تکلیف ۲۳

یازدهم تجربی B

۲۰

امیر محمدفرجانی

---

(۲)

$\log_n m = a \qquad \log_{mn} m^2 n = b \qquad a>0 \qquad [b] = ?$

$\dfrac{\log_n m^2 n}{\log_n mn} \to \dfrac{2\log_n m + 1}{\log_n m + 1} \to \dfrac{2a+1}{a+1} \to \left[2 - \dfrac{1}{a+1}\right] \to 2\left[-\dfrac{1}{a+1}\right]$

$1 = 2 - 1$ ✓

---

(۲)

الف) $y = \sqrt{\dfrac{x}{\log_{\frac{1}{2}} x}} \qquad x>0 \qquad \dfrac{x}{\log_{\frac{1}{2}} x} \geq 0 \to \log_{\frac{1}{2}} x = 0 \qquad (0,1)$ ✓

ب) $y = \dfrac{\log_4 (x^2 - x - 2)}{\sqrt{x^2-1} + 1} \qquad x^2 - x - 2 > 0 \to (x-2)(x+1) > 0$

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

$x^2 - 1 \geq 0 \to x^2 > 1 \to x > 1,\ x < -1 \qquad (-\infty, -1) \cup (2, +\infty)$ ✓

---

(۲)

$2\log_x 9 + \log_a 3x = 2 \qquad x=9 \to 2\log_9 a + \log_a 3^3 = 2 \to \log_3 a + \log_a 3 = 2 \to \log_3 a + \dfrac{1}{\log_3 a} - 2 = 0$

$\log_3 a = A \to A + \dfrac{1}{A} - 2 = 0 \to A^2 + 1 - 2A = 0 \to (A-1)(A-1) = 0$

$\log_3 a = 1 \to a = 3$ ✓

---

(۲)

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

$(\log 5 - \log 3) x^2 + (2\log 3) x - \log 15 = 0$

$\dfrac{\sqrt{\Delta}}{|a|} \to \dfrac{\sqrt{0/64 - 4(0/3)(1/1)}}{0/3} = \dfrac{1/4}{0/3}$ ✓

$\log 15 \to \log 30 - \log 2 \to \log 3 + \log 10 - \log 2 = 1/1$

---

(۲)

$\log_2 7 = 2/8 \qquad \log_5 2 = 0/5 \qquad \log_{14} 10 = ? \to \log_{14} 5 + \log_{14} 2$

$\log_{14} 5 \to \dfrac{1}{\log_5 14} = \dfrac{1}{\log_5 2 + \log_5 7} \qquad \log_{14} 2 \to \dfrac{1}{\log_2 14} \to \dfrac{1}{\log_2 2 + \log_2 7}$

$\log_5 7 = \dfrac{\log_2 7}{\log_2 5} \to \log_5 7 = 1/4 = \dfrac{14}{10}$

$\dfrac{1}{1/9} + \dfrac{1}{3/8} \to \dfrac{2+1}{3/8} \to \dfrac{3}{3/8}$ ✓

امیرمحمد فروبانی

$\log_2 5 = 1.6 \quad \log_3 5 = 1.5 \quad \log_{15} 6 \to \log_{15} 2 + \log_{15} 3 \to \frac{1}{\log_2 15} + \frac{1}{\log_3 15}$

$\to \frac{1}{\log_2 3 + \log_2 5} + \frac{1}{\log_3 3 + \log_3 5} \quad \log_2 3 = \frac{\log_3 5}{\log_2 5}$… $= 1.6 \times 1.5 = 2.4$

$\frac{1}{4} + \frac{1}{2.5} \to \frac{1}{4} + \frac{10}{25} \to \frac{25+40}{100} \Rightarrow \frac{65}{100} = 0.65$

$\log_8 18 = m \quad \log_4 12 = ? \to \log_{2^2} 12 \to \frac{1}{2}\log_2 12 \to \frac{1}{2}(2 + \log_2 3)$

$\log_{2^3} 18 \to \frac{1}{3}\log_2 18 = m \to \log_2 18 = 3m \to \log_2 9 + \log_2 2 = 3m \to \log_2 3 = \frac{3m-1}{2}$

$\log_2 9 = \log_2 3^2 \to 2\log_2 3$

$\frac{1}{2}(2 + \log_2 3) \to \frac{3m+3}{4}$

$(0.4)^{2x-1} = \left(\frac{125}{8}\right)^{x^2} \quad \log_8 (9x+1)$

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

$(x+3)(x-1)=0$

$\alpha - 1 = \frac{3}{3}$ و $\frac{1}{3}$

$\frac{1}{3} \to \log_8 \left(9\left(\frac{1}{3}\right)+1\right) \to \log_8 4 \to \log_{2^3} 2^2 \to \frac{2}{3}\log_2 2 \to \frac{2}{3}$

$\log_2 3 = a \quad \log_8 b = \frac{2}{3}(1+a) \quad \log(3b-8) = ?$

$\log_8 b = \frac{2}{3}(\log_2 2 + \log_2 3) \to \frac{2}{3}(\log_2 6) \to \log_{2^3} 6^2 = \log_8 36 = \log_8 b \to b = 36$

$\log(3b-8) \Rightarrow \log(3 \times 36 - 8) \to \log 100 = 2$

امیر محمد فرد جان

(۲)

$\log_4$

$\left(\frac{1}{\sqrt{2}}\right)^a < ?$

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

$2a = b+c \Rightarrow c = 2a-b$

$\frac{(10)^{\log_2 \sqrt{2}}}{4\sqrt{2}} = \sqrt{8}$ ✓

$-4a+6a+\frac{1}{2}c=0$ $\frac{2a}{b}$

$\log 4 = \frac{2a}{b} \rightarrow 2\log 2 = \frac{2a}{b} \rightarrow \log 2 = \frac{a}{b}$

$\left(\frac{1}{\sqrt{2}}\right)^{2-\frac{b}{a}}$ $(\sqrt{2})^{\frac{b}{a}-2} \rightarrow \log_{(\sqrt{2})} \frac{1}{2} - 2$