نیلیا دهستم پور (19) تکلیف ۲۳ یازدهم دختر C

① (6)

$\log_{mn} m^2n = b \to \log_{mn} mn + \log_{mn} m = b \to \log_{mn} m = b-1 \to \log_{n^a n} n^a = b-1$

$\log_{n^{a+1}} n^a = b-1 \to b-1 = \frac{a}{a+1} \to a>0 \to a+1>a \quad \frac{a}{a+1}>0 \to b=1/m \to [b]=1$

---

②

الف) $y=\sqrt{\frac{x}{\log_{\frac{1}{2}} x}}$ $\quad \frac{x}{\log_{\frac{1}{2}} x} \to \log_{\frac{1}{2}} x \neq 0 \to x\neq 1,\ x>0 \to D_f=(0,+\infty)-\{1\}$ (1)

ب) $y=\frac{\log_4 (x^2-x-2)}{\sqrt{x^2-1}+1} \to x^2-1\geq 0 \to x^2\geq 1 \to x\geq 1$ یا $x\leq -1$ [1]

$x^2-x-2>0$

$(x-2)(x+1)>0 \to$ $+\ \underset{-1}{|}\ -\ \underset{2}{|}\ +$ $\to x\to(-\infty,-1)\cup(2,+\infty)$ [2]

هیچ وقت صفر نمی‌شود

$[1]\cap[2] \to (-\infty,-1)=D_f$

---

③

$x=9 \leftarrow 2\log_x a + \log_a \sqrt{x} = 2$ (6)

$2\log_9 a + \log_a 3 = 2$

$\frac{2}{2}\log_3 a + \log_a 3 = 2 \to \frac{1}{\log_a 3} + \log_a 3 = 2 \to \log_a 3 = 1 \to \boxed{a=3}$

---

④

$[\log\frac{5}{2}]x^2 + (\log 9)x - \log 15 = 0 \leftarrow \log 3 \approx 0/4 ,\ \log 2 \approx 0/3$ (5)

$\log\frac{5}{2} = \log_{10} 5 - \log_{10} 2 = (\log_{10} 10 - \log_{10} 2) - \log_{10} 2 = 0/3$ $\quad \log 9 = \log_{10} 3^2 = 2\log 3 = 0/8$

$\log 15 = \log\frac{30}{2} = \log_{10} 10 + \log_{10} 3 - \log_{10} 2 = 1/1$ $\quad \frac{3}{10}x^2 + \frac{8}{10}x - \frac{11}{10} = 0 \to 3x^2+8x-11=0 \to x^2+8x-33=0$

$1+\frac{11}{3} = \boxed{\frac{14}{3}}$ یا $-\frac{11}{3}-\frac{3}{3} = \boxed{-\frac{14}{3}}$ $\quad \boxed{x=-\frac{11}{3}}$ یا $\boxed{x=1} \leftarrow (x+11)(x-3)$

---

⑤

$\log_2 7 = 2/8 \quad \log_5 2 = 0/5 \to \log_2 5 = 2 \quad \log_{14} 10 = \frac{\log_2 10}{\log_2 14} = \frac{\log_2 5\times 2}{\log_2 7\times 2} = \frac{\log_2 5 + \log_2 2}{\log_2 7 + \log_2 2} = \frac{3}{3/8} = \frac{30}{38}$

---

⑥ (5)

$\log_3 5 = 1/5 \to \log_2 3 = 1/6 \to \log_3 2 = \frac{1}{\frac{16}{10}} = \frac{10}{16} = \frac{5}{8}$

$\log_{15} 6 = \frac{\log_3 6}{\log_3 15} = \frac{\log_3 2 + \log_3 3}{\log_3 5 + \log_3 3} = \frac{\frac{13}{8}}{\frac{25}{10}} = \frac{13}{20}$

۲ الف)

$\frac{x}{\log_{\frac{1}{2}} x} \geq 0 \to \log_2 x < 0 \to x < 2^0 = 1 \to \begin{cases} x>0 \\ x<1 \end{cases} \to D=(0,1)$

۲ ب)

$\sqrt{x^2-1} \to (-\infty,-1]\cup[1,+\infty)$ ①

$\log_4 (x^2-x-2) \to x^2-x-2>0 \to (-\infty,-1)\cup(2,+\infty)$ ②

$① \cap ② \to (-\infty,1)\cup(2,+\infty)$

7

$\log_8^{18} = x \rightarrow \log_8^{9} + \log_8^{2} = \frac{2}{3}\log_2^{3} + \frac{1}{3} = m \rightarrow \frac{2}{3}\log_2^{3} = m - \frac{1}{3}$

$\log_4^{12} = \log_4^{3} + \log_4^{4} = \frac{1}{2}\log_2^{3} + 1 \rightarrow \frac{1}{2} \times \frac{3}{2} \times (m - \frac{1}{3}) + 1 \qquad \log_2^{3} = (m - \frac{1}{3})\frac{3}{2}$

$= \frac{3}{4}m - \frac{1}{4} + 1 = \frac{3}{4}m + \frac{3}{4}$

8

$(0.4)^{2x-1} = \left(\frac{125}{8}\right)^{x^2} \rightarrow \left(\frac{2}{5}\right)^{2x-1} = \left(\frac{5^3}{2^3}\right)^{x^2} \rightarrow \left(\frac{5}{2}\right)^{1-2x} = \left(\frac{5}{2}\right)^{3x^2}$

$3x^2 = 1 - 2x \rightarrow 3x^2 + 2x - 1 = 0 \rightarrow x^2 + 2x - 3 \rightarrow x = \frac{1}{3}$ ق ق

$x = -1 \rightarrow$ غ ق ق

$\log_8^{(9x+1)} = \log_8^{9 \times \frac{1}{3} + 1} = \log_8^{3+1} = \log_{2^3}^{2^2} = \frac{2}{3}$

9

$\log_2^{3} = a \qquad \log_8^{b} = \frac{2}{3}(1+a) \rightarrow \frac{2}{3}(1 + \log_2^{3}) = \frac{2}{3}(\log_2^{2} + \log_2^{3})$

$\frac{2}{3}(\log_2^{6}) = \frac{2}{3}\log_2^{6} = \log_8^{36} = \log_8^{b} \rightarrow b = 36 \qquad \log^{3b-8} = \log_{10}^{100} = 2$

10

$-4ax^2 + bx + \frac{1}{2}c = 0$ ریشه مضاعف $\rightarrow \frac{-b}{-4a} = \frac{b}{4a} \longrightarrow \frac{4a}{b} \qquad \frac{4a}{b} = \log_{10}^{4}$

$\frac{4a}{b} = 2\log_{10}^{2} \rightarrow \log_{10}^{2} = \frac{2a}{b} \rightarrow \log_2^{10} = \frac{2a}{\dots}$

$\frac{c}{2a} = 1 - \log_2^{10} \leftarrow \log_2^{10} = 1 - \frac{c}{2a} \leftarrow \frac{1}{\log_{10}^{2}} = \frac{2a - c}{2a}$

$\log_2^{2} - \log_2^{10} = \log_2^{\frac{1}{5}} \rightarrow \log_2^{\frac{1}{5}} = \frac{c}{2a} \rightarrow \frac{c}{a} = 2\log_2^{\frac{1}{5}} \rightarrow \log_2^{\frac{1}{25}}$

$\left(\frac{1}{\sqrt[8]{2}}\right)^{\frac{c}{a}} = \left(\frac{1}{\sqrt[8]{2}}\right)^{\log_2^{\frac{1}{25}}} \rightarrow \left(\frac{1}{25}\right)^{\log_2^{2^{-\frac{1}{8}}}} = \left(\frac{1}{25}\right)^{-\frac{1}{8}} = \sqrt[8]{25} = \sqrt[4]{5}$