Subject: ..........

Date: ..........

کلید تشریحی

۲۰

۱ـ $\log_n m = a$ $\qquad \underbrace{\cancel{\log_{mn} mn}}_{1} + \underbrace{\log_{mn} m}_{\frac{\log_n m}{\log_n m + 1}} = \log_{mn} m^2 n = b \Rightarrow b = 1 + \frac{a}{1+a}$

$\downarrow$

$[b] = 1$ ⓶

۲ـ $\frac{x}{\log_{\frac{1}{2}} x} \geq 0 \longrightarrow$ $\begin{array}{ccccc} & 0 & & 1 & \\ - & | & + & | & - \end{array}$

$x > 0$

$\longrightarrow D_f = (0, 1)$

⓶

$x^2 - 1 \geq 0$ $\qquad \begin{array}{ccccc} & -1 & & 1 & \\ + & | & - & | & + \end{array}$

$\sqrt{x^2-1} \neq -1$

$x^2 - x - 2 > 0$ $\qquad \begin{array}{ccccc} & -1 & & 2 & \\ + & | & - & | & + \end{array}$

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

۳ـ $2\underbrace{\log_x a}_{t} + \frac{1}{2}\log_a x = 2 \longrightarrow 2t + \frac{1}{2t} = 2 \rightarrow 4t^2 - 4t + 1 = 0$

$t = \frac{1}{2} \rightarrow \log_x a = \frac{1}{2} \longrightarrow \sqrt{x} = a \longrightarrow a = 3$ ⓶

۴ـ $(\overset{0.7}{\log 5} - \overset{0.4}{\log 3})x^2 + (\overset{0.8}{2\log 3})x - (\underset{0.7}{\log 5} + \underset{0.4}{\log 3}) \Rightarrow 0.3x^2 + 0.8x - 1.1 = 0$

$\log 5 = 1 - \underset{0.3}{\log 2}$

$\downarrow$

اختلاف ریشه ها $= \frac{\sqrt{64 \times 10^{-2} + 4 \times 3 \times 11 \times 10^{-2}}}{3 \times 10^{-1}}$

$= \boxed{\frac{14}{3}}$

۵ـ $\frac{\log_2 5 + 1}{\log_2 7 + 1} = \frac{3}{3.8} = \boxed{\frac{15}{19}}$ ⓶

TANDIS

$\frac{1}{1.6}$

۶ـ

$\log_{15}^{6} = \frac{\log_3^2+1}{\frac{\log_3^5+1}{1.5}} = \frac{1.3}{2.5} = \frac{13}{20}$

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۷ـ

$\underbrace{\frac{2}{3}\log_2^3}_{\log_8^9} + \underbrace{\frac{1}{3}}_{\log_8^2} = m$

$\log_2^3 = (m - \frac{1}{3})\frac{3}{2}$

$\log_4^{12} = 1 + \frac{1}{2}\log_2^3 = 1 + \frac{1}{2} \times \frac{3}{2}(m - \frac{1}{3})$

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

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۸ـ

$(\frac{2}{5})^{2x-1} = (\frac{5}{2})^{3x^2} \longrightarrow (\frac{5}{2})^{1-2x} = (\frac{5}{2})^{3x^2} \longrightarrow 3x^2+2x-1=0$ $\begin{cases} x=-1 & \text{غ ق ق} \\ x=\frac{1}{3} \end{cases}$

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$\log_8^{\overset{4}{\cancel{\frac{1}{3}\times 9+1}}} = \boxed{\frac{2}{3}}$

۹ـ

$\frac{1}{3}\log_2^b = \frac{2}{3}(\underset{\log_2^2}{\cancel{1}} + \log_2^3) \longrightarrow \log_2^b = 2\log_2^6 \longrightarrow \boxed{b=36}$

$\log^{36\times 3-8} = \log 100 = \boxed{2}$

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۱۰ـ

$\frac{1}{\alpha+\beta} = \log 4 \longrightarrow \frac{-b}{-4a} = \log_4^{10} \longrightarrow b = 4a\log_4^{10}$

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$b+c = 2a \rightarrow c = 2a-b \Rightarrow \frac{c}{a} = 2 - 4\log_4^{10} = 2 - 2\log_2^{10}$

$(2^{-\frac{1}{8}})^{2-2(\log_2^5+1)} = 2^{\frac{1}{4}\log_2^5} = 5^{\frac{1}{4}\log_2^2} = \boxed{\sqrt[4]{5}}$