درس صادق‌زاده _ یازدهم دختر A

سوال ۱) $\log_n m = a$ ، $\log_{mn} m^2 n = b$ ، $a>0$ ، $[b]=?$

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

$$[b] = 1+\underbrace{\left[\frac{a}{a+1}\right]}_{0} = 1$$

سوال ۲)

$$\sqrt{\frac{x}{\log_{\frac{1}{2}} x}} \qquad \frac{x}{\log_{\frac{1}{2}} x} \geq 0$$

	0		1	
$-$		$+$		$-$

$\Rightarrow D_f = (0,1)$

جزو دامنه نیست

$x>0$ ، $\log_{2^{-1}} x \Rightarrow -\log_2 x = 0 \Rightarrow x=1$

$$\frac{\log_4 (x^2-x-2)}{\sqrt{x^2-1}+1}$$

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

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

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

و $\sqrt{x^2-1}+1 \neq 0 \to$ همیشه برقرار

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

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

$\to (-\infty,-1]\cup[1,+\infty)$ (2)

$\Rightarrow D_f = (1)\cap(2) = (-\infty,-1)\cup(2,+\infty)$

سوال ۳) $2\log_x a + \log_a \sqrt{x} = 2$ ، $x=9$ ، $a=?$

$$2\log_{\underset{3^2}{9}} a + \log_a 3 = 2 \Rightarrow \log_3 a + \log_a 3 = 2 \to \log_3 a + \frac{1}{\log_3 a} = 2$$

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

سوال ۴)

$\underbrace{\log 5}_{\log \frac{10}{2}} - \log 3 = \log 10 - \log 2 - \log 3 = 0/3$ ، $\log 9 = \log 3^2 = 2\log 3 = 0/8$

$\log 15 = \log 3 + \underbrace{\log 5}_{\log 10 - \log 2} = 0/4 + 1 - 0/3 = 1/1$

Arman

$$0.3x^2 + 0.8x - 1.1 = 0 \xrightarrow{\div 10^{-1}} 3x^2 + 8x - 11 = 0$$

$$\to \Delta = 64 + 132 = 196$$

$$|x_2 - x_1| = \frac{\sqrt{\Delta}}{|a|} = \frac{14}{3}$$

(سوال ۵) $\log_5 2 = 0.5, \ \log_2 7 = 2.8$ $\qquad \log_{14} 10 = ?$

$$\frac{1}{\log_2 5} = \frac{1}{2} \Rightarrow \log_2 5 = 2$$

$$\frac{\log_2 \overset{2\times 5}{10}}{\log_2 14_{=2\times 7}} = \frac{\log_2 2 + \log_2 5}{\log_2 2 + \log_2 7} =$$

$$\frac{1+2}{1+2.8} = \frac{3}{3.8} = \frac{30}{38} = \boxed{\frac{15}{19}}$$

(سوال ۶) $\log_3 5 = 1.5 \quad \log_2 3 = 1.6$ $\qquad \log_{15} 6 = ?$

$$\frac{\log_2 5}{\log_2 3} = \frac{3}{2}$$

$$\to \log_2 5 = \frac{8}{5} \times \frac{3}{2} = \frac{12}{5}$$

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

$$= \frac{1 + 1.6}{2.4 + 1.6} = \frac{2.6}{4} = \frac{26}{40} = \frac{13}{20} = \boxed{0.65}$$

(سوال ۷) $\log_8 18 = m$ $\qquad \log_4 12 = ?$

$$\log_8 18 = \frac{1}{3}\log_2 18 = \frac{1}{3} \times (\log_2 3^2 + \log_2 2) = \frac{1}{3}(2\log_2 3 + 1)$$

$$= \frac{2}{3}\log_2 3 = m - \frac{1}{3} \Rightarrow \log_2 3 = \frac{3}{2}m - \frac{1}{2}$$

$$\frac{1}{2}\log_2 12 = \frac{1}{2}(2\log_2 2 + \log_2 3) = \frac{1}{2}\left(2 + \frac{3}{2}m - \frac{1}{2}\right) = \frac{3}{4} + \frac{3}{4}m$$

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

سوال ۸)

$$(0/4)^{2x-1} = \left(\frac{125}{8}\right)^{x^2} \qquad \log_{8}^{(9x+1)}$$

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

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

$$\Rightarrow 3x^2 + 2x - 1 = 0$$

$$x^2 + 2x - 3 = 0$$

$$(x+3)(x-1) = 0$$

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

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$$\log_8 4 = \frac{2}{3}\log_2 2 = \frac{2}{3}$$

سوال ۹)

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

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

$$\log_2 b = 2 + 2\log_2 3$$

$$2(1+\log_2 3) = 2\log_2 6$$

$$\Rightarrow \log_2 36 = \log_2 b \Rightarrow b = 36$$

$$\log(108-8) = 2$$

سوال ۱۰)

$$\frac{2a}{b} = \log 2 \to b = \frac{2a}{\log 2}$$

عکس مجموع ریشه ها $= \frac{4a}{b} = 2\log 2 \Rightarrow$

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

$$\frac{c}{a} = \frac{2a-b}{a} = 2 - \frac{b}{a} = 2 - \left(\frac{2\cancel{a}}{\log 2} \times \frac{1}{\cancel{a}}\right) = 2 - \frac{2}{\log 2} = 2\Big(1 - \underbrace{\frac{1}{\log 2}}_{\log_2 10}\Big)$$

$$= 2 - 2\log_2 10 = 2 - \log_2 100$$

$$\frac{1}{\sqrt{2}} = \left(2^{-\frac{1}{8}}\right)^{2-2\log_2 10} = \left(2^{-\frac{1}{8}}\right)^{2\big(\overbrace{\underbrace{1-\log_2 10}_{\log_2 0/2}}^{\log_2 2}\big)}$$

$$۲^{-\frac{1}{۴}\log_{۲}^{۰/۲}} = ۲^{\log_{۲۴}^{۵}} \longrightarrow ۵^{\log_{۲}^{۲} ۴} = ۵^{\frac{1}{۴}\log_{۲}^{۲}}$$

$$= \sqrt[۴]{۵}$$