

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

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

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الف) $\frac{x}{\log \frac{1}{x}} > 0 \Rightarrow x > 0, x > 0, \log \frac{1}{x} \neq 0 \Rightarrow x \neq 1$ $\left| \frac{-1}{-1} + \frac{1}{-1} \right| \Rightarrow (0, 1)$

ب) $x^2 - x - 2 > 0 \Rightarrow \Delta = 9, x = -1, 2$ $\left| \frac{-1}{+1} - \frac{2}{-1} \right| \Rightarrow (-\infty, -1) \cup (2, +\infty)$
 $x^2 - 1 > 0 \Rightarrow x > 1 \Rightarrow (-\infty, -1] \cup [1, +\infty)$ $\sqrt{x^2 - 1} + 1 \neq 0 \Rightarrow D = \mathbb{R} \setminus (-\infty, -1) \cup (2, +\infty)$

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$$2 \log_{\frac{a}{2}} + \log_a^3 = 2 \Rightarrow \log_{\frac{a}{2}}^a + \log_a^3 = 2 \Rightarrow \frac{1}{\log_a^2} + \log_a^3 = 2$$

$$\xrightarrow{\log_a^2 = t} \frac{1}{t} + t = 2 \Rightarrow t^2 + 1 = 2t \Rightarrow t^2 - 2t + 1 = 0 \Rightarrow t = 1$$

$$\log_a^3 = 1 \Rightarrow a = 3$$

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$$(\log 5 - \log 3) x^2 + (2 \log 3) x - \log 3 - \log 5 = 0$$

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$$\frac{c}{a} = \frac{-\log 3 - \log 5}{\log 5 - \log 3} = \frac{\log 3 + \log 5}{\log 3 - \log 5} = \frac{\log 3 + (\log 10 - \log 2)}{\log 3 - (\log 10 - \log 2)} = \frac{0.4771 + 0.3010}{0.4771 - 0.3010} = \frac{0.7781}{0.1761} = 4.418$$

$$= \frac{1.1}{-0.3} = -\frac{11}{3}$$

$$\text{اختلاف: } \left| -\frac{11}{3} - 1 \right| = \frac{14}{3}$$

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$$\log \frac{1}{14} = \frac{\log \frac{1}{2}}{\log \frac{1}{4}} = \frac{\log 5 + \log 2}{\log 2 + \log 4} = \frac{-\log 2 + 1}{2 \log 2 + 1} \xrightarrow{(\log 2) = \frac{1}{2}} \frac{2+1}{2+2} = \frac{3}{4} \approx 0.75$$

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$$\frac{\log 14}{\log 7} \Rightarrow \frac{\log 2^3}{\log 2} = \frac{3 \log 2}{\log 2} = 3$$

$$\log \frac{12}{4} = 1 + \log \frac{3}{2} = 1 + \frac{1}{2} (\log 3 - \log 2) = \frac{2 + \log 3 - \log 2}{2}$$

$$\log_{10}^y = \frac{1}{\log_4^{10}} = \frac{\log_4^y}{\log_4^{10}} = \frac{\log_4^y + 1}{\log_4^{10} + 1} = \frac{\frac{1}{10} + 1}{\frac{1}{10} + 1} = \frac{11}{11} = 1$$

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$$\log_{r^m}^1 = \frac{1}{m} \log_r^1 = m \Rightarrow \frac{1}{m} (\log_r^1 + \log_r^m) = m \Rightarrow \frac{1}{m} (\log_r^m) + \frac{1}{m} = m$$

$$\Rightarrow \frac{1}{m} \log_r^m = m - \frac{1}{m} \Rightarrow \log_r^m = \frac{m^2 - 1}{m}$$

$$\log_r^1 = \frac{1}{m} \log_r^1 = \frac{1}{m} (\log_r^1 + \log_r^m) = \frac{1}{m} (1 + \log_r^m) = \frac{1}{m} (1 + \frac{m^2 - 1}{m})$$

$$\Rightarrow \frac{1}{m} (\frac{m^2 - 1}{m} + 1) = \frac{m^2 - 1}{m^2} + \frac{1}{m} = \frac{m^2 - 1 + m}{m^2} = \frac{m^2 + m - 1}{m^2}$$

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$$(1/f)^{x-1} = (\frac{a}{r})^{x-1} \Rightarrow (\frac{r}{a})^{x-1} = (\frac{a}{r})^{x-1} \Rightarrow x-1 = x-1 \Rightarrow x-1 = x-1$$

$$\Rightarrow \Delta = f + f(r) = 14 \Rightarrow x = \frac{-r \pm f}{4} \Rightarrow -1 \Rightarrow 9x + 1 > 0 \Rightarrow 9x > -1 \Rightarrow x > -\frac{1}{9}$$

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$$\log_{r^1}^{(9x+1)} = \log_{r^1}^f = \log_{r^1}^{r^x} = \left(\frac{r}{r}\right)^x$$

$$\log_{r^m}^b = \frac{1}{m} \log_r^b = \frac{r}{m} + \frac{r}{m} a \Rightarrow \log_r^b = r + ra, \log_{r^m}^a = a \Rightarrow m = r^a$$

$$\log_r^b = r + ra \Rightarrow (r)^{r+ra} = b \Rightarrow r^r \cdot r^{ra} = b \Rightarrow r^r (r^a)^r = b \Rightarrow b = r^{r(r+1)}$$

$$\log_{r^1}^{(rb-1)} = \log_{r^1}^{100} = (r)$$

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$$\log_{r^a}^b = \frac{b}{a} = \frac{1}{r^a} \Rightarrow \frac{b}{a} = \log_r^f \Rightarrow \frac{r^a}{b} = \log_r^f / a = \frac{b+c}{r} \Rightarrow r^a - b = c$$

$$\frac{c}{a} = \frac{r^a - b}{a} = r - \frac{b}{a} = r - \frac{r}{\log_r^f} \Rightarrow (r^{-\frac{1}{a}})^{\frac{1}{r}} = (r^{-\frac{1}{a}})^{r - \frac{r}{\log_r^f}} = r^{-\frac{1}{r}} + \frac{1}{r \log_r^f} = \frac{1}{r^{\frac{1}{r}}} \cdot \frac{1}{r \log_r^f}$$

$$(r^{\frac{1}{a}} \cdot \log_r^f \cdot \log_r^f = 1 \Rightarrow \log_r^f = \frac{1}{\log_r^f} \Rightarrow (r)^{\frac{1}{\log_r^f}} = 1.0)$$

$$\Rightarrow r^{-\frac{1}{r}} \times (r^{-\frac{1}{r}})^{\frac{1}{r}} = \frac{1}{\sqrt[r]{r}} \times \sqrt[r]{1} = \frac{\sqrt[r]{1}}{\sqrt[r]{r}} = \sqrt[r]{\frac{1}{r}}$$

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