نام و نام خانوادگی ...مهلا بابایی‌زاده...... پاسخنامه تشریحی تکلیف شماره ...۲۴... کلاس ...یازدهم ریاضی B...

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$f(x) = 3^{Ax+B}$, $y = x^2 \longrightarrow x = 1$, $x = 3$

if $x=1 \Rightarrow y = x^2 \rightarrow y = 1$

if $x = 3 \Rightarrow y = 9$

$x=1 \Rightarrow 3^{A+B} = 1 \Rightarrow A+B=0$

$x=3 \Rightarrow 3^{3A+B} = 9 \Rightarrow 3A+B=2$

$-A+B=0$
$3A+B=2$
$2A = 2 \Rightarrow A = 1 \,,\, B = -1$

$3^{Ax+B} \longrightarrow f(x) = 3^{x-1} \longrightarrow$ if $x=0 \Rightarrow y = 3^{-1} = \frac{1}{3}$

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$\log_2 (4^x+15) = x+3 \Rightarrow 2^{(x+3)} = 2^{2x} + 15 \rightarrow 2^x \times 8 = 2^{2x} + 15 \longrightarrow$ if $2^x = t$

$t^2 - 8t + 15 = 0$

$(t-5)(t-3) \rightarrow 2^x = 5 \Rightarrow x = \log_2 5$

$2^x = 3 \Rightarrow x = \log_2 3$

$\log_2 5 + \log_2 3 = \log_2 (3\times 5) = \log_2 15$

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$(\log_{21} 3)^2 + \log_{21} 147 \times \log_{21} 1323$

$\log_{21} 147 \rightarrow 21 \times 7$, $\log_{21} 1323 \rightarrow 441 \times 3 = (21)^2 \times 3$

$\Rightarrow (\log_{21} 3)^2 + (\log_{21} 21 + \log_{21} 7) \times (\log_{21} 21^2 + \log_{21} 3)$

$\log_{21} 7 \rightarrow \frac{21}{3} = \log_{21} 21 - \log_{21} 3 = 1 - \log_{21} 3$

$(\log_{21} 3)^2 + (2 - \log_{21} 3)(2 + \log_{21} 3)$

$(\log_{21} 3)^2 + 4 - (\log_{21} 3)^2 = 4$

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$\log(x^2 - 2x + 1) + 3\log(1-x) = 5$, $\log_3 (-x) = ?$

$(x-1)^2$, $\log(1-x)^3$

$\log(x-1)^2 + \log(1-x)^3 = 5$

$\log(1-x)^5 = 5 \Rightarrow 10^5 = (1-x)^5 \Rightarrow 1-x = 10$

$x = -9$

$\log_3 9 = 2$

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$\log_2 (x^2+2x+4) + \log_2 (x-2) = 3$, $\log_{\sqrt[3]{2}} x = ?$, $\log_{\sqrt[3]{2}} \sqrt[3]{16} = 4$

$\log_2 (x+2)^2 + \log_2 (x-2) = 3$

$\log_2 (x-2)(x^2+2x+4) = 3 \longrightarrow x^3 - 8 \Rightarrow \log_2 (x^3-8) = 3 \Rightarrow x^3 - 8 = 8$

$x^3 = 16 \Rightarrow x = \sqrt[3]{16}$

$\log(2-x) - \log \frac{1}{(x-2)^2} = 3 \qquad \log_{\sqrt{2}}(-x) = ?$

$$\frac{\frac{2-x}{1}}{\frac{1}{(x-2)^2}} = (2-x)^3 \Rightarrow \log_{10}(2-x)^3 = 3 \Rightarrow 2-x = 10 \Rightarrow x = -8$$ ۶

$$\log_{\sqrt{2}} 8 = \log_{2^{\frac{1}{2}}} 2^3 = 3 \times 2 \log_2 2 = \boxed{6}$$

$3^{x^2-2} = 81^x \qquad \log_6(x-2) = ?$

$3^{x^2-2} = 3^{4x}$

$x^2 - 4x - 2 = 0$

$\Delta = 16 + 8 = 24 \qquad x = \frac{4 \pm \sqrt{24}}{2} \Rightarrow x = 2 \pm \sqrt{6} \rightarrow \boxed{x = 2 + \sqrt{6}}$

$$\log_6 \sqrt{6} = \log_6 6^{\frac{1}{2}} = \frac{1}{2} \log_6 6 = \boxed{\frac{1}{2}}$$ ۷

$\log_3 2 = \frac{5}{8} \qquad \log_{18} 8 \rightarrow 2^3 \Rightarrow 3 \log_{18} 2 \rightarrow \frac{3}{\log_2 18} = \frac{3}{\log_2 9 + \log_2 2} = \frac{3}{2 \times \frac{8}{5} + 1} = \frac{3}{\frac{21}{5}} = \boxed{\frac{15}{21}}$ ۸

$\log_2 9 \rightarrow 2\log_2 3$

$\text{if } \log_3 2 = \frac{5}{8} \Rightarrow \log_2 3 = \frac{8}{5}$

$\log_4 3 = 0.8 \qquad \log_{12} 6 = ?$

$(4)^{0.8} \rightarrow 2^{2 \times 0.8} = 2^{1.6} = 3 \Rightarrow 3^{\frac{10}{16}} = 2 \quad \left(\frac{10}{16} = \frac{5}{8}\right)$

$\frac{1}{\log_c 12} \rightarrow 4 \times c$

$\log_{12} 6 \rightarrow \frac{12}{2} \Rightarrow \log_{12} 12 - \log_{12} 2 = 1 - \frac{5}{8} \times \log_{12} 3 \Rightarrow 1 - \frac{5}{8}\left(\frac{1}{\log_3 4 + \log_3 3}\right)$ with $\log_3 4 = \frac{1}{0.8}$, $\log_3 3 = 1$

$1 - \frac{5}{8} \times \frac{4}{9} = 1 - \frac{5}{18} = \boxed{\frac{13}{18}}$ ۹

$(a \log 2) x^2 + a x + b \log 2 = 0 \xrightarrow{\text{یکی از ریشه‌ها}} -1 \qquad \alpha = -1, \quad \beta = ?$

$S = -\frac{b}{a} = \frac{-a}{a \log 2} = \frac{-1}{\log 2} \Rightarrow -1 + \beta = \frac{-1}{\log 2} \Rightarrow \beta = -\log_2 10 + 1 \cdot \log_2 2$ ۱۰

$-\log_2 10 + \log_2 2$

$(\sqrt{2})^{\frac{b}{a}} \qquad P = -1 \times \beta = \frac{b \log 2}{a \log 2} \Rightarrow -1 \times \log_2 \frac{1}{5} \rightarrow 5^{-1} \rightarrow \log_2 5 \qquad \log_2 \frac{1}{10} + \log_2 2 = \log_2 \frac{1}{5}$

$$(2^{\frac{1}{2}})^{\log_2 5} \Rightarrow 5^{\log_2 2^{\frac{1}{2}}} \Rightarrow 5^{\frac{1}{2}} = \boxed{\sqrt{5}}$$