شایان رومی‌زاده

$\log_n^m = a \to m = n^a$

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

$b = \frac{2a+1}{a+1} \to [b] = \left[\frac{a}{a+1} + 1\right] = 1 + \left[\frac{a}{a+1}\right] \xrightarrow{a>0} \boxed{[b]=1}$ 1

$\frac{x}{\log_{\frac12}^x} \geq 0 , \log_{\frac12}^x \neq 0 \Rightarrow \left(\frac12\right)^0 \neq x \to \boxed{x \neq 1}$ (1)

$\boxed{x>0}$ (2)

$, x>0 \Rightarrow \log_{\frac12}^x > 0 \to x > \left(\frac12\right)^0 \to \boxed{x>1}$ (3)

(1) $\cap$ (2) $\cap$ (3) $\Rightarrow \boxed{D = (1,+\infty)}$ 2

$x^2 - x - 2 \geq 0 \to (x+1)(x-2) \geq 0 \to$ $\begin{array}{ccccc} & -1 & & 2 & \\ + & 0 & - & 0 & + \end{array}$ $\to -\infty < x \leq -1$ یا $2 \leq x < +\infty$ $\boxed{(-\infty,-1] \cup [2,+\infty)}$ (2)

$\sqrt{x^2-1} + 1 \neq 0$ همواره برقرار ، $\sqrt{x^2-1} \geq 0 \to x^2 - 1 \geq 0 \to x^2 \geq 1 \to \boxed{-1 \leq x \leq 1}$ (1)

(1) $\cap$ (2) $\to \boxed{D = \varnothing}$

$2\log_x^a + \log_a^{\sqrt{x}} = 2 , x=9 \Rightarrow 2\log_9^a + \log_a^3 = 2 \to \frac{2}{2}\log_3^a + \log_a^3 = 2$

$\log_3^a = 2 - \log_a^3 \to \log_3^a + \log_a^3 = 2 \Rightarrow \frac{\log_3^a}{\log_3^3} + \frac{\log_3^3}{\log_3^a} = \frac{\log_3^a}{1} + \frac{1}{\log_3^a} = 2 , \log_3^a = t$ 3

$\Rightarrow t + \frac{1}{t} = 2 \to t^2 - 2t + 1 = 0 < \begin{matrix} t=1 \\ (t-1)^2 = 0 \end{matrix} \Rightarrow \log_3^a = 1 \Rightarrow \boxed{a=3}$

$= \left(\overbrace{\log^{10}}^{1} - \overbrace{\log^{6}}^{(\log^2+\log^3)}\right)x^2 + \left(2\log^3\right)x - \left(\underbrace{\log^3 + \log^5}_{\log^{15} = \log^3 + \log^5}\right) = 0 \to (1 - 0.3 - 0.4)x^2 + 2\times(0.4)x - 0.4 - \log^5$ 4

$\log^{\frac{5}{3}} = \log^{\frac{1}{6}} = \log^{10} - \log^{6}$

$\log^5 = \log^{\frac{10}{2}} = \log^{10} - \log^2 = 1 - 0.3 = 0.7$

$\to \underline{0.3x^2 + 0.8x - 1.1 = 0}$

اختلاف ریشه‌ها $= \frac{\sqrt{\Delta}}{|a|} = \frac{\sqrt{0.64 + 4.4 \times 0.3}}{0.3} = \frac{1.4}{0.3} = \boxed{\frac{14}{3}}$

$\log_{14}^{10} = \frac{\log_2^{10}}{\log_2^{14}} = \frac{\log_2^2 + \log_2^5}{\log_2^2 + \log_2^7} = \frac{1+2}{1+2.8} = \frac{3}{3.8} \simeq \boxed{0.79}$

$\log_5^2 = \frac{1}{2} \to \log_2^5 = 2$ 5

$$\log_{۱۵}^{۶} = \frac{\log_{۲}^{۶}}{\log_{۲}^{۱۵}} = \frac{\log_{۲}^{۲}+\log_{۲}^{۳}}{\log_{۲}^{۳}+\log_{۲}^{۵}} = \frac{۱+۱,۶}{۱,۶+۱,۵} = \frac{۲,۶}{۳,۱} \simeq \boxed{۰,۸۴}$$ ۶

$$\log_{۲^۳}^{۱۸} = m \rightarrow \log_{۲}^{۱۸} = ۳m = \log_{۲}^{۹}+\log_{۲}^{۲} = ۲\log_{۲}^{۳}+۱ = ۳m \Rightarrow \log_{۲}^{۳} = \frac{۳m-۱}{۲}$$

$$\log_{۲^۳}^{۱۲} = \frac{۱}{۳}\log_{۲}^{۱۲} = \frac{۱}{۳}\left(\log_{۲}^{۲^۲}+\log_{۲}^{۳}\right) = \frac{۱}{۳}\left(۲+\log_{۲}^{۳}\right) = \frac{۱}{۳}\left(۲+\frac{۳m-۱}{۲}\right) = \boxed{\frac{۳m+۳}{۶}}$$ ۷

$$(۰,۴)^{۲x-۱} = \frac{۲^{۲x-۱}}{۵^{۲x-۱}} = \left(\frac{۵^۳}{۲^۳}\right)^{x^۲} = \frac{۵^{۳x^۲}}{۲^{۳x^۲}} \rightarrow ۲^{۳x^۲+۲x-۱} = ۵^{۳x^۲+۲x-۱} \rightarrow ۳x^۲+۲x-۱=۰ \begin{cases} x=-۱ \\ x=\frac{۱}{۳} \end{cases}$$

$$\log_{۸}^{۹x+۱} = \frac{۱}{۳}\log_{۲}^{۹x+۱} \begin{cases} x=\frac{۱}{۳} \rightarrow \frac{۱}{۳}\log_{۲}^{۴} = \frac{۱}{۳}\times ۲ = \boxed{\frac{۲}{۳}} \\ x=-۱ \rightarrow \frac{۱}{۳}\log_{۲}^{-۸} \end{cases}$$ ۸

غ ق ق ×

$$\log_{۲^۳}^{b} = \frac{۱}{۳}\log_{۲}^{b} = \frac{۲}{۳}(۱+a) \Rightarrow \log_{۲}^{b} = ۲(a+۱) \rightarrow b = ۴^a \times ۴ \xrightarrow[۲^a=۳]{a=\log_{۲}^{۳}} b = ۹\times۴ = ۳۶$$ ۹

$$\Rightarrow \log_{۱۰}^{۳b-۸} = \log_{۱۰}^{۱۰۸-۸} = \log_{۱۰}^{۱۰۰} = \boxed{۲}$$

۱۰