نام و نام خانوادگی ......مبینا فروتن...... پاسخنامه تشریحی تکلیف شماره ...۲۳... کلاس ...یازدهم ریاضی B...

۱

$\log_n^m = a$, $\log_{mn}^{m^2n} = b$, $a>0$

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

$1+\frac{a}{a+1} = b \to [b] = \left[1+\frac{a}{a+1}\right] \to 1+\underbrace{\left[\frac{a}{a+1}\right]}_{0}$ طبق فرض سوال چون $a>0$ که یعنی عبارت ← کوچکتر از ۱ است $\Rightarrow \boxed{[b]=1}$

۲

الف) $y=\sqrt{\frac{x}{\log_{\frac{1}{2}}^{x}}} \to x=0$, $\log_{\frac{1}{2}}^{x}=0 \to x=1$

$x=0 \to$ جزو دامنه است

	0		1	
$-$		$+$		$-$

$\to \boxed{D_f=(0,1)}$

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

$x^2-x-2>0 \to (x-2)(x+1)>0$

	-1		2	
$+$		$-$		$+$

$\sqrt{x^2-1}\neq -1 \to$ همواره برقرار است

$\boxed{D_f=(-\infty,-1)\cup(2,+\infty)}$

۳

$2\log_x^9+\log_a^{\sqrt{x}}=2 \to x=9$ $\quad 2\log_9^9+\log_a^3=2 \to \frac{1}{2}\times 2\log_3^9+\log_a^3=2$

$\frac{1}{\log_3^a}+\log_a^3=2 \to \log_a^3=x \to x+\frac{1}{x}=2$ $\quad x^2-2x+1=0 \to (x-1)^2=0$

$\boxed{x=1}$

$\log_a^3=1 \to \boxed{a=3} \to$ جواب نهایی

۴

$(\log_{10}^{\frac{5}{3}})x^2+(\log 9)x-\log 15=0$ $\quad \log 2=0.3$ $\quad \log 3=0.4$

$\log_{10}^{\frac{5}{3}} = \log_{10}^{\frac{10}{2}}-\log_{10}^{3} \to \log_{10}^{10}-\log_{10}^{2}-\log_{10}^{3} = 1-0.7=0.3$

$\log 9 = 2\log 3 = 0.8$ $\quad \log 15 = \log^3+\log^5 = \log^3+\log\frac{10}{2} = 0.4+1-0.3=1.1$

$0.3x^2+0.8x-1.1=0 \to \frac{\sqrt{5}}{109}$ $\boxed{\frac{11}{3}}$

۵

$\log_5^2=0.5$ $\quad \log_2^7=2.8$ $\quad \log_{14}^{10}=?$

$\log_{14}^{10} = \frac{\log_2^{10}}{\log_2^{14}} = \frac{\log_2^2+\log_2^5}{\log_2^7+\log_2^2} = \frac{1+\log_2^5}{1+2.8} = \frac{1+\frac{1}{\log_5^2}}{1+2.8} = \frac{3}{3.8} = \boxed{\frac{15}{19}}$

$\log_3 5 = 1.5 \quad \log_2 3 = 1.6 \quad \log_{15} 6 = ?$

$\log_{15} 6 = \frac{\log_2 6}{\log_2 15} = \frac{\log_2 3 + \log_2 2}{\log_2 5 + \log_2 3} = \frac{2.6}{\log_2 5 + 1.6} \to \log_3 5 = \frac{\log_2 5}{\log_2 3} = 1.5 \to \log_2 5 = 1.5 \times 1.6$ | ۶

$\frac{2.6}{1.6 \times 1.5 + 1.6} = \frac{2.6}{4} = 0.65$

$\log_8 18 = m \quad \log_{24} 12 = ? \quad \log_8 18 = \frac{1}{3}\log_2 18 = \frac{1}{3}(\underbrace{\log_2 9}_{9=3^2} + \log_2 2) = (2\log_2 3 + 1)\frac{1}{3}$

$\log_4 12 = \frac{1}{2}\log_2 12 = \frac{1}{2}(\log_2 3 + \log_2 4) = \frac{1}{2}(\log_2 3 + 2) \Rightarrow (2\log_2 3 + 1)\frac{1}{3} = m$ | ۷

$\log_2 3 = \frac{3m-1}{2} \to \frac{1}{2}(\log_2 3 + 2) = \frac{1}{2}\left(\frac{3m-1}{2} + 2\right) = \left(\frac{3m+3}{2}\right)\frac{1}{2} =$

$\boxed{(m+1)\frac{3}{4}}$

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

$3x^2 = 1 - 2x \to 3x^2 + 2x - 1 = 0 \to x = \cancel{-1}, \frac{1}{3} \qquad -1 \to$ [illegible]

$x = \frac{1}{3} \quad \log_8 (9x+1) = \log_8 4 = \log_{2^3} 2^2 = \frac{2}{3}\log_2 2 = \boxed{\frac{2}{3}}$ | ۸

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

$\log_2 b = \underbrace{2\log_2 3 + 2}_{2(\log_2 3 + 1)} \to \log_2 3 + \log_2 2 = \log_2 6 \to \log_2 b = 2\log_2 6 \to \log_2 b = \log_2 36$ | ۹

$b = 36 \quad \log_{10} (3b - 8) = \log_{10} 100 = \boxed{2}$

$-4ax^2 + bx + \frac{1}{2}c = 0 \to \frac{1}{\alpha} + \frac{1}{\beta} = \log 4 \to \alpha + \beta = -\frac{b}{-4a} = \frac{b}{4a} \to$ معکوس $= \frac{4a}{b}$

$\frac{4a}{b} = \log 4 = 2\log 2 \to \frac{2a}{b} = \log 2 \qquad a = \frac{b+c}{2} \to c = 2a - b$

$\frac{c}{a} = \frac{2a-b}{a} = 2 - \frac{b}{a} = 2 - \left(\frac{\frac{2a}{\log 2}}{a}\right) = 2 - \frac{2}{\log 2} = 2 - 2\log_2 10$ | ۱۰

$\left(\frac{1}{\sqrt[4]{2}}\right)^{\frac{c}{a}} = \left(\frac{1}{2}\right)^{\frac{-1}{8} \times \frac{c}{a}} = \frac{1}{2}^{\frac{-1}{8} \times \underbrace{(2 - 2\log_2 10)}_{2\log_2 34}} = 2^{\log_2 5^4} = 5\log_{2^4} 2^2 =$

$5^{\frac{1}{4}\log_2 2} = 5^{\frac{1}{4}} = \boxed{\sqrt[4]{5}}$