

$$\log_{mn} m^n = \log_{mn} m + \log_{mn} n = 1 + \log_{mn} n \rightarrow \frac{1}{\log_{mn} m} = \frac{1}{1 + \log_{mn} n}$$

$$\log_{mn} m = a \rightarrow \log_{mn} n = \frac{1}{a} \Rightarrow \frac{1}{1 + \frac{1}{a}} = \frac{a}{a+1} \Rightarrow b = 1 + \frac{a}{a+1}$$

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$$\Rightarrow [b] = 1 \rightarrow \text{جواب}$$

(ب)

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

$$x^2 - x - 2 > 0 \rightarrow (x-2)(x+1) > 0 \rightarrow \frac{-1}{+1} \frac{2}{+1}$$

$$\sqrt{x^2 - 1} > 0 \rightarrow x^2 - 1 > 0 \rightarrow x > 1 \text{ یا } x < -1$$

$D_f = \mathbb{R} - (-1, 2)$

جواب

(الف)

$$y = \sqrt{\frac{x}{\log \frac{x}{\frac{1}{x}}}}$$

$x > 0$

$\frac{x}{\log \frac{x}{\frac{1}{x}}} > 0 \rightarrow \begin{cases} x < 0 \\ \log \frac{x}{\frac{1}{x}} < 0 \rightarrow x > 1 \end{cases}$ } عَقَب

$\frac{x}{\log \frac{x}{\frac{1}{x}}} > 0 \rightarrow \begin{cases} x > 0 \\ \log \frac{x}{\frac{1}{x}} > 0 \rightarrow x < 1 \end{cases}$

$D_f = (0, 1)$

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$$2 \log_a a + \log_a \sqrt{a} = 2 \quad \log_a a = t \quad \log_a \sqrt{a} = \frac{t}{2}$$

$$\frac{2}{t} + \frac{t}{2} = 2 \rightarrow t = 2 \quad \log_a a = 2 \xrightarrow{a=9} \log_a 9 = 2 \Rightarrow a = 9$$

$$(\log \frac{2}{r}) x^r + (\log 9) x - \log 18 = 0$$

$$\log 2^r = r \log 2 = 0.18$$

$$\log 10 + \log \frac{r}{2} = 1 + \log r - \log 2 = 1.1$$

$$\log 10 \times \frac{1}{9} = \log 10 + \log \frac{1}{9} = 1 - \log 9 = 1 - \log 3 \times 3 = 1 - 0.7 = 0.3$$

$$0.18x^r + 0.18x - 1.1 = 0 \xrightarrow{a+b+c=0} x = 1 \quad x = \frac{-11}{2} \text{ اختلاف باشد} = 1 - (-\frac{11}{2}) = \frac{12}{2} \rightarrow \text{جواب}$$

$$\log_r r = \frac{\log r}{\log r} = 1 \Rightarrow \log r = 1 \log r$$

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$$\log_{12} 10 = \frac{\log 10}{\log 12} = \frac{\log 2 + \log 5}{\log 2 + \log 3} = \frac{\log 2 + 2 \log 3}{\log 2 + 2 \log 3} = \frac{2 \log 3}{2 \log 3} = 1 \rightarrow \text{جواب}$$

$$\log_{\sqrt{r}} \Delta = \frac{\log \Delta}{\log \sqrt{r}} = 1.8 \rightarrow \log \Delta = 1.8 \log \sqrt{r}$$

$$\log_{\sqrt{r}} \sqrt{r} = \frac{\log \sqrt{r}}{\log \sqrt{r}} = 1 \rightarrow \log \sqrt{r} = \frac{\Delta}{\Lambda} \log \sqrt{r}$$

$$\log_{\sqrt{10}} \sqrt{r} = \frac{\log \sqrt{r}}{\log \sqrt{10}} = \frac{\log \sqrt{r} + \log \sqrt{r}}{\log \sqrt{r} + \log \Delta} = \frac{\frac{\Delta}{\Lambda} \log \sqrt{r} + \log \sqrt{r}}{\log \sqrt{r} + 1.8 \log \sqrt{r}} = \frac{\frac{1.8}{\Lambda} \log \sqrt{r}}{\frac{\Delta}{\sqrt{r}} \log \sqrt{r}} = \boxed{\frac{1.8}{\Delta}}$$

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6

$$\log_{\frac{1}{\Lambda}} \Lambda = m \rightarrow \frac{\log \Lambda}{\log \frac{1}{\Lambda}} = m \rightarrow \frac{\log 9 + \log r}{\log \Lambda} = \log_{\frac{1}{\Lambda}} 9 + \log_{\frac{1}{\Lambda}} r = m$$

$$\rightarrow \log_{\frac{r}{r}} \sqrt{r} = m - \frac{1}{r} \rightarrow \frac{r}{r} \log_{\frac{r}{r}} \sqrt{r} = m - \frac{1}{r} = \left(\frac{rm}{r} - \frac{1}{r} = \log_{\frac{r}{r}} \sqrt{r} \right)$$

$$\log_{\frac{r}{r}} \sqrt{r} = \frac{\log \sqrt{r}}{\log \frac{r}{r}} = \frac{\log \frac{r}{r} + \log \sqrt{r}}{\log \frac{r}{r}} = 1 + \log_{\frac{r}{r}} \sqrt{r} = 1 + \frac{1}{r} \log_{\frac{r}{r}} \sqrt{r} = 1 + \frac{1}{r} \times \left(\frac{rm}{r} - \frac{1}{r} \right) = \boxed{\frac{rm + r}{r}}$$

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7

$$\left(\frac{r}{\Delta} \right)^{rx-1} = \left(\frac{\Delta^r}{r^r} \right)^{rx} \rightarrow \left(\frac{r}{\Delta} \right)^{-rx} = \left(\frac{r}{\Delta} \right)^{rx-1}$$

$$-rx = rx-1 \rightarrow rx + rx-1 = 0 \rightarrow x = -1$$

$x = \frac{1}{r}$

$$\log_{\frac{r}{\Delta}} (rx+1) \xrightarrow{x=-1} \frac{0}{\Delta}$$

$x = \frac{1}{r}$
 $\log_{\frac{r}{\Delta}} \sqrt{r}$

$$\text{جواب} \rightarrow \left(\frac{r}{r} \right) = \frac{r}{r} \log_{\frac{r}{r}} \sqrt{r} = \log_{\frac{r}{r}} \sqrt{r}$$

8

$$\frac{r}{r} (1+a) \rightarrow \frac{r}{r} + \frac{r}{r} \log_{\frac{r}{r}} \sqrt{r} \Rightarrow \frac{r}{r} + \log_{\frac{r}{r}} 9 = \log_{\frac{r}{r}} b$$

$$\log_{\frac{r}{r}} \frac{b}{9} = \frac{r}{r} \rightarrow \frac{b}{9} = \Lambda^{\frac{r}{r}} \rightarrow \frac{b}{9} = \Delta \rightarrow b = 36$$

$$\log (3 \times 36 - 1) = \log 100 = \boxed{2} \rightarrow \text{جواب}$$

9

$$\frac{-b}{-\Delta a} = \frac{b}{\Delta a} = \alpha + \beta \rightarrow \frac{1}{\alpha + \beta} = \log \Delta \Rightarrow \frac{\Delta a}{b} = \log \Delta \Rightarrow \frac{a}{b} = \log \sqrt{r} \quad b+c=ca$$

$$\left(\frac{1}{\sqrt{r}} \right)^{\frac{c}{a}} \rightarrow \frac{c}{a} = \frac{ra-b}{a} = r - \frac{b}{a} = r - \log_{\sqrt{r}} 10 \rightarrow -\frac{c}{a} = \log_{\sqrt{r}} 10 - r$$

$$\left(\frac{1}{\sqrt{r}} \right)^{-\frac{c}{a}} = \left(\frac{1}{\sqrt{r}} \right)^{\log_{\sqrt{r}} 10 - r} = \frac{\sqrt{r}^{\log_{\sqrt{r}} 10}}{\sqrt{r}^r} = \frac{10 \log_{\sqrt{r}} \sqrt{r}}{\sqrt{r}^r} = \frac{10 \cdot \frac{1}{2}}{\sqrt{r}^{\frac{1}{2}}} = \Delta^{\frac{1}{2}} = \boxed{\sqrt{\Delta}}$$

10

جواب