نام و نام خانوادگی ...الناهیت امیری... ۲۰ پاسخنامه تشریحی تکلیف شماره ...۲۳... کلاس ...یازدهم ریاضی A...

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$\log_n m = a \qquad \log_{mn} m^2 n = b$

$\log_{mn} m^2n = \underbrace{\log_{mn} mn}_{1} + \log_{mn} m = 1 + \frac{1}{\log_m mn} = 1 + \frac{1}{\underbrace{\log_m m}_{1} + \log_m n} = 1 + \frac{1}{1+\frac{1}{\underbrace{\log_n m}_{a}}} = 1+\frac{1}{\frac{a+1}{a}} =$

$1+\frac{a}{a+1}$ ۵

$[b] = [1+\frac{a}{a+1}] = 1 + [\underbrace{\frac{a}{a+1}}_{0<\frac{a}{a+1}<1}] = 1 \Rightarrow \boxed{[b]=1}$

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الف) $y = \sqrt{\frac{x}{\log_{\frac{1}{2}} x}} \to x>0$ (I)

$\frac{x}{\log_{\frac12} x} \geq 0 \to$ $0 \;\; + \;\; 1 \;\; -$ (II)

(I) $\cap$ (II) $\to 0<x<1 \Rightarrow \boxed{D_f = (0,1)}$

ب) $y = \frac{\log_4 (x^2-x-2)}{\sqrt{x^2-1}+1} \to x^2-x-2>0 \Rightarrow (x-2)(x+1)>0$ $\quad + \;\; -1 \;\; - \;\; 2 \;\; + \to x\in(-\infty,-1)\cup(2,+\infty)$ (I) ۵

$x^2-1\geq 0 \to x^2\geq 1 \to x\in(-\infty,-1]\cup[1,+\infty)$ (II)

(I) $\cap$ (II) $\to \boxed{x\in(-\infty,-1)\cup(2,+\infty)}$

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$2\log_x a + \log_a \sqrt{x} = 2 \xrightarrow{x=9} \underbrace{2\log_9 a}_{\log_3 a} + \log_a 3 = 2 \to \log_3 a + \frac{1}{\log_3 a} = 2 \xrightarrow{(\log_3 a = t)}$

$t + \frac{1}{t} = 2 \to \frac{t^2+1}{t} = 2 \to 2t = t^2+1 \Rightarrow t^2-2t+1=0 \Rightarrow t=1$ ۵

$\Rightarrow \log_3 a = 1 \to 3^1 = a \Rightarrow \boxed{a=3}$

۴

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

$|\alpha-\beta| = \frac{\sqrt{\Delta}}{|a|} = \frac{\sqrt{(\log 9)^2 + 4\log\frac54 \log 15}}{\underbrace{|\log\frac54|}_{\log 5 - \log 4 = \log 10 - \log 2 - \log 4}} = \frac{\sqrt{(2\overset{0.4}{\log 3})^2 + 4(\overset{1}{\log 10} - \overset{0.3}{\log 2} - \overset{0.4}{\log 4})(\overset{1}{\log 10} - \overset{0.3}{\log 2} + \overset{0.4}{\log 3})}}{\log 10 - \underset{0.3}{\log 2} - \underset{0.4}{\log 4}}$ ۵

$= \frac{\sqrt{0.64+1.32}}{0.3} = \frac{\sqrt{1.96}}{0.3} = \frac{1.4}{0.3} = \frac{14}{3}$

۵

$\log_{14} 10 = \frac{\log_2 10}{\log_2 14} = \frac{\overset{\frac{1}{0.5}=2}{\log_2 5} + \overset{1}{\log_2 2}}{\underset{1}{\log_2 2} + \underset{2.8}{\log_2 7}} = \frac{3}{3.8} = \frac{15}{19}$ ۵

$\log_2 7 = 2.8$

$\log_5 2 = 0.5 \Rightarrow \log_2 5 = \frac{1}{\underset{0.5}{\log_5 2}} = 2$

۶

$$\log_{15}^{6} = \frac{\log_3^6}{\log_3^{15}} = \frac{\log_3^3+\log_3^2}{\log_3^3+\log_3^5} = \frac{1+\frac{5}{8}}{1+\frac{3}{2}} = \frac{\frac{13}{8}}{\frac{5}{2}} = \frac{13}{20}$$

$\log_3^5 = 1.5$

$\log_2^3 = 1.6 \to \log_3^2 = \frac{1}{\underbrace{\log_2^3}_{1.6}} = \frac{5}{8}$

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

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$$\log_8^{18} = \log_8^{9\times 2} = \log_{2^3}^{3^2} + \log_8^2 = m \to \frac{2}{3}\log_2^3 + \frac{1}{3} = m \Rightarrow \log_2^3 = \frac{3m-1}{2}$$

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$$(0.4)^{2x-1} = \left(\frac{125}{8}\right)^{x^2} \to \left(\frac{2}{5}\right)^{2x-1} = \left(\frac{5^3}{2^3}\right)^{x^2} \to \left(\frac{5}{2}\right)^{-2x+1} = \left(\frac{5}{2}\right)^{3x^2} \Rightarrow 3x^2 = -2x+1 \Rightarrow 3x^2+2x-1=0$$

$x=-1$

$x=\frac{1}{3}$

$\to x=-1 \Rightarrow \log_8^{(-9+1)} = \log_8^{-8}$ غ ق ق

$\to x=\frac{1}{3} \Rightarrow \log_8^4 = \log_{2^3}^{2^2} = \boxed{\frac{2}{3}}$

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$\log_2^3 = a$

$$\log_8^b = \frac{2}{3}(1+a) = \frac{2}{3}(\underbrace{\log_2^2+\log_2^3}_{\log_2^6}) = \log_{2^3}^{6^2} = \log_8^{36} \Rightarrow b = 36$$

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

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واسطه حسابی $\to a = \frac{b+c}{2} \Rightarrow 2a = b+c \to 2a = (2a\log_2^{10}) + c \Rightarrow c = 2a(1-\log_2^{10}) = 2a(\log_2^{0.2})$

عکس مجموع ریشه‌ها $\to \frac{1}{x_1+x_2} = \frac{1}{\frac{-b}{-4a}} = \frac{4a}{b} = \log 4 \to \frac{b}{4a} = \log_4^{10} = \frac{1}{2}\log_2^{10} \Rightarrow b = 2a\log_2^{10}$

$$\left(\frac{1}{\sqrt[8]{2}}\right)^{\frac{c}{a}} = \left(\frac{1}{2}\right)^{\frac{1}{8}\left(\frac{c}{a}\right)} = \left(\frac{1}{2}\right)^{\left(\frac{1}{8}\right)\left(\frac{2a\log_2^{0.2}}{a}\right)} = \left(\frac{1}{2}\right)^{\left(\frac{1}{4}\log_2^{0.2}\right)} = 2^{-\frac{1}{4}\log_2^{0.2}} = \left(\frac{1}{0.2}\right)^{\frac{1}{4}} = 5^{\frac{1}{4}} = \sqrt[4]{5}$$

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