

Miscellaneous Mathematical Symbols-B

Range: 2980–29FF

This file contains an excerpt from the character code tables and list of character names for *The Unicode Standard, Version 17.0*

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See <https://www.unicode.org/errata/> for an up-to-date list of errata.

See <https://www.unicode.org/charts/> for access to a complete list of the latest character code charts. See <https://www.unicode.org/charts/PDF/Unicode-17.0/> for charts showing only the characters added in Unicode 17.0. See <https://www.unicode.org/Public/17.0.0/charts/> for a complete archived file of character code charts for Unicode 17.0. See <https://www.unicode.org/charts/About.html#Conventions> for conventions used in these code charts, and other general information.

Disclaimer

These charts are provided as the online reference to the character contents of the Unicode Standard, Version 17.0 but do not provide all the information needed to fully support individual scripts using the Unicode Standard. For a complete understanding of the use of the characters contained in this file, please consult the appropriate sections of The Unicode Standard, Version 17.0, online at <https://www.unicode.org/versions/Unicode17.0.0/>, as well as the Unicode Standard Annexes, the other Unicode Technical Reports and Standards, and the Unicode Character Database, which are available online.

See <https://www.unicode.org/ucd/> and <https://www.unicode.org/reports/>

A thorough understanding of the information contained in these additional sources is required for a successful implementation.

Fonts

The shapes of the reference glyphs used in these code charts are not prescriptive. Considerable variation is to be expected in actual fonts.

See <https://www.unicode.org/charts/fonts.html> for a list.

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	298	299	29A	29B	29C	29D	29E	29F
0	 2980	 2990	 29A0	 29B0	 29C0	 29D0	 29E0	 29F0
1	 2981	 2991	 29A1	 29B1	 29C1	 29D1	 29E1	 29F1
2	 2982	 2992	 29A2	 29B2	 29C2	 29D2	 29E2	 29F2
3	 2983	 2993	 29A3	 29B3	 29C3	 29D3	 29E3	 29F3
4	 2984	 2994	 29A4	 29B4	 29C4	 29D4	 29E4	 29F4
5	 2985	 2995	 29A5	 29B5	 29C5	 29D5	 29E5	 29F5
6	 2986	 2996	 29A6	 29B6	 29C6	 29D6	 29E6	 29F6
7	 2987	 2997	 29A7	 29B7	 29C7	 29D7	 29E7	 29F7
8	 2988	 2998	 29A8	 29B8	 29C8	 29D8	 29E8	 29F8
9	 2989	 2999	 29A9	 29B9	 29C9	 29D9	 29E9	 29F9
A	 298A	 299A	 29AA	 29BA	 29CA	 29DA	 29EA	 29FA
B	 298B	 299B	 29AB	 29BB	 29CB	 29DB	 29EB	 29FB
C	 298C	 299C	 29AC	 29BC	 29CC	 29DC	 29EC	 29FC
D	 298D	 299D	 29AD	 29BD	 29CD	 29DD	 29ED	 29FD
E	 298E	 299E	 29AE	 29BE	 29CE	 29DE	 29EE	 29FE
F	 298F	 299F	 29AF	 29BF	 29CF	 29DF	 29EF	 29FF

Miscellaneous mathematical symbols

- 2980 ||| TRIPLE VERTICAL BAR DELIMITER
→ 2AF4 ||| triple vertical bar binary relation
→ 2AFC ||| large triple vertical bar operator
- 2981 • Z NOTATION SPOT
• medium-small-sized black circle
→ 2219 • bullet operator
→ 25CF ● black circle
- 2982 ∷ Z NOTATION TYPE COLON
→ 0F7F ཌ tibetan sign rnam bcad

Brackets

- 2983 { LEFT WHITE CURLY BRACKET
- 2984 } RIGHT WHITE CURLY BRACKET
- 2985 (LEFT WHITE PARENTHESIS
→ 2E28 (left double parenthesis
→ FF5F (fullwidth left white parenthesis
- 2986) RIGHT WHITE PARENTHESIS
• used for Bourbakist intervals
→ 2E29) right double parenthesis
→ FF60) fullwidth right white parenthesis
- 2987 [Z NOTATION LEFT IMAGE BRACKET
- 2988] Z NOTATION RIGHT IMAGE BRACKET
- 2989 [Z NOTATION LEFT BINDING BRACKET
- 298A] Z NOTATION RIGHT BINDING BRACKET
- 298B [LEFT SQUARE BRACKET WITH UNDERBAR
- 298C] RIGHT SQUARE BRACKET WITH UNDERBAR

Brackets with ticks

For bidirectional processing, the brackets with ticks are paired on the basis of their left/right symmetric glyphs, rather than on the basis of an open/close pairing inferred from code point order.

- 298D [LEFT SQUARE BRACKET WITH TICK IN TOP CORNER
- 298E] RIGHT SQUARE BRACKET WITH TICK IN BOTTOM CORNER
- 298F [LEFT SQUARE BRACKET WITH TICK IN BOTTOM CORNER
- 2990] RIGHT SQUARE BRACKET WITH TICK IN TOP CORNER

Brackets

- 2991 { LEFT ANGLE BRACKET WITH DOT
- 2992 } RIGHT ANGLE BRACKET WITH DOT
- 2993 < LEFT ARC LESS-THAN BRACKET
- 2994 > RIGHT ARC GREATER-THAN BRACKET
- 2995 ⋈ DOUBLE LEFT ARC GREATER-THAN BRACKET
- 2996 ⋈ DOUBLE RIGHT ARC LESS-THAN BRACKET
- 2997 (LEFT BLACK TORTOISE SHELL BRACKET
→ 27EC (mathematical left white tortoise shell bracket
→ 3014 (left tortoise shell bracket
→ 3018 (left white tortoise shell bracket
- 2998) RIGHT BLACK TORTOISE SHELL BRACKET

Fences

- 2999 ∴ DOTTED FENCE
• four close dots vertical
- 299A ∿ VERTICAL ZIGZAG LINE
→ 2307 ∿ wavy line

Angles

- 299B ∟ MEASURED ANGLE OPENING LEFT
→ 2221 ∟ measured angle

- 299C ⊥ RIGHT ANGLE VARIANT WITH SQUARE
→ 221F ⊥ right angle
- 299D ⊞ MEASURED RIGHT ANGLE WITH DOT
- 299E ∠ ANGLE WITH S INSIDE
- 299F ∠ ACUTE ANGLE
→ 2220 ∠ angle
- 29A0 ∟ SPHERICAL ANGLE OPENING LEFT
→ 2222 ∟ spherical angle
- 29A1 ∟ SPHERICAL ANGLE OPENING UP
- 29A2 ∟ TURNED ANGLE
→ 2220 ∠ angle
- 29A3 ∟ REVERSED ANGLE
- 29A4 ∟ ANGLE WITH UNDERBAR
- 29A5 ∟ REVERSED ANGLE WITH UNDERBAR
- 29A6 ∟ OBLIQUE ANGLE OPENING UP
- 29A7 ∟ OBLIQUE ANGLE OPENING DOWN
- 29A8 ∟ MEASURED ANGLE WITH OPEN ARM ENDING IN ARROW POINTING UP AND RIGHT
- 29A9 ∟ MEASURED ANGLE WITH OPEN ARM ENDING IN ARROW POINTING UP AND LEFT
- 29AA ∟ MEASURED ANGLE WITH OPEN ARM ENDING IN ARROW POINTING DOWN AND RIGHT
- 29AB ∟ MEASURED ANGLE WITH OPEN ARM ENDING IN ARROW POINTING DOWN AND LEFT
- 29AC ∟ MEASURED ANGLE WITH OPEN ARM ENDING IN ARROW POINTING RIGHT AND UP
- 29AD ∟ MEASURED ANGLE WITH OPEN ARM ENDING IN ARROW POINTING LEFT AND UP
- 29AE ∟ MEASURED ANGLE WITH OPEN ARM ENDING IN ARROW POINTING RIGHT AND DOWN
- 29AF ∟ MEASURED ANGLE WITH OPEN ARM ENDING IN ARROW POINTING LEFT AND DOWN

Empty sets

- 29B0 ∅ REVERSED EMPTY SET
→ 2205 ∅ empty set
→ 2349 ∅ apl functional symbol circle backslash
- 29B1 ∅̄ EMPTY SET WITH OVERBAR
- 29B2 ∅̊ EMPTY SET WITH SMALL CIRCLE ABOVE
- 29B3 ∅̄ RIGHT EMPTY SET WITH RIGHT ARROW ABOVE
- 29B4 ∅̄ LEFT EMPTY SET WITH LEFT ARROW ABOVE

Circle symbols

- 29B5 ⊖ CIRCLE WITH HORIZONTAL BAR
→ 2296 ⊖ circled minus
→ 1CEF0 ⊖ medium small white circle with horizontal bar
- 29B6 ⊕ CIRCLED VERTICAL BAR
→ 1F715 ⊕ alchemical symbol for nitre
- 29B7 ∥ CIRCLED PARALLEL
~ 29B7 FE00 ∥ with parallel lines touching the circle
- 29B8 ⊗ CIRCLED REVERSE SOLIDUS
- 29B9 ⊥ CIRCLED PERPENDICULAR
- 29BA ⊕ CIRCLE DIVIDED BY HORIZONTAL BAR AND TOP HALF DIVIDED BY VERTICAL BAR
- 29BB ⊗ CIRCLE WITH SUPERIMPOSED X
→ 2297 ⊗ circled times
- 29BC ⊗ CIRCLED ANTICLOCKWISE-ROTATED DIVISION SIGN
- 29BD ⬆ UP ARROW THROUGH CIRCLE
- 29BE ⊙ CIRCLED WHITE BULLET
→ 229A ⊙ circled ring operator
→ 233E ⊙ apl functional symbol circle jot
→ 25CE ⊙ bullseye

- 29BF  CIRCLED BULLET
 • forms part of a graduated set of circles with enclosed black circle of different sizes
 → 2299  circled dot operator
 → 25C9  fisheye
 → 2A00  n-ary circled dot operator
- 29C0  CIRCLED LESS-THAN
 29C1  CIRCLED GREATER-THAN
 29C2  CIRCLE WITH SMALL CIRCLE TO THE RIGHT
 29C3  CIRCLE WITH TWO HORIZONTAL STROKES TO THE RIGHT

Square symbols

- 29C4  SQUARED RISING DIAGONAL SLASH
 → 2341  apl functional symbol quad slash
 → 303C  masu mark
- 29C5  SQUARED FALLING DIAGONAL SLASH
 → 2342  apl functional symbol quad backslash
- 29C6  SQUARED ASTERISK
 29C7  SQUARED SMALL CIRCLE
 → 233B  apl functional symbol quad jot
- 29C8  SQUARED SQUARE
 29C9  TWO JOINED SQUARES
 → 2BBA  overlapping white squares

Triangle symbols

- 29CA  TRIANGLE WITH DOT ABOVE
 29CB  TRIANGLE WITH UNDERBAR
 29CC  S IN TRIANGLE
 29CD  TRIANGLE WITH SERIFS AT BOTTOM
 → 25B3  white up-pointing triangle
- 29CE  RIGHT TRIANGLE ABOVE LEFT TRIANGLE
 29CF  LEFT TRIANGLE BESIDE VERTICAL BAR
 29D0  VERTICAL BAR BESIDE RIGHT TRIANGLE

Bowtie symbols

- 29D1  BOWTIE WITH LEFT HALF BLACK
 → 22C8  bowtie
- 29D2  BOWTIE WITH RIGHT HALF BLACK
 29D3  BLACK BOWTIE
 → 1FB9B  left and right triangular half block
- 29D4  TIMES WITH LEFT HALF BLACK
 → 22C9  left normal factor semidirect product
- 29D5  TIMES WITH RIGHT HALF BLACK
 → 22CA  right normal factor semidirect product
- 29D6  WHITE HOURGLASS
 = vertical bowtie
 = white framus
 → 231B  hourglass
 → 1F76E  alchemical symbol for hour
- 29D7  BLACK HOURGLASS
 → 1FB9A  upper and lower triangular half block

Fences

- 29D8  LEFT WIGGLY FENCE
 → FE34  presentation form for vertical wavy low line
- 29D9  RIGHT WIGGLY FENCE
 29DA  LEFT DOUBLE WIGGLY FENCE
 29DB  RIGHT DOUBLE WIGGLY FENCE

Miscellaneous mathematical symbols

- 29DC  INCOMPLETE INFINITY
 = ISOtech entity ∞
 → 221E  infinity
- 29DD  TIE OVER INFINITY
 29DE  INFINITY NEGATED WITH VERTICAL BAR
 29DF  DOUBLE-ENDED MULTIMAP
 → 22B8  multimap
 → 1F73A  alchemical symbol for arsenic
- 29E0  SQUARE WITH CONTOURED OUTLINE
 = D'Alembertian
 → 274F  lower right drop-shadowed white square
- 29E1  INCREASES AS
 → 22B4  normal subgroup of or equal to
- 29E2  SHUFFLE PRODUCT
 → 22FF  z notation bag membership

Relations

- 29E3  EQUALS SIGN AND SLANTED PARALLEL
 → 0023  number sign
 → 22D5  equal and parallel to
- 29E4  EQUALS SIGN AND SLANTED PARALLEL WITH TILDE ABOVE
 29E5  IDENTICAL TO AND SLANTED PARALLEL
 → 2A68  triple horizontal bar with double vertical stroke
- 29E6  GLEICH STARK
 = tautological equivalent

Miscellaneous mathematical symbols

- 29E7  THERMODYNAMIC
 = record mark
 • vertical bar crossed by two horizontals
 → 2260  not equal to
 → 2BD2  group mark
- 29E8  DOWN-POINTING TRIANGLE WITH LEFT HALF BLACK
 → 25ED  up-pointing triangle with left half black
- 29E9  DOWN-POINTING TRIANGLE WITH RIGHT HALF BLACK
 → 25EE  up-pointing triangle with right half black
- 29EA  BLACK DIAMOND WITH DOWN ARROW
 29EB  BLACK LOZENGE
 → 25CA  lozenge
- 29EC  WHITE CIRCLE WITH DOWN ARROW
 29ED  BLACK CIRCLE WITH DOWN ARROW

Error bar symbols

- 29EE  ERROR-BARRED WHITE SQUARE
 29EF  ERROR-BARRED BLACK SQUARE
 29F0  ERROR-BARRED WHITE DIAMOND
 29F1  ERROR-BARRED BLACK DIAMOND
 29F2  ERROR-BARRED WHITE CIRCLE
 29F3  ERROR-BARRED BLACK CIRCLE

Miscellaneous mathematical symbols

- 29F4  RULE-DELAYED
 = colon right arrow
- 29F5  REVERSE SOLIDUS OPERATOR
 → 005C  reverse solidus
 → 2216  set minus
 → 27CD  mathematical falling diagonal
- 29F6  SOLIDUS WITH OVERBAR

29F7 $\backslash$ REVERSE SOLIDUS WITH HORIZONTAL STROKE
 → 2340 $\backslash$ apl functional symbol backslash bar

Large operators

29F8 $/$ BIG SOLIDUS
 → 2215 $/$ division slash
 29F9 $\backslash$ BIG REVERSE SOLIDUS
 = z notation schema hiding
 → 2216 $\backslash$ set minus

Specialized plus sign operators

29FA $\#$ DOUBLE PLUS
 29FB $\equiv$ TRIPLE PLUS

Brackets

29FC $\langle$ LEFT-POINTING CURVED ANGLE BRACKET
 → 227A $\prec$ precedes
 → 2329 $\langle$ left-pointing angle bracket
 29FD $\rangle$ RIGHT-POINTING CURVED ANGLE BRACKET
 → 227B $\succ$ succeeds
 → 232A $\rangle$ right-pointing angle bracket

Symbols used in game theory

TINY (pronounced "teenie") and MINY (pronounced "meenie") are symbols that yield infinitesimal values when applied to numbers in combinatorial game theory.

29FE $+$ TINY
 → 002B $+$ plus sign
 29FF $-$ MINY
 → 2212 $-$ minus sign

Standardized Variation Sequences	
29B7	 CIRCLED PARALLEL
29B7	 with parallel lines touching the circle
29B7 FE00	