♡ B ۱۳ شماره صفحه ♡

۲۰

①

$\log_n^m = a \quad , \quad \log_{mn}^{m^2 n} = b \quad , \quad a>0$ $\qquad 0<\frac{a}{a+1}<1 \rightarrow 1<b<2 \quad \boxed{[b]=1}$

$\frac{\log^m}{\log^n} = a \rightarrow \log^m = a\log^n \qquad \frac{\log^{m^2 n}}{\log^{mn}} = \frac{2\log^m + \log^n}{\log^m+\log^n} = \frac{2a\log^n+\log^n}{a\log^n+\log^n} \rightarrow b = \frac{2a+1}{a+1}$ $\quad 1+\frac{a}{a+1}$

۱

②

$y=\sqrt{\dfrac{x}{\log_{\frac{1}{2}}^x}}$ $\qquad$ I) $x>0$ $\qquad$ III $= \dfrac{x}{\log_{\frac{1}{2}}^x} \geq 0$

II) $\log_{\frac{1}{2}}^x \neq 0 \rightarrow x \neq 1$

$I \cap II \cap III = \boxed{(0,1)}$

۱

$y = \dfrac{\log_2^{(x^2-x-2)}}{\sqrt{x^2-1}+1} = I \cap II : (-\infty,-1) \cup (2,+\infty)$

I: $x^2-1 \geq 0 \rightarrow |x| \geq 1 \rightarrow x \in (-\infty,-1] \cup [1,+\infty)$

II: $x^2-x-2>0 \rightarrow x=-1/2$ $\qquad x\in(-\infty,-1)\cup(2,+\infty)$

③

$2\log_x^9 + \log_9^{3x} = 2 \xrightarrow{x=9} 2\log_{32}^9 + \log_9^3 = 2 \rightarrow \log_3^9 + \log_9^3 = 2 \rightarrow t=1 \rightarrow a=3$

④

$\log^2 = 0/3 \qquad \log^3 = 0/4 \qquad (\log^{\frac{5}{3}})x^2 + \log^9 x - \log^{15} = 0$ $\qquad x_2 = \frac{-1/1}{0/3}$

$\log^5 = 0/7$ $\qquad (\log^5 - \log^3)x^2 + 2\log^3 x - (\log^3+\log^5) \Rightarrow 0/3x^2 + 0/8x + 1/1 = 0$ $\qquad x_1 = 1 \rightarrow \sum x = \frac{14}{3}$

⑤

$\log_2^3 = 2/8 \ , \ \log_5^3 = 0/5 \quad \log_{14}^{10} = ?$

$\frac{\log_2^{14}}{\log_2^{10}} \Rightarrow \frac{\log_2^7 + \log_2^2}{\log_2^5+\log_2^2} \Rightarrow \frac{2/8+1}{3} \rightarrow \frac{3/8}{3}$ عکس $\log_{14}^{10} = \frac{3}{3/8}$

(۶)

$\log_{2} = 1/6 \,,\ \log_{3}^{5} = 1/5 \qquad \log_{15}^{6} = ?$

$\log_{3}^{2} = \frac{5}{8}$

$$\frac{\log_{3}^{6}}{\log_{3}^{15}} = \frac{\log_{3}^{2} + \log_{3}^{3}}{\log_{3}^{5} + \log_{3}^{3}} = \frac{\frac{5}{8}+1}{\underset{2/5}{1/5+1}} \rightarrow \frac{\frac{13}{8}}{\frac{5}{2}} \rightarrow \frac{26}{40} \rightarrow \frac{13}{20}$$

---

(۷)

$\log_{8}^{18} = m \qquad \log_{4}^{12} = ? \rightarrow \frac{\log_{8}^{12}}{\log_{8}^{4}} \Rightarrow \frac{\log_{8}^{4} + \log_{8}^{3}}{\log_{2^3}^{2^2}} \rightarrow \frac{\frac{2}{3} + \log_{8}^{3}}{\frac{2}{3}} = \frac{\frac{2}{3} + \frac{m-\frac{1}{3}}{2}}{\frac{2}{3}}$

$\log_{8}^{9} + \log_{8}^{2}$

$2\log_{8}^{3} + \underset{\frac{1}{3}}{\log_{2^3}^{2}} = m \quad \rightarrow \frac{m-\frac{1}{3}}{2} = \log_{8}^{3}$

$$\frac{\frac{4+3m-1}{6}}{\frac{2}{3}} \rightarrow \frac{12+9m-3}{12}$$

$\boxed{\frac{3}{4}(m+1)} \leftarrow \frac{9+9m}{12}$

---

(۸)

$(0/4)^{2x-1} = \left(\frac{125}{8}\right)^{x^2} \qquad \log_{8}^{9x\cancel{+1}\ 4} = ? \quad \log_{8}^{4} \rightarrow \log_{2^3}^{2^2} \rightarrow \frac{2}{3}$

$\left(\frac{2}{5}\right)^{2x-1} = (2/5)^{3x^2} \rightarrow (2/5)^{1-2x} = (2/5)^{3x^2} \rightarrow 3x^2 = 1-2x \rightarrow 3x^2+2x-1 = 0$

$\boxed{x = -1 , \frac{1}{3}}$

---

(۹)

$\log_{2}^{3} = a \ ,\ \log_{8}^{b} = \frac{2}{3}(1+a) \qquad \log^{3b-8} = ? \qquad 2^{a} = 3$

$\log_{2}^{b} = 2(1+a) \rightarrow b = 2^{2(1+a)} = 2^{2+2a} = 2^{2} \times 2^{2a} \Rightarrow 4 \times (2^{a})^{2}$

$b = 4 \times 3^{2} = 36$

$\log^{3b-8} = \log^{100} = 2$

---

(۱۰)

$\frac{-1}{\frac{b}{-4a}} = \log^{4} = \frac{4a}{b} = \log^{4} \quad \frac{a}{b} = \frac{\log^{4}}{4} = \frac{2\log^{2}}{4} = \frac{\log^{2}}{2}$

$2a = b + c$

$\frac{2a}{b} = 1 + \frac{c}{b}$

$2\left(\frac{\log^{2}}{2}\right) = 1 + \frac{c}{b}$

$\frac{c}{b} = -1 + \log^{2} \qquad \frac{c}{b} = \log^{2} - 1 \qquad \frac{a}{b} = \frac{\log^{2}}{2} \rightarrow \frac{c}{a} = \frac{\log^{2} - 1}{\frac{\log^{2}}{2}}$

$\frac{\log\frac{1}{5}}{\frac{1}{2}\log 2} = \log_{\sqrt{2}}^{\frac{1}{5}} \rightarrow \left(\frac{1}{\sqrt{2}}\right)\log_{\sqrt{2}}^{\frac{1}{5}} \rightarrow \left(\frac{1}{5}\right)\log_{\sqrt{2}}^{\sqrt{2}} \rightarrow \frac{4}{5}$