

**Appendix B. Character Keywords and Properties**

The following table gives the default math keywords, their target characters and codes along with spacing and linear-format build-up properties. A full keyword consists of a backslash followed by a keyword in the table.

Keyword	Glyph	Code	Spacing	LF Property
above	$\overset{\perp}{\phantom{x}}$	U+2534	ordinary	subsup upper
acute	´	U+0301	ordinary	accent
aleph	$\aleph$	U+2135	ordinary	operand
alpha	$\text{\AA}$	U+03B1	ordinary	operand
amalg	$\amalg$	U+2210	ordinary	nary
angle	$\sphericalangle$	U+2220	relational	normal
aoint	$\oint$	U+2233	ordinary	nary
approx	$\approx$	U+2248	relational	normal
asmash	$\uparrow$	U+2B06	ordinary	encl phantom
ast	*	U+2217	binary	normal
asympt	$\asymp$	U+224D	relational	normal
atop	$\overset{!}{\phantom{x}}$	U+00A6	ordinary	divide
Bar	$\bar{=}$	U+033F	ordinary	accent
bar	$\bar{-}$	U+0305	ordinary	accent
because	$\because$	U+2235	relational	normal
begin	$\lceil$	U+3016	open	open
below	$\underset{\top}{\phantom{x}}$	U+252C	ordinary	subsup lower
beta	$\text{\B}$	U+03B2	ordinary	operand
beth	$\beth$	U+2136	ordinary	operand
bot	$\perp$	U+22A5	relational	normal
bigcap	$\bigcap$	U+22C2	ordinary	nary
bigcup	$\bigcup$	U+22C2	ordinary	nary
bigodot	$\bigodot$	U+2A00	ordinary	nary
bigoplus	$\bigoplus$	U+2A01	ordinary	nary
bigotimes	$\bigotimes$	U+2A02	ordinary	nary
bigsqcup	$\bigsqcup$	U+2A06	ordinary	nary
biguplus	$\biguplus$	U+2A04	ordinary	nary
bigvee	$\bigvee$	U+22C1	ordinary	nary
bigwedge	$\bigwedge$	U+22C0	ordinary	nary
bowtie	$\bowtie$	U+22C8	relational	normal

## Unicode Nearly Plain Text Encoding of Mathematics

bot	$\perp$	U+22A5	relational	normal
box	$\square$	U+25A1	ordinary	encl box
bra	$\langle$	U+27E8	open	open
breve	$\breve$	U+0306	ordinary	accent
bullet	$\cdot$	U+2219	binary	normal
cap	$\cap$	U+2229	binary	normal
cbrt	$\sqrt[3]{}$	U+221B	open	encl root
cdot	$\cdot$	U+22C5	binary	normal
cdots	$\cdots$	U+22EF	ordinary	normal
check	$\checkmark$	U+030C	ordinary	accent
chi	$\chi$	U+03C7	ordinary	operand
circ	$\circ$	U+2218	binary	normal
close	$\dagger$	U+2524	ordinary	close
clubsuit	$\clubsuit$	U+2663	ordinary	normal
coint	$\oint$	U+2232	ordinary	nary
cong	$\cong$	U+2245	relational	normal
cup	$\cup$	U+222A	binary	normal
daleth	$\daleth$	U+2138	ordinary	operand
dashv	$\dashv$	U+22A3	relational	stretch horz
Dd	$\mathbb{D}$	U+2145	differential	operand
dd	$\mathcal{d}$	U+2146	differential	operand
ddddot	$\cdots\cdots$	U+20DC	ordinary	accent
dddoteq	$\cdots$	U+20DB	ordinary	accent
ddot	$\ddot{\phantom{x}}$	U+0308	ordinary	accent
ddots	$\ddots$	U+22F1	relational	normal
degree	$^\circ$	U+00B0	ordinary	operand
Delta	$\Delta$	U+0394	ordinary	operand
delta	$\delta$	U+03B4	ordinary	operand
diamond	$\diamond$	U+22C4	binary	normal
diamondsuit	$\diamondsuit$	U+2662	ordinary	normal
div	$\div$	U+00F7	binary	normal
dot	$\dot{\phantom{x}}$	U+0307	ordinary	accent
doteq	$\doteq$	U+2250	relational	normal
dots	$\dots$	U+2026	ordinary	normal
Downarrow	$\Downarrow$	U+21D3	relational	normal

## Unicode Nearly Plain Text Encoding of Mathematics

downarrow	$\downarrow$	U+2193	relational	normal
dsmash	$\Downarrow$	U+2B07	ordinary	encl phantom
ee	$e$	U+2147	ordinary	operand
ell	$\ell$	U+2113	ordinary	operand
emptyset	$\emptyset$	U+2205	unary	operand
emsp		U+2003	skip	normal
end	$\rceil$	U+3017	close	close
ensp		U+2002	skip	normal
epsilon	$\epsilon$	U+03F5	ordinary	operand
eqarray	$\equiv$	U+2588	ordinary	encl eqarray
eqno	$\#$	U+0023	ordinary	marker
equiv	$\equiv$	U+2261	relational	normal
eta	$\text{H}$	U+03B7	ordinary	operand
exists	$\exists$	U+2203	unary	normal
forall	$\forall$	U+2200	unary	normal
funcapply	$\overset{\circ}{\circ}$	U+2061	binary	subsupFA
Gamma	$\Gamma$	U+0393	ordinary	operand
gamma	$\gamma$	U+03B3	ordinary	operand
ge	$\geq$	U+2265	relational	normal
geq	$\geq$	U+2265	relational	normal
gets	$\leftarrow$	U+2190	ordinary	stretch horiz
gg	$\gg$	U+226B	relational	normal
gimel	$\aleph$	U+2137	ordinary	operand
grave	$\grave{\text{`}}$	U+0300	ordinary	accent
hairsp		U+200A	skip	normal
hat	$\hat{\text{^}}$	U+0302	ordinary	accent
hbar	$\hbar$	U+210F	ordinary	operand
heartsuit	$\heartsuit$	U+2661	ordinary	normal
hookleftarrow	$\hookleftarrow$	U+21A9	relational	stretch horiz
hookrightarrow	$\hookrightarrow$	U+21AA	relational	stretch horiz
hphantom	$\leftrightarrow$	U+2B04	ordinary	encl phantom
hvec	$\vec{\text{^}}$	U+20D1	ordinary	accent
ii	$\ddot{i}$	U+2148	ordinary	operand
iiiint	$\int\!\!\!\int$	U+2A0C	ordinary	nary
iiint	$\iiint$	U+222D	ordinary	nary

iint	$\iint$	U+222C	ordinary	nary
Im	$\Im$	U+2111	ordinary	operand
imath	$\imath$	U+0131	ordinary	operand
in	$\in$	U+2208	relational	normal
inc	$\Delta$	U+2206	unary	operand
infty	$\infty$	U+221E	ordinary	operand
int	$\int$	U+222B	ordinary	nary
iota	$\iota$	U+03B9	ordinary	operand
jj	$\jmath$	U+2149	ordinary	operand
jmath	0237	U+0237	ordinary	operand
kappa	$\kappa$	U+03BA	ordinary	operand
ket	$\rangle$	U+27E9	close	close
Lambda	$\Lambda$	U+039B	ordinary	operand
lambda	$\lambda$	U+03BB	ordinary	operand
langle	$\langle$	U+27E8	open	open
lbrace	$\{$	U+007B	open	open
lbrack	$[$	U+005B	open	open
lceil	$\lceil$	U+2308	open	open
ldiv	$/$	U+2215	binary	divide
ldots	$\dots$	U+2026	ordinary	normal
le	$\leq$	U+2264	relational	normal
Leftarrow	$\Leftarrow$	U+21D0	relational	stretch horiz
leftarrow	$\leftarrow$	U+2190	relational	stretch horiz
leftharpoondown	$\leftharpoondown$	U+21BD	relational	stretch horiz
leftharpoonup	$\leftharpoonup$	U+21BC	relational	stretch horiz
Leftrightarrow	$\Leftrightarrow$	U+21D4	relational	stretch horiz
leftrightarrow	$\leftrightarrow$	U+2194	relational	stretch horiz
leq	$\leq$	U+2264	relational	normal
lfloor	$\lfloor$	U+230A	open	open
ll	$\ll$	U+226A	relational	normal
Longleftarrow	$\Longleftarrow$	U+27F8	relational	normal
longleftarrow	$\longleftarrow$	U+27F5	relational	normal
Longleftrightarrow	$\Longleftrightarrow$	U+27FA	relational	normal
longleftrightarrow	$\longleftrightarrow$	U+27F7	relational	normal
Longrightarrow	$\Longrightarrow$	U+27F9	relational	normal

## Unicode Nearly Plain Text Encoding of Mathematics

longrightrightarrow	$\rightarrow$	U+27F6	relational	normal
mapsto	$\mapsto$	U+21A6	relational	stretch horiz
matrix	$\blacksquare$	U+25A0	ordinary	encl matrix
medsp		U+205F	Ordinary	normal
mid	$ $	U+2223	relational	list delims
models	$\models$	U+22A8	relational	stretch horiz
mp	$\mp$	U+2213	unary/binary	unary/binary
mu	$\text{M}$	U+03BC	ordinary	operand
nabla	$\nabla$	U+2207	unary	operand
naryand	$\text{⋈}$	U+2592	ordinary	normal
nbspc		U+00A0	skip	normal
ndiv	$\oslash$	U+2298	binary	divide
ne	$\neq$	U+2260	relational	normal
nearrow	$\nearrow$	U+2197	relational	normal
neq	$\neq$	U+2260	relational	normal
ni	$\ni$	U+220B	relational	normal
norm	$\ $	U+2016	ordinary	open/close
nu	$\nu$	U+03BD	ordinary	operand
nwarrow	$\nwarrow$	U+2196	relational	normal
odot	$\odot$	U+2299	binary	normal
of	$\text{⋈}$	U+2592	ordinary	normal
oiint	$\oiint$	U+2230	ordinary	nary
oiint	$\oint$	U+222F	ordinary	nary
oint	$\oint$	U+222E	ordinary	nary
Omega	$\Omega$	U+03A9	ordinary	operand
omega	$\omega$	U+03C9	ordinary	operand
ominus	$\ominus$	U+2296	binary	normal
open	$\dagger$	U+251C	ordinary	open
oplus	$\oplus$	U+2295	binary	normal
oslash	$\oslash$	U+2298	binary	normal
otimes	$\otimes$	U+2297	binary	normal
over	$/$	U+002F	binarynsp	divide
overbar	$\bar{\phantom{x}}$	U+00AF	ordinary	encl overbar
overbrace	$\overbrace{\phantom{x}}$	U+23DE	ordinary	stretch over
overparen	$\overparen{\phantom{x}}$	U+23DC	ordinary	stretch over

parallel	$\parallel$	U+2225	relational	normal
partial	$\partial$	U+2202	unary	operand
phantom	$\diamond$	U+27E1	ordinary	encl phantom
Phi	$\Phi$	U+03A6	ordinary	operand
phi	$\phi$	U+03D5	ordinary	operand
Pi	$\Pi$	U+03A0	ordinary	operand
pi	$\pi$	U+03C0	ordinary	operand
pm	$\pm$	U+00B1	unary/binary	unary/binary
pppprime	$''''$	U+2057	ordinary	Unisubsup
ppprime	$'''$	U+2034	ordinary	Unisubsup
pprime	$''$	U+2033	ordinary	Unisubsup
prec	$\prec$	U+227A	relational	normal
preceq	$\preceq$	U+227C	relational	normal
prime	$'$	U+2032	ordinary	Unisubsup
prod	$\prod$	U+220F	ordinary	nary
propto	$\propto$	U+221D	relational	normal
Psi	$\Psi$	U+03A8	ordinary	operand
psi	$\psi$	U+03C8	ordinary	operand
qdrft	$\sqrt[4]{}$	U+221C	open	encl root
rangle	$\rangle$	U+27E9	close	close
ratio	$:$	U+2236	relational	normal
rbrace	$\}$	U+007D	close	close
rbrack	$\}]$	U+005D	close	close
rceil	$\lceil$	U+2309	close	close
rddots	$\ddots$	U+22F0	relational	normal
Re	$\Re$	U+211C	ordinary	operand
rect	$\square$	U+25AD	ordinary	encl rect
rfloor	$\lfloor$	U+230B	close	close
rho	$\rho$	U+03C1	ordinary	operand
Rightarrow	$\Rightarrow$	U+21D2	relational	stretch horiz
rightarrow	$\rightarrow$	U+2192	relational	stretch horiz
rightharpoondown	$\rightrightarrows$	U+21C1	relational	stretch horiz
rightharpoonup	$\rightarrow$	U+21C0	relational	stretch horiz
sdiv	$/$	U+2044	binarynsp	divide
searrow	$\swarrow$	U+2198	relational	normal

## Unicode Nearly Plain Text Encoding of Mathematics

setminus	$\backslash$	U+2216	binary	normal
Sigma	$\Sigma$	U+03A3	ordinary	operand
sigma	$\Sigma$	U+03C3	ordinary	operand
sim	$\sim$	U+223C	relational	normal
simeq	$\approx$	U+2243	relational	normal
smash	$\updownarrow$	U+2B0D	ordinary	encl phantom
spadesuit	$\spadesuit$	U+2660	ordinary	normal
sqcap	$\sqcap$	U+2293	binary	normal
sqcup	$\sqcup$	U+2294	binary	normal
sqrt	$\sqrt{\quad}$	U+221A	open	encl root
sqsubseteq	$\sqsubseteq$	U+2291	relational	normal
sqsupseteq	$\sqsupseteq$	U+2292	relational	normal
star	$\star$	U+22C6	binary	normal
subset	$\subset$	U+2282	relational	normal
subseteq	$\subseteq$	U+2286	relational	normal
succ	$\succ$	U+227B	relational	normal
succeq	$\succcurlyeq$	U+227D	relational	normal
sum	$\Sigma$	U+2211	ordinary	nary
superset	$\supset$	U+2283	relational	normal
supseteq	$\supseteq$	U+2287	relational	normal
swarrow	$\searrow$	U+2199	relational	normal
tau	$\tau$	U+03C4	ordinary	operand
therefore	$\therefore$	U+2234	relational	normal
Theta	$\Theta$	U+0398	ordinary	operand
theta	$\theta$	U+03B8	ordinary	operand
thicksp		U+2005	skip	normal
thinsp		U+2006	skip	normal
tilde	$\sim$	U+0303	ordinary	accent
times	$\times$	U+00D7	binarynsp	normal
to	$\rightarrow$	U+2192	relational	stretch horiz
top	$\top$	U+22A4	relational	normal
tvec	$\vec{t}$	U+20E1	ordinary	accent
underbar	$\bar{\quad}$	U+2581	ordinary	encl under-
underbrace	$\underbrace{\quad}$	U+23DF	ordinary	stretch under
underparen	$\underbrace{\quad}$	U+23DD	ordinary	stretch under

## Unicode Nearly Plain Text Encoding of Mathematics

Uparrow	$\Uparrow$	U+21D1	relational	normal
uparrow	$\uparrow$	U+2191	relational	normal
Updownarrow	$\Updownarrow$	U+21D5	relational	normal
updownarrow	$\updownarrow$	U+2195	relational	normal
uplus	$\uplus$	U+228E	binary	normal
Upsilon	$\Upsilon$	U+03A5	ordinary	operand
upsilon	$\upsilon$	U+03C5	ordinary	operand
varepsilon	$\varepsilon$	U+03B5	ordinary	operand
varphi	$\Phi$	U+03C6	ordinary	operand
varpi	$\varpi$	U+03D6	ordinary	operand
varrho	$\varrho$	U+03F1	ordinary	operand
varsigma	$\varsigma$	U+03C2	ordinary	operand
vartheta	$\vartheta$	U+03D1	ordinary	operand
vbar	$\bar{\phantom{a}}$	U+2502	ordinary	list delims
vdash	$\vdash$	U+22A2	relational	stretch horz
vdots	$\vdots$	U+22EE	relational	normal
vec	$\vec{\phantom{a}}$	U+20D7	ordinary	accent
vee	$\vee$	U+2228	binary	normal
Vert	$\ $	U+2016	ordinary	open/close
vert	$ $	U+007C	ordinary	open/close
vphantom	$\vphantom{\Updownarrow}$	U+21F3	relational	encl phantom
vthicksp		U+2004	skip	normal
wedge	$\wedge$	U+2227	binary	normal
wp	$\wp$	U+2118	ordinary	operand
wr	$\wr$	U+2240	binary	normal
Xi	$\Xi$	U+039E	ordinary	operand
xi	$\xi$	U+03BE	ordinary	operand
zeta	$\zeta$	U+03B6	ordinary	operand
zwnj		U+200C	ordinary	normal
zwsp		U+200B	ordinary	normal