$\log_8^{18} = m \qquad \log_4^{12} = \log_4^4 + \log_4^3 \Rightarrow \frac{12-3+m}{12} = \frac{9+m}{12}$

$\log_2^{18} = \frac{m}{3} \qquad \log_4^3 \Rightarrow \frac{1}{2}\log_2^3$

$\underbrace{\log_2^2}_{1} + \log_2^9$

$1 + 2\log_2^3 = \frac{m-3}{3} \Rightarrow \log_2^3 = \frac{m-3}{6} \Rightarrow \log_4^3 = \frac{m-3}{12}$

$(0.4)^{2x-1} = \left(\frac{125}{8}\right)^{x^2} \qquad \log_8(9x+1) \geq 0$ *

$\left(\frac{2}{5}\right)^{2x-1} = \left(\left(\frac{5}{2}\right)^3\right)^{x^2} = \left(\frac{2}{5}\right)^{-3x^2}$

$-3x^2 = 2x-1 \Rightarrow 3x^2 + 2x - 1 <$ -1 * غیرقابل قبول ، $+\frac{1}{3}$

$\Rightarrow 9 \times \frac{1}{3} + 1 = 4$

$\log_8^4 = \frac{2}{3}\log_2^2$ 2 $\Rightarrow \frac{2}{3}$

$\log_2^3 = a \qquad \log_8^b = \frac{2}{3}(1+a) \qquad \log(3b-8) \qquad \log_{10}^{108-8} = 2$ 2

$\frac{1}{3}\log_2^b = \frac{2}{3}(1+a)$

$\log_2^b = 2\underbrace{(1+a)}_{\log_2^2 + \log_2^3}$

$\underbrace{\log_2^2 + \log_2^3}_{\log_2^6}$

$\log_2^b = 2\log_2^6 \Rightarrow \log_2^b = \log_2^{36} \Rightarrow b = 36$

$\frac{1}{\alpha+\beta} = \log 4 \qquad -4ax^2 + bx + \frac{1}{2}c = 0 \qquad 2a = c+b$

$\frac{-b}{-4a} = \frac{b}{4a}$

$\frac{4a}{b} = \log 4 \qquad \left(\frac{1}{\sqrt[8]{2}}\right)^{\frac{c}{a}} = ?$

$\frac{1}{2^{\frac{1}{8}}} \Rightarrow \left(\frac{1}{2}\right)^{\frac{1}{8}} \Rightarrow \left(2^{-\frac{1}{8}}\right)^{\frac{c}{a}}$ 1

$\frac{\cancel{2}(c+b)}{b} = \cancel{2}\log_{10}^2$

$\frac{c}{b} + 1 = \log_{10}^2 \Rightarrow \underbrace{\cancel{\log_{10}^{10} - \log_{10}^2}}_{\log_{10}^5} = -\frac{c}{b} \qquad -\frac{c}{2a-c} \Rightarrow \log_5^{10} = -\frac{2a-c}{c}$

$\log_5^{10} = \frac{-2a}{c} + 1$

$\left(2^{-\frac{1}{8}}\right)^{\log_{\frac{1}{2}}^{5^2}} \Rightarrow 5^2 \underbrace{\log_{\frac{1}{2}}^{2^{-\frac{1}{8}}}}$

$\frac{2a}{c} = \log_5^5 - \log_5^{10}$

$-\frac{1}{8}\log_{2^{-1}}^2 \Rightarrow \frac{-\frac{1}{8}}{-1}\cancel{\log_2^2}^{1} = \frac{1}{8}$

$\frac{2a}{c} = \log_5^{\frac{1}{2}}$

$\frac{5^2}{8}$

$\frac{a}{c} = \frac{1}{2}\log_5^{\frac{1}{2}}$

$\frac{a}{c} = \log_{5^2}^{\frac{1}{2}}$

$\frac{c}{a} = \log_{\frac{1}{2}}^{5^2}$

نوران املایی

۱۴

$\log_n m = a \qquad \log_{mn} m^2 n = b \qquad a \geq ? \quad [b]$

$\underbrace{\log_{mn} m^2}_{2\log_{mn} m} + \underbrace{\log_{mn} n}_{\frac{1}{\log_n mn}} = \frac{1}{a+1}$

$\frac{1}{\log_n mn} \Rightarrow \overset{a}{\log_n m} + \overset{1}{\log_n n}$

$\frac{2}{\log_m mn} \Rightarrow \frac{2}{\frac{a+1}{a}} = \frac{2a}{a+1} + \frac{1}{a+1} = \frac{2a+1}{a+1} \Rightarrow \left[1+\frac{a}{a+1}\right] \Rightarrow 1 = [b]$ ۲

$\log_m mn = \underbrace{\log_m m + \log_m n}_{1+\frac{1}{a}}$

$y = \sqrt{\frac{x}{\log_{\frac12} x}} \Rightarrow 0 \qquad x>0 \qquad \log_{\frac12} x \neq 0 \Rightarrow (\tfrac12)^0 \neq x = x \neq 1 \qquad \frac{0 \quad 1}{-\ +\ -} \Rightarrow x \in (0,1)$ ۲

$y = \frac{\log_4 (x^2-x-2)}{\sqrt{x^2-1}+1} \qquad x^2-x-2>0 \quad (x+1)(x-2) \quad -1,\ 2 \quad \frac{-1 \quad 2}{+\ -\ +} \Rightarrow (-\infty,-1)\cup(2,+\infty)$ ۲

$\sqrt{x^2-1}+1 \neq 0 \qquad \sqrt{x^2-1} \neq -1$ ✗

$2\log_x a + \log_a \sqrt{x} = 2 \qquad x=9 \quad a=? \qquad \frac{2}{b}+\frac{b}{2} = 2 \Rightarrow \frac{4+b^2}{2b} = 2 \Rightarrow b^2+4 = 4b$

$2\frac{1}{\log_a x} + \frac12 \underbrace{\log_a x}_{b} \Rightarrow \log_a 9 = 2 \Rightarrow a^2 = 3^2 \Rightarrow \underline{a=3} \qquad b^2-4b+4=0 \quad (b-2)^2=0 \quad \underline{b=2}$ ۲

$\log 2 = 0.3 \qquad \log 3 = 0.4$ اختلاف ریشه‌ها؟ $\frac{\sqrt{\Delta}}{|a|}$

$(\log\frac53)x^2 + (\log 9)x - \log 15 = 0 \qquad \frac{\sqrt{0.64+4(0.33)}}{0.3} = \frac{1.4}{0.3} \quad (1.96)$

$\underbrace{(\log 9)^2}_{2\log 3 \to (0.8)^2 \to 0.64} - 4(\log\frac53 \times -\log 15)$ ۲

$+4(\log\frac53 \times \log 15)$

$(\log 5 - \log 3)(\log 3 + \log 5)$

$0.7 - 0.4 \qquad 0.4 + 0.7$

$0.3 \times 1.1 \Rightarrow 0.33$

$\log 5 = \underbrace{\log 10 - \log 2}_{\underbrace{1-0.3}_{0.7}}$

$\frac{\frac{14}{10}}{\frac{3}{10}} = \frac{14}{3}$

$\log_2 7 = 2.8 \qquad \log_5 2 = 0.5 \qquad \log_{14} 10$

$\log_2 7 + \log_2 2 = \log_2 14$

$2.8 + 1 = \boxed{3.8}$

$\Rightarrow \underbrace{\frac{1}{\log_{14} 2}}_{\frac{1}{3.8}} \Rightarrow \underbrace{\log_{14} 2}_{\frac{1}{3.8}} + \underbrace{\log_{14} 5}_{\frac{1}{1.9}} = \log_{14} 10 \Rightarrow \frac{10}{38} + \frac{10}{19} = \frac{10+20}{38} = \boxed{\frac{15}{19}}$ ۲

$\log_2 7 \times \log_5 2 = \log_5 7$

$2.8 \times \frac12 = 1.4$

$\Rightarrow \underbrace{\log_5 7}_{1.4} + \underbrace{\log_5 2}_{0.5} = \underbrace{\log_5 14}_{1.9}$

$\log_3 5 = 1.5 \qquad \log_2 3 = 1.6 \qquad \log_{15} 6$

$\log_3 5 \times \log_2 3 = \log_2 5 + \log_2 3 = \log_2 15 \Rightarrow \underbrace{\log_{15} 2}_{\frac14} + \underbrace{\log_{15} 3}_{\frac{2}{15}} = \log_{15} 6 \Rightarrow \frac{15+8}{60} = \frac{23}{60}$ ۱

$1.5 \times 1.6 \qquad 2.4 + 1.6 = 4$

$\log_3 5 + \log_3 3 = \log_3 15 \Rightarrow \log_{15} 3 = \frac{10}{25} = \frac{2}{5}$

$1.5 \qquad 1 \qquad 2.5$

$$\frac{\log_{3}^{6}}{\log_{3}^{15}}=\frac{\log_{3}^{2}+\log_{3}^{3}}{\log_{3}^{5}+\log_{3}^{3}}=\frac{\frac{1}{1.6}+1}{1.5+1}=\frac{13}{20}=0.65 \quad (6$$

$$\frac{\log 18}{\log 8}\Rightarrow\frac{\log 3}{\log 2}=\frac{3m-1}{2} \qquad \log_{4}^{12}=1+\log_{4}^{3}=1+\frac{1}{2}\left(\frac{3m-1}{2}\right)=\frac{3m+3}{4} \quad (7$$

$$\log_{4}^{3} \to \frac{\log 3}{2\log 2}$$

$$a=\frac{b+c}{2}\to b=2a-c\to\frac{1}{x_1+x_2}=\frac{1}{S}=\frac{4a}{b}=\frac{4a}{2a-c}=2\log^{2} \quad (10$$

$$\to\frac{2a}{2a-c}=\log^{2}\xrightarrow{\text{عکس}}\frac{2a-c}{2a}=\log_{2}^{10}\to 1-\log_{2}^{10}=\frac{c}{2a}\to 2-\log_{2}^{100}=\frac{c}{a} \quad (1)$$

$$\left(\frac{1}{\sqrt[8]{2}}\right)^{\frac{c}{a}}=\left(2^{-\frac{1}{8}}\right)^{\frac{c}{a}}=\left(2^{\frac{c}{a}}\right)^{\frac{-1}{8}}\xrightarrow{(1)}\left(2^{2-\log_{2}^{100}}\right)^{\frac{-1}{8}}$$

$$\left(\frac{2^{2}}{2^{\log_{2}^{100}}}\right)^{\frac{-1}{8}}=\left(\frac{4}{100}\right)^{\frac{-1}{8}}=(25)^{\frac{1}{8}}=\sqrt[4]{5}$$