

antlr4_tex2sym example No.1

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

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

$$(3) \quad 40! = 8159152832478977343456112695961158942720000000000$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

antlr4_tex2sym example No.2

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

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

$$(24) \quad \frac{d}{dx}(x^2 \sin \pi x) = x(\pi x \cos(\pi x) + 2 \sin(\pi x))$$

$$(25) \quad \frac{d}{dx}(\log(\log x)) = \frac{1}{x \log(x)}$$

$$(26) \quad \frac{d}{dx} \log_{x+1} 3 = -\frac{\log(3)}{(x+1) \log(x+1)^2}$$

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

$$(28) \quad \int \theta \cos \theta^2 d\theta = \frac{\sin(\theta^2)}{2} + C$$

$$(29) \quad \int t^2 \log t dt = \frac{t^3(3 \log(t) - 1)}{9} + C$$

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

$$(31) \quad \sum_{k=1}^n k(k+1)^2 = \frac{n(n+1)(n+2)(3n+5)}{12}$$

$$(32) \quad \lim_{x \rightarrow -\infty} (\sqrt{x^2 + 3x} + x) = -\frac{3}{2}$$

$$(33) \quad a_{n+1} = 3a_n + 12, \quad a_1 = 3$$

$$solution : a_n = 3 \cdot 3^n - 6$$

$$(34) \quad a_{n+2} = 12a_{n+1} - 35a_n, \quad a_1 = 2, \quad a_2 = 24$$

$$solution : a_n = -5^n + 7^n$$

$$(35) \quad 2x^2 + 3x + 4 = 0$$

$$solution : \left\{ -\frac{3}{4} - \frac{\sqrt{23}i}{4}, -\frac{3}{4} + \frac{\sqrt{23}i}{4} \right\}$$

$$(36) \quad x^2 - 3x - 4 \leq 0$$

$$solution : [-1, 4]$$

$$(37) \quad x^3 - 2x^2 - 5x + 6 \geq 0$$

$$solution : [-2, 1] \cup [3, \infty)$$

$$(38) \quad -x^2 - x^2 = -2x^2$$

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