آیناز ابراهیم زاده - یازدهم دختر B - تکلیف ۲۳

$\log_n m = a \rightarrow \log_m n = \frac{1}{a} \Rightarrow \log_m n + \log_m m = \log_m mn = \frac{1}{a} + 1 \rightarrow \log_m mn = \frac{a+1}{a} \rightarrow \log_{mn} m = \frac{a}{a+1}$ ۱-

$\log_{mn} m^2 n = \log_{mn} m + \log_{mn} mn = b \rightarrow \frac{a}{a+1} + 1 = b \rightarrow \left[\frac{a}{a+1}\right] + 1 = 1 = [b]$

الف) $y = \sqrt{\frac{x}{\log_{\frac{1}{2}} x}}$ ۲-

$\hookrightarrow \log_{\frac{1}{2}} x > 0 \quad x > 0$ و $\log_{\frac{1}{2}} x > 0 \rightarrow x < 1 \quad \Rightarrow D_y = (0,1)$

ب) $y = \frac{\log_2 (x^2 - x - 2)}{\sqrt{x^2-1} + 1} \rightarrow x^2 - x - 2 > 0 \rightarrow \begin{array}{cccc} & -1 & & 2 \\ + & | & - & | & + \end{array}$

$\rightarrow \sqrt{x^2-1} + 1 \neq 0 \checkmark \qquad D_y = (-\infty, -1) \cup (2, +\infty)$

$2\log_x a + \log_a \sqrt{x} = 2 \rightarrow 2\log_x a + \frac{1}{4\log_x a} - 2 = 0 \rightarrow 4(\log_x a)^2 + 1 - 4\log_x a = 0 \rightarrow (2\log_x a - 1)^2$ ۳-

$2\log_9 a = 1 \rightarrow \underline{a = 3}$

$\log 2 \simeq 0.3$ ۴-

$\log 3 \simeq 0.4$

$\left(\log \frac{5}{3}\right) x^2 + (\log 6) x - \log 15 = 0$

$\rightarrow (\log_{10} 10 - \log_{10} 2 - \log_{10} 3) x^2 + (\log 3 + \log 2) x - (\log 10 - \log 2 + \log 3)$

$1 - 0.3 - 0.4 \qquad 0.4 + 0.4 \qquad 1 - 0.3 + 0.4$

$\hookrightarrow 0.3x^2 + 0.8x - 1.1 = 0$

$|\alpha - \beta| = \sqrt{(\alpha+\beta)^2 - 4\alpha\beta} = \sqrt{S^2 - 4P}$

$S = -\frac{8}{3} \quad P = \frac{-11}{3} \qquad \sqrt{\frac{64}{9} + \frac{44}{3}} = \sqrt{\frac{196}{9}} = \boxed{\frac{14}{3}}$

$\log_2 7 = 2.8 \rightarrow \log_2 7 + \log_2 2 = 3.8 = \log_2 14$ ۵-

$\log_5 2 = 0.5 \rightarrow \log_2 5 = 2 \rightarrow \log_2 5 + \log_2 2 = \log_2 10 = 3 \qquad \rightarrow \frac{\log_2 10}{\log_2 14} = \frac{3}{3.8} = \frac{30}{38} = \frac{15}{19}$

$\log_{14} 10 = \frac{15}{19}$

$\log_3 5 = 1.5 \rightarrow \log_3 5 + \log_3 3 = \log_3 15 = 2.5$ ۶-

$\log_2 3 = 1.6 \rightarrow \log_3 2 = \frac{5}{8} \rightarrow \log_3 2 + \log_3 3 = \log_3 6 = \frac{13}{8}$

$\log_{15} 6 = ? \rightarrow \frac{\log_3 6}{\log_3 15} = \frac{\frac{13}{8}}{\frac{5}{2}} = \frac{13}{20}$

-۷

$\log_{۸}۱۸=m \to \frac{\log_{۲}۱۸}{\log_{۲}۸}=m \to \log_{۲}۱۸=۳m \qquad \log_{۲}۱۸-\log_{۲}۲=\log_{۲}۹=۲\log_{۲}۳=۳m-۱$

$\log_{۲}۳=\frac{۳m-۱}{۲}$

$\log_{۴}۱۲=\frac{۳m+۳}{۴}$

$\log_{۴}۱۲=\frac{\log_{۲}۱۲}{\log_{۲}۴}=\frac{\log_{۲}۳+\log_{۲}۴}{۲}=\frac{\frac{۳m-۱}{۲}+۲}{۲}=\frac{۳m-۱+۴}{۴}=\frac{۳m+۳}{۴}$

-۸

$(۰/۴)^{۳x-۱}=\left(\frac{۱۲۵}{۸}\right)^{x^۲} \to \left(\frac{۲}{۵}\right)^{۳x-۱}=\frac{۲}{۵}^{-۳x^۲} \to ۳x^۲+۳x-۱=۰ \to x\begin{cases}-۱\\ \frac{۱}{۳}\end{cases}$

$\log_{۸}^{۹x+۱} \to ۹x+۱>۰ \to x>-\frac{۱}{۹} \to x=\frac{۱}{۳} \to \log_{۸}۴=\log_{۲^۳}۲^۲=\boxed{\frac{۲}{۳}}$

-۹

$\log_{۲}۳=a \to \log_{۲}۳+\log_{۲}۲=\log_{۲}۶ \to \frac{۲}{۳}(\log_{۲}۶)=\log_{۸}۳۶$

$\log_{۸}b=\frac{۲}{۳}(۱+a) \qquad \to b=۳۶$

$\log(۳b-۸) \to \log_{۱۰}^{۱۰۰}=\boxed{۲}$

-۱۰

$-۲ax^۲+bx+\frac{۱}{۲}c=۰ \to \frac{۱}{\alpha+\beta}=\log ۴ \qquad \alpha+\beta=\frac{b}{۲a} \to \frac{۱}{\alpha+\beta}=\frac{۲a}{b}=\log ۴ \to \frac{b}{a}=۴\log_{۴}۱۰$

$\left(\frac{۱}{\sqrt[۸]{۲}}\right)^{\frac{c}{a}}=\left(۲^{-\frac{۱}{۸}}\right)^{\frac{c}{a}} \qquad \frac{b+c}{۲}=a \to ۲a=b+c$

$\hookrightarrow c=b-۲a$

$\frac{c}{a}=\frac{۲a-b}{a}=۲-\frac{b}{a}=۲(۱-۲\log_{۲}۱۰)=۲(۱-\log_{۲}۱۰)$

$۱.۲\log_{۲}\frac{۲}{۱۰}$

$\left(\left(\frac{۱}{۲}\right)^{۸}\right)^{۲\log_{۲}\frac{۲}{۱۰}}=\left(\left(\frac{۱}{۲}\right)^{\frac{۲}{۱۰}}\right)^{۲\log_{۲}۸}=\left(\left(\frac{۱}{۲}\right)^{\frac{۲}{۱۰}}\right)^{۶}=۲^{-\frac{۱۲}{۱۰}}$