نام و نام خانوادگی: سیدرضا التمانیان

شماره تکلیف: ۲۳ کلاس: یازدهم ب B

۲۰

$\log_n m = a$ $\quad \log_{mn} m^2 n = b \Rightarrow \log_{mn} m^2 n = \log_{mn} m^2 + \log_{mn} n \Rightarrow \begin{cases} \log_{mn} m^2 = \frac{1}{\frac{1}{2}\log_{m^2} mn} \Rightarrow \frac{2}{1+\log_m n} \\ \log_{mn} n = \frac{1}{\log_n mn} = \frac{1}{\log_n m + \log_n n} \end{cases}$ ۱

$\log_m n = \frac{1}{a}$

$\Rightarrow \frac{2}{\frac{1}{a}+\frac{a}{a}} + \frac{1}{a+1} \Rightarrow \frac{2a+1}{a+1} \Rightarrow 1+\frac{a}{a+1}$ (۲)

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

الف) I $x>0 ,\ x\neq 1$

$\log_{\frac{1}{2}} x > 0 \Rightarrow x<1$ II

$\log_{\frac{1}{2}} x < 0 \Rightarrow x>1$ ۲ (۲)

$\Rightarrow I\cap II = 0<x<1$ ✓

چون که کسر از صورت منفی و مخرج مثبت و کسر منفی می‌شود.

ب) $\dfrac{\log_4 (x^2-x-2)}{\sqrt{x^2-1}+1} \Rightarrow$

مخرج همیشه مثبت

$x^2-x-2>0$

$(x+1)(x-2)>0$

$\Rightarrow$ $-1,\ 2$: $+\ |\ -\ |\ +$ $\quad$ I $(-\infty,-1)\cup(2,+\infty)$

$x^2-1 \geq 0 \Rightarrow |x|\geq 1 \Rightarrow x\geq 1 ,\ x\leq -1$ II

$\Rightarrow I\cap II = (-\infty,-1)\cup(2,+\infty)$ ✓

$\log_x a = \frac{1}{\log_a x} \Rightarrow \frac{2}{2\log_a 3} + \log_a 3 = 2 \Rightarrow \log_a 3 = t$

$\Rightarrow \frac{1}{t} + t = 2 \Rightarrow t^2-2t+1=0 \Rightarrow (t-1)^2=0 \Rightarrow t=1$ (۲) ۳

$\Rightarrow \log_a 3 = 1 \Rightarrow a=3$ ✓

$\log\frac{5}{3} = \log_{10} 5 - \log_{10} 3 \Rightarrow \log_{10} 5 = \log_{10} 10 - \log_{10} 2 = 0.7 \quad \log_{10} 9 = 2\log_{10} 3 \Rightarrow 2\times\frac{4}{10} = 0.8$

$0.7 \quad 0.4 \quad \Rightarrow \log\frac{5}{3} = 0.3$ (۲) ۴

$\log_{10} 15 = \log_{10} 3 + \log_{10} 5 = 1.1$ $\quad (0.4,\ 0.7)$

$|x_2-x_1| = \frac{\sqrt{\Delta}}{|a|} \Rightarrow \dfrac{\sqrt{(\frac{8}{10})^2-4(\frac{3}{10})(\frac{11}{10})}}{\frac{3}{10}} = \dfrac{\sqrt{\frac{196}{100}}}{\frac{3}{10}} = \frac{14}{3}$ ✓

$\log_{14} 10 = \log_{14} 2 + \log_{14} 5 \Rightarrow \frac{1}{\log_2 14} + \frac{1}{\log_5 14} \Rightarrow \frac{1}{\log_2 7+\log_2 2} + \frac{1}{\log_5 7+\log_5 2}$

$\log_2 7 = 2.8 ,\ \log_5 2 = \frac{1}{2} \Rightarrow \frac{\log_2 7}{\log_2 5} = \frac{2.8}{2} = 1.4 \Rightarrow \frac{1}{2.8+1} + \frac{1}{1.4+0.5} = \frac{3}{3.8}$ (۲) ۵

$\log_2 5 = 2$ معکوس

$\log_{14} 10 \Rightarrow \frac{15}{19}$ ✓

$\log_{15}6 = \log_{15}2 + \log_{15}3 \Rightarrow \frac{1}{\log_2 15} + \frac{1}{\log_3 15} \Rightarrow \frac{1}{\log_2 3+\log_2 5} + \frac{1}{\log_3 5+\log_3 3}$

$\log_2 3 = 1.6,\ \log_3 5 = 1.5 \Rightarrow \log_3 2 = \frac{1}{1.6} = \frac{10}{16} \Rightarrow \frac{\log_3 5}{\log_3 2} = \log_2 5 = \frac{1.5}{\frac{10}{16}} = 2.4$ (۲) ۶

$\frac{1}{1.6+2.4} + \frac{1}{1.5+1} \Rightarrow \frac{1}{4} + \frac{1}{2.5} = \frac{4+2.5}{10} \Rightarrow \log_{15}6 = 0.65$ ✓

$\log_8 18 = m \Rightarrow \log_8 18 = \log_8 3 + \log_8 6 \Rightarrow \frac{1}{3}\log_2 3 + \log_8 2 + \log_8 3\ \frac{1}{3}\log_2 3$

$\Rightarrow \frac{2}{3}\log_2 3 + \frac{1}{3} = m \Rightarrow 3m = 2\log_2 3 + 1 \Rightarrow \log_2 3 = \frac{3m-1}{2}$ (۲) ۷

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

$(\frac{4}{10})^{2n-1} = (\frac{2}{5})^{2n-1}$, $(\frac{125}{8})^{n^2} = (\frac{2^3}{5^3})^{-n^2} \Rightarrow (\frac{2}{5})^{-3n^2}$

$\Rightarrow (\frac{2}{5})^{2n-1} = (\frac{2}{5})^{-3n^2} \Rightarrow$ چون پایه‌ها برابرند توان‌ها نیز برابرند $\Rightarrow -3n^2 = 2n-1$ (۲) ۸

$\Rightarrow 3n^2 + 2n - 1 = 0 \Rightarrow$ جمع ضرایب کناری برابر وسطی $\Rightarrow n = -1,\ \frac{1}{3}$

X ← غیرقابل قبول چون $9n-1>0$

$\log_8(\frac{9}{3}+1) = \log_8 4 = \frac{2}{3}$ ✓

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

$\log_2 b = 2\log_2 6 \Rightarrow \frac{1}{2}\log_2 b = \log_2\sqrt{b} = \log_2 6 \Rightarrow b = 36 \Rightarrow \log(3\times 36 - 8) = \log 100$ ۹ (۲)

$\Rightarrow \log_{10}100 = 2$ ✓

$\frac{1}{\alpha+\beta} = \log 4 \Rightarrow S = \alpha+\beta = \frac{-b}{-4a} \Rightarrow \frac{4a}{b} = \log 4 \Rightarrow \frac{a}{b} = \frac{\log 2}{2}$

$2a = b+c \Rightarrow \frac{2a}{b} = 1 + \frac{c}{b} \Rightarrow \log 2 = 1 + \frac{c}{b} \Rightarrow \frac{c}{b} = \log 2 - \log 10$ (۲) ۱۰

$\Rightarrow \frac{\log 2 - \log 10}{\frac{\log 2}{2}} = \frac{c}{a} \Rightarrow \frac{\log\frac{1}{5}}{\log\sqrt{2}} \Rightarrow \log_{\sqrt{2}}\frac{1}{5} \Rightarrow (2^{-\frac{1}{8}})^{\log_{\sqrt{2}}\frac{1}{5}}$

$\Rightarrow (\frac{1}{5})^{\log_{\sqrt{2}} 2^{-\frac{1}{8}}} \Rightarrow (\frac{1}{5})^{-\frac{1}{4}} \Rightarrow 5^{\frac{1}{4}} = \sqrt[4]{5}$ ✓