۱۸

حسابان

۱- $\log_{n} m = a$ $\qquad \frac{\log_B m}{\log_B n} = a$

$b = \log_{mn} m^2 n = \frac{2\log m + \log n}{\log n + \log n} = \frac{2a+1}{a+1} = 1 + \frac{a}{a+1}$ ... → [۵] د)

۲- الف) $y = \sqrt{\frac{x}{\log_{\frac{1}{2}} x}}$

$x > 0$ $\qquad D_y = (0, 1)$

$\log_{\frac{1}{2}} x \neq 0 \to \log_{\frac{1}{2}} x = 0 \to x = 1 \to x \neq 1$ $\qquad \frac{x}{\log_{\frac{1}{2}} x} \geq 0$ طبق → $0 < x < 1$

همواره مثبت $\qquad$ صفر → $1 < x$

ب) $y = \frac{\log_2 (x^2 - x - 2)}{\sqrt{x^2-1} + 1}$

$x^2 - x - 2 > 0$ $\quad$ (-1, 2: + − +) $\qquad x < -1 \cup x > 2$

$\sqrt{x^2-1} + 1 \neq 0$ همیشه

$x \geq 1 \cup x \leq -1$ $\qquad \cap \quad x < -1,\ 2 < x \to (-\infty, -1) \cup (2, +\infty)$

۳- $2\log_{a^2} a + \log_a 2 = 2 \to \log_2 a + \log_a 2 = 2$

$\log_2 a = t$ $\quad t + \frac{1}{t} = 2 \to t^2 + 1 = 2t \to$

$t^2 - 2t + 1 = 0$

$(t-1)^2 = 0$

$t = 1 \quad \log_2 a = 1 \quad a = 2$ ج)

۴- $\log 5 = \log \frac{10}{2} = 1 - \log 2 = 1 - 0/3 = 0/7$

$\log \frac{5}{4} = \log 5 - \log 4 = 0/7 - 0/6 = 0/1$

حل تمارین

$\log 9 = 2\log 3 = 2\times 0/48 = 0/8$

$\log 15 = \log 5\times 3 = \log 3 + \log 5 = 0/48 + 0/7 = 1/18 \Rightarrow 0/3x^2 + 0/8x - 1/1 = 0$

$\xrightarrow{\times 10} 3x^2 + 8x - 11 = 0 \qquad |x_2 - x_1| = \frac{\sqrt{\Delta}}{|a|} = \frac{\sqrt{64 - 4(3)(-11)}}{3} = \frac{\sqrt{196}}{3} = \frac{14}{3}$

۵-

$\log_5 2 = \frac{1}{3} \to \frac{\log 2}{\log 5} = \frac{1}{3} \to \frac{\log 2}{\log \frac{10}{2}} = \frac{1}{3} \to \frac{\log 2}{\log 10 - \log 2} = \frac{1}{3}$

$\frac{\log 2}{1 - \log 2} = \frac{1}{3} \to 1 - \log 2 = 3\log 2 \to 4\log 2 = 1 \to \log 2 = \frac{1}{4}$

$\log_2 7 = 2/8 \to \frac{\log 7}{\log 2} = 2/8 \to \frac{\log 7}{\frac{1}{4}} = 2/8 \to \log 7 = \frac{28}{40}$

$\log_{14} 10 = \frac{\log 10}{\log 14} = \frac{1}{\log 2 + \log 7} = \frac{1}{\frac{1}{4} + \frac{28}{40}} = \frac{10}{19}$

۶-

$\log_3 5 \times \log_2 3 = \log_2 5 \to \log_3 5 \times \log_2 3 = 1/5 \times 1/6 \Rightarrow \log_2 5 = 2/4$

$\log_{15} 6 = \frac{\log_2 6}{\log_2 15} \qquad \log_{15} 6 = \frac{\log_2 2 + \log_2 3}{\log_2 3 + \log_2 5} = \frac{1 + 1/6}{1/6 + 2/4} = \frac{2/6}{4} = 0/65$

۶-

$\log_{۲}^{۳} \times \log^{..}_{۳} = \log^{..}_{۲} \longrightarrow \log_{۳}^{۵} \times \log_{۲}^{۳} = ۱,۵ \times ۱,۶ \Rightarrow \log_{۲}^{۵} = ۲,۴$

[illegible]

$\log_{۱۵}^{۶} = \frac{\log_{۲}^{۶}}{\log_{۲}^{۱۵}} \qquad \log_{۱۵}^{۶} = \frac{\log_{۲}^{۲} + \log_{۲}^{۳}}{\log_{۲}^{۳} + \log_{۲}^{۵}} = \frac{۱ + ۱,۶}{۱,۶ + ۲,۴} = \frac{۲,۶}{۴}$

[illegible]

۷-

$\frac{\log_{۸}^{۱۲}}{\log_{۸}^{x}} = \log_{۴}^{۱۲} \longrightarrow \log_{۸}^{۱۲} = \log_{۸}^{۴} + \log_{۸}^{۳} = \frac{۲}{۳} + \frac{۱}{۳}\log_{۲}^{۳}$

$\log_{۸}^{۱۸} = m \Rightarrow \log_{۸}^{۹} + \log_{۸}^{۲} = m \rightarrow \frac{۲}{۳}\log_{۲}^{۳} + \frac{۱}{۳}\log_{۲}^{۲} = m \rightarrow \log_{۲}^{۳} = \frac{۳m - ۱}{۲}$

REEF GROUP

هاله صفریان

$$\log_4 12 = \frac{\frac{3}{2} + \frac{1}{2}\log_2 3}{\frac{3}{2}} = \frac{\frac{3}{2} + \frac{1}{2}\left(\frac{3m-1}{2}\right)}{\frac{3}{2}} = \frac{3 + \frac{3m-1}{2}}{3} = \frac{3m+5}{6}$$

۸-

$$(0.64)^{2x-1} = \left(\frac{125}{8}\right)^{x^2} \to \frac{125}{8} = \left(\frac{5}{2}\right)^3 \to \left(\frac{2}{5}\right)^{x-1} = \left(\left(\frac{5}{2}\right)^3\right)^{x^2}$$

$$\left(\frac{4}{5}\right)^{2x-1} = \left(\frac{4}{5}\right)^{-3x^2} \xrightarrow{\text{تساوی نماها}} 2x-1 = -3x^2$$

$$3x^2 + 2x - 1 = 0 \to (x+1)(3x-1) = 0$$

$x \to -1 \to$ غ ق ق $\to \log_8 (9x+1)$ ، $9x+1 < 0$ غ ق ق

$x = \frac{1}{3}$ ق ق

$$\log_8 (9x+1) = \log_8 (3+1) = \log_8 4 = \frac{2}{3}\log_2 2 = \frac{2}{3}$$

۹-

$$\log_8 b = \log_{32} b \to \frac{1}{3}\log_2 b = \frac{3}{2}(1 + \log_{12} 3)$$

$$\log_2 b = 2\log_2 6 = \log_3 36 \to \log_{10} 100 = 2$$

$$a=\frac{b+c}{2} \to b=2a-c \to \frac{1}{x_1+x_2}=\frac{1}{S}=\frac{4a}{b}=\frac{4a}{2a-c}=2\log 2$$

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$$\to \frac{4a}{2a-c}=\log 4 \xrightarrow{\text{عکس}} \frac{2a-c}{4a}=\log_4 10 \to 1-\log_4 10=\frac{c}{4a} \to 4-\log_4 100=\frac{c}{a} \quad (1)$$

$$\left(\frac{1}{\sqrt[8]{2}}\right)^{\frac{c}{a}}=\left(2^{-\frac{1}{8}}\right)^{\frac{c}{a}}=\left(2^{\frac{c}{a}}\right)^{-\frac{1}{8}} \xrightarrow{(1)} \left(2^{4-\log_2 10}\right)^{-\frac{1}{8}}$$

$$\left(\frac{2^4}{2^{\log_2 10}}\right)^{-\frac{1}{8}}=\left(\frac{16}{10}\right)^{-\frac{1}{8}}=(25)^{\frac{1}{8}}=\sqrt[4]{5}$$