

To: UTC

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RE: Arabic Math Alphabetic Symbols

Date: 31 January 2010

Background

A proposal for Arabic alphabetic math symbols was first submitted to the UTC by Azzeddine Lazrek in 2005. The latest version of the proposal, <http://www.unicode.org/L2/L2006/06124-n3085.pdf>, includes documentation for the characters, with the exception of a number of the “tailed” set. (We are still gathering evidence for a number of the tailed characters. Supplementary documentation will be provided in support of these characters.)

Attached is a codechart and names list that draws on the characters discussed in the document above. It includes 17 additional tailed characters that are based upon the isolated forms of the letters. The order has been rearranged slightly from that in L2/06-124, in order to be more consistent.¹

In order to give background on the use (and need) for Arabic math symbols, the following overview is provided (adapted from the proposal cited above, L2/06-124):

In Arabic presentation, Arabic mathematical expressions use special symbols and usually flow from *right to left*. Most of these symbols had been adopted through official international conventions such as *The Amman’s 1987 convention*.

Arabic mathematical alphabetic symbols constitute a widely used version of the Arabic alphabet, used over many centuries and in many contexts, e.g. epigraphical, manuscript and manual books, traditional printed editions. This way of writing expressions corresponds to the standards and conventions adopted in languages using Arabic alphabet-based scripts, such as Arabic or Persian. The majority of mathematics handbooks used in the Middle East, Libya, Algeria,..., are typeset according to these conventions. Before French mathematical notation was adopted, Moroccan handbooks also respected this way of typesetting symbols. Up till now, the symbols are written by hand or, at best, with a typewriter. They are then printed directly with the traditional typesetters, without the aid of computers. Generally, the use of computers never goes beyond processing the ordinary text part of the document. In some cases, both types of presentations of mathematics, Arabic and Latin, may be required in the same text.

¹ See footnote 2, below.

Therefore, the addition of those characters is necessary for the correct and accurate representation of ancient and current Arabic mathematical expressions. It is also necessary in order to complement the Arabic script which already exists in the Unicode Standard.

In mathematics, style variations are very important semantically. One reason for using mathematical alphabetic symbols in Latin-based script texts is that they are typeset in a different way from letters in ordinary text. For example, the character spacing is different in mathematic mode than in text mode, as illustrated in “let n be a number in the set N part of the natural number set \mathbb{N} in the context \mathcal{N} .” For right-to-left Arabic mathematical text, the usual shaping, or ligaturing, of Arabic letters is omitted except for abbreviations or for entities like trigonometric function names.

The mathematical alphabetic symbols used in Arabic mathematical handbooks are of six styles (or forms): *isolated*, *initial*, *tailed*, *stretched*, *looped*, and *double-struck*. With minor variations in shape, certain forms of these characters already exist in the Unicode standard. In particular, the isolated and initial styles of the Arabic letters appear in the "Arabic Presentation Forms-B" block, but are used in natural text. For use in mathematical mode, we propose mathematical counterparts be included in the Unicode Standard. That will facilitate the use of MathML for Arabic mathematical presentation.

Note that the Arabic math alphabetics do not have joining behavior, and as a result, need to be encoded separately.

Font information is not included in the names list, since these characters are symbols used in math, so no decompositions will be provided. (There is one exception: the 17 new tailed characters, whose glyphs come from a different font. This information was needed for the creation of the chart only, and will be removed.)

Lastly, note that for math in Arabic, the order of the letters is different from the order in the currently encoded Arabic block (see proposal document above, pp. 3-4).

Organization of the Chart

The first portion of the block is made up of sets of alphabetic symbols, with names that reflect the shapes of the letters: *isolated*, *initial*, *tailed*, *tailed initial*, *stretched*, *looped*, *double-struck*, *double-struck initial*. Within each of these sets, the letters appear in the “math” alphabetic order (ALEF, BEH, JEEM, DAL...).

Following the double-struck initial group, there is a set of “particular alphabetic” symbols, which is made up of characters that are not “simple” Arabic letters (i.e., ALEF ALHISAB, HEH

MASHQUQAT, etc). These are followed by a “double-struck particular alphabetic” symbols group, which should follow the order of characters in the “particular alphabetic” group.²

² There is an error in the attached codechart/names list for the “particular alphabetic math symbols” and the “double-struck particular alphabetic” sets, which we were not able to correct in time for the February UTC. A revised version will follow. The correct order should be as follows:

Particular alphabetic math symbols

ARABIC MATH SYMBOL ALEF ALHISAB
ARABIC MATH SYMBOL HEH MASHQUQAT
ARABIC MATH SYMBOL ZAIN MODGHAMAT
ARABIC MATH SYMBOL YEH RAJIAT
ARABIC MATH SYMBOL KAF ZINADY
ARABIC MATH SYMBOL KAF RUQAAT
ARABIC MATH SYMBOL LAMALEF
ARABIC MATH SYMBOL MEEM MURSALAT
ARABIC MATH SYMBOL INVERTED NOON
ARABIC MATH SYMBOL LEFT NOON
ARABIC MATH SYMBOL REH MODGHAMAT
ARABIC MATH SYMBOL HAMZA
ARABIC MATH SYMBOL SHARAT KAF
ARABIC MATH SYMBOL ALEF MAKSURA
ARABIC MATH SYMBOL PEH
ARABIC MATH SYMBOL TCHEH
ARABIC MATH SYMBOL VEH
ARABIC MATH SYMBOL GHEH
ARABIC MATH SYMBOL LOOPED ALEF MAKSURA
ARABIC MATH SYMBOL LOOPED PEH
ARABIC MATH SYMBOL LOOPED TCHEH
ARABIC MATH SYMBOL LOOPED VEH
ARABIC MATH SYMBOL LOOPED GHEH

Double-struck particular alphabetic math symbols

ARABIC MATH SYMBOL DOUBLE-STRUCK ALEF ALHISAB
ARABIC MATH SYMBOL DOUBLE-STRUCK HEH MASHQUQAT
ARABIC MATH SYMBOL DOUBLE-STRUCK ZAIN MODGHAMAT
ARABIC MATH SYMBOL DOUBLE-STRUCK YEH RAJIAT
ARABIC MATH SYMBOL DOUBLE-STRUCK KAF ZINADY
ARABIC MATH SYMBOL DOUBLE-STRUCK KAF RUQAAT
ARABIC MATH SYMBOL DOUBLE-STRUCK LAMALEF
ARABIC MATH SYMBOL DOUBLE-STRUCK MEEM MURSALAT
ARABIC MATH SYMBOL DOUBLE-STRUCK INVERTED NOON
ARABIC MATH SYMBOL DOUBLE-STRUCK LEFT NOON
ARABIC MATH SYMBOL DOUBLE-STRUCK REH MODGHAMAT
ARABIC MATH SYMBOL DOUBLE-STRUCK HAMZA
ARABIC MATH SYMBOL DOUBLE-STRUCK SHARAT KAF
ARABIC MATH SYMBOL DOUBLE-STRUCK ALEF MAKSURA

The next group is the “dotless alphabetic math symbols” set, which is ordered differently from the 8 groups at the beginning of the block. In the “dotless” set, each letter, e.g., DOTLESS BEH, is ordered by its isolated form followed by the other forms it takes (initial, tailed, tailed initial, looped, double-struck, double-struck initial). For example, DOTLESS BEH is followed by INITIAL DOTLESS BEH, TAILED DOTLESS BEH, etc. This group of characters needs to be handled differently from the other sets, because in Arabic-script math, dots and diacritics are not commonly used to differentiate the symbols. Having them together in one group will make it easier for mathematicians to locate them.

The next group are “large mathematical” symbols, followed by dotless forms of these symbols. Finally, two sets of reversed math symbols appear. All of the characters in this set which have corresponding non-reversed forms listed in the chart have the bidi category “Y”.

Request to the UTC

The Arabic language user community would benefit greatly from the timely adoption of these characters, particularly as the original proposal has languished so long. The MathML WG would very much like to see progress on this proposal since the Arabic math alphabetic are referred to in the MathML 3.0 specification due to be published this summer.

Comments are sought from the UTC regarding the names, order, and repertoire.

	10F0	10F1	10F2	10F3	10F4	10F5	10F6	10F7	10F8
0	ا 10F00	ف 10F10	ط 10F20	ظ 10F30	غ 10F40	ش 10F50	سا 10F60	هو 10F70	شه 10F80
1	ب 10F01	ص 10F11	ي 10F21	غ 10F31	به 10F41	ته 10F51	عا 10F61	وه 10F71	ته 10F81
2	ح 10F02	ق 10F12	ك 10F22	ج 10F32	جه 10F42	شه 10F52	فا 10F62	زه 10F72	شه 10F82
3	د 10F03	ر 10F13	ل 10F23	ه 10F33	هه 10F43	خه 10F53	صا 10F63	حا 10F73	ح 10F83
4	ه 10F04	ش 10F14	م 10F24	و 10F34	حه 10F44	ضه 10F54	قا 10F64	طه 10F74	نه 10F84
5	و 10F05	ت 10F15	ذ 10F25	ح 10F35	طه 10F45	ظه 10F55	شا 10F65	يه 10F75	ضه 10F85
6	ز 10F06	ث 10F16	س 10F26	يه 10F36	يه 10F46	غه 10F56	تا 10F66	كه 10F76	ظه 10F86
7	ح 10F07	خ 10F17	ع 10F27	ك 10F37	كه 10F47	با 10F57	ثا 10F67	له 10F77	غ 10F87
8	ط 10F08	ذ 10F18	ف 10F28	س 10F38	له 10F48	جاله 10F58	خا 10F68	مه 10F78	ا 10F88
9	ي 10F09	ض 10F19	ص 10F29	ع 10F39	مه 10F49	ها 10F59	ضا 10F69	نه 10F79	ب 10F89
A	ك 10F0A	ظ 10F1A	ق 10F2A	ص 10F3A	نه 10F4A	حا 10F5A	ظا 10F6A	سه 10F7A	ح 10F8A
B	ل 10F0B	غ 10F1B	ش 10F2B	ش 10F3B	سه 10F4B	طا 10F5B	غا 10F6B	ع 10F7B	د 10F8B
C	م 10F0C	ب 10F1C	ت 10F2C	ت 10F3C	عه 10F4C	يا 10F5C	ه 10F6C	فه 10F7C	ه 10F8C
D	ن 10F0D	جا 10F1D	ث 10F2D	ث 10F3D	فه 10F4D	كا 10F5D	ب 10F6D	مه 10F7D	و 10F8D
E	س 10F0E	ها 10F1E	لا 10F2E	ح 10F3E	صه 10F4E	ما 10F5E	ح 10F6E	قه 10F7E	ز 10F8E
F	ع 10F0F	لا 10F1F	ض 10F2F	ضه 10F3F	قه 10F4F	نا 10F5F	ه 10F6F	ه 10F7F	ح 10F8F

	10F9	10FA	10FB	10FC	10FD	10FE	10FF	1100	1101
0	ط 10F90	ذ 10FA0	ف 10FB0	ن 10FC0	ع 10FD0	ر 10FE0	ه 10FF0	ها 11000	ا 11010
1	ي 10F91	ض 10FA1	ص 10FB1	ر 10FC1	م 10FD1	ه 10FE1	فا 10FF1	عر 11001	ب 11011
2	ك 10F92	ظ 10FA2	ق 10FB2	ز 10FC2	ء 10FD2	سا 10FE2	فه 10FF2		ث 11012
3	ل 10F93	غ 10FA3	ش 10FB3	ى 10FC3	ه 10FD3	م 10FE3	و 10FF3		ج 11013
4	م 10F94	ب 10FA4	ت 10FB4	ع 10FC4	ع 10FD4	ب 10FE4	و 10FF4		د 11014
5	ن 10F95	ج 10FA5	ث 10FB5	كا 10FC5	ك 10FD5	ر 10FE5	و 10FF5		ذ 11015
6	س 10F96	ه 10FA6	خ 10FB6	لا 10FC6	ك 10FD6	س 10FE6	و 10FF6		ح 11016
7	ع 10F97	ح 10FA7	ظ 10FB7	ء 10FC7	لا 10FD7	ح 10FE7	فه 10FF7		E 11017
8	ف 10F98	ط 10FA8	ظ 10FB8	ا 10FC8	م 10FD8	ع 10FE8	و 10FF8		س 11018
9	ص 10F99	پ 10FA9	غ 10FB9	ح 10FC9	ج 10FD9	س 10FE9	مجا 10FF9		ا 11019
A	ق 10F9A	ك 10FAA	م 10FBA	فا 10FCA	ه 10FDA	س 10FEA	جدا 10FFA		ا 1101A
B	ر 10F9B	ل 10FAB	ء 10FBB	ع 10FCB	ر 10FDB	ه 10FEB	نجا 10FFB		ب 1101B
C	ش 10F9C	م 10FAC	ها 10FBC	ى 10FCC	ز 10FDC	ن 10FEC	لا 10FFC		6 1101C
D	ت 10F9D	ز 10FAD	ك 10FBD	م 10FCD	ى 10FDD	ه 10FED	تع 10FFD] 1101D
E	ث 10F9E	س 10FAE	م 10FBE	ح 10FCE	ء 10FDE	فا 10FEE	مجا 10FFE		3 √ 1101E
F	خ 10F9F	ع 10FAF	ن 10FBF	فه 10FCF	ا 10FDF	و 10FEF	جدا 10FFF		4 √ 1101F

Isolated alphabetic math symbols

10F00	ا	ARABIC MATH SYMBOL ALEF → 0627 ا arabic letter alef
10F01	ب	ARABIC MATH SYMBOL BEH → 0628 ب arabic letter beh
10F02	ج	ARABIC MATH SYMBOL JEEM → 062C ج arabic letter jeem
10F03	د	ARABIC MATH SYMBOL DAL → 062F د arabic letter dal
10F04	ه	ARABIC MATH SYMBOL HEH → 0647 ه arabic letter heh
10F05	و	ARABIC MATH SYMBOL WAW → 0648 و arabic letter waw
10F06	ز	ARABIC MATH SYMBOL ZAIN → 0632 ز arabic letter zain
10F07	ح	ARABIC MATH SYMBOL HAH → 062D ح arabic letter hah
10F08	ط	ARABIC MATH SYMBOL TAH → 0637 ط arabic letter tah
10F09	ي	ARABIC MATH SYMBOL YEH → 064A ي arabic letter yeh
10F0A	ك	ARABIC MATH SYMBOL KAF → 0643 ك arabic letter kaf
10F0B	ل	ARABIC MATH SYMBOL LAM → 0644 ل arabic letter lam
10F0C	م	ARABIC MATH SYMBOL MEEM → 0645 م arabic letter meem
10F0D	ن	ARABIC MATH SYMBOL NOON → 0646 ن arabic letter noon
10F0E	س	ARABIC MATH SYMBOL SEEN → 0634 س arabic letter seen
10F0F	ع	ARABIC MATH SYMBOL AIN → 0639 ع arabic letter ain
10F10	ف	ARABIC MATH SYMBOL FEH → 0641 ف arabic letter feh
10F11	ص	ARABIC MATH SYMBOL SAD → 0635 ص arabic letter sad
10F12	ق	ARABIC MATH SYMBOL QAF → 0642 ق arabic letter qaf
10F13	ر	ARABIC MATH SYMBOL REH → 0631 ر arabic letter reh
10F14	ش	ARABIC MATH SYMBOL SHEEN → 0634 ش arabic letter sheen
10F15	ت	ARABIC MATH SYMBOL TEH → 062A ت arabic letter the
10F16	ث	ARABIC MATH SYMBOL THEH → 062B ث arabic letter theh
10F17	خ	ARABIC MATH SYMBOL KHAH → 062E خ arabic letter khah
10F18	ذ	ARABIC MATH SYMBOL THAL → 0630 ذ arabic letter thal
10F19	ض	ARABIC MATH SYMBOL DAD → 0636 ض arabic letter dad
10F1A	ظ	ARABIC MATH SYMBOL ZAH → 0638 ظ arabic letter zah
10F1B	غ	ARABIC MATH SYMBOL GHAIN → 063A غ arabic letter ghain

Initial alphabetic math symbols

10F1C	ب	ARABIC MATH SYMBOL INITIAL BEH → 0628 ب arabic letter beh → FE91 ب arabic letter beh initial form
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10F1D	ج	ARABIC MATH SYMBOL INITIAL JEEM → 062C ج arabic letter jeem → FE9F ج arabic letter jeem initial form
10F1E	ه	ARABIC MATH SYMBOL INITIAL HEH → 0647 ه arabic letter heh → FEEB ه arabic letter heh initial form
10F1F	ح	ARABIC MATH SYMBOL INITIAL HAH → 062D ح arabic letter hah → FEA3 ح arabic letter hah initial form
10F20	ط	ARABIC MATH SYMBOL INITIAL TAH
10F21	ي	ARABIC MATH SYMBOL INITIAL YEH → 064A ي arabic letter yeh → FEF3 ي ! arabic letter yeh initial form
10F22	ك	ARABIC MATH SYMBOL INITIAL KAF → 0643 ك arabic letter kaf → FEDB ك arabic letter kaf initial form
10F23	ل	ARABIC MATH SYMBOL INITIAL LAM → 0644 ل arabic letter lam → FEDF ل arabic letter lam initial form
10F24	م	ARABIC MATH SYMBOL INITIAL MEEM → 0645 م arabic letter meem → FEE3 م arabic letter meem initial form
10F25	ن	ARABIC MATH SYMBOL INITIAL NOON → 0646 ن arabic letter noon → FEE7 ن arabic letter noon initial form
10F26	س	ARABIC MATH SYMBOL INITIAL SEEN → 0634 س arabic letter seen → FEB3 س arabic letter seen initial form
10F27	ع	ARABIC MATH SYMBOL INITIAL AIN → 0639 ع arabic letter ain → FECB ع arabic letter ain initial form
10F28	ف	ARABIC MATH SYMBOL INITIAL FEH → 0641 ف arabic letter feh → FED3 ف arabic letter feh initial form
10F29	ص	ARABIC MATH SYMBOL INITIAL SAD → 0635 ص arabic letter sad → FEBB ص arabic letter sad initial form
10F2A	ق	ARABIC MATH SYMBOL INITIAL QAF → 0642 ق arabic letter qaf → FED7 ق arabic letter qaf initial form
10F2B	ش	ARABIC MATH SYMBOL INITIAL SHEEN → 0634 ش arabic letter sheen → FEB7 ش arabic letter sheen initial form
10F2C	ت	ARABIC MATH SYMBOL INITIAL TEH → 062A ت arabic letter teh → FE97 ت arabic letter teh initial form
10F2D	ث	ARABIC MATH SYMBOL INITIAL THEH → 062B ث arabic letter theh → FE9B ث arabic letter theh initial form
10F2E	خ	ARABIC MATH SYMBOL INITIAL KHAH → 062E خ arabic letter khah → FEA7 خ arabic letter khah initial form
10F2F	ض	ARABIC MATH SYMBOL INITIAL DAD → 0636 ض arabic letter dad → FEBF ض arabic letter dad initial form
10F30	ظ	ARABIC MATH SYMBOL INITIAL ZAH
10F31	غ	ARABIC MATH SYMBOL INITIAL GHAIN → 063A غ arabic letter ghain → FECF غ 1 arabic letter ghain initial form

Tailed alphabetic math symbols

10F32	ج	ARABIC MATH SYMBOL TAILED JEEM • 38 in ARRAMEZ font
10F33	د	ARABIC MATH SYMBOL TAILED DAL • 41 in ARRAMEZ font

10F34	و	ARABIC MATH SYMBOL TAILED WAW • 59 in ARRAMEZ font
10F35	ح	ARABIC MATH SYMBOL TAILED HAH • 39 in ARRAMEZ font
10F36	ي	ARABIC MATH SYMBOL TAILED YEH • 60 in ARRAMEZ font
10F37	ك	ARABIC MATH SYMBOL TAILED KAF • 54 in ARRAMEZ font
10F38	س	ARABIC MATH SYMBOL TAILED SEEN • 44 in ARRAMEZ font
10F39	ع	ARABIC MATH SYMBOL TAILED AIN • 50 in ARRAMEZ font
10F3A	ص	ARABIC MATH SYMBOL TAILED SAD • 46 in ARRAMEZ font
10F3B	ش	ARABIC MATH SYMBOL TAILED SHEEN • 45 in ARRAMEZ font
10F3C	ت	ARABIC MATH SYMBOL TAILED TEH • 36 in ARRAMEZ font
10F3D	ث	ARABIC MATH SYMBOL TAILED THEH • 37 in ARRAMEZ font
10F3E	خ	ARABIC MATH SYMBOL TAILED KHAH • 40 in ARRAMEZ font
10F3F	ض	ARABIC MATH SYMBOL TAILED DAD • 47 in ARRAMEZ font
10F40	غ	ARABIC MATH SYMBOL TAILED GHAIN • 51 in ARRAMEZ font

Tailed initial alphabetic math symbols

10F41	ب	ARABIC MATH SYMBOL TAILED INITIAL BEH
10F42	ج	ARABIC MATH SYMBOL TAILED INITIAL JEEM
10F43	ه	ARABIC MATH SYMBOL TAILED INITIAL HEH
10F44	ح	ARABIC MATH SYMBOL TAILED INITIAL HAH
10F45	ط	ARABIC MATH SYMBOL TAILED INITIAL TAH
10F46	ي	ARABIC MATH SYMBOL TAILED INITIAL YEH
10F47	ك	ARABIC MATH SYMBOL TAILED INITIAL KAF
10F48	ل	ARABIC MATH SYMBOL TAILED INITIAL LAM
10F49	م	ARABIC MATH SYMBOL TAILED INITIAL MEEM
10F4A	ن	ARABIC MATH SYMBOL TAILED INITIAL NOON
10F4B	س	ARABIC MATH SYMBOL TAILED INITIAL SEEN
10F4C	ع	ARABIC MATH SYMBOL TAILED INITIAL AIN
10F4D	ف	ARABIC MATH SYMBOL TAILED INITIAL FEH
10F4E	ص	ARABIC MATH SYMBOL TAILED INITIAL SAD
10F4F	ق	ARABIC MATH SYMBOL TAILED INITIAL QAF
10F50	ش	ARABIC MATH SYMBOL TAILED INITIAL SHEEN
10F51	ت	ARABIC MATH SYMBOL TAILED INITIAL TEH
10F52	ث	ARABIC MATH SYMBOL TAILED INITIAL THEH
10F53	خ	ARABIC MATH SYMBOL TAILED INITIAL KHAH
10F54	ذ	ARABIC MATH SYMBOL TAILED INITIAL DAD
10F55	ظ	ARABIC MATH SYMBOL TAILED INITIAL ZAH
10F56	غ	ARABIC MATH SYMBOL TAILED INITIAL GHAIN

Stretched alphabetic math symbols

10F57	ب	ARABIC MATH SYMBOL STRETCHED BEH
10F58	ج	ARABIC MATH SYMBOL STRETCHED JEEM
10F59	ه	ARABIC MATH SYMBOL STRETCHED HEH
10F5A	ح	ARABIC MATH SYMBOL STRETCHED HAH
10F5B	ط	ARABIC MATH SYMBOL STRETCHED TAH
10F5C	ي	ARABIC MATH SYMBOL STRETCHED YEH
10F5D	ك	ARABIC MATH SYMBOL STRETCHED KAF
10F5E	ل	ARABIC MATH SYMBOL STRETCHED LAM
10F5F	م	ARABIC MATH SYMBOL STRETCHED MEEM
10F60	ن	ARABIC MATH SYMBOL STRETCHED NOON
10F61	س	ARABIC MATH SYMBOL STRETCHED SEEN
10F62	ع	ARABIC MATH SYMBOL STRETCHED AIN

10F62	ف	ARABIC MATH SYMBOL STRETCHED FEH
10F63	ص	ARABIC MATH SYMBOL STRETCHED SAD
10F64	ق	ARABIC MATH SYMBOL STRETCHED QAF
10F65	ش	ARABIC MATH SYMBOL STRETCHED SHEEN
10F66	ت	ARABIC MATH SYMBOL STRETCHED TEH
10F67	ث	ARABIC MATH SYMBOL STRETCHED THEH
10F68	خ	ARABIC MATH SYMBOL STRETCHED KHAH
10F69	ذ	ARABIC MATH SYMBOL STRETCHED DAD
10F6A	ظ	ARABIC MATH SYMBOL STRETCHED ZAH
10F6B	غ	ARABIC MATH SYMBOL STRETCHED GHAIN

Looped alphabetic math symbols

10F6C	ا	ARABIC MATH SYMBOL LOOPED ALEF
10F6D	ب	ARABIC MATH SYMBOL LOOPED BEH
10F6E	ج	ARABIC MATH SYMBOL LOOPED JEEM
10F6F	د	ARABIC MATH SYMBOL LOOPED DAL
10F70	ه	ARABIC MATH SYMBOL LOOPED HEH
10F71	و	ARABIC MATH SYMBOL LOOPED WAW
10F72	ز	ARABIC MATH SYMBOL LOOPED ZAIN
10F73	ح	ARABIC MATH SYMBOL LOOPED HAH
10F74	ط	ARABIC MATH SYMBOL LOOPED TAH
10F75	ي	ARABIC MATH SYMBOL LOOPED YEH
10F76	ك	ARABIC MATH SYMBOL LOOPED KAF
10F77	ل	ARABIC MATH SYMBOL LOOPED LAM
10F78	م	ARABIC MATH SYMBOL LOOPED MEEM
10F79	ن	ARABIC MATH SYMBOL LOOPED NOON
10F7A	س	ARABIC MATH SYMBOL LOOPED SEEN
10F7B	ع	ARABIC MATH SYMBOL LOOPED AIN
10F7C	ف	ARABIC MATH SYMBOL LOOPED FEH
10F7D	ص	ARABIC MATH SYMBOL LOOPED SAD
10F7E	ق	ARABIC MATH SYMBOL LOOPED QAF
10F7F	ش	ARABIC MATH SYMBOL LOOPED SHEEN
10F80	ت	ARABIC MATH SYMBOL LOOPED TEH
10F81	ث	ARABIC MATH SYMBOL LOOPED THEH
10F82	خ	ARABIC MATH SYMBOL LOOPED KHAH
10F83	ذ	ARABIC MATH SYMBOL LOOPED DAD
10F84	ظ	ARABIC MATH SYMBOL LOOPED ZAH
10F85	غ	ARABIC MATH SYMBOL LOOPED GHAIN
10F86		
10F87		

Double-struck alphabetic math symbols

10F88	ا	ARABIC MATH SYMBOL DOUBLE-STRUCK ALEF
10F89	ب	ARABIC MATH SYMBOL DOUBLE-STRUCK BEH
10F8A	ج	ARABIC MATH SYMBOL DOUBLE-STRUCK JEEM
10F8B	د	ARABIC MATH SYMBOL DOUBLE-STRUCK DAL
10F8C	ه	ARABIC MATH SYMBOL DOUBLE-STRUCK HEH
10F8D	و	ARABIC MATH SYMBOL DOUBLE-STRUCK WAW
10F8E	ز	ARABIC MATH SYMBOL DOUBLE-STRUCK ZAIN
10F8F	ح	ARABIC MATH SYMBOL DOUBLE-STRUCK HAH
10F90	ط	ARABIC MATH SYMBOL DOUBLE-STRUCK TAH
10F91	ي	ARABIC MATH SYMBOL DOUBLE-STRUCK YEH
10F92	ك	ARABIC MATH SYMBOL DOUBLE-STRUCK KAF
10F93	ل	ARABIC MATH SYMBOL DOUBLE-STRUCK LAM
10F94	م	ARABIC MATH SYMBOL DOUBLE-STRUCK MEEM
10F95	ن	ARABIC MATH SYMBOL DOUBLE-STRUCK NOON
10F96	س	ARABIC MATH SYMBOL DOUBLE-STRUCK SEEN
10F97	ع	ARABIC MATH SYMBOL DOUBLE-STRUCK AIN
10F98	ف	ARABIC MATH SYMBOL DOUBLE-STRUCK FEH
10F99	ص	ARABIC MATH SYMBOL DOUBLE-STRUCK SAD

10F9A	ق	ARABIC MATH SYMBOL DOUBLE-STRUCK QAF
10F9B	ر	ARABIC MATH SYMBOL DOUBLE-STRUCK REH
10F9C	ش	ARABIC MATH SYMBOL DOUBLE-STRUCK SHEEN
10F9D	ت	ARABIC MATH SYMBOL DOUBLE-STRUCK TEH
10F9E	ث	ARABIC MATH SYMBOL DOUBLE-STRUCK THEH
10F9F	خ	ARABIC MATH SYMBOL DOUBLE-STRUCK KHAH
10FA0	ذ	ARABIC MATH SYMBOL DOUBLE-STRUCK THAL
10FA1	ض	ARABIC MATH SYMBOL DOUBLE-STRUCK DAD
10FA2	ظ	ARABIC MATH SYMBOL DOUBLE-STRUCK ZAH
10FA3	غ	ARABIC MATH SYMBOL DOUBLE-STRUCK GHAIN

Double-struck initial alphabetic math symbols

10FA4	ب	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL BEH
10FA5	ج	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL JEEM
10FA6	ه	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL HEH
10FA7	ح	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL HAH
10FA8	ط	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL TAH
10FA9	ي	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL YEH
10FAA	ك	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL KAF
10FAB	ل	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL LAM
10FAC	م	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL MEEM
10FAD	ن	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL NOON
10FAE	س	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL SEEN
10FAF	ع	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL AIN
10FB0	ف	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL FEH
10FB1	ص	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL SAD
10FB2	ق	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL QAF
10FB3	ش	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL SHEEN
10FB4	ت	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL TEH
10FB5	ث	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL THEH
10FB6	خ	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL KHAH
10FB7	ذ	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL DAD
10FB8	ظ	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL ZAH
10FB9	غ	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL GHAIN

Particular alphabetic math symbols

10FBA	ا	ARABIC MATH SYMBOL ALEF ALHISAB
10FBB	ء	ARABIC MATH SYMBOL SHARAT KAF

10FBC	هـ	ARABIC MATH SYMBOL HEH MASHQUQAT
10FBD	ك	ARABIC MATH SYMBOL KAF RUQAAT
10FBE	م	ARABIC MATH SYMBOL MEEM MURSALAT
10FBF	ن	ARABIC MATH SYMBOL INVERTED NOON
10FC0	ق	ARABIC MATH SYMBOL LEFT NOON
10FC1	ر	ARABIC MATH SYMBOL REH MODGHAMAT
10FC2	ز	ARABIC MATH SYMBOL ZAIN MODGHAMAT
10FC3	ى	ARABIC MATH SYMBOL ALEF MAKSURA → 0649 ى arabic letter alef maksura
10FC4	ي	ARABIC MATH SYMBOL YEH RAJIAT → 06D2 ي arabic letter yeh barree
10FC5	ك	ARABIC MATH SYMBOL KAF ZINADY → 06AA ك arabic letter swash kaf
10FC6	لا	ARABIC MATH SYMBOL LAMALEF → FEFB لا arabic ligature lam with alef
10FC7	ء	ARABIC MATH SYMBOL HAMZA → 0621 ء arabic letter hamza
10FC8	پ	ARABIC MATH SYMBOL PEH → 067E پ arabic letter peh
10FC9	چ	ARABIC MATH SYMBOL TCHEH → 0686 چ arabic letter tcheh
10FCA	ف	ARABIC MATH SYMBOL VEH → 06A4 ف arabic letter veh
10FCB	غ	ARABIC MATH SYMBOL GHEH → 06A0 غ arabic letter ain with three dots above
10FCC	ى	ARABIC MATH SYMBOL LOOPED ALEF MAKSURA
10FCD	پ	ARABIC MATH SYMBOL LOOPED PEH
10FCE	چ	ARABIC MATH SYMBOL LOOPED TCHEH
10FCF	ف	ARABIC MATH SYMBOL LOOPED VEH
10FD0	غ	ARABIC MATH SYMBOL LOOPED GHEH

Double-struck particular alphabetic math symbols

10FD1	ا	ARABIC MATH SYMBOL DOUBLE-STRUCK ALEF ALHISAB
10FD2	ء	ARABIC MATH SYMBOL DOUBLE-STRUCK SHARAT KAF
10FD3	هـ	ARABIC MATH SYMBOL DOUBLE-STRUCK HEH MASHQUQAT
10FD4	ي	ARABIC MATH SYMBOL DOUBLE-STRUCK YEH RAJIAT
10FD5	ك	ARABIC MATH SYMBOL DOUBLE-STRUCK KAF RUQAAT
10FD6	ك	ARABIC MATH SYMBOL DOUBLE-STRUCK KAF ZINADY
10FD7	لا	ARABIC MATH SYMBOL DOUBLE-STRUCK LAMALEF
10FD8	م	ARABIC MATH SYMBOL DOUBLE-STRUCK MEEM MURSALAT
10FD9	ن	ARABIC MATH SYMBOL DOUBLE-STRUCK INVERTED NOON
10FDA	ق	ARABIC MATH SYMBOL DOUBLE-STRUCK LEFT NOON
10FDB	ر	ARABIC MATH SYMBOL DOUBLE-STRUCK REH MODGHAMAT
10FDC	ز	ARABIC MATH SYMBOL DOUBLE-STRUCK ZAIN MODGHAMAT
10FDD	ى	ARABIC MATH SYMBOL DOUBLE-STRUCK ALEF MAKSURA
10FDE	ء	ARABIC MATH SYMBOL DOUBLE-STRUCK HAMZA

Dotless alphabetic math symbols

10FDF	ب	ARABIC MATH SYMBOL DOTLESS BEH → 066E ب arabic letter dotless beh
10FE0	د	ARABIC MATH SYMBOL INITIAL DOTLESS BEH → FBE8 د arabic letter uighur kazakh kirghiz alef maksura initial form
10FE1	ه	ARABIC MATH SYMBOL TAILED DOTLESS BEH
10FE2	س	ARABIC MATH SYMBOL STRETCHED DOTLESS BEH
10FE3	ع	ARABIC MATH SYMBOL LOOPED DOTLESS BEH
10FE4	س	ARABIC MATH SYMBOL DOUBLE-STRUCK DOTLESS BEH
10FE5	د	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL DOTLESS BEH
10FE6	ن	ARABIC MATH SYMBOL DOTLESS NOON
10FE7	ه	ARABIC MATH SYMBOL TAILED DOTLESS NOON • 61 in ARRAMEZ font
10FE8	ن	ARABIC MATH SYMBOL LOOPED DOTLESS NOON
10FE9	ن	ARABIC MATH SYMBOL DOUBLE-STRUCK DOTLESS NOON
10FEA	ن	ARABIC MATH SYMBOL DOTLESS INVERTED NOON
10FEB	ن	ARABIC MATH SYMBOL DOUBLE-STRUCK DOTLESS INVERTED NOON
10FEC	ن	ARABIC MATH SYMBOL DOTLESS LEFT NOON
10FED	ن	ARABIC MATH SYMBOL DOUBLE-STRUCK DOTLESS LEFT NOON
10FEE	ف	ARABIC MATH SYMBOL DOTLESS FEH → 066F ف arabic letter dotless feh
10FEF	ف	ARABIC MATH SYMBOL INITIAL DOTLESS FEH
10FF0	ه	ARABIC MATH SYMBOL TAILED DOTLESS FEH
10FF1	س	ARABIC MATH SYMBOL STRETCHED DOTLESS FEH
10FF2	ف	ARABIC MATH SYMBOL LOOPED DOTLESS FEH
10FF3	ف	ARABIC MATH SYMBOL DOUBLE-STRUCK DOTLESS FEH
10FF4	ه	ARABIC MATH SYMBOL DOUBLE-STRUCK INITIAL DOTLESS FEH
10FF5	ق	ARABIC MATH SYMBOL DOTLESS QAF
10FF6	ه	ARABIC MATH SYMBOL TAILED DOTLESS QAF • 62 in ARRAMEZ font
10FF7	ق	ARABIC MATH SYMBOL LOOPED DOTLESS QAF
10FF8	ق	ARABIC MATH SYMBOL DOUBLE-STRUCK DOTLESS QAF

Large alphabetic math symbols

10FF9	∑	ARABIC MATH SYMBOL LARGE N-ARY SUMMATION
10FFA	∏	ARABIC MATH SYMBOL LARGE N-ARY PRODUCT
10FFB	ℓ	ARABIC MATH SYMBOL LARGE LIMIT
10FFC	!	ARABIC MATH SYMBOL LARGE FACTORIAL
10FFD	تعريف	ARABIC MATH SYMBOL BY DEFINITION

Dotless large alphabetic math symbols

10FFE	∑	ARABIC MATH SYMBOL DOTLESS LARGE N-ARY SUMMATION
10FFF	∏	ARABIC MATH SYMBOL DOTLESS LARGE N-ARY PRODUCT
11000	ℓ	ARABIC MATH SYMBOL DOTLESS LARGE LIMIT
11001	تعريف	ARABIC MATH SYMBOL DOTLESS BY DEFINITION

Reversed mathematical symbols

11010	∫	ARABIC MATH SYMBOL REVERSED INTEGRAL → 222B ∫ integral
11011	∮	ARABIC MATH SYMBOL REVERSED CONTOUR INTEGRAL → 222E ∮ contour integral
11012	∯	ARABIC MATH SYMBOL REVERSED SURFACE INTEGRAL → 222F ∯ surface integral
11013	∭	ARABIC MATH SYMBOL REVERSED VOLUME INTEGRAL → 2230 ∭ volume integral
11014	√	ARABIC MATH SYMBOL REVERSED SQUARE ROOT → 221A √ square root
11015	∝	ARABIC MATH SYMBOL REVERSED PROPORTIONAL TO → 221D ∝ proportional to
11016	′	ARABIC MATH SYMBOL REVERSED PRIME
11017	∃	ARABIC MATH SYMBOL REVERSED THERE EXISTS → 2203 ∃ there exists
11018	∖	ARABIC MATH SYMBOL REVERSED WREATH PRODUCT → 2240 ∖ wreath product
11019	−	ARABIC MATH SYMBOL REVERSED NEGATION
1101A	∠	ARABIC MATH SYMBOL REVERSED ANGLE → 2220 ∠ angle
1101B	∑	ARABIC MATH SYMBOL REVERSED N-ARY SUMMATION → 2211 ∑ n-ary summation
1101C	∂	ARABIC MATH SYMBOL REVERSED PARTIAL DIFFERENTIAL → 2202 ∂ partial differential
1101D	∩	ARABIC MATH SYMBOL REVERSED COMPLEMENT → 2201 ∩ complement

Reversed root symbols

1101E	∛	ARABIC MATH SYMBOL REVERSED CUBE ROOT → 221B ∛ cube root
1101F	∜	ARABIC MATH SYMBOL REVERSED FOURTH ROOT → 221C ∜ fourth root