

$$\log_m^n = a \quad \log_{mn}^{m^n n} = b \quad a > 0 \quad [b] = ? \Rightarrow [b] = \overline{1}$$

$$m = n^a$$

$$b = \log_{mn}^{m^n n} = \log_{n^a n}^{(n^a)^n n} = \log_{n^{a+1}}^{n^{a+1} n} = \log_{n^{a+1}}^{n^{a+2}} = \frac{a+2}{a+1} = 2 - \frac{1}{a+1}$$

$$a > 0 \Rightarrow a+1 > 1 \Rightarrow 1 < b < 2$$

الف) $y = \sqrt{\frac{x}{\log \frac{1}{x}}}$ $\log \frac{1}{x} \neq 0 \Rightarrow x \neq 1$

$\log \frac{1}{x} > 0 \Rightarrow x < 1$

$\frac{x}{\log \frac{1}{x}} > 0 \Rightarrow x < 1$

$D_f = (0, +\infty) - \{1\}$

ب) $y = \frac{\log(x^2 - x - 1)}{\sqrt{x^2 - 1} + 1}$ $x^2 - x - 1 > 0 \Rightarrow \Delta = 1 + 4 = 5$

$x = \frac{1 \pm \sqrt{5}}{2}$ $\begin{cases} x > 1 \\ x < -1 \end{cases}$

$x^2 - 1 > 0 \Rightarrow x > 1 \text{ or } x < -1$

$D_f = (-\infty, -1) \cup (1, +\infty)$

$2 \log x + \log \sqrt{x} = 2$, $x = 9$
 $a = ?$

$2 \log a + \log \sqrt{a} = 2 \Rightarrow \frac{2}{\log a} + \log a - 2 = 0 \Rightarrow \frac{2}{t} + t - 2 = 0 \Rightarrow t^2 - 2t + 1 = 0$

$\Delta = 4 - 4 = 0 \Rightarrow t = 1 \Rightarrow \log a = 1 \Rightarrow a = 10$

$\log 2 = 0.18$, $\log 3 = 0.18$

$(\log \frac{a}{b})^x + (\log 9)^x - \log 15 = 0 \Rightarrow 0.18^x + 0.18^x - 1.18 = 0$

$\log^x a = 2 \log^x b = 0.18$

$\Delta = 4^x + 11^x - 19^x$

$x = \frac{-4 \pm 11}{2} = \frac{-15}{2} = -7.5$

$\log \frac{a}{b} = \log a - \log b = \log 10 - \log 2 - \log 3 = 1 - 0.18 - 0.18 = 0.64$

$\log \frac{a}{b} = \log a - \log b = \log 10 - \log 2 - \log 3 = 1 - 0.18 - 0.18 = 0.64$

$\sqrt{\frac{11}{3}} = \frac{11}{3}$

$\log 2 = 0.18$, $\log 3 = 0.18$

$\log \frac{10}{18} = ? = \log \frac{5}{9} = \frac{\log 5}{\log 9} = \frac{\log 5 + \log 2}{\log 2 + \log 3} = \frac{1 + 0.18}{0.18 + 0.18} = \frac{1.18}{0.36} = \frac{29}{9}$

$\log 2 = \frac{1}{\log \frac{1}{2}} = 2$

≈ 0.179

