

سوال ۱

$\log_n m = a$, $\log_{mn} m^n = b$, $a > 0$, $[b] = ?$

$\rightarrow \frac{\log m}{\log n} = a$

$\rightarrow 1 + \frac{\log m}{\log m + \log n} = b \rightarrow 1 + \frac{a}{a+1} = b \rightarrow [b] = 1$

۱

سوال ۲

الف) $y = \sqrt{\frac{x}{\log \frac{x}{x-1}}}$, $\frac{x}{\log \frac{x}{x-1}} \gg 0$, $x \neq 1$

$\frac{0}{-1} + \frac{1}{0} \Rightarrow D_y = (0, 1)$

$x > 0, x \neq 1$

۱

ب) $y = \frac{\log_2(x^2 - x - 2)}{\sqrt{x^2 - 1} + 1}$

$x^2 - x - 2 > 0 \rightarrow (x-2)(x+1) > 0 \rightarrow \begin{matrix} x > 2 \\ x < -1 \end{matrix}$

$x^2 - 1 > 0 \rightarrow x^2 > 1 \rightarrow x > 1, x < -1$

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

سوال ۳

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

$\frac{1}{2} \log_x a = \frac{1}{2 \log_a x}$

$\Rightarrow 2 \log_a a + \frac{1}{2 \log_a 9} = 2$

تغییری نسبی
آن به مخرجش ۲
می شود که ۱ است

$\Rightarrow 2 \log_a a = 1$

$a = 3$

سوال ۴

$\log_2 2 = 1, 3$, $\log_3 2 = -1, 4$

$(\log_2 \frac{2}{3}) x^2 + (\log_3 9) x - \log_2 15 = 0$

$\Rightarrow 3x^2 + 8x - 11 = 0 \Rightarrow (3x+11)(x-1) = 0$

اختلاف
نسبتها $= \frac{14}{3}$

اختلاف نسبتها: $\frac{-11}{3} - 1 = \frac{-14}{3}$

سوال ۵

$\log_2 7 = 2, 8$, $\log_8 7 = 1, 5$, $\log_7 10 = ?$

$\log 7 = 2, 8 \log 2$, $2 \log 7 = \log 8$

$\log 10 = \frac{\log 8 + \log 7}{\log 2 + \log 7} = \frac{2+1}{1+2,8} = \frac{3}{3,8}$

سوال ۶

$\log_3 5 = 4, 5$, $\log_5 3 = 1, 4$, $\log_{15} 2 = ?$

$\log 5 = 1, 5 \log 3$, $\frac{2}{3} \log 3 = \log 2$

$\log 2 = \frac{\log 3 + \log 2}{\log 5 + \log 3} = \frac{1 + \frac{2}{3}}{1,5 + 1} = \frac{1,33}{2,5} = \frac{13}{25}$

$\log_{\lambda} \lambda^m = m$, $\log_{\lambda} \lambda^r = ?$

$\frac{\log \lambda + r \log \lambda}{r \log \lambda} = m \rightarrow r \log \lambda = (r m - 1) \log \lambda$

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

۶

$(\frac{1}{\lambda})^{2n-1} = (\frac{1 \cdot 2 \cdot \dots}{\lambda})^{2n-1}$, $\log_{\lambda} (9n+1) = ?$

سوال ۸

$(\frac{1}{\lambda})^{2n-1} = (\frac{1}{\lambda})^{2n-1} \Rightarrow 1 - 2n = 2n \rightarrow 2n^2 + 2n - 1 = 0 \rightarrow (2n-1)(n+1) = 0$

$\Rightarrow \log_{\lambda} ((9 \times \frac{1}{3}) + 1) = \log_{\lambda} 4 = \frac{2}{3}$

زیرا $9n+1 < 0$ غلطی $n = -1 \Rightarrow n = \frac{1}{3}$

$\log_{\lambda} \lambda^r = a$, $\log_{\lambda} b = \frac{1}{r} (1+a)$, $\log (\lambda b - 1) = ?$

سوال ۹

$\frac{\log \lambda^r}{\log \lambda} = a$, $\log_{\lambda} b = \frac{1}{r} (1+a) \rightarrow \frac{\log b}{r \log \lambda} = \frac{1}{r} (1+a) \rightarrow \log b = r(1+a) \log \lambda$

$\log b = r \log \lambda + r \log \lambda \rightarrow \log b = \log \lambda^r \rightarrow b = \lambda^r$

$\log (\lambda b - 1) = \log (\lambda^r \lambda - 1) = \log 100 = 2$

$-f a x^2 + b x + \frac{1}{r} c = 0$, $\log_{\lambda} \lambda = 1$, $(\frac{1}{\sqrt{r}})^{\frac{c}{a}} = ?$

سوال ۱۰

$2a = c + b$, $\log_{\lambda} \lambda = 1$, $\log_{\lambda} \lambda = a$

$\frac{1}{a+b} = \frac{1}{5} = \frac{1}{\frac{b}{fa}} = \frac{fa}{b} \Rightarrow \frac{fa}{b} = \log_{\lambda} \lambda \Rightarrow \frac{fa}{2a-c} = \log_{\lambda} \lambda$

$\Rightarrow \frac{fa-c}{fa} = \log_{\lambda} \lambda \rightarrow \frac{1}{r} - \frac{c}{fa} = \log_{\lambda} \lambda \rightarrow \frac{1}{r} - \log_{\lambda} \lambda = \frac{c}{fa} \rightarrow \log_{\lambda} \frac{1}{\lambda} = \frac{c}{fa}$

$\log_{\lambda} (\frac{1}{\lambda})^{\frac{c}{a}} = \frac{c}{a} \Rightarrow (\frac{1}{\sqrt{r}})^{\frac{c}{a}} = \frac{1}{\sqrt{r}} \times \log_{\lambda} \lambda^{-\frac{c}{a}} = \frac{1}{\sqrt{r}} \log_{\lambda} \lambda^{-\frac{c}{a}} = \sqrt{r} \log_{\lambda} \lambda^{-\frac{c}{a}} = \sqrt{\frac{c}{a}}$