Miscellaneous Mathematical Symbols-B
Range: 2980–29FF

The Unicode Standard, Version 15.1
This file contains an excerpt from the character code tables and list of character names for
The Unicode Standard, Version 15.1

This file may be changed at any time without notice to reflect errata, or other updates to the Unicode Standard.
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-15.1/ for charts showing only the characters added in Unicode 15.1.
See https://www.unicode.org/Public/15.1.0/charts/ for a complete archived file of character code charts for Unicode 15.1.
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 15.1 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 15.1, online at https://www.unicode.org/versions/Unicode15.1.0/, as well as Unicode Standard Annexes
#9, #11, #14, #15, #24, #29, #31, #34, #38, #41, #42, #44, #45, and #50, the other Unicode Technical Reports and Standards,
and the Unicode Character Database, which are available online.

See https://www.unicode.org/ucd/ and http://www.unicode.org/reports/

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

Copying characters from the character code tables or list of character names is not recommended, because for
production reasons the PDF files for the code charts cannot guarantee that the correct character codes will always be
copied.

Fonts
The shapes of the reference glyphs used in these code charts are not prescriptive. Considerable variation is to be
expected in actual fonts. The particular fonts used in these charts were provided to the Unicode Consortium by a number
of different font designers, who own the rights to the fonts.

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

Terms of Use
You may freely use these code charts for personal or internal business uses only. You may not incorporate them either
wholly or in part into any product or publication, or otherwise distribute them without express written permission from
the Unicode Consortium. However, you may provide links to these charts.

The fonts and font data used in production of these code charts may NOT be extracted, or used in any other way in any
product or publication, without permission or license granted by the typeface owner(s).

The Unicode Consortium is not liable for errors or omissions in this file or the standard itself. Information on characters
added to the Unicode Standard since the publication of the most recent version of the Unicode Standard, as well as on
characters currently being considered for addition to the Unicode Standard can be found on the Unicode web site.

See https://www.unicode.org/pending/pending.html and http://www.unicode.org/alloc/Pipeline.html.
See https://www.unicode.org/charts/About.html for more information concerning the conventions and symbols used in
these code charts.

Copyright © 1991-2023 Unicode, Inc. All rights reserved. See https://www.unicode.org/copyright.html
<table>
<thead>
<tr>
<th>298</th>
<th>299</th>
<th>29A</th>
<th>29B</th>
<th>29C</th>
<th>29D</th>
<th>29E</th>
<th>29F</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2980</td>
<td>2990</td>
<td>29A0</td>
<td>29B0</td>
<td>29C0</td>
<td>29D0</td>
<td>29E0</td>
</tr>
<tr>
<td>1</td>
<td>2981</td>
<td>2991</td>
<td>29A1</td>
<td>29B1</td>
<td>29C1</td>
<td>29D1</td>
<td>29E1</td>
</tr>
<tr>
<td>2</td>
<td>2982</td>
<td>2992</td>
<td>29A2</td>
<td>29B2</td>
<td>29C2</td>
<td>29D2</td>
<td>29E2</td>
</tr>
<tr>
<td>3</td>
<td>2983</td>
<td>2993</td>
<td>29A3</td>
<td>29B3</td>
<td>29C3</td>
<td>29D3</td>
<td>29E3</td>
</tr>
<tr>
<td>4</td>
<td>2984</td>
<td>2994</td>
<td>29A4</td>
<td>29B4</td>
<td>29C4</td>
<td>29D4</td>
<td>29E4</td>
</tr>
<tr>
<td>5</td>
<td>2985</td>
<td>2995</td>
<td>29A5</td>
<td>29B5</td>
<td>29C5</td>
<td>29D5</td>
<td>29E5</td>
</tr>
<tr>
<td>6</td>
<td>2986</td>
<td>2996</td>
<td>29A6</td>
<td>29B6</td>
<td>29C6</td>
<td>29D6</td>
<td>29E6</td>
</tr>
<tr>
<td>7</td>
<td>2987</td>
<td>2997</td>
<td>29A7</td>
<td>29B7</td>
<td>29C7</td>
<td>29D7</td>
<td>29E7</td>
</tr>
<tr>
<td>8</td>
<td>2988</td>
<td>2998</td>
<td>29A8</td>
<td>29B8</td>
<td>29C8</td>
<td>29D8</td>
<td>29E8</td>
</tr>
<tr>
<td>9</td>
<td>2989</td>
<td>2999</td>
<td>29A9</td>
<td>29B9</td>
<td>29C9</td>
<td>29D9</td>
<td>29E9</td>
</tr>
<tr>
<td>A</td>
<td>298A</td>
<td>299A</td>
<td>29AA</td>
<td>29BA</td>
<td>29CA</td>
<td>29DA</td>
<td>29EA</td>
</tr>
<tr>
<td>B</td>
<td>298B</td>
<td>299B</td>
<td>29AB</td>
<td>29BB</td>
<td>29CB</td>
<td>29DB</td>
<td>29EB</td>
</tr>
<tr>
<td>C</td>
<td>298C</td>
<td>299C</td>
<td>29AC</td>
<td>29BC</td>
<td>29CC</td>
<td>29DC</td>
<td>29EC</td>
</tr>
<tr>
<td>D</td>
<td>298D</td>
<td>299D</td>
<td>29AD</td>
<td>29BD</td>
<td>29CD</td>
<td>29DD</td>
<td>29ED</td>
</tr>
<tr>
<td>E</td>
<td>298E</td>
<td>299E</td>
<td>29AE</td>
<td>29BE</td>
<td>29CE</td>
<td>29DE</td>
<td>29EE</td>
</tr>
<tr>
<td>F</td>
<td>298F</td>
<td>299F</td>
<td>29AF</td>
<td>29BF</td>
<td>29CF</td>
<td>29DF</td>
<td>29EF</td>
</tr>
</tbody>
</table>
### Miscellaneous Mathematical Symbols

<table>
<thead>
<tr>
<th>Code</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
</table>
| 2980  | TRIPLE VERTICAL BAR DELIMITER | → 2A4F (triple vertical bar binary relation)  
| 2981  | Z NOTATION SPOT         | • medium-small-sized black circle  
|       |                         | → 2219 • bullet operator  
|       |                         | → 25CF • black circle                                                    |
| 2982  | Z NOTATION TYPE COLON   | → 0F7F :$ tibetan sign rnam bcad  
| 2983  | LEFT WHITE CURLY BRACKET | → 2E28 (left double parenthesis)  
| 2984  | RIGHT WHITE CURLY BRACKET | → 2E29 (right double parenthesis)  
| 2985  | LEFT WHITE PARENTHESIS  | → FF60 (fullwidth right white parenthesis)  
| 2986  | RIGHT WHITE PARENTHESIS | • used for Bourbakist intervals  
|       |                         | → FF60 (fullwidth right white parenthesis)                             |
| 2987  | Z NOTATION LEFT IMAGE BRACKET | → 2219 • bullet operator  
| 2988  | Z NOTATION RIGHT IMAGE BRACKET | → 2219 • bullet operator  
| 2989  | Z NOTATION LEFT BINDING BRACKET | → 2219 • bullet operator  
| 2990  | Z NOTATION RIGHT BINDING BRACKET | → 2219 • bullet operator  
| 2991  | LEFT SQUARE BRACKET WITH UNDERBAR | → 27EC (mathematical left white tortoise shell bracket)  
| 2992  | RIGHT SQUARE BRACKET WITH UNDERBAR | → 2219 • bullet operator  
| 2993  | LEFT ARC LESS-THAN BRACKET | → 2221 • measured angle  
| 2994  | RIGHT ARC GREATER-THAN BRACKET | → 2221 • measured angle  
| 2995  | DOUBLE LEFT ARC GREATER-THAN BRACKET | → 2221 • measured angle  
| 2996  | DOUBLE RIGHT ARC LESS-THAN BRACKET | → 2221 • measured angle  
| 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 | → 2221 • measured angle  

### 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.

<table>
<thead>
<tr>
<th>Code</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
</table>
| 298D  | LEFT SQUARE BRACKET WITH TICK IN TOP CORNER | → 2205 • empty set  
| 298E  | RIGHT SQUARE BRACKET WITH TICK IN BOTTOM CORNER | → 2205 • empty set  
| 298F  | LEFT SQUARE BRACKET WITH TICK IN BOTTOM CORNER | → 2205 • empty set  
| 2990  | RIGHT SQUARE BRACKET WITH TICK IN TOP CORNER | → 2205 • empty set  

### Empty sets

<table>
<thead>
<tr>
<th>Code</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
</table>
| 298B  | REVERSED EMPTY SET     | → 2205 • empty set  
| 2980  | EMPTY SET WITH OVERBAR | → 2205 • empty set  
| 2982  | EMPTY SET WITH RIGHT ARROW ABOVE | → 2205 • empty set  
| 2984  | EMPTY SET WITH LEFT ARROW ABOVE | → 2205 • empty set  

### Circle symbols

<table>
<thead>
<tr>
<th>Code</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
</table>
| 2985  | CIRCLE WITH HORIZONTAL BAR | • used in superscripted form to mean standard state (chemistry)  
| 2986  | CIRCLED VERTICAL BAR     | → 1F715 (chemical symbol for litre)  
| 2987  | CIRCLED PARALLEL         | → 2297 (circled times)  
| 2988  | CIRCLED REVERSE SOLIDUS  | → 2297 (circled times)  
| 2989  | CIRCLED PERPENDICULAR    | → 2297 (circled times)  
| 2990  | CIRCLE DIVIDED BY HORIZONTAL BAR AND TOP HALF DIVIDED BY VERTICAL BAR | → 2297 (circled times)  
| 2991  | CIRCLE WITH SUPERIMPOSED X | → 2297 (circled times)  
| 2992  | CIRCLED ANTICLOCKWISE-ROTATED DIVISION SIGN | → 2297 (circled times)  
| 2993  | UP ARROW THROUGH CIRCLE  | → 2297 (circled times)  
| 2994  | CIRCLED WHITE BULLET     | → 2297 (circled times)  

### Fences

<table>
<thead>
<tr>
<th>Code</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
</table>
| 2999  | DOTTED FENCE            | • four close dots vertical  
| 299A  | VERTICAL ZIGZAG LINE    | → 2307 • wavy line  

### Angles

<table>
<thead>
<tr>
<th>Code</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
</table>
| 299B  | MEASURED ANGLE OPENING LEFT | → 2221 • measured angle  

---

The Unicode Standard, Version 15.1, Copyright © 1991-2023 Unicode, Inc. All rights reserved.
<table>
<thead>
<tr>
<th>Code</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>29BF</td>
<td>⭐</td>
<td>CIRCLED BULLET</td>
</tr>
<tr>
<td>29CF</td>
<td>⭐</td>
<td>SQUARE RISING DIAGONAL SLASH</td>
</tr>
<tr>
<td>29D4</td>
<td>⭐</td>
<td>TRIANGLE WITH DOT ABOVE</td>
</tr>
<tr>
<td>29D5</td>
<td>⭐</td>
<td>TRIANGLE WITH UNDERBAR</td>
</tr>
<tr>
<td>29D6</td>
<td>⭐</td>
<td>BLACK BOWTIE</td>
</tr>
<tr>
<td>29D7</td>
<td>⭐</td>
<td>HOURGLASS</td>
</tr>
<tr>
<td>29D8</td>
<td>⭐</td>
<td>LEFT WIGGLY FENCE</td>
</tr>
<tr>
<td>29D9</td>
<td>⭐</td>
<td>RIGHT WIGGLY FENCE</td>
</tr>
<tr>
<td>29DA</td>
<td>⭐</td>
<td>LEFT DOUBLE WIGGLY FENCE</td>
</tr>
<tr>
<td>29DB</td>
<td>⭐</td>
<td>RIGHT DOUBLE WIGGLY FENCE</td>
</tr>
</tbody>
</table>

**Miscellaneous mathematical symbols**

- Tie over infinity
- Infinity negated with vertical bar
- Double-ended multimap
- Square with contoured outline
- Incomplete infinity
- Increases as
- Shuffle product

**Relations**

- Equals sign and slanted parallel
- Identical to and slanted parallel

**Miscellaneous mathematical symbols**

- Thermodynamic
- Error-barred white square
- Error-barred black square
- Error-barred white diamond
- Error-barred black diamond
- Error-barred white circle
- Error-barred black circle

**Error bar symbols**

- Rule-delayed
- Reverse solidus operator
- Solidus with overbar

**Miscellaneous mathematical symbols**

- Incomplete infinity
- IsoTech entity \( \infty \)
- \( \infty \)
Large operators

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

Specialized plus sign operators

29FA # DOUBLE PLUS
29FB # TRIPLE PLUS

Brackets

29FC ⪪ LEFT-POINTING CURVED ANGLE BRACKET
   → 227A ⪪ precedes
   → 2329 ⪪ left-pointing angle bracket
29FD ⪫ RIGHT-POINTING CURVED ANGLE BRACKET
   → 227B ⪫ succeeds
   → 232A ⪫ 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