Notomath—LaTeX math support for the noto package

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This package provides math support for the Google font collection Noto, a massive text font whose LaTeX support has been available for several years using Bob Tennent's noto package. The math support is based on newtxmath but there are some wrinkles that make it desirable to craft a small package, notomath, that can serve as a front end to simplify the business of lining up the text and math options, given that there are considerable size discrepancies between text and math at their natural sizes.

For the noto option to newtxmath, the Roman and Greek alphabets in the latter were substituted by those in Noto scaled down by 10% to an x-height of 482, which is a close enough match to the symbols in newtxmath for all practical purposes.

The Noto fonts comprise three different faces: NotoSerif, NotoSans and NotoSansMono. Each face has its own .sty file: noto-serif.sty, noto-sans.sty and noto-mono.sty. There is also an integrated .sty file, noto.sty, though it is a bit less configurable. Most of the time, it should not be necessary to load any of these packages explicitly, that task being relegated to the package notomath.

Usage

For most users, it will likely suffice to place some small variant of the following line in the preamble:

```
\usepackage{notomath}
```

The effect of this is:

- load noto-serif and noto-sans scaled down by the factor .9 to an x-height of 482;
- set the main text font to NotoSerif and set \sfdefault to NotoSans;
- the only weight used from the nine available weights are regular and bold, as these are the weights used in newtxmath with options noto and notosans;
- load newtxmath with option noto at natural scale.

Alternatively, the package may be loaded with options that modify the above behaviors:

- mono loads, in addition, noto-mono at the same x-height as the other Noto text packages.
- scale (or scaled) allows you to rescale all the Noto text packages and newtxmath by the specified factor.
- the figure style for NotoSerif and NotoSans may be controlled by the options proportional (or pf) and oldstyle (or osf), as in the noto package. (The default setting is tabular, lining figures.)
- You may add as an option to notomath any newtxmath option that is relevant to noto—these are simply passed along to newtxmath, if truly relevant. (E.g., option vvarbb would be passed along, but not garamondx because that would change all the math italic alphabets to match garamondx.)
- sfdefault changes the main text font to NotoSans, but leaves the meaning of \rmdefault unchanged, so that \textrm{} prints its argument using NotoSerif.

Usage Notes

- There are a couple of issues that might lead you to avoid NotoSansMono as your Typewriter font:
  - In OT1 encoding, the glyphs are not laid out as TEX TYPEWRITER TEXT, as, for example, cmtt. This means you will get incorrect output from text that involves quotes, backslash, braces and the like. (This is not a problem in other encodings such as T1.)
  - The NotoSansMono fonts have no visiblespace glyph, so \verb* will fail to to render the space as something like ␣. If this is important to you, replace noto-mono with a package like inconsolata, if you want to try another sans mono font. The loading order is important—you should load inconsolata before loading notomath.
- If you chose the sfdefault option so that NotoSans is the main text font, you may find that a SansMono font if too similar to be easily distinguished from the main font, in which case you may wish to switch to a serifed mono font. If not loading NotoSansMono by means of the option mono, you should load a replacement TT package BEFORE loading notomath if you wish to be able to use the macro \mathtt using glyphs that match those used for \texttt. There are three reasonable options, and possibly more that I'm not aware of. Each would need to be scaled up a bit.
  - The TT package zlmtt does have a visiblespace glyph and its OT1 encoding is in TEX TYPEWRITER TEXT so \verb and \texttt function correctly even in OT1 encoding. I find the caps too tall to be a very good match.
  - The TT package newtxtt does have a visiblespace glyph and works well in T1 encoding. There is no OT1 encoded version currently. Caps are a bit too tall to be a very good match.
  - The TT package nimbusmononarrow does have a visiblespace glyph and its OT1 encoding is in TEX TYPEWRITER TEXT so \verb and \texttt function correctly even in OT1 encoding. Caps are not too tall—this is my preferred serifed TT with NotoSans text.
-

Example preamble fragments

EXAMPLE 1:

```
\usepackage[mono,vvarbb,upint]{notomath}
% load NotoSerif, NotoSans, NotoSansMono, mainfont=NotoSerif
% options vvarbb and upint passed to newtxmath, resulting in
% STIX Blackboard Bold and upright integrals rather than slanted
```

The Noto fonts will be scaled to x-height 482, matching math symbols. The main text font will be NotoSerif.

EXAMPLE 2:

```
\usepackage[varq,varl]{inconsolata} % inconsolata sans mono
\usepackage[vvarbb,uprightscript]{notomath}
% load NotoSerif, NotoSans, mainfont=NotoSerif
% options vvarbb and uprightscript passed to newtxmath, resulting in
% STIX Blackboard Bold and upright script
```

The Noto fonts will be scaled to x-height 482, matching math symbols. The main text font will be NotoSerif.

EXAMPLE 3:

```
\usepackage[scaled=1.12]{nimbusmononarrow}% typewriter font
\usepackage[sfdefault,subscriptcorrection]{notomath}
% load NotoSerif, NotoSans, mainfont=NotoSans
% option subscriptcorrection passed to newtxmath
```

will output the Noto fonts scaled to x-height 482 with matching math symbols. The main text font will be Noto-Sans.

EXAMPLE 4:

```
\usepackage[scaled=1.24]{nimbusmononarrow}% typewriter font
\usepackage[scale=1.11,sfdefault,pf,osf]{notomath}
% load NotoSerif, NotoSans, mainfont=NotoSans
% option subscriptcorrection passed to newtxmath
```

will output the Noto fonts scaled to x-height 536 with matching math symbols. The main text font will be NotoSans with proportional oldstyle figures except in math, which always uses tabular lining figures.

The examples above all work with `pdflatex`, and with `xelatex` if some additional rules are followed. With `xelatex`, the lines in the above examples must precede the loading of `fontspec`, which must use the option `nomath`. After that, one may load any text fonts required for secondary use, or even replace the main Noto fonts.

Subscript Correction

The spacing of math letters was adjusted so the superscripts would not collide with the base letters. This was necessary mainly for letters like j, f, y and β as superscripts and like D and Ω as base letters. As a result of these adjustments, some of the formerly problematic superscript letters become problematic subscript letters. Two files are provided to make adjustments to the letter by inserting appropriate kerns when that letter is the first character in a subscript—one for NotoSerif and one for NotoSans letters, under the respective names

```
newtx-noto-subs.tex % for NotoSerif
newtx-notosans-subs.tex
```

The appropriate file is read in by `newtxmath` provided you add the option `subscriptcorrection`. A line in the file of the form `{j}{-2}` will translate to a kern of `-2mu` being placed before a leading j in a subscript.

Lower level settings

It may be that you wish to make use of lower level settings in the individual `noto-` packages. In that case, the following information may be useful.

Recall from the README to the `noto`:

- `\usepackage{noto}`
  - loads NotoSerif as `\rmdefault`;
  - loads NotoSans as `\sfdefault`;
  - loads NotoSansMono as `\ttdefault`;
  - lets `\familydefault` to `\rmdefault`;
  - so, main body text is NotoSerif, `\textsf` points to NotoSans and `\texttt` to NotoSansMono.
  - The `scale` option does not affect NotoSerif size.
- `\usepackage{noto-serif}`
  - loads NotoSerif as `\rmdefault`;
  - lets `\familydefault` to `\rmdefault`;
  - neither NotoSans nor NotoSansMono is loaded.
  - `scale` option available.

- `\usepackage{noto-sans}`
  - loads NotoSans as `\sfdefault`;
  - does not modify `\familydefault`;
  - neither NotoSerif or NotoSansMono is loaded.
  - `scale` option available.
- `\usepackage[sfdefault]{noto-sans}`
  - loads NotoSans as `\sfdefault`;
  - lets `\familydefault` to `\sfdefault`
  - neither NotoSerif or NotoSansMono is loaded and NotoSans becomes the main text font.
  - `scale` option available.
- `\usepackage{noto-mono}`
  - loads NotoSansMono as `\ttdefault`;
  - neither NotoSerif or NotoSans is loaded.
  - `scale` option available.

At its lowest level, you invoke NotoMath in `newtxmath` using the option `noto`, and NotoSansMath using the option `notosans`.

Math samples

An inversion formula: Let $g : \mathbb{R}^+ \to \mathbb{R}$ be bounded and right continuous, and let $\varphi(\alpha) \coloneqq \int_0^\infty e^{-\alpha t} g(t)\,dt$ denote its Laplace transform. Then, for every $t > 0$,

$$g(t) = \lim_{\varepsilon\to 0} \lim_{\lambda\to\infty} \varepsilon^{-1} \sum_{\lambda t < k \le (\lambda+\varepsilon)t} \frac{(-1)^k}{k!} \lambda^k \varphi^{(k)}(\lambda). \tag{1}$$

Solutions of systems of ODEs: Let $\mathbf{v}(\mathbf{x}, \boldsymbol{\alpha})$ denote a parametrized vector field ($\mathbf{x} \in U$, $\boldsymbol{\alpha} \in A$) where U is a domain in $\mathbb{R}^n$ and the parameter space A is a domain in $\mathbb{R}^m$. We assume that $\mathbf{v}$ is C^k-differentiable as a function of $(\mathbf{x}, \boldsymbol{\alpha})$, where $k \ge 2$. Consider a system of differential equations in U:

$$\mathbf{x} = \mathbf{v}(\mathbf{x}, \boldsymbol{\alpha}), \qquad \mathbf{x} \in U \tag{2}$$

Fix an initial point $\mathbf{p}_0$ in the interior of U, and assume $\mathbf{v}(\mathbf{p}_0, \boldsymbol{\alpha}_0) \ne \mathbf{0}$. Then, for sufficiently small t, $|\mathbf{p} - \mathbf{p}_0|$ and $|\boldsymbol{\alpha} - \boldsymbol{\alpha}_0|$, the system (2) has a unique solution $\mathbf{x}_{\boldsymbol{\alpha}}(t)$ satisfying the initial condition $\mathbf{x}_{\boldsymbol{\alpha}}(0) = \mathbf{p}$, and that solution depends differentiably (of class C^k) on t, $\mathbf{p}$ and $\boldsymbol{\alpha}$.

Stirling's formula:

$$\Gamma(z) \sim e^{-z} z^{z-1/2} \sqrt{2\pi} \left[1 + \frac{1}{12z} + \frac{1}{288z^2} - \frac{139}{51840z^3} + \dots \right], \quad z \to \infty \text{ in } |\arg z| < \pi. \tag{3}$$

Bézier curves: Given z_1, z_2, z_3, z_4 in $\mathbb{C}$, define the Bézier curve with control points z_1, z_2, z_3, z_4 by

$$z(t) \coloneqq (1-t)^3 z_1 + 3(1-t)^2 t z_2 + 3(1-t)t^2 z_3 + t^3 z_4, \qquad 0 \le t \le 1.$$

Because $(1-t)^3 + 3(1-t)^2 t + 3(1-t)t^2 + t^3 = (1-t+t)^3 = 1$ and all summands are positive for $0 \le t \le 1$, $z(t)$ is a convex combination of the four points z_k, hence the curve defined by $z(t)$ lies in their convex hull. As t varies from 0 to 1, the curve moves from z_1 to z_4 with initial direction $z_2 - z_1$ and final direction $z_4 - z_3$.

Maxwell's equations:

$$\mathbf{B}' = -c\nabla \times \mathbf{E}$$
$$\mathbf{E}' = c\nabla \times \mathbf{B} - 4\pi\mathbf{J}.$$

Residue theorem: Let f be analytic in the region G except for the isolated singularities $a_1, a_2, \ldots, a_m$. If γ is a closed rectifiable curve in G which does not pass through any of the points a_k and if $\gamma \approx 0$ in G, then

$$\frac{1}{2\pi i}\int_\gamma f = \sum_{k=1}^{m} n(\gamma; a_k)\operatorname{Res}(f; a_k).$$

Maximum modulus principle: Let G be a bounded open set in $\mathbb{C}$ and suppose that f is a continuous function on $\bar{G}$ which is analytic in G. Then

$$\max\{|f(z)| : z \in \bar{G}\} = \max\{|f(z)| : z \in \partial G\}.$$

Jacobi's identity: Define the *theta function* ϑ by

$$\vartheta(t) = \sum_{n=-\infty}^{\infty} \exp(-\pi n^2 t), \qquad t > 0.$$

Then

$$\vartheta(t) = t^{-1/2}\vartheta(1/t).$$

The following three samples show the previous three reworked using NotoSerif and its associated math fonts.

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Font Tables

Sans Math Letters

	′0	′1	′2	′3	′4	′5	′6	′7	
′00x	Γ 0	Δ 1	Θ 2	Λ 3	Ξ 4	Π 5	Σ 6	Υ 7	″0x
′01x	Φ 8	Ψ 9	Ω 10	α 11	β 12	γ 13	δ 14	ϵ 15	
′02x	ζ 16	η 17	θ 18	ι 19	κ 20	λ 21	μ 22	ν 23	″1x
′03x	ξ 24	π 25	ρ 26	σ 27	τ 28	υ 29	ϕ 30	χ 31	
′04x	ψ 32	ω 33	ε 34	ϑ 35	ϖ 36	ϱ 37	ς 38	φ 39	″2x
′05x	↼ 40	↽ 41	⇀ 42	⇁ 43	˓ 44	˒ 45	▹ 46	◃ 47	
′06x	0 48	1 49	2 50	3 51	4 52	5 53	6 54	7 55	″3x
′07x	8 56	9 57	. 58	, 59	< 60	/ 61	> 62	★ 63	
′10x	∂ 64	A 65	B 66	C 67	D 68	E 69	F 70	G 71	″4x
′11x	H 72	I 73	J 74	K 75	L 76	M 77	N 78	O 79	
′12x	P 80	Q 81	R 82	S 83	T 84	U 85	V 86	W 87	″5x
′13x	X 88	Y 89	Z 90	♭ 91	♮ 92	♯ 93	⌣ 94	⌢ 95	
′14x	ℓ 96	a 97	b 98	c 99	d 100	e 101	f 102	g 103	″6x
′15x	h 104	i 105	j 106	k 107	l 108	m 109	n 110	o 111	
′16x	p 112	q 113	r 114	s 115	t 116	u 117	v 118	w 119	″7x
′17x	x 120	y 121	z 122	ı 123	ȷ 124	℘ 125	⃗ 126	͡ 127	
′20x	128	ϰ 129	130	131	0 132	1 133	2 134	3 135	″8x
′21x	4 136	5 137	6 138	7 139	8 140	9 141	𝒜 142	ℬ 143	
′22x	𝒞 144	𝒟 145	ℰ 146	ℱ 147	𝒢 148	ℋ 149	ℐ 150	𝒥 151	″9x
′23x	𝒦 152	ℒ 153	ℳ 154	𝒩 155	𝒪 156	𝒫 157	𝒬 158	ℛ 159	
′24x	𝒮 160	𝒯 161	𝒰 162	𝒱 163	𝒲 164	𝒳 165	𝒴 166	𝒵 167	″Ax
′25x	𝒶 168	𝒷 169	𝒸 170	𝒹 171	ℯ 172	𝒻 173	ℊ 174	𝒽 175	
′26x	𝒾 176	𝒿 177	𝓀 178	𝓁 179	𝓂 180	𝓃 181	ℴ 182	𝓅 183	″Bx
′27x	𝓆 184	𝓇 185	𝓈 186	𝓉 187	𝓊 188	𝓋 189	𝓌 190	𝓍 191	
′30x	𝓎 192	𝓏 193	ı 194	ȷ 195	A 196	B 197	C 198	D 199	″Cx
′31x	E 200	F 201	G 202	H 203	I 204	J 205	K 206	L 207	
′32x	M 208	N 209	O 210	P 211	Q 212	R 213	S 214	T 215	″Dx
′33x	U 216	V 217	W 218	X 219	Y 220	Z 221	a 222	b 223	
′34x	c 224	d 225	e 226	f 227	g 228	h 229	i 230	j 231	″Ex
′35x	k 232	l 233	m 234	n 235	o 236	p 237	q 238	r 239	
′36x	s 240	t 241	u 242	v 243	w 244	x 245	y 246	z 247	″Fx
′37x	ı 248	ȷ 249	250	251	252	253	254	255	
	″8	″9	″A	″B	″C	″D	″E	″F	

Sans Math LettersA

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	Γ 0	Δ 1	Θ 2	Λ 3	Ξ 4	Π 5	Σ 6	Υ 7	″0x
´01x	Φ 8	Ψ 9	Ω 10	α 11	β 12	γ 13	δ 14	ϵ 15	
´02x	ζ 16	η 17	θ 18	ι 19	κ 20	λ 21	μ 22	ν 23	″1x
´03x	ξ 24	π 25	ρ 26	σ 27	τ 28	υ 29	ϕ 30	χ 31	
´04x	ψ 32	ω 33	ε 34	ϑ 35	ϖ 36	ϱ 37	ς 38	φ 39	″2x
´05x	40	41	42	𝟘 43	𝟙 44	𝟚 45	𝟛 46	𝟜 47	
´06x	𝟝 48	𝟞 49	𝟟 50	𝟠 51	𝟡 52	53	⊄ 54	⊅ 55	″3x
´07x	∉ 56	∌ 57	≔ 58	≕ 59	≠ 60	= 61	{ 62	} 63	
´10x	∂ 64	𝔄 65	𝔅 66	ℭ 67	𝔇 68	𝔈 69	𝔉 70	𝔊 71	″4x
´11x	ℌ 72	ℑ 73	𝔍 74	𝔎 75	𝔏 76	𝔐 77	𝔑 78	𝔒 79	
´12x	𝔓 80	𝔔 81	ℜ 82	𝔖 83	𝔗 84	𝔘 85	𝔙 86	𝔚 87	″5x
´13x	𝔛 88	𝔜 89	ℨ 90	ℏ 91	ħ 92	ƛ 93	Ƶ 94	Å 95	
´14x	Ɛ 96	𝔞 97	𝔟 98	𝔠 99	𝔡 100	𝔢 101	𝔣 102	𝔤 103	″6x
´15x	𝔥 104	𝔦 105	𝔧 106	𝔨 107	𝔩 108	𝔪 109	𝔫 110	𝔬 111	
´16x	𝔭 112	𝔮 113	𝔯 114	𝔰 115	𝔱 116	𝔲 117	𝔳 118	𝔴 119	″7x
´17x	𝔵 120	𝔶 121	𝔷 122	123	124	ı 125	ȷ 126	⁀ 127	
´20x	128	ϰ 129	130	131	𝔸 132	𝔹 133	ℂ 134	𝔻 135	″8x
´21x	𝔼 136	𝔽 137	𝔾 138	ℍ 139	𝕀 140	𝕁 141	𝕂 142	𝕃 143	
´22x	𝕄 144	ℕ 145	𝕆 146	ℙ 147	ℚ 148	ℝ 149	𝕊 150	𝕋 151	″9x
´23x	𝕌 152	𝕍 153	𝕎 154	𝕏 155	𝕐 156	ℤ 157	𝕒 158	𝕓 159	
´24x	𝕔 160	𝕕 161	𝕖 162	𝕗 163	𝕘 164	𝕙 165	𝕚 166	𝕛 167	″Ax
´25x	𝕜 168	𝕝 169	𝕞 170	𝕟 171	𝕠 172	𝕡 173	𝕢 174	𝕣 175	
´26x	𝕤 176	𝕥 177	𝕦 178	𝕧 179	𝕨 180	𝕩 181	𝕪 182	𝕫 183	″Bx
´27x	ı 184	ȷ 185	ɩ 186	ȷ 187	𝑔 188	𝑦 189	190	191	
´30x	192	𝔸 193	𝔹 194	ℂ 195	𝔻 196	𝔼 197	𝔽 198	𝔾 199	″Cx
´31x	ℍ 200	𝕀 201	𝕁 202	𝕂 203	𝕃 204	𝕄 205	ℕ 206	𝕆 207	
´32x	ℙ 208	ℚ 209	ℝ 210	𝕊 211	𝕋 212	𝕌 213	𝕍 214	𝕎 215	″Dx
´33x	𝕏 216	𝕐 217	ℤ 218	ℾ 219	ℿ 220	ℽ 221	ℼ 222	223	
´34x	224	𝕒 225	𝕓 226	𝕔 227	𝕕 228	𝕖 229	𝕗 230	𝕘 231	″Ex
´35x	𝕙 232	𝕚 233	𝕛 234	𝕜 235	𝕝 236	𝕞 237	𝕟 238	𝕠 239	
´36x	𝕡 240	𝕢 241	𝕣 242	𝕤 243	𝕥 244	𝕦 245	𝕧 246	𝕨 247	″Fx
´37x	𝕩 248	𝕪 249	𝕫 250	ƛ 251	252	253	254	255	
	″8	″9	″A	″B	″C	″D	″E	″F	

Serif Math Letters

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	Γ 0	Δ 1	Θ 2	Λ 3	Ξ 4	Π 5	Σ 6	Υ 7	˝0x
´01x	Φ 8	Ψ 9	Ω 10	α 11	β 12	γ 13	δ 14	ϵ 15	
´02x	ζ 16	η 17	θ 18	ι 19	κ 20	λ 21	μ 22	ν 23	˝1x
´03x	ξ 24	π 25	ρ 26	σ 27	τ 28	υ 29	ϕ 30	χ 31	
´04x	ψ 32	ω 33	ε 34	ϑ 35	ϖ 36	ϱ 37	ς 38	φ 39	˝2x
´05x	↼ 40	↽ 41	⇀ 42	⇁ 43	˓ 44	˒ 45	▹ 46	◃ 47	
´06x	0 48	1 49	2 50	3 51	4 52	5 53	6 54	7 55	˝3x
´07x	8 56	9 57	. 58	, 59	< 60	/ 61	> 62	★ 63	
´10x	∂ 64	A 65	B 66	C 67	D 68	E 69	F 70	G 71	˝4x
´11x	H 72	I 73	J 74	K 75	L 76	M 77	N 78	O 79	
´12x	P 80	Q 81	R 82	S 83	T 84	U 85	V 86	W 87	˝5x
´13x	X 88	Y 89	Z 90	♭ 91	♮ 92	♯ 93	⌣ 94	⌢ 95	
´14x	ℓ 96	a 97	b 98	c 99	d 100	e 101	f 102	g 103	˝6x
´15x	h 104	i 105	j 106	k 107	l 108	m 109	n 110	o 111	
´16x	p 112	q 113	r 114	s 115	t 116	u 117	v 118	w 119	˝7x
´17x	x 120	y 121	z 122	ı 123	ȷ 124	℘ 125	⃗ 126	⁀ 127	
´20x	128	ϰ 129	130	131	0 132	1 133	2 134	3 135	˝8x
´21x	4 136	5 137	6 138	7 139	8 140	9 141	𝒜 142	ℬ 143	
´22x	𝒞 144	𝒟 145	ℰ 146	ℱ 147	𝒢 148	ℋ 149	ℐ 150	𝒥 151	˝9x
´23x	𝒦 152	ℒ 153	ℳ 154	𝒩 155	𝒪 156	𝒫 157	𝒬 158	ℛ 159	
´24x	𝒮 160	𝒯 161	𝒰 162	𝒱 163	𝒲 164	𝒳 165	𝒴 166	𝒵 167	˝Ax
´25x	𝒶 168	𝒷 169	𝒸 170	𝒹 171	ℯ 172	𝒻 173	ℊ 174	𝒽 175	
´26x	𝒾 176	𝒿 177	𝓀 178	𝓁 179	𝓂 180	𝓃 181	ℴ 182	𝓅 183	˝Bx
´27x	𝓆 184	𝓇 185	𝓈 186	𝓉 187	𝓊 188	𝓋 189	𝓌 190	𝓍 191	
´30x	𝓎 192	𝓏 193	ı 194	ȷ 195	𝓐 196	𝓑 197	𝓒 198	𝓓 199	˝Cx
´31x	𝓔 200	𝓕 201	𝓖 202	𝓗 203	𝓘 204	𝓙 205	𝓚 206	𝓛 207	
´32x	𝓜 208	𝓝 209	𝓞 210	𝓟 211	𝓠 212	𝓡 213	𝓢 214	𝓣 215	˝Dx
´33x	𝓤 216	𝓥 217	𝓦 218	𝓧 219	𝓨 220	𝓩 221	𝓪 222	𝓫 223	
´34x	𝓬 224	𝓭 225	𝓮 226	𝓯 227	𝓰 228	𝓱 229	𝓲 230	𝓳 231	˝Ex
´35x	𝓴 232	𝓵 233	𝓶 234	𝓷 235	𝓸 236	𝓹 237	𝓺 238	𝓻 239	
´36x	𝓼 240	𝓽 241	𝓾 242	𝓿 243	𝔀 244	𝔁 245	𝔂 246	𝔃 247	˝Fx
´37x	ı 248	ȷ 249	250	251	252	253	254	255	
	˝8	˝9	˝A	˝B	˝C	˝D	˝E	˝F	

Serif Math LettersA

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	Γ 0	Δ 1	Θ 2	Λ 3	Ξ 4	Π 5	Σ 6	ϒ 7	″0x
´01x	Φ 8	Ψ 9	Ω 10	α 11	β 12	γ 13	δ 14	ϵ 15	
´02x	ζ 16	η 17	θ 18	ι 19	κ 20	λ 21	μ 22	ν 23	″1x
´03x	ξ 24	π 25	ρ 26	σ 27	τ 28	υ 29	ϕ 30	χ 31	
´04x	ψ 32	ω 33	ε 34	ϑ 35	ϖ 36	ϱ 37	ς 38	φ 39	″2x
´05x	40	41	42	𝟘 43	𝟙 44	𝟚 45	𝟛 46	𝟜 47	
´06x	𝟝 48	𝟞 49	𝟟 50	𝟠 51	𝟡 52	53	⊄ 54	⊅ 55	″3x
´07x	∉ 56	∌ 57	≔ 58	≕ 59	≠ 60	= 61	{ 62	} 63	
´10x	∂ 64	𝔄 65	𝔅 66	ℭ 67	𝔇 68	𝔈 69	𝔉 70	𝔊 71	″4x
´11x	ℌ 72	ℑ 73	𝔍 74	𝔎 75	𝔏 76	𝔐 77	𝔑 78	𝔒 79	
´12x	𝔓 80	𝔔 81	ℜ 82	𝔖 83	𝔗 84	𝔘 85	𝔙 86	𝔚 87	″5x
´13x	𝔛 88	𝔜 89	ℨ 90	ℏ 91	ℏ 92	ƛ 93	Ƶ 94	Å 95	
´14x	Ɛ 96	𝔞 97	𝔟 98	𝔠 99	𝔡 100	𝔢 101	𝔣 102	𝔤 103	″6x
´15x	𝔥 104	𝔦 105	𝔧 106	𝔨 107	𝔩 108	𝔪 109	𝔫 110	𝔬 111	
´16x	𝔭 112	𝔮 113	𝔯 114	𝔰 115	𝔱 116	𝔲 117	𝔳 118	𝔴 119	″7x
´17x	𝔵 120	𝔶 121	𝔷 122	123	124	ı 125	ȷ 126	⁀ 127	
´20x	128	ϰ 129	130	131	𝔸 132	𝔹 133	ℂ 134	𝔻 135	″8x
´21x	𝔼 136	𝔽 137	𝔾 138	ℍ 139	𝕀 140	𝕁 141	𝕂 142	𝕃 143	
´22x	𝕄 144	ℕ 145	𝕆 146	ℙ 147	ℚ 148	ℝ 149	𝕊 150	𝕋 151	″9x
´23x	𝕌 152	𝕍 153	𝕎 154	𝕏 155	𝕐 156	ℤ 157	𝕒 158	𝕓 159	
´24x	𝕔 160	𝕕 161	𝕖 162	𝕗 163	𝕘 164	𝕙 165	𝕚 166	𝕛 167	″Ax
´25x	𝕜 168	𝕝 169	𝕞 170	𝕟 171	𝕠 172	𝕡 173	𝕢 174	𝕣 175	
´26x	𝕤 176	𝕥 177	𝕦 178	𝕧 179	𝕨 180	𝕩 181	𝕪 182	𝕫 183	″Bx
´27x	ı 184	ȷ 185	ı 186	ȷ 187	ℊ 188	𝓎 189	190	191	
´30x	192	𝔸 193	𝔹 194	ℂ 195	𝔻 196	𝔼 197	𝔽 198	𝔾 199	″Cx
´31x	ℍ 200	𝕀 201	𝕁 202	𝕂 203	𝕃 204	𝕄 205	ℕ 206	𝕆 207	
´32x	ℙ 208	ℚ 209	ℝ 210	𝕊 211	𝕋 212	𝕌 213	𝕍 214	𝕎 215	″Dx
´33x	𝕏 216	𝕐 217	ℤ 218	ℾ 219	ℿ 220	ℽ 221	ℼ 222	223	
´34x	224	𝕒 225	𝕓 226	𝕔 227	𝕕 228	𝕖 229	𝕗 230	𝕘 231	″Ex
´35x	𝕙 232	𝕚 233	𝕛 234	𝕜 235	𝕝 236	𝕞 237	𝕟 238	𝕠 239	
´36x	𝕡 240	𝕢 241	𝕣 242	𝕤 243	𝕥 244	𝕦 245	𝕧 246	𝕨 247	″Fx
´37x	𝕩 248	𝕪 249	𝕫 250	ƛ 251	252	253	254	255	
	″8	″9	″A	″B	″C	″D	″E	″F	