ایلیا مسلمی تکلیف شماره ۲۳ یازدهم تجربی A

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$m=n^a$

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

$\rightarrow 0<\frac{a}{a+1}<1 \Rightarrow 1<b<2 \Rightarrow [b]=1$

۲-

الف) $\log_{\frac{1}{2}} x : x>0$

$\sqrt{\frac{x}{\log_{\frac{1}{2}} x}} : \begin{cases} x\neq 1 \\ \frac{x}{\log_{\frac{1}{2}} x} \geq 0 \end{cases}$

$0<x<1 \Rightarrow$ مخرج مثبت، صورت مثبت ✓

$x>1 \Rightarrow$ صورت مثبت، مخرج منفی ✗

$\Rightarrow D_f=(0,1)$

ب) $\log_4 (x^2-x-2) : x^2-x-2>0$ (-1, 2 : $+\ -\ +$) $x<-1$ یا $x>2$ (I)

$\sqrt{x^2-1}+1 : x^2-1\geq 0 \Rightarrow$ (-1, 1 : $+\ -\ +$) $x<-1$ یا $x>1$ (II)

$\xrightarrow{(I)\cap(II)} D_f=(-\infty,-1)\cup(2,+\infty)$

۳-

$2\log_9 a + \log_a 3 = 2 \Rightarrow 2\log_{3^2} a + \log_a 3 = 2$

$\Rightarrow \log_3 a + \log_a 3 - 2 = 0 \Rightarrow \log_3 a + \frac{1}{\log_3 a} - 2 = 0$

$\xrightarrow{\log_3 a = t} t+\frac{1}{t}-2=0 \xrightarrow{\times t} t^2-2t+1=0$

$\Rightarrow t=1 \Rightarrow \log_3 a = 1 \Rightarrow a=3$

۴-

$\log\frac{5}{3} = \log\frac{10}{2} - \log 3 = \log 10 - \log 2 - \log 3 = 1-0/3-0/4=0/3$

$\log 9 = 2\log 3 = 2\times 0/4 = 0/8$

$\log 15 = \log 5 + \log 3 = \underbrace{\log 10 - \log 2}_{\log\frac{10}{2}} + \log 3 = 1-0/3+0/4 = 1/1$

$\Rightarrow (\log\frac{5}{3})x^2 + (\log 9)x - (\log 15) = 0/3x^2 + 0/8x - 1/1 = 0$

$\xrightarrow{\times 10} 3x^2+8x-11=0 \Rightarrow x = -\frac{11}{3},\ 1$ $1-(-\frac{11}{3}) = \frac{14}{3}$

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$$\log_{15}^{10} = \frac{\log_2^{10}}{\log_2^{15}} = \frac{\log_2^5 + \log_2^2}{\log_2^3 + \log_2^5} = \frac{\frac{1}{\log_5^2} + 1}{\log_2^3 + 1} = \frac{\frac{1}{0/5} + 1}{2/1 + 1} = 0/78$$

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$$\log_{10}^{4} = \frac{\log_2^4}{\log_2^{10}} = \frac{\log_2^2 + \log_2^3}{\log_2^5 + \log_2^2} = \frac{1}{\log_2^3 + 1} = \frac{1}{1/6 + 1} = 0/68$$

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$$\log_8^{11} = \log_{2^3}^{11} = \frac{1}{3}\log_2^{11} \Rightarrow \log_2^{11} = 3m$$

$$\log_4^{12} = \log_{2^2}^{12} = \frac{1}{2}\log_2^{12} = \frac{1}{2}\left(\log_2^4 + \log_2^3\right) = \frac{1}{2}\left(2 + \log_2^3\right)$$

$$= 1 + \frac{1}{2}\log_2^3$$

$$\log_2^{12} = \log_2^{3\times 4} = 2\log_2^3 + 1 \Rightarrow \log_2^3 = \frac{3m-1}{2}$$

$$\Rightarrow \log_4^{12} = 1 + \frac{1}{2}\log_2^3 = 1 + \frac{3m-1}{4} = \frac{3m+3}{4}$$

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$$(0/4)^{2x-1} = \left(\frac{2}{5}\right)^{2x-1} = \left(\frac{5}{2}\right)^{1-2x}$$

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

$$\Rightarrow 3x^2 + 2x - 1 = 0 \Leftarrow -1 \longrightarrow \log^{9x+1}$$

$$\frac{1}{2}\log^{9x+1} \quad \text{و} \quad 8 = \log_8^4 = \frac{2}{3}\log_2^2 = \frac{2}{3}$$

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$$3 = 2^a \qquad b = 8^{\frac{2}{3}(1+a)} = 2^{2(1+a)} = 2^{2+2a} = 2^2 \times 2^{2a} = 2^2 \times 2^9 \times 2^9$$

$$= 4 \times 3 \times 3 = 36 \qquad \log^{3b-8} = \log 100 = 2$$

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$$\frac{b}{5a} = \frac{1}{\log^4} \Rightarrow \log^4 = \frac{5a}{b} \qquad a = \frac{b+c}{2} \Rightarrow c = 2a - b = 2a - \frac{5a}{\log^4}$$

$$\frac{c}{a} = 2 - \frac{4}{\log 4} \qquad \left(\frac{1}{\sqrt{2}}\right)^{\frac{c}{a}} = 2^{\frac{-1}{8}\times\frac{c}{a}} = 2^{-\frac{1}{8}\times\left(2-\frac{c}{\log 4}\right)}$$

$$= 2^{-\frac{1}{4} + \frac{1}{2\log 4}} = 2^{\log_{14}^{10} - \frac{1}{4}} = 2^{\log_{14}^{10} + \log_{14}^{\frac{1}{2}}} = 2^{\log_{14}^{5}}$$

$$\leftarrow \log_{14}^{10} \qquad 5^{\log 14^2} = \sqrt[4]{5^2} = \sqrt{5}$$