	19	\textrquill (}	114
		\textpipevar ()	20	\textrtailed (դ)	21
		\textpm (±)	133, 253	\textrtailed (դ)	19
				\texttailhth (ֆ)	20

\textrtaill (ł)	19	\textSFvi (ꝝ)	199	\textsuperscript	24
\textrtailn (ń)	18	\textSFvii (ꝑ)	199	\textsurd (✓)	133
\textrtailr (ł̄)	18	\textSFviii (Ꝓ)	199	\textswab	134
\textrtails (ſ)	18	\textSFx (Ꝏ)	199	\textsyllabic (ꝑ)	23
\textrtailt (ť)	21	\textSFxi (ꝓ)	199	\textTau (Ꝉ)	17
\textrtailt (ł̄)	18	\textSFxix (ꝑ)	199	\texttau (ꝑ)	17
\textrtailz (ż)	18	\textSFxl (ꝏ)	199	\texttctclig (ꝑ)	19
\textrtblock (ꝑ)	199	\textSFxli (ꝏ)	199	\textteshlig (ꝑ)	21
\textrthook (ꝑ)	18	\textSFxlii (ꝑ)	199	\textteshlig (ꝑ)	19
\textrthooklong (ꝑ)	19	\textSFxliii (ꝑ)	199	\textTheta (Ꝉ)	17
\textRubikUa (ꝑ 	212	\textSFxlii (ꝑ)	199	\texttheta (Ꝉ)	17
\textssarab	166	\textSFxlv (ꝑ)	199	\texttheta (Ꝉ)	17
\textscsca (ꝑ)	18	\textSFxlvii (ꝏ)	199	\textthing (Ꝉ)	191
\textscscaolig (ꝑ)	19	\textSFxlviii (ꝏ)	199	\textthorn (þ)	19
\textscsbc (ꝑ)	18	\textSFxliii (ꝏ)	199	\textthornvari (þ)	20
\textscscdelta (ꝑ)	19	\textSFxlvii (ꝏ)	199	\textthornvarii (þ)	20
\textscsce (ꝑ)	18	\textSFxx (ꝏ)	199	\textthornvariii (þ)	20
\textscsf (ꝑ)	19	\textSFxxi (ꝏ)	199	\textthornvariv (þ)	20
\textscsg (ꝑ)	18	\textSFxxii (ꝑ)	199	\textthreeoldstyle (ꝑ)	29
\textscsch (ꝑ)	18	\textSFxxiii (ꝑ)	199	\textthreequarters (ꝑ)	133,
\textscschwa (ꝑ)	21	\textSFxxiv (ꝏ)	199	253	
\textscschwa (ꝑ)	18	\textSFxxv (ꝑ)	199	\textthreequartersemdash (—)	
\textscsci (ꝑ)	18	\textSFxxvi (ꝑ)	199	29	
\textscsj (ꝑ)	18	\textSFxxvii (ꝑ)	199	\textthreesuperior (ꝑ)	133,
\textscsck (ꝑ)	19	\textSFxxviii (ꝑ)	199	253	
\textscscl (ꝑ)	18	\textSFxxxix (ꝏ)	199	\texttildedot (ꝑ)	23
\textscsm (ꝑ)	19	\textSFxxxvi (ꝑ)	199	\texttildelow (~)	29, 251
\textscsn (ꝑ)	18	\textSFxxxvii (ꝑ)	199	\texttimes (×)	133
\textscscoelig (ꝑ)	18	\textSFxxxviii (ꝑ)	199	\texttoneletterstem (ꝑ)	19
\textscscomega (ꝑ)	18	\textshade (ꝑ)	199	\texttoptiebar (ꝑ)	23
\textscscp (ꝑ)	19	\textSigma (Σ)	17	\texttrademark (™)	15, 28
\textscsq (ꝑ)	20	\textsigma (σ)	17	\texttrademark (™)	15, 28, 254
\textscr (ꝑ)	18	\textsixoldstyle (6)	29	\texttslig (ꝑ)	19
\textscripta (ꝑ)	18	\textsoftsign (ꝑ)	18	\textturna (ꝑ)	19
\textscriptg (ꝑ)	18	\textspleftarrow (↑)	20	\textturncelig (ꝑ)	19
\textscriptv (ꝑ)	21	\textsterling (£)	15	\textturnglotstop (ꝑ)	20
\textscriptv (ꝑ)	18	\textsterling (£)	15, 27	\textturnrh (ꝑ)	19
\textscu (ꝑ)	18	\textstretchc (ꝑ)	19	\textturnrnk (ꝑ)	19
\textscy (ꝑ)	18	\textstretchcvar (ꝑ)	20	\textturnlonglegr (ꝑ)	19
\textseagull (ꝑ)	23	\textstyle	241, 242, 249	\textturnnm (ꝑ)	19
\textsecstress (ꝑ)	18	\textsubacute (ꝑ)	23	\textturnmrleg (ꝑ)	19
\textsection (ꝑ)	169	\textsubarch (ꝑ)	23	\textturnnr (ꝑ)	19
\textsection (ꝑ)	15	\textsubbar (ꝑ)	23	\textturnrrtail (ꝑ)	19
\textsection (ꝑ)	15	\textsubbridge (ꝑ)	23	\textturnsck (ꝑ)	20
\textservicemark	28	\textsubcircum (ꝑ)	23	\textturnscripta (ꝑ)	19
\textservicemark (SM)	28	\textsubdot (ꝑ)	23	\textturnscu (ꝑ)	20
\textsevenoldstyle (ꝑ)	29	\textsubdoublearrow (↔)	20	\textturnt (ꝑ)	19
\textSFi (ꝑ)	199	\textsubgrave (ꝑ)	23	\textturnthree (ꝑ)	20
\textSFii (ꝑ)	199	\textsublhalfring (ꝑ)	23	\textturntwo (ꝑ)	20
\textSFiii (ꝑ)	199	\textsubplus (ꝑ)	23	\textturnv (ꝑ)	19
\textSFiv (ꝑ)	199	\textsubrhalfring (ꝑ)	23	\textturnw (ꝑ)	19
\textSFix (ꝑ)	199	\textsubrightarrow (→)	20	\textturny (ꝑ)	19
\textSFl (ꝑ)	199	\textsubring (ꝑ)	23	\texttwelvedash (—)	29
\textSFli (ꝑ)	199	\textsubsquare (ꝑ)	23	\texttwooldstyle	29
\textSFlii (ꝑ)	199	\textsubtilde (ꝑ)	23	\texttwooldstyle (2)	29
\textSFliii (ꝑ)	199	\textsubumlaut (ꝑ)	23	\texttwosuperior (ꝑ)	133, 253
\textSFliv (ꝑ)	199	\textsubw (ꝑ)	23	\textuncrfemale (ꝑ)	20
\textSFv (ꝑ)	199	\textsubwedge (ꝑ)	23	\textunderscore	15
		\textsuperimpostilde (ꝑ)	23	\textuparrow (↑)	78
				\textupblock (ꝑ)	199

\textupfullarrow (\uparrow)	20
\textUpsilon (Υ)	17
\textupsilon (υ)	17, 19
\textupstep (\uparrow)	19
\textvbaraccent (v)	24
\textvbaraccent (v)	25
\textvertline ()	19
\textviby (v)	19
\textviby (v)	19
\textvisibleSpace	15
\textwon (W)	27
\textwynn (p)	19
\textXi (Ξ)	17
\textxi (ξ)	17
\textxswdown (x)	191
\textxswup (x)	191
\textyen (Y)	27, 253
\textyogh (\textyogh)	21
\textyogh (\textyogh)	19
\textzerooldstyle (o)	29
\textZeta (Z)	17
\textzeta (ζ)	17
.tfm files	13, 134, 213, 235, 255
tfrupee (package)	28, 256, 257
\TH (P)	16, 253
\th (p)	169
\th (p)	16, 253
Thành, Hàn Thé	243
\therefore (∴)	56
\therefore (∴)	55, 125
\therefore (∴)	62
\therefore (∴)	126
\therefore (∴)	126
\therefore (∴)	126
\Thermo	192
\thermod (\textthermod)	132
\Theta (Θ)	101
\thetaeta (θ)	101
\thetaetaup (θ)	102
\thezing (\textthezing)	191
\thickapprox (\approx)	55
\thickapprox (\approx)	62
\thickapprox (\approx)	60
\thickapprox (\approx)	64
\thicksim (\sim)	55
\thicksim (\sim)	62
\thicksim (\sim)	60
\thicksim (\sim)	64
\thickvert ()	108
thin space	249
\ThinFog (■■■)	192
\thinstar (*)	39
\third (///)	130
thirty-second note	see musical symbols
\thirtysecondNote ($\text{\textthirtysecondNote}$)	174
\thirtysecondNoteDotted ($\text{\textthirtysecondNoteDotted}$)	174
\thirtysecondNoteDottedDouble (♩)	174
\thirtysecondNoteDottedDoubleDown (♩)	174
\thirtysecondNoteDottedDown (♩)	174
\thirtysecondNoteDown (♩)	174
\ThisStyle	243
\Thorn (P)	21
\thorn (p)	21
\thorn (p)	20
\thorn (p)	21
\thorn (p)	21
thousandths	see \textperthousand
\threeBeamedQuavers (♪♪♪)	175
\threeBeamedQuaversI (♪♪♪)	175
\threeBeamedQuaversII (♪♪♪)	175
\threeBeamedQuaversIII (♪♪♪)	175
\threedangle (\textthreedangle)	129
\threedotcolon (:)	37
\threesim (\textthreesim)	240
thumb pizzicato	see \lilyThumb
tick	see check marks
\tieinfinity (∞)	128
TikZ (package)	13, 158, 159, 205–208, 212
tikzsymbols (package)	205, 206, 256, 257
tilde	15, 18, 20, 22–24, 26, 29, 114, 117, 120, 244, 251
extensible	117, 120
vertically centered	251
\tilde (\texttilde)	115
\tilde (\texttilde)	114, 244
\tildel (\texttildel)	21
time of day	192, 193
time signatures	170, 173–175, 177
\timelimit (+)	195
\times (\times)	32
\times (\times)	36
\times (\times)	35
\times (\times)	34
\times (\times)	37
Times Roman (font)	27, 237
\timesbar (\texttimesbar)	35
\timesbar (\texttimesbar)	37
timing (package)	136
tipa (package)	18, 19, 21, 22, 24, 25, 239, 256, 257
tipx (package)	19, 256, 257
\Tmesonminus (T^-)	144
\Tmesonnull (T^0)	144
\Tmesonplus (T^+)	144
\minus (-)	37
\tnbststile ()	66
\tnbststile ()	66
\tnbststile ()	66
\tnbststile ()	66
\to	see \rightarrow
\to (\rightarrow)	86
\ToBottom (\textToBottom)	191
\toea (\texttoea)	91
\tona (\texttona)	91
\tone	19
\Tongey (\textTongey)	206
\top (\texttop)	32, 104, 241
\top (\texttop)	105
\top (\texttop)	104
\top (\texttop)	105
top hat	116
\topborder (\texttopborder)	197
\topbot (\texttopbot)	241, 242
\topbot (\texttopbot)	105
\Topbottomheat ($\text{\textTopbottomheat}$)	205
\topcir (\texttopcir)	132
\topdoteq (\texttopdoteq)	56
\topfork (\texttopfork)	62
\topfork (\texttopfork)	64
\Topheat (\textTopheat)	205
\topsemicircle ($\text{\texttopsemicircle}$)	154
torus (\texttorus)	see alphabets, math
\tosa (\texttosa)	91
\ToTop (\textToTop)	191
\towa (\texttowa)	92
\tplus (+)	37
\TR (\textTR)	140
\tr (\texttr)	100
trademark	15, 28, 253, 254
registered	15, 28, 253
\TransformHoriz (○•)	66
transforms	66, 67, 123, see also alphabets, math
\TransformVert (○)	66
transliteration	21, 25
semitic	21, 25
transliteration symbols	21
transpose	32
transversal intersection	see \pitchfork
\trapezium (\texttrapezium)	154
	171
\trebleclef (\texttrebleclef)	171
trees	206, 233
\trema (:)	see accents
\trfsigns (package)	67, 105, 123, 256
\triangle (\triangle)	130
\triangle (\triangle)	40, 77

\underset{...}{}	239
undertilde (package)	120, 256, 257
\undertilde{~}	26
\underwedge{.}	26
Unicode	13, 199, 252–255
union	see \cup
unit disk (\mathbb{D})	see alphabets, math
\unitedpawns{ ∞ }	195
units (package)	133
unity ($\mathbb{1}$)	see alphabets, math
universa (package)	156, 191, 256, 257
\unlhd{ \triangleleft }	32, 33
\unlhd{ \triangleleft }	74
\unlhd{ \triangleleft }	72, 76
\unlhd{ \triangleleft }	37
\unrhd{ \triangleright }	32, 33
\unrhd{ \triangleright }	74
\unrhd{ \triangleright }	72, 76
\unrhd{ \triangleright }	37
\upalpha{ α }	102
\upand{ \wp }	37
\UParrow{ \blacktriangle }	190
\Uparrow{ $\uparrow\downarrow$ }	78, 107
\Uparrow{ \updownarrow }	84
\Uparrow{ \updownarrow }	110
\Uparrow{ \updownarrow }	81
\Uparrow{ \updownarrow }	92
\Uparrow{ \updownarrow }	111
\uparrow{ $\uparrow\downarrow$ }	78, 107, 235
\uparrow{ \updownarrow }	110
\uparrow{ \updownarrow }	84
\uparrow{ \updownarrow }	81
\uparrow{ \updownarrow }	95
\uparrow{ \updownarrow }	111
\uparrow{ \updownarrow }	92
\uparrowbarred{ \dagger }	92
\uparrowoncircle{ $\ddot{\Phi}$ }	154
\uparrowtail{ $\uparrow\downarrow$ }	85
\uparrowtail{ $\uparrow\downarrow$ }	81
\upAssert{ \doteq }	60
\upassert{ \perp }	60
\upbackepsilon{ ε }	103
\upbar{...}	24
\upbeta{ β }	102
\upbkarrow{ \uparrow }	85
\upblackarrow{ \uparrow }	89
\upblackspoon{ \uparrow }	97
\upbow{ \vee }	171
\upbowtie{ \bowtie }	35, 36
\upbracketfill{...}	245
\upchi{ χ }	102
\updasharrow{ \uparrow }	89
\updasharrow{ \updownarrow }	92
\Updelta{ Δ }	102
\updelta{ δ }	102
\Updownarrow{ \updownarrow }	78, 107
\Updownarrow{ \updownarrow }	85
\Updownarrow{ \updownarrow }	110
\Updownarrow{ \updownarrow }	81
\Updownarrow{ \updownarrow }	92
\Updownarrow{ \updownarrow }	111
\updownarrow{ \updownarrow }	78, 107
\updownarrow{ \downarrow }	110
\updownarrow{ \downarrow }	85
\updownarrow{ \downarrow }	81
\updownarrow{ \downarrow }	95
\updownarrow{ \downarrow }	111
\updownarrow{ \downarrow }	92
\updownarrowbar{ \downarrow }	89
\updownarrowbar{ \downarrow }	92
\updownarrows{ $\updownarrow\updownarrow$ }	79
\updownarrows{ $\updownarrow\updownarrow$ }	85
\updownarrows{ $\updownarrow\updownarrow$ }	81
\updownarrows{ $\updownarrow\updownarrow$ }	92
\updownblackarrow{ \downarrow }	89
\updowncurvearrow{ ζ }	86
\updownharpoonleftleft{ $\downarrow\downarrow$ }	93
\updownharpoonleftright{ $\downarrow\downarrow$ }	88
\updownharpoonleftright{ $\downarrow\downarrow$ }	83
\updownharpoonleftright{ $\downarrow\downarrow$ }	93
\updownharpoonrightleft{ $\downarrow\downarrow$ }	88
\updownharpoonrightleft{ $\downarrow\downarrow$ }	83
\updownharpoonrightleft{ $\downarrow\downarrow$ }	93
\updownharpoonrightright{ $\downarrow\downarrow$ }	93
\updownharpoons{ $\downarrow\downarrow$ }	80
\updownharpoons{ $\downarrow\downarrow$ }	88
\updownharpoons{ $\downarrow\downarrow$ }	83
\updownharpoonsleftright{ $\downarrow\downarrow$ }	88
\updownharpoonsleftright{ $\downarrow\downarrow$ }	93
\Updownline{ $\updownarrow\updownarrow$ }	58
\updownline{ $\downarrow\downarrow$ }	58
\downardsquigarrow{ ζ }	86
\updownwavearrow{ ζ }	85
\updownwhitearrow{ $\downarrow\downarrow$ }	89
\uepsilon{ ϵ }	102
\upeta{ η }	102
\upfilledspoon{ \uparrow }	96
\upfishtail{ \uparrow }	64
\upfootline{ \uparrow }	58
\upfree{ \uparrow }	58
\Upsilonigma{ Γ }	102
\upgamma{ γ }	102
upgreek (package)	17, 102, 256, 257
\upharpoonccw{ \downarrow }	83
\upharpooncw{ \uparrow }	83
\upharpoonleft{ \downarrow }	80
\upharpoonleft{ \downarrow }	79
\upharpoonleft{ \downarrow }	90
\upharpoonleft{ \downarrow }	88
\upharpoonleft{ \downarrow }	93
\upharpoonleftbar{ \downarrow }	93
\upharpoonright{ \downarrow }	80
\upharpoonright{ \downarrow }	79
\upharpoonright{ \downarrow }	90
\upharpoonright{ \downarrow }	88
\upharpoonright{ \downarrow }	94
\upharpoonrightbar{ \downarrow }	94
\upharpoonsleftright{ $\uparrow\downarrow$ }	94
\upin{ ψ }	64
upint (stix package option)	42, 43, 50, 52
\upint{ \bar{J} }	53
\upint{ \bar{J} }	50
\upints{ \bar{J} }	52
\upintup{ \bar{J} }	52
\upiota{ ι }	102
\upkappa{ κ }	102
\Uplambda{ Λ }	102
\uplambda{ λ }	102
\uplcurvearrow{ ζ }	86
\upleftcurvedarrow{ ζ }	86
\uplett{...}	24
\uplsquigarrow{ ζ }	86
\uplsquigarrow{ ζ }	81
\uplus{ \oplus }	34
\uplus{ \oplus }	32
\uplus{ \oplus }	36
\uplus{ \oplus }	36
\uplus{ \oplus }	35
\uplus{ \oplus }	37
\Upmapsto{ \updownarrow }	85
\upmapsto{ \uparrow }	85
\upmapsto{ \uparrow }	81
\upModels{ \updownarrow }	58
\upmodels{ \updownarrow }	60
\upmodels{ \updownarrow }	58
\upmu{ μ }	102
\upnu{ ν }	102
\Upomega{ Ω }	102
\upomega{ ω }	102
\upp{ \wedge }	26
\upparenthfill{...}	245
\Upphi{ Φ }	102
\upphi{ ϕ }	102
\Uppi{ Π }	102
\uppi{ π }	102
\uppitchfork{ \pitchfork }	98

\uppitchfork (ḥ)	96
\upproto (ȝ)	58
\Upsiloni (Ψ)	102
\uppsi (ψ)	102
upquote (package)	251
\uprcurvarrow (⤒)	86
\uprho (ρ)	102
upright Greek letters	17, 102
\uprightcurvarrow (⤓)	86
\uprightcurvarrow (⤔)	92
\uprsquigarrow (⤖)	86
\uprsquigarrow (⤗)	81
upside-down symbols	250–251
upside-down symbols	18–21, 25, 238
\Upsigma (Σ)	102
\upsigma (σ)	102
\Upsilonon (Υ)	101
\upsilon (υ)	101
\Upsilononmeson (Υ)	144
\upsilonup (υ)	102
\upslice (Δ)	39
\upspoon (Ϙ)	97
\upspoon (ϙ)	96
\upt (↥)	26
\uptau (τ)	102
\uptherefore (∴)	126
\uptherefore (∴)	34, 126
\Uptheta (Θ)	102
\uptheta (θ)	102
\uptodownarrow (⤑)	79
\uptodownarrow (⤒)	89
\upuparrows (⤒⤒)	79
\upuparrows (⤒⤒)	78
\upuparrows (⤒⤒)	89
\upuparrows (⤒⤒)	85
\upuparrows (⤒⤒)	81
\upuparrows (⤒⤒)	92
\upupharpoons (⤒⤒)	80
\Upupsilon (Υ)	102
\upupsilon (υ)	102
\upvarepsilon (ε)	102
\upvarphi (φ)	102
\upvarpi (ϖ)	102
\upvarrho (ρ)	102
\upvarsigma (σ)	102
\upvartheta (ϑ)	102
\upVDash (⤒⤒)	60
\upVdash (⤒⤒)	60
\upVdash (⤒)	58
\upvDash (⤒⤒)	60
\upvdash (⊥)	60
\upvdash (⊥)	58
\upwavearrow (⤖)	85
\upwhitearrow (⤒)	89
\upwhitearrow (⤓)	92
\Upxi (Ξ)	102
\upxi (ξ)	102
\upY (ѧ)	35
\upzeta (ζ)	102
\Uranus (՞)	138
\Uranus (՞)	139
\Uranus (՞)	138
\uranus (՞)	137
\urarc (՞)	132
\urblacktriangle (՞)	154
\urcorner (՞)	106
\urcorner (՞)	106
\urcorner (՞)	106
\urcorner (՞)	109
\urcorner (՞)	107
url (package)	251
\urtriangle (՞)	154
urwchancal (package)	134, 256
\US (܂)	140, 141
\US (܂)	141
\usepackage	13
\usf (܂)	171
\usfz (܂)	171
ushort (package)	121, 256, 257
\ushort (܂)	121
\ushortdw (܂)	121
\ushortw (܂)	121
\ut (܂)	24
UTF-8	254, 255
utf8x (inputenc package option)	254
\utilde (܂)	120
\utimes (܂)	35, 36
\utimes (܂)	38
\utimes (܂)	34
Utopia (font)	27, 54
\UU (܂)	140
\UUparrow (܂)	92
\UUparrow (܂)	112
\Uparrow (܂)	85
\Uparrow (܂)	92
\Uparrow (܂)	112
uvebo.fd (file)	219
V	
\v (܂)	22
\Var (Var)	100
\vara (܂)	21
\aramalg (܂)	35
\varangle (܂)	130
\varbarwedge (܂)	37
\varbeta (܂)	103
\varbigcirc (܂)	33
\varbigtriangledown (܂)	155
\varbigtriangleup (܂)	155
\varcap (܂)	36
\varCapricorn (܂)	139
\varcarriagereturn (܂)	92
\VarClock (܂)	192
\varclub (܂)	158
\varclubsuit (܂)	158
\varclubsuit (܂)	158
\varcoppa (܂)	166
\varcoprod (܂)	48
\varcup (܂)	36
\varcurlyvee (܂)	33
\varcurlywedge (܂)	33
\vardiamond (܂)	158
\vardiamondsuit (܂)	158
\vardiamondsuit (܂)	158
\vardigamma (܂)	166
\vardoublebarwedge (܂)	37
\vardownarrow (܂)	95
\vardownwavearrow (܂)	85
\varEarth (܂)	138
\varepsilon (܂)	101
\varepsilon (܂)	103
\varepsilon (܂)	103
\varepsilonup (܂)	102
\VarFlag (܂)	192
varg (txfonts/pfxfonts package option)	103
\varg (g)	103
\varg (g)	103
\varg (g)	21
\vareq (≥)	71
\varhash (#)	130
\varhash (#)	62
\varheart (܂)	158
\varheartsuit (܂)	158
\varheartsuit (܂)	158
\varheartsuit (܂)	158
\varhexagon (܂)	154
\varhexagon (܂)	152
\varhexagonblack (܂)	154
\varhexagonlrbonds (܂)	154
\varhexstar (*)	150
\varhookdownarrow (܂)	85
\varhookleftarrow (↔)	85
\varhookleftarrow (↔)	95
\varhooknearrow (⤓)	85
\varhooknarrow (⤓)	85
\varhookrightarrow (↔)	85
\varhookrightarrow (↔)	95
\varhooksearrow (⤓)	85
\varhookswarrow (⤓)	85
\varhookuparrow (↑)	85
\vari (܂)	21
variable-sized symbols	43–54, 235, 237
\VarIceMountain (܂)	192
\varidotsint (܂)	53

\varinjlim (\varinjlim)	95, 99
\varint (\int)	44
\varintercal (\intercal)	36
\various (R)	195
\varisinobar ($\bar{\in}$)	64
\varisins (ϵ)	62
\varisins (\Subset)	64
\varkappa (\varkappa)	101
\varkappa (κ)	103
\varkappa (κ)	103
\varleftarrow (\leftarrow)	95
\varleftarrowrightarrow (\leftrightarrow)	95
\varleftarrowrightwavearrow (\leftrightarrow)	85
\varleftwavearrow (\curvearrowleft)	85
\varleq (\leq)	71
\varliminf (\varliminf)	99
\varlimsup (\varlimsup)	99
\varlongleftarrow (\longleftarrow)	95
\varlongleftrightarrow (\longleftrightarrow)	95
\varlongmapsfrom (\longleftarrow)	95
\varlongmapsto (\longrightarrow)	95
\varlongrightarrowarrow (\longrightarrow)	95
\varlrtriangle (\vartriangleleft)	155
\varlrttriangle (\vartriangleright)	77, 153
\varmapsfrom (\hookleftarrow)	95
\varmapsto (\hookrightarrow)	95
\varmathbb	134
\varmodtwosum (\varsum)	49
\varMoon (\mathbb{C})	139
\VarMountain (\mathbf{m})	192
\varnearrow (\nearrow)	95
\varniobar (\exists)	64
\varnis (\ni)	62
\varnis (\ni)	64
\varnothinging (\emptyset)	31, 130
\varnothinging (\emptyset)	131
\varnothinging (\emptyset)	131
\varnothinging (\emptyset)	131
\varnothinging (\emptyset)	129
\varnotin (\notin)	104
\varnotowner (\notin)	104
\varnwarrow (\nwarrow)	95
\varoast (\circledast)	33
\varobar (\oplus)	33
\varobslash (\oslash)	33
\varocircle (\circledcirc)	33
\varodot (\odot)	33
\varogreaterthan (\triangleright)	33
\varoiintclockwise (\oint)	45
\varoiintctrcclockwise (\oint)	45
\varointclockwise (\oint)	45
\varointclockwise (\oint)	45
\varointctrcclockwise (\oint)	45
\varointclockwise (\oint)	44
\varointclockwise (\oint)	45
\varointclockwise (\oint)	46
\varointclockwise (\oint)	46
\varointclockwise (\oint)	49
\varointclockwise (\oint)	50
\varointclockwisesl (\oint)	51
\varointclockwiseup (\oint)	51
\varointctrcclockwise (\oint)	46
\varointctrcclockwise (\oint)	53
\varointctrcclockwise (\oint)	46
\varointctrcclockwise (\oint)	49
\varolessthan (\triangleleft)	33
\varomega (ω)	21
\varominus (\ominus)	33
\varopeno (\circ)	21
\varoplus (\oplus)	33
\varoslash (\oslash)	33
\varosum ($\overline{\Sigma}$)	49
\varotimes (\otimes)	33
\varovee (\oslash)	33
\varowedge (\oslash)	33
\varparallel (\parallel)	56
\varparallelelinv ($\backslash\backslash$)	56
\varpartialdiff (∂)	106
\varphi (φ)	101
\varphi (φ)	103
\varphi (φ)	103
\varphiup (φ)	102
\varphoton (\mathfrak{f})	144
\varpi (ϖ)	101
\varpi (ϖ)	103
\varpi (ϖ)	102
\varpi (ϖ)	103
\varpiup (ϖ)	102
\varPluto (\mathbf{P})	139
\varprod (\times)	46
\varprod (\prod)	49
\varprojlim (\varinjlim)	95, 99
\varproto (α)	55
\varproto (α)	62
\varproto (α)	60
\varproto (α)	58
\varproto (α)	64
\varrho (ϱ)	101
\varrho (ϱ)	103
\varrho (ϱ)	102
\varrho (ϱ)	103
\varrhoup (ϱ)	102
\varrightarrow (\rightarrow)	95
\varrightwavearrow (\rightsquigarrow)	85
\Warsampi (\mathcal{W})	166
\Varsampi (\mathcal{W})	166
\varsearrow (\searrow)	95
\varsigma (ς)	101
\varsigma (ς)	103
\varsigma (ς)	103
\varsigmaup (ς)	102
\varspade (\spadesuit)	158
\varspadesuit (\spadesuit)	158
\varspadesuit (\spadesuit)	158
\varsqcap (\sqcap)	36
\varsqcup (\sqcup)	36
\varsqsubsetneq (\subsetneq)	68
\varsqsubsetneqq (\subsetneqq)	68
\varsqsupsetneq (\supsetneq)	68
\varsqsupsetneqq (\supsetneqq)	68
\varstar (\star)	34
\varstar (\star)	155
\varstigma (\mathfrak{s})	166
\varsubsetneq (\subsetneq)	68
\varsubsetneqq (\subsetneqq)	67
\varsubsetneqq (\subsetneqq)	69
\varsubsetneqq (\subsetneqq)	69
\varsubsetneqq (\subsetneqq)	68
\varsubsetneqq (\subsetneqq)	68
\varsubsetneqq (\subsetneqq)	70
\varsubsetneqq (\subsetneqq)	68
\varsubsetneqq (\subsetneqq)	67
\varsubsetneqq (\subsetneqq)	69
\varsubsetneqq (\subsetneqq)	69
\varsubsetneqq (\subsetneqq)	68
\varsubsetneqq (\subsetneqq)	68
\varsubsetneqq (\subsetneqq)	70
\varsum (\sum)	49
\varsumint (\oint)	49
\VarSummit (Δ)	192
\varsupsetneq (\supsetneq)	68
\varsupsetneq (\supsetneq)	67
\varsupsetneq (\supsetneq)	69
\varsupsetneq (\supsetneq)	69
\varsupsetneq (\supsetneq)	68
\varsupsetneq (\supsetneq)	68
\varsupsetneq (\supsetneq)	67
\varsupsetneq (\supsetneq)	67
\varsupsetneq (\supsetneq)	69
\varsupsetneq (\supsetneq)	69
\varsupsetneq (\supsetneq)	68
\varsupsetneq (\supsetneq)	70
\varsupsetneqq (\supsetneqq)	69
\varsupsetneqq (\supsetneqq)	68
\varsupsetneqq (\supsetneqq)	70
\varsumint (\oint)	49
\VarTaschenuhr (\mathfrak{T})	192
\varTerra (\mathfrak{t})	139
\varthetaeta (ϑ)	101
\varthetaeta (ϑ)	103
\varthetaeta (ϑ)	103
\varthetaetaup (ϑ)	102
\vartimes (\times)	33
\vartimes (\times)	36
\vartriangle (\triangle)	130
\vartriangleleft (\triangleleft)	77
\vartriangleleft (\triangleleft)	40, 77
\vartriangleleft (\triangleleft)	76
\vartriangleleft (\triangleleft)	77
\vartriangleleft (\triangleleft)	77
\vartriangleleft (\triangleleft)	76
\vartriangleleft (\triangleleft)	75
\vartriangleleft (\triangleleft)	77
\vartriangleleft (\triangleleft)	77
\vartriangleleft (\triangleleft)	77
\vartriangleleft (\triangleleft)	72, 76
\vartriangleleft (\triangleleft)	77, 155
\vartriangleleft (\triangleleft)	76

<code>\wasyllozenge (□)</code>	190	
<code>\wasyparagraph (§)</code>	30	
<code>\wasypyproto (∞)</code>	55	
<code>\wasysym</code> (package)	21, 27, 30, 33, 44, 55, 68, 70, 125, 130, 136, 137, 139, 142, 149, 150, 152, 170, 190, 236, 238, 256, 257	
<code>\wasytherefore (∴)</code>	125	
<code>\Water (∇)</code>	139	
<code>\water (●)</code>	144	
wavy-line delimiters	108–112	
<code>\wbetter (±)</code>	195	
<code>\Wboson (W)</code>	144	
<code>\Wbosonminus (W⁻)</code>	144	
<code>\Wbosonplus (W⁺)</code>	144	
<code>\wdecisive (+−)</code>	195	
<code>\weakpt (×)</code>	195	
<code>\WeakRain (ゑ)</code>	192	
<code>\WeakRainCloud (ゑ)</code>	192	
weather symbols	192, 207–208	
Web symbols	208–212	
<code>\webomints</code> (package)	218, 219, 256	
<code>\Wecker (⌚)</code>	192	
<code>\Wedge (△)</code>	36	
<code>\Wedge (▲)</code>	37	
<code>\wedge (△)</code>	34	
<code>\wedge (▲)</code>	32	
<code>\wedge (△)</code>	36	
<code>\wedge (▲)</code>	35, 36	
<code>\wedge (△)</code>	35	
<code>\wedge (▲)</code>	37	
<code>\wedgebar (△)</code>	37	
<code>\wedgedot (△)</code>	35	
<code>\wedgedot (▲)</code>	35	
<code>\wedgedot (△)</code>	37	
<code>\wedgedoublebar (△)</code>	37	
<code>\wedgemidvert (▲)</code>	37	
<code>\wedgeodot (△)</code>	37	
<code>\wedgeonwedge (△)</code>	36	
<code>\wedgeonwedge (▲)</code>	37	
<code>\wedgeq (△)</code>	60	
<code>\wedgeq (△)</code>	64	
Weierstrass \wp function	see <code>\wp</code>	
<code>\westcross (✗)</code>	149	
<code>\wfermion (⤙)</code>	143	
<code>\Wheelchair (♿)</code>	191	
<code>\whfermion (⤚)</code>	143	
<code>\whistle (哱)</code>	24	
<code>\white</code>	197	
<code>\whitearrowupfrombar (⤧)</code>	90	
<code>\whitearrowupfrombar (⤨)</code>	92	
<code>\whitearrowuppedestal (⤩)</code>	90	
<code>\whitearrowuppedestalhbar (⤪)</code>	90	
<code>\whitearrowuppedestalvbar (⤫)</code>	90	
<code>\wideangledown (⤠)</code>	129	
<code>\wideangleup (⤡)</code>	129	
<code>\widearc (⤢)</code>	120	
<code>\widearrow (⤣)</code>	119	
<code>\widebar (⤤)</code>	119	
<code>\widebridgeabove (⤥)</code>	115	
<code>\widecheck (⤦)</code>	119	
<code>\widecheck (⤧)</code>	119	
<code>\widehat (⤧)</code>	118	
<code>\widehat (⤨)</code>	118	
<code>\widehat (⤪)</code>	119	
<code>\widehat (⤫)</code>	119	
<code>\widehat (⤬)</code>	117	
<code>\widehat (⤭)</code>	117	
<code>\wideOarc (⤮)</code>	120	
<code>\wideparen (⤧)</code>	119	
<code>\wideparen (⤨)</code>	118	
<code>\wideparen (⤩)</code>	120	
<code>\wideparen (⤪)</code>	118	
<code>\wideparen (⤫)</code>	117	
<code>\widering (⤮)</code>	119	
<code>\widering (⤩)</code>	120	
<code>\widetilde (⤮)</code>	117	
<code>\widetilde (⤨)</code>	118	
<code>\widetilde (⤩)</code>	118	
<code>\widetilde (⤫)</code>	119	
<code>\widetilde (⤬)</code>	117	
<code>\widetilde (⤭)</code>	117	
<code>\widetilde (⤮)</code>	117, 120	
<code>\widetriangle (⤮)</code>	117	
<code>\wind</code>	192	
<code>\Windows®</code>	252	
<code>\Winkey (☺)</code>	206	
<code>\Innocey (☺)</code>	206	
<code>\Wintertree (⤠)</code>	206	
witch's hat	116	
witches	41, 124	
<code>\with (&)</code>	38	
<code>\with (L)</code>	195	
<code>\withattack (→)</code>	195	
<code>\withidea (△)</code>	195	
<code>\withinit (↑)</code>	195	
<code>\without (—)</code>	195	
Wizards of the Coast	233	
<code>\wn (?)</code>	31	
woman	160, 191	
<code>\WomanFace (●)</code>	191	
won	see <code>\textwon</code>	
world	191	
<code>\WorstTree (⤠)</code>	206	
<code>\wp (wp)</code>	104	
<code>\wp (p)</code>	105	
<code>\wp (P)</code>	105	
<code>\wp (wp)</code>	104	
<code>\wp (wp)</code>	105	
<code>\wq (wq)</code>	171	
<code>\wqq (wqq)</code>	171	
<code>\wr (r)</code>	32	
<code>\wr (r)</code>	36	
<code>\wr (r)</code>	35	
<code>\wr (r)</code>	37	
<code>\wreath (r)</code>	35, 36	
<code>\wreath (r)</code>	35	
wreath product	see <code>\wr</code>	
<code>\WritingHand (⤵)</code>	191	
<code>\wsuipa</code> (package)	20, 24, 26, 236, 239, 243, 256, 257	
<code>\upperhand (±)</code>	195	

X	
\x (ζ)	128
\x (::)	197
\XBox (☒)	149
\xbsol (\)	50
Xdvi	94, 238
X _L A _T E _X	101, 170, 255
X _Q T _E X	25
\xey (⌚)	206
xfakebold (package)	250, 256, 257
xfrac (package)	133
\xhookleftarrow (↔)	121
\xhookleftarrow (▀)	95
\xhookrightarrow (↔)	121
\xhookrightarrow (▀)	95
\Xi (Ξ)	101
\xi (ξ)	101
\xint (ƒ)	53
\xiup (ξ)	102
\xLeftarrow (⇐)	121
\xleftarrow (←)	95, 121
\xleftbroom (≪)	123
\xleftflutteringbat (❀=)	124
\xleftharpoondown (↔)	121
\xleftharpoonup (↔)	121
\xleftpitchfork (↔)	123
\xLeftrightarrow (↔)	122
\xLeftrightarrow (↔)	121
\xleftarrow (▀)	95
\xleftrightharpoons (↔)	121
\xleftswishingghost (❀=)	124
\xleftwitchonbroom (❀=)	124
\xleftwitchonbroom* (❀=)	124
\xleftwitchonpitchfork (↔)	124
\xleftwitchonpitchfork*	124
\xlongequal (==)	122
\xlongequal (▀=)	122
\xLongleftarrow (⟵)	122
\xlongleftarrow (←)	122
\xLongleftrightarrow (⟷)	122
\xlongleftarrow (↔)	122
\xlongleftarrow (▀↔)	122
\xlongleftarrow (↔)	122
\xlongleftarrow (↔)	122
\xmapsto (→)	121
\xmapsto (→)	122
\xmapsto (▀)	95
XML	252
\XQ (⌚)	140
\xRightarrow (⇒)	121
\xrightarrow (→)	95, 121
\xrightbroom (⇒)	123
\xrightflutteringbat (❀=)	124
\xrightharpoondown (↔)	121
\xrightharpoonup (↔)	121
\xrightleftharpoons (↔)	121
\xrightleftharpoons (▀=)	121
\xrightpitchfork (Ǝ)	123
\xrightswishingghost (❀=)	124
\xrightwitchonbroom (❀=)	124
\xrightwitchonbroom* (❀=)	124
\xrightwitchonpitchfork	124
\xrightwitchonpitchfork*	124
\xsolid (X)	149
\xsolid (X)	149
\xsolidbold (X)	149
\xsolidbrush (X)	149
\xswordsdown (X)	191
\xswordsup (X)	191
\xtofrom (↔)	122
\xtwoheadleftarrow (↔)	122
\xtwoheadrightarrow (↔)	122
X _y -pic	242
Y	
\ydown (⌚)	33
Z	
\ZA (Ⓐ)	140
Zapf Chancery (font)	134
Zapf Dingbats (font)	145, 150
\ZB (Ⓑ)	140
\Zbar (𝐙)	105
\Zborder (𝐙)	159
\Zboson (𝐙)	144
\ZC (₵)	140
\zcmp (§)	132
\ZD (Ⓓ)	140
\ZE (Ⓔ)	140
\Zeta (Ζ)	101
\zeta (ζ)	101
\zetaup (ζ)	102
\Zeus (⌘)	139
\ZF (Ⓕ)	140
\ZG (Ⓖ)	140
\ZH (Ⓗ)	140
\ZI (Ⓘ)	140
\ZJ (Ⓙ)	140
\ZK (Ⓚ)	140
\ZL (Ⓛ)	140
\ZM (Ⓜ)	140
\ZN (Ⓝ)	140
\ZO (Ⓞ)	140
\Zodiac	138
zodiacal symbols	137–139, 215–218
\ZP (Ⓟ)	140
\zpipe (»)	132
\zproject (↑)	132
\ZQ (Ⓠ)	140
\ZR (Ⓑ)	140
\ZS (Ⓢ)	140
\ZT (Ⓣ)	140
\ztransf (●~○)	67

\Ztransf ($\bullet\rightsquigarrow$)	63	\zugzwang (\odot)	195	\ZwPa ($\ddot{\gamma}$)	172
\ztransf ($\circ\rightsquigarrow\bullet$)	67	\ZV (\mathcal{Y})	140	\ZX (\mathcal{X})	140
\ztransf ($\rightsquigarrow\bullet$)	62	\ZW (\mathcal{W})	140	\ZY (\mathcal{Y})	140
\ZU (\mathcal{Y})	140			\ZZ (\mathcal{Z})	140
\Zu (\mathbf{Z})	100	\Zwdr (♪)	172		