

$$b = \frac{\log_m^n n}{\log_m n} = \frac{\log_n^m + \log_n^m + \log_n^n}{\log_n^m + \log_n^n} = \frac{2a+1}{a+1} = 1 + \frac{a}{a+1} \Rightarrow b=1 \quad (1)$$

(۲) الف) یای ترین شکل لگاریتم را رسم کنیم $\Rightarrow D_f = (0, 1) \cup (2, +\infty)$

① $\frac{x}{\log x} \geq 0 \Rightarrow \frac{0}{\frac{1}{x}} + \frac{1}{\frac{1}{x}} = x \geq 0 \Rightarrow x > 0$

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ب) $x^2 - 1 \geq 0 \Rightarrow x^2 \geq 1 \Rightarrow x \leq -1$ یا $x \geq 1$

$x^2 - x - 2 > 0 \Rightarrow (x-2)(x+1) > 0 \Rightarrow x < -1$ یا $x > 2$

$\Rightarrow D_f = (-\infty, -1) \cup (2, +\infty)$

(۳) $2y^a + y^3 = y^a + y^3 = 2 \Rightarrow a=3$

$\log_a^a + \frac{1}{\log_a^a} = \frac{(\log_a^a)^2 + 1}{\log_a^a} = \frac{t^2 + 1}{t} = 2 \Rightarrow t^2 - 2t + 1 = 0 \Rightarrow t=1 \Rightarrow \log_a^a = 1 \Rightarrow a=3$

(۴) $\frac{\sqrt{\Delta}}{|a|} = \frac{(\log^2)^2 + 4 \log^2 \log^2}{| \log^2 |} = \frac{(2 \log^2)^2 + 4(\log^2 - \log^2 - \log^2)}{\log^2 - \log^2 - \log^2} = \frac{(2 \log^2)^2 + 4(-\log^2)}{-\log^2} = \frac{4 \log^4 - 4 \log^2}{-\log^2} = \frac{4 \log^2 (\log^2 - 1)}{-\log^2} = \frac{4(1-1)}{-1} = 0$

(۵) $\log_{1/4}^1 = \frac{\log_4^1}{\log_4^{1/4}} = \frac{\log_4^1 + \log_4^2}{\log_4^1 + \log_4^2} = \frac{2+1}{2+1} = 1$

$\log_4^2 = \frac{1}{\frac{1}{2}} = 2$

(۶) $\log_{1/2}^2 = \frac{\log_2^2 + \log_2^2}{\log_2^2 + \log_2^2} = \frac{1 + \frac{1}{2}}{1 + \frac{1}{2}} = \frac{3/2}{3/2} = 1$

$\log_2^2 = \frac{1}{\frac{1}{2}} = 2$

(۷) $m = \log_n^m + \log_n^m = \log_n^{2m} \Rightarrow \frac{2m}{n} = \log_n^m = m+1 \Rightarrow \log_n^m = \frac{(m+1)m}{n}$

اگر بخواهیم عدد به هم حساب می شود (۱۸)

(۸) $\left(\frac{r}{a}\right)^{2x-1} = \left(\frac{a}{r}\right)^{2x} \Rightarrow -2x = 2x-1 \Rightarrow 4x = 1 \Rightarrow x = \frac{1}{4}$

$\Rightarrow 9x+1 > 0 \Rightarrow x > -\frac{1}{9} \Rightarrow \log_{1/9}^{(3+1)} = \frac{1}{3} (\log_9^4) = \frac{2}{3}$

(۹) $(a+1)^{\frac{r}{a}} = (\log_r^r + \log_r^r)^{\frac{r}{a}} = \frac{r}{a} \log_r^r = \log_r^{\frac{r^2}{a}} \Rightarrow b = \frac{r^2}{a} \Rightarrow \log^{(1.1-1)} = \log^1 = 1$

(۱۰) $a = \frac{b+c}{r} \Rightarrow ra = b+c$

$\frac{1}{5} = \frac{1}{\frac{b}{a}} = \frac{ra}{b} = \log^r \Rightarrow \log^r = \frac{ra}{b} \Rightarrow a = b \log^r$

$c = ra - b = r b \log^r - b = b(\log^r - 1) = b(\log^r - \log^1) = b \log^{\Delta^{-1}} = c$

$\frac{1}{\Delta} = \frac{1}{\log^{\Delta^{-1}}} = \frac{1}{\log^{\frac{1}{\Delta}}} = \frac{1}{\log^{\frac{1}{\Delta}}} = \frac{1}{\Delta}$