

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

$$\log_{mn}^{m^n} = b \xrightarrow{m=n^a} \log_{n^a n}^{(n^a)^n} = \log_{n^{a+1}}^{n^{a+1}} = b \rightarrow b = \frac{a+1}{a+1} \log_n^{n^{a+1}} = \frac{a+1}{a+1}$$

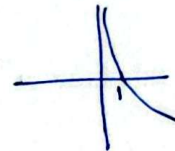
$$\frac{a+1}{a+1} = \frac{a+1}{a+1} - \frac{1}{a+1} = 1 - \frac{1}{a+1}$$

$$a > 0 \rightarrow \frac{1}{a+1} < 1 \rightarrow 1 < 1 - \frac{1}{a+1} < 1 \rightarrow [b] = 1$$

$$y = \sqrt{\frac{n}{\log \frac{1}{y}}} \rightarrow \log \frac{1}{y} \rightarrow n > 0$$

$$L \rightarrow \log \frac{1}{y} \neq 0 \rightarrow n \neq 1$$

$$\frac{n}{\log \frac{1}{y}} > 0 \xrightarrow{n \neq 0} \frac{n}{\log \frac{1}{y}} > 0 \xrightarrow{n > 0} \log \frac{1}{y} > 0$$



برای $0 < n < 1$ عبارت مثبت است

$$\text{اشتراک} \rightarrow 0 < n < 1 = D_y$$

$$\log_{\frac{1}{x}}(x^2 - n - 2) \rightarrow x^2 - n - 2 > 0 \quad \frac{-1 \pm \sqrt{1 - 4(-n-2)}}{2} \rightarrow \begin{cases} n > 2 \\ n < -1 \end{cases}$$

$$\sqrt{x^2 - 1} + 1$$

همواره غیر صفر و مثبت

$$\sqrt{x^2 - 1} \rightarrow x^2 - 1 \geq 0 \rightarrow (x-1)(x+1) \geq 0$$

$$\frac{-1 \pm \sqrt{1 - 4(-n-2)}}{2} \rightarrow \begin{cases} n \geq 1 \\ n \leq -1 \end{cases}$$

$$\text{اشتراک} \rightarrow n > 2 \cup n < -1 \rightarrow (-\infty, -1) \cup (2, +\infty) = D_y$$

$$2 \log_a^a + \log_a^{\sqrt{a}} = 2 \rightarrow 2 \log_a^a + \log_a^{\sqrt{a}} = 2 \rightarrow 2 \log_{\sqrt{a}}^a + \log_a^{\sqrt{a}} = 2 \rightarrow 2 \times \frac{1}{\sqrt{a}} \times \log_a^a + \log_a^{\sqrt{a}} = 2$$

$$\log_a^a + \log_a^{\sqrt{a}} = 2 \rightarrow \frac{1}{\log_a^{\sqrt{a}}} + \log_a^{\sqrt{a}} = 2 \rightarrow \frac{1}{t} + t = 2 \xrightarrow{\times t} 1 + t^2 - 2t = 0 \rightarrow (t-1)^2 = 0 \rightarrow t = 1$$

$$\log_a^{\sqrt{a}} = 1 \rightarrow a = \sqrt{a}$$

$$\log 2 \approx 0,3$$

$$\log 3 \approx 0,48$$

$$\log 6 = \log \frac{10}{2} = \log 10 - \log 2 \rightarrow 0,3$$

$$\log \frac{6}{3} = \log 6 - \log 3 = 0,3 - 0,48 = 0,12$$

$$\log 9 = \log 3 \times 3 = \log 3^2 = 2 \log 3 = 2 \times 0,48 = 0,96$$

$$\log 18 = \log 6 + \log 3 = 0,3 + 0,48 = 0,78$$

$$(\log \frac{6}{3})x^2 + (\log 9)x - \log 18 = 0 \rightarrow 0,12x^2 + 0,96x - 0,78 = 0 \xrightarrow{\times 100} 12x^2 + 96x - 78 = 0 \rightarrow$$

$$0 = \text{جمع ضرائب} \rightarrow x_1 = 1, x_2 = -\frac{11}{3} \xrightarrow{\text{اختلاف ریشه ها}} |1 - (-\frac{11}{3})| = \boxed{\frac{14}{3}}$$

-5

$$\log 5 = 0,69$$

$$\log 2 = 0,3$$

$$\log \frac{10}{2} = \frac{\log 10}{\log 2} = \frac{1}{0,3} \approx 3,33$$

$$\log \frac{10}{5} = \log 2 = 0,3$$

$$\log \frac{10}{2} = \log 5 = 0,69$$

$$\log 2 = \frac{1}{\log \frac{10}{2}} = \frac{1}{3,33} \approx 0,3$$

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$$\log 2 = 0,3 \quad \log 5 = 0,69 \rightarrow \log 10 = \log 2 + \log 5 = 0,3 + 0,69 = 1$$

$$\log \frac{4}{10} = \frac{\log 4}{\log 10} = \frac{\log 2 + \log 2}{1} = \frac{0,3 + 0,3}{1} = 0,6$$

$$\log_{\frac{1}{r}}^{\frac{1}{r}} = m \rightarrow \frac{\log_{\frac{1}{r}}^{\frac{1}{r}}}{\log_{\frac{1}{r}}^{\frac{1}{r}}} = \frac{\log_{\frac{1}{r}}^{\frac{1}{r}} + \log_{\frac{1}{r}}^{\frac{1}{r}}}{\log_{\frac{1}{r}}^{\frac{1}{r}} \rightarrow \frac{1}{r}} = \frac{1 + \log_{\frac{1}{r}}^{\frac{1}{r}}}{\frac{1}{r}} = \frac{1 + r \log_{\frac{1}{r}}^{\frac{1}{r}}}{\frac{1}{r}} = m \rightarrow 1 + r \log_{\frac{1}{r}}^{\frac{1}{r}} = r m \rightarrow \log_{\frac{1}{r}}^{\frac{1}{r}} = \frac{r m - 1}{r}$$

$$\log_{\frac{1}{r}}^{\frac{1}{r}} = ? \rightarrow \frac{\log_{\frac{1}{r}}^{\frac{1}{r}}}{\log_{\frac{1}{r}}^{\frac{1}{r}}} = \frac{\log_{\frac{1}{r}}^{\frac{1}{r}} + \log_{\frac{1}{r}}^{\frac{1}{r}}}{\log_{\frac{1}{r}}^{\frac{1}{r}}} = \frac{\log_{\frac{1}{r}}^{\frac{1}{r}} + r}{\frac{1}{r}} \rightarrow \frac{\frac{r m - 1}{r} + r}{\frac{1}{r}} = \frac{\frac{r m - 1 + r^2}{r}}{\frac{1}{r}} = \frac{r m - 1 + r^2}{1} = \boxed{\frac{r m + r}{r}}$$

-A

$$(0, \frac{1}{r})^{r n - 1} = (\frac{1 + \frac{1}{r}}{1})^{r n - 1} \rightarrow (\frac{r}{1 + r})^{r n - 1} = (\frac{a^r}{r^r})^{r n - 1} \rightarrow (\frac{r}{a})^{r n - 1} = (\frac{a}{r})^{r n - 1} \rightarrow$$

$$(\frac{a}{r})^{-1})^{r n - 1} = (\frac{a}{r})^{r n - 1} \rightarrow (\frac{a}{r})^{-r n + 1} = (\frac{a}{r})^{r n - 1} \rightarrow -r n + 1 = r n - 1 \rightarrow r n + r n - 1 = 0$$

جمع ضرایب اولی و آخری = وسطی $\rightarrow r_1 = -1, r_2 = \frac{1}{r}$

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

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$$\log_{\frac{1}{r}}^{\frac{1}{r}} = a$$

$$\log_{\frac{1}{r}}^{\frac{1}{r}} = \frac{r}{r} (1 + a) \rightarrow \log_{\frac{1}{r}}^{\frac{1}{r}} = \frac{r}{r} (1 + a) \rightarrow \frac{1}{r} \log_{\frac{1}{r}}^{\frac{1}{r}} = \frac{r}{r} (1 + a) \rightarrow \frac{1}{r} \times \frac{1}{r} \log_{\frac{1}{r}}^{\frac{1}{r}} = \frac{r}{r} (1 + a)$$

$$\rightarrow \log_{\frac{1}{r}}^{\frac{1}{r}} = 1 + a \rightarrow \log_{\frac{1}{r}}^{\frac{1}{r}} = 1 + \log_{\frac{1}{r}}^{\frac{1}{r}} \rightarrow \log_{\frac{1}{r}}^{\frac{1}{r}} - \log_{\frac{1}{r}}^{\frac{1}{r}} = 1 \rightarrow \log_{\frac{1}{r}}^{\frac{1}{r}} = 1 \rightarrow \frac{\sqrt{b}}{r} = 1 \rightarrow \frac{\sqrt{b}}{r} = r \rightarrow$$

$$\sqrt{b} = r \rightarrow b = r^2$$

$$\log(r b - 1) = \log(r(r^2) - 1) = \log(1 \cdot r - 1) = \log 1 = 0 = \boxed{r}$$

$$-ra^r + b^r + \frac{1}{r}c = 0$$

$$s = \frac{-b}{-ra} = \frac{b}{ra} \xrightarrow{\text{Rule}} \frac{ra}{b} = \log r$$

$$a = \frac{b+c}{r} \rightarrow ra = b+c \quad \leftarrow \quad b = \frac{ra}{\log r}$$

$$ra = \frac{ra}{\log r} + c \rightarrow c = ra - \frac{ra}{\log r} \rightarrow c = a(r - \frac{r}{\log r}) \rightarrow \frac{c}{a} = r - \frac{r}{\log r} = r - \frac{r}{r \log r}$$

$$\rightarrow \frac{c}{a} = r - \frac{r}{\log r}$$

$$\left(\frac{1}{\sqrt{r}}\right)^{\frac{c}{a}} = (r)^{-\frac{1}{r}} r - \frac{r}{\log r} = r^{(-\frac{1}{r}) \times (r - \frac{r}{\log r})} = r^{(-\frac{r}{r} + \frac{r}{r \log r})} = r^{(-\frac{1}{r} + \frac{1}{\log r})} =$$

$$\hookrightarrow \frac{1}{\sqrt{r}} = \frac{1}{(r)^{\frac{1}{2}}} = (r)^{-\frac{1}{2}}$$

$$r^{\frac{1}{2}(\frac{1}{\log r} - 1)} = r^{\frac{1}{2}(\log r - 1)} = \sqrt[r]{r^{\log r - 1}} = \sqrt[r]{\frac{r^{\log r}}{r}} = \sqrt[r]{\frac{1 \cdot \log r}{r}} = \sqrt[r]{\frac{1}{r}} = \sqrt[r]{a}$$

$$\hookrightarrow \frac{1}{\log r} = \log r$$