

$$\log_n^m a / \log_{mn}^m n, b, a > 0 \rightarrow \frac{\log m}{\log n} = a, \frac{\log m + \log m + \log n}{\log m + \log n} = b$$

$$\rightarrow a \log n = \log m \rightarrow 1 + \frac{\log m}{\log m + \log n} \xrightarrow{\text{جمله 1}} 1 + \frac{a \log n}{(a+1) \log n}$$

$$\rightarrow \frac{2a+1}{a+1} = b \rightarrow [b], 1$$

الف) $\sqrt{\frac{x}{\log x}} \rightarrow x > 0 \rightarrow \frac{x}{\log x} \geq 0 \rightarrow \log \frac{1}{x} > 0$

رسم نمودار: $y = \frac{x}{\log x}$ در $(0, 1)$ و $(1, \infty)$ مثبت است. $P_y(0, 1)$

ب) $\log(x^2 - x - 2) > 0 \rightarrow (x+1)(x-2) > 0 \rightarrow x < -1 \text{ یا } x > 2$

$\log(x^2 - 1) + 1 > 0 \rightarrow (x+1)(x-1) > 0 \rightarrow x < -1 \text{ یا } x > 1$

$$2 \log_a^a + \log_a^{\sqrt{x}} = 2 \frac{x-9}{\log a^2} \log a^2 + \log a^3 = 2$$

$$\rightarrow a = 3 \rightarrow \log_9^9 + \log_3^3 = 2 \cdot 1 + 1$$

$$\log 2.0/3 / \log 3.0/4 \rightarrow \log 5, \log 10, \log 2 = 1, 0/3 = 0/7$$

$$\rightarrow [\log 5, \log 3] x^2 + (\log 3 + \log 3) x - (\log 3 + \log 5) = 0 \rightarrow 3x^2 + 8x - 11 = 0$$

$$\Delta = 196, \sqrt{\Delta} = 14, x = \frac{-8 \pm 14}{6} \rightarrow x = \frac{14}{6} = \frac{7}{3}$$

$$\log_2^7 \cdot 218 / \log_5^2 \cdot 0/5 \rightarrow \frac{\log 2}{\log 5} = \frac{\log 2}{1 - \log 2} \cdot \frac{1}{2} = \log 2 \cdot \frac{1}{3}$$

$$\rightarrow \log 5 \cdot 1 - \frac{1}{3} = \frac{2}{3} \rightarrow \frac{\log 7}{\log 2} \cdot \frac{\log 7}{\frac{1}{3}} = \frac{14}{5} \rightarrow \log 7 \cdot \frac{14}{15}$$

$$\rightarrow \log_{14}^{10} \log_{14}^{10} \cdot \frac{1}{\log 2 + \log 7} = \frac{19}{15} \Rightarrow \frac{15}{19}$$

$$\log_3 5 \cdot 1/5 / \log_2 3 \cdot 1/6 \rightarrow \frac{\log_3 5}{\log_2 3} \cdot 1/6, \frac{1 - \log_2 2}{\log_3 2} \cdot \frac{1}{\log_3 2} \cdot 1/5$$

$$\rightarrow \frac{\log_2 2}{\log_3 2} \cdot \frac{1}{16} \rightarrow \frac{1}{\log_3 2} \cdot \frac{15}{10} + \frac{10}{16} \cdot \frac{17}{8} \rightarrow \boxed{\log_3 \frac{8}{17} \cdot \log_2 \frac{5}{17}}$$

$$\log_5 1 - \frac{5}{17} \cdot \left(\frac{12}{17}\right) \rightarrow \log_{15} \frac{\log_2 2 + \log_3 3}{\log_3 2 + \log_5 5} \cdot \frac{13}{20} \rightarrow \boxed{\frac{13}{20} \cdot 45}$$

$$\log_8^{18} m / \log_{24}^{12} ? \rightarrow \frac{\log_3 3 + \log_3 3 + \log_2 2}{3 \log_2 2} \cdot m = 3m \log_2 2 \cdot \log_2 2 + 2 \log_3 3$$

$$\rightarrow \frac{(3m-1) \log_2 2 \cdot \log_3 3}{2 \log_2 2 + \log_3 3} \rightarrow ? \text{ Tillb}$$

$$\frac{(2 + \frac{3m-1}{2}) \log_2 2}{2} \cdot \frac{3m+3}{2} \cdot \frac{3m+3}{4} \cdot 0.75m + 0.75$$

$$\left(\frac{2}{5}\right)^{2x-1} = \left(\frac{125}{8}\right)^{x^2} \rightarrow \frac{2^{2x}}{5^{2x}} \cdot \frac{5}{2} = \frac{5^{3x^2}}{2^{3x^2}} \rightarrow 2^{3x^2+2x-1} = 5^{3x^2+2x-1}$$

$$\frac{2!}{1!} \rightarrow 3x^2+2x-1=0 \rightarrow \frac{-2 \pm 4}{6} = -1, \left(\frac{1}{3}\right) \rightarrow -1 - \sqrt{5}$$

$$\log_8 4 = \frac{2}{3} \log_2 2 \cdot \left(\frac{2}{3}\right)$$

$$\log_2^3 a / \log_8^b \cdot \frac{2}{3} (1+a) \rightarrow \frac{1}{3} \log_2^b \cdot \frac{2}{3} (1+a) \rightarrow \frac{\log_2 b}{\log_2 2} \cdot 2 + 2a$$

$$\rightarrow 2 \log_2 2 + 2a \log_2 2 = \log_2 b \cdot \frac{\log_3 3}{\log_2 2} \cdot a \rightarrow 2 \log_2 2 + 2 \log_3 3 = \log_2 b$$

$$2(\log_2 2 \cdot 3) = \log_2 b \rightarrow \log_2 36 = \log_2 b \rightarrow \boxed{b=36} \rightarrow \boxed{\log_{100} 2}$$

$$\frac{4a}{b} \cdot \log_4 / (c+b) \cdot 2a \rightarrow \frac{2a}{b} \cdot \log_2 2 = \frac{b+c}{b} \cdot \log_2 2$$

$$\rightarrow 1 + \frac{c}{b} \cdot \log_2 2 \rightarrow \frac{c}{b} = -\log_2 5 \rightarrow 2a \cdot \log_2 2 / b \cdot \log_{10} / c = -\log_2 5$$

$$2^{\frac{1}{8} \cdot \frac{\log_2 5}{\log_2 2}} \rightarrow 2^{\frac{\log_2 5}{4 \cdot 2}} \rightarrow \log_2^2 \frac{1}{4} \log_2 5 \rightarrow \log_2^4 \log_2 5$$

$$\log_2 \sqrt{5}$$