No.

Date. ۲۳ تعلیف شماره ۱   یازدهم ریاضی   سینا رشید محمدی

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

$m = n^a$

$\Rightarrow \log_{n^{a+1}} n^{(2a+1)} = b \Rightarrow \frac{2a+1}{a+1} \log_n n = \frac{2a+1}{a+1} = b$

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

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الف) $y = \sqrt{\frac{x}{\log_{\frac{1}{2}} x}}$ I) $x>0$ (II) $\log_{\frac{1}{2}} x = 0 \Rightarrow x \neq 1$ (III) $\frac{x}{\log_{\frac{1}{2}} x} \geq 0$

$I \cap II \cap III = (0,1)$ ⟸ if $x=0$ یا $x=1$ $= 0$ نشان

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

II) $\sqrt{x^2-1}+1 \neq 0 \Rightarrow \sqrt{x^2-1} \neq -1 \Rightarrow \mathbb{R}$

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

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$2\log_x a + \log_a \sqrt{x} = 2 \qquad x = 9 \Rightarrow a = ?$

$2\log_9 a + \log_a 3 = 2 \Rightarrow \log_3 a + \log_a 3 = 2 \Rightarrow \frac{1}{\log_3 a} + \log_a 3 = 2 \Rightarrow \log_a 3 = 1$

$2\log_{3^2} a \Rightarrow \frac{2}{2}\log_3 a$

$\Rightarrow \boxed{a = 3}$

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$\log 3 \simeq 0.48 \quad \log 2 \simeq 0.3 \qquad \sqrt{\Delta} = \sqrt{\frac{132+64}{100}} = \frac{14}{10} \qquad (\log 9)^2 = (2\log 3)^2 = \frac{64}{100}$

$[\log \frac{5}{3}] x^2 + (\log 9)x - \log 15 = 0 \qquad +4(\log 5 - \log 3)(\log 5 + \log 3)$

$a = \log 5 - \log 3 = 0.7 - 0.48 = 0.22$ مزدوج ⟸ $+4((\log 5)^2 - (\log 3)^2)$

$|\alpha - \beta| = \frac{\sqrt{\Delta}}{|a|} \qquad \log 5 = \log \frac{10}{2} = \log 10 - \log 2 = 0.7$

$= \frac{1.4}{0.22} = \frac{14}{3}$

$\Delta = b^2 - 4ac = (\log 9)^2 - 4(\log \frac{5}{3})(-\log 15) \qquad 4(\frac{49}{100} - \frac{16}{100}) = \frac{132}{100}$

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$\log_2 7 = 2.8 \qquad \log_5 2 = 0.5 \qquad \log_{14} 10 = ? \quad \frac{30}{38} = \frac{15}{19}$

$\log_{14} 10 = \frac{1}{\log_{10} 14} \Rightarrow \log_{10} 14 = \log_{10} 2 + \log_{10} 7 = \frac{2.8}{3} + \frac{1}{3} = \frac{3.8}{3} = \frac{38}{30}$

$\log_2 7 = \frac{\log_{10} 7}{\log_{10} 2} = 2.8 \qquad \log_5 2 = \frac{\log_{10} 2}{\log_{10} 5} = \frac{\log_{10} 2}{1-\log_{10} 2} = 0.5$

$\log_{10} 7 = \frac{2.8}{3}$

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$\frac{3}{2}\log_{10} 2 = \frac{1}{2} \Rightarrow \log_{10} 2 = \frac{1}{3} \qquad \Rightarrow \frac{1}{2} - \frac{1}{2}\log_{10} 2 = \log_{10} 2$

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۶- $\log_3 5 = 1.5$ $\quad \log_2 3 = 1.6 \Rightarrow \log_3 2 = \frac{10}{16}$

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

$\log_2 5 = \frac{\log_3 5}{\log_3 2} = \frac{\frac{15}{10}}{\frac{10}{16}} = 2.4$

۷- $\log_8 18 = m$ $\quad \log_4 12 = ?$ $\quad \log_4 12 = \frac12 \log_2 3 + \frac12 \log_2 4 = \frac{3m-1+1}{4}$

$\log_8 18 = \frac{\log_4 18}{\log_4 8} = \frac{\log_4 2 + \log_4 9}{\log_4 4 + \log_4 2} = m \Rightarrow \frac{3m}{2} - \frac12 = \log_4 9$ $\quad$ (۱) $\boxed{\frac{3m+3}{4}}$

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

۸- $(0.4)^{2x-1} = (\frac{125}{8})^{x^2}$ $\quad \log_8 (9x+1) = ?$

$(\frac25)^{2x-1} = (\frac{5^3}{2^3})^{x^2} \Rightarrow (\frac25)^{2x-1} = (\frac52)^{3x^2} \Rightarrow (\frac25)^{2x-1} = (\frac25)^{-3x^2}$ $\quad a>0$, $\log_b a$

$\log_8 (3+1) = \log_8 4 = 2\log_8 2 \Rightarrow 2x-1 = -3x^2 \Rightarrow 3x^2+2x-1$ $\quad x = \frac{-3}{3} = -1$ ✗

$\Rightarrow \boxed{\frac23}$ $\quad \Rightarrow x^2+2x-3 = (x+3)(x-1) \Rightarrow$ یا $x = \frac13$ ✓

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$\log_2 3 = a$ $\quad \log_8 b = \frac23 (1+a)$ $\quad \log(3b-8) = ?$

$\log_8 b = \frac13 \log_2 b \Rightarrow \log_2 b = 2+2a \Rightarrow \underbrace{2^2}_{4} \times \underbrace{2^{2a}}_{(2^a)^2 = 9} = b \Rightarrow \boxed{b = 36}$

$2^a = 3 \Rightarrow (2^a)^2 = 9$ $\quad 3\times 36 = 108$ $\quad \log(3b-8) = \log(108-8) = \log 100 = \boxed{2}$

۱۰- $4ax^2 + bx + \frac12 c = 0$ $\quad (\frac{1}{\sqrt2})^{\frac ca} = ?$ $\quad b+c = 2a \Rightarrow c = 2a-b$ *

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

$\Rightarrow \frac{2a}{b} = \log 2 \Rightarrow \boxed{\frac{2a}{\log 2} = b} \Rightarrow \frac ca = \frac{2a-b}{a} = 2 - \frac ba = 2 - (\frac{2a}{\log 2} \times \frac1a)$

$\Rightarrow \frac ca = 2 - \frac{2}{\log 2} = 2 - 2\log_2 10 \rightarrow (\frac{1}{\sqrt2})^{\frac ca} = (2^{-\frac12})^{2-2\log_2 10}$

$\frac{2}{\log 2} = 2\log_2 10$ $\quad \Rightarrow 2^{-\frac14 + \frac14 \log_2 10} = 2^{-\frac14} \times (2^{\frac14(\log_2 5 + \log_2 2)}) = 2^{\frac14 \log_2 5} = 5^{\frac14} = \boxed{\sqrt[4]{5}}$

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