antlr4_tex2sym example No.1

(1) $2^{10} = 1024$

(2) $2^{2^{2^2}} = 65536$

(3) $40\,! = 815915283247897734345611269596115894272000000000$

(4) ${}_{10}P_3 = 720$

(5) $\dfrac{\dfrac{1}{2} - \dfrac{1}{3}}{\dfrac{1}{2} + \dfrac{1}{3}} = \dfrac{1}{5}$

(6) $-\dfrac{3}{5}a - 0.8a + a \div 5 \times 8 = \dfrac{a}{5}$

(7) $2a^3b^4(x - y)^2(x + y)^2 = 2a^3b^4x^4 - 4a^3b^4x^2y^2 + 2a^3b^4y^4$

(8) $ABC(X + Y + Z)^2 = ABCX^2 + 2ABCXY + 2ABCXZ + ABCY^2 + 2ABCYZ + ABCZ^2$

(9) $\left(\dfrac{1}{2}\alpha + \dfrac{1}{3}\beta + \dfrac{1}{6}\gamma\right)^2 = \dfrac{\alpha^2}{4} + \dfrac{\alpha\beta}{3} + \dfrac{\alpha\gamma}{6} + \dfrac{\beta^2}{9} + \dfrac{\beta\gamma}{9} + \dfrac{\gamma^2}{36}$

(10) ${}_3C_0\ a^3 + {}_3C_1\ a^2b + {}_3C_2\ ab^2 + {}_3C_3\ b^3 = (a + b)^3$

(11) $a^3 + b^3 + c^3 - 3abc = (a + b + c)\left(a^2 - ab - ac + b^2 - bc + c^2\right)$

(12) $(x + y)(y + z)(z + x) + xyz = (x + y + z)\left(xy + xz + yz\right)$

(13) $\dfrac{\sqrt{2} - 1}{\sqrt{6} + \sqrt{3}} = \dfrac{-2\sqrt{6} + 3\sqrt{3}}{3}$

(14) $\sqrt{10 - 2\sqrt{21}} = -\sqrt{3} + \sqrt{7}$

(15) $\sqrt[5]{\sqrt[3]{14348907}} = 3$

(16) $\sqrt{7} \times \sqrt[3]{7} \times \sqrt[6]{7} = 7$

(17) $\big|\,|3 - \pi| - 1\,\big| = -\pi + 4$

(18) $(1 + i)^3 = -2 + 2i$

(19) $e^{\pi i} = -1$

(20) $\sin\dfrac{5}{4}\pi\ \cos\dfrac{5}{6}\pi\ \tan\dfrac{5}{3}\pi = -\dfrac{3\sqrt{2}}{4}$

(21) $\sin^2\dfrac{5}{4}\pi + \cos^2\dfrac{5}{6}\pi + \tan^2\dfrac{5}{3}\pi = \dfrac{17}{4}$

antlr4_tex2sym example No.2

(22) $\log e^5 = 5$

(23) $\log_2 4^3 = 6$

(24) $\dfrac{d}{dx}(x^2 \sin \pi x) = x \left(\pi x \cos\left(\pi x\right) + 2\sin\left(\pi x\right)\right)$

(25) $\dfrac{d}{dx}\left(\log\left(\log x\right)\right) = \dfrac{1}{x \log\left(x\right)}$

(26) $\dfrac{d}{dx}\left(\log_{x+1} 3\right) = -\dfrac{\log\left(3\right)}{\left(x+1\right)\log\left(x+1\right)^2}$

(27) $\dfrac{d}{dx} e^{ex} = e^{ex+1}$

(28) $\displaystyle\int \theta \cos \theta^2 \, d\theta = \dfrac{\sin\left(\theta^2\right)}{2} + C$

(29) $\displaystyle\int t^2 \log t \, dt = \dfrac{t^3 \left(3 \log\left(t\right) - 1\right)}{9} + C$

(30) $\displaystyle\int_1^{\frac{5}{2}} (x-1)(2x-5)^2 \, dx = \dfrac{27}{16}$

(31) $\displaystyle\sum_{k=1}^{n} k(k+1)^2 = \dfrac{n\left(n+1\right)\left(n+2\right)\left(3n+5\right)}{12}$

(32) $\displaystyle\lim_{x\to-\infty}\left(\sqrt{x^2 + 3x} + x\right) = -\dfrac{3}{2}$

(33) $a_{n+1} = 3a_n + 12, \quad a_1 = 3$ $\qquad\qquad solution: \ a_n = 3 \cdot 3^n - 6$

(34) $a_{n+2} = 12a_{n+1} - 35a_n, \quad a_1 = 2, \ a_2 = 24$ $\qquad\qquad solution: \ a_n = -5^n + 7^n$

(35) $2x^2 + 3x + 4 = 0$ $\qquad\qquad solution: \ \left\{-\dfrac{3}{4} - \dfrac{\sqrt{23}i}{4}, -\dfrac{3}{4} + \dfrac{\sqrt{23}i}{4}\right\}$

(36) $x^2 - 3x - 4 \leqq 0$ $\qquad\qquad solution: \ [-1, 4]$

(37) $x^3 - 2x^2 - 5x + 6 \geqq 0$ $\qquad\qquad solution: \ [-2, 1] \cup [3, \infty)$

(38) $(aaa\,a\,a\,a\,a)^3 = a^{21}$

(39) $\{\dfrac{1}{2}a - (\dfrac{1}{3}b - \dfrac{1}{4}c)\}^2 = \dfrac{a^2}{4} - \dfrac{ab}{3} + \dfrac{ac}{4} + \dfrac{b^2}{9} - \dfrac{bc}{6} + \dfrac{c^2}{16}$

(40) $\left\{\dfrac{1}{2}a - \left(\dfrac{1}{3}b - \dfrac{1}{4}c\right)\right\}^2 = \dfrac{a^2}{4} - \dfrac{ab}{3} + \dfrac{ac}{4} + \dfrac{b^2}{9} - \dfrac{bc}{6} + \dfrac{c^2}{16}$