روژانو صدرالعلمایی تکلیف ۲۳ یازدهم دختر C

-۱

$\log_{n}^{m} = a \qquad \log_{mn}^{m^2 n} = b \qquad a>0 \qquad [b] = ?$

$$\frac{\log_{n}^{m^2 n}}{\log_{n}^{mn}} = \frac{\log_{n}^{m^2} + \cancel{\log_{n}^{n}}^{\,1}}{\log_{n}^{m} + \cancel{\log_{n}^{n}}^{\,1}} = \frac{2a+1}{a+1} \to \left[1 + \frac{a}{a+1}\right] = 1$$

$a+1+a$

بین صفر و یک

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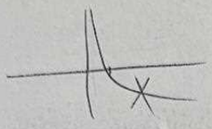
$y = \sqrt{\dfrac{x}{\log_{\frac{1}{2}}^{x}}} \geq 0 \longrightarrow x>0$

$- \to +$



چون x همیشه باید بزرگتر صفر باشد پس صورت همیشه مثبت است
پس باید مخرج هم مثبت و غیرصفر باشد پس $x \neq 1$ است و
x های بزرگتر از ۱ جواب را منفی می‌کنند

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

ب) $y = \dfrac{\log_{4}^{x^2-x-2}}{\sqrt{x^2-1}+1}$

① $x^2-1 \geq 0 \quad x^2 \geq 1 \longrightarrow x \geq 1 \quad x \leq -1$

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

②

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

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

-۳

$2\log_{x}^{a} + \log_{a}^{\sqrt{x}} = 2 \qquad x=9 \quad a=?$

$\longrightarrow 2\underbrace{\log_{a}^{9}}_{t} + \frac{1}{2}\log_{a}^{9} = 2 \to 2t + \frac{1}{2}\times\frac{1}{t} = 2 \xrightarrow{\times t}$

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

$\log_{9}^{a} = \frac{1}{2} \quad \boxed{a = \sqrt{9} = 3} \longleftarrow 4t^2 - 4t + 1 = 0 \to (2t-1)^2 = 0 \quad t = \frac{1}{2}$

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

$\log^{9} = 2\log^{3} \qquad \log^{15} = \log^{5} + \log^{3} \qquad \log^{10} - \log^{2} = \log^{5}$

$1 - 0.3 = 0.7$

$0.3x^2 + 0.8x - 1.1 = 0 \qquad 0.7 + 0.4$

$\log^{\frac{5}{3}} = \log^{5} - \log^{3} = 0.7 - 0.4 = 0.3$

$3x^2 + 8x - 11 = 0 \longrightarrow x^2 + 8x - 11\times 3 = 0$

$(x+11)(x-3) = 0 \qquad -\frac{11}{3} \qquad \frac{3}{3} \longrightarrow \left|-\frac{11}{3} - \frac{3}{3}\right| = \boxed{\frac{14}{3}}$

-۵

$\frac{1}{\log_{5}^{2}} = \log_{2}^{5} = 2$

$\log_{14}^{10} = ? \qquad \log_{5}^{2} = 0.5 \qquad \log_{2}^{7} = 2.8$

$$\frac{\log_{2}^{10}}{\log_{2}^{14}} = \frac{\cancel{\log_{2}^{2}}^{\,1} + \cancel{\log_{2}^{5}}^{\,2}}{\cancel{\log_{2}^{7}}^{\,2.8} + \cancel{\log_{2}^{2}}^{\,1}} = \frac{3}{3.8} = \frac{30}{38} = \boxed{\frac{15}{19}}$$

$\log_{15}6 = ?$ $\log_2 3 = 1.6$ $\log_3 5 = 1.5 \longrightarrow \dfrac{\log_2 5}{1.6\ \log_2 3} = \dfrac{3}{2}$ $\log_2 5 = 2.4$ ۶-

$$\frac{\log_2 6}{\log_2 15} = \frac{\log_2 2 + \log_2 3}{\log_2 3 + \log_2 5} = \frac{1+1.6}{1.6+2.4} = \frac{2.6}{4} = \frac{26}{40} = \frac{13}{20} = \boxed{0.65}$$

$\log_8 18 = m$ $\log_4 12 = ? = \log_4 2^2 + \log_4 3 = 1 + \log_4 3 = 1 + m - \frac{1}{4} = \boxed{\frac{3}{4} + m}$ ۷-

$$\frac{\log_4 18}{\log_4 8} = \frac{\log_4 18}{2} = m \longrightarrow 2m = \log_4 3^2 + \underbrace{\log_4 2}_{\frac{1}{2}} \longrightarrow \frac{2m - \frac{1}{2}}{2} = \log_4 3 = m - \frac{1}{4}$$

$(0.4)^{2x-1} = \left(\frac{125}{8}\right)^{x^2}$ $\log_x (9x+1) \rightarrow \log_8 4 = \log_{2^3} 2^2 \boxed{= \frac{2}{3}}$ ۸-

$$\left(\frac{2}{5}\right)^{2x-1} = \left(\frac{5}{2}\right)^{3x^2} \longrightarrow -2x+1 = 3x^2 \rightarrow 3x^2 + 2x - 1 = 0 \quad x^2 + 2x - 3 \quad (x+3)(x-1) = 0$$

غ ق ق $-1 = \frac{-3}{3}$ $\frac{1}{3}$ ✓

۹-

$\log_2 3 = a$ $\log_8 b = \frac{2}{3}(1+a)$ $\log (3b-8) = ? = \log (3 \times 36 - 8 = 100) = 2$

$$\cancel{\tfrac{1}{3}}\log_2 b = \frac{2}{\cancel{3}}(1+a)$$

$$\log_2 b = \underbrace{2}_{\log_2 4} + \underbrace{2(\log_2 3)}_{\log_2 9} = \log_2 36$$

۱۰-

$-4ax^2 + bx + \frac{1}{2}c = 0$ $\log 2 = \dfrac{1}{x_1 + x_2}$ $\dfrac{b+c}{2} = a$

$$\left(\frac{1}{\sqrt[8]{2}}\right)^{\frac{c}{a}} \qquad 2^{\frac{1}{8}}$$

$$\frac{-b}{-4a} \rightarrow \frac{4a}{b} = \log 4 \rightarrow \frac{2a}{b} = \log_{10} 2 \rightarrow b = \frac{2a}{\log 2}$$

$$c = 2a - b \xrightarrow{\div a} \frac{c}{a} = 2 - \frac{b}{a} = 2 - \left(\frac{2}{\log_{10} 2}\right) = 2 - 2\log_2 10$$

$$2^{-\frac{1}{8}(2 - 2\log_2 10)} = 2^{-\frac{1}{4}(\underbrace{1}_{\log_2 2} - \log_2 10)} = 2^{-\frac{1}{4}(\log_2 0.2)} = 2^{\log_2 5^{\frac{1}{4}}} \rightarrow \boxed{5^{\frac{1}{4}} = \sqrt[4]{5}}$$