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پارمیس عباسیان . تکلیف ۲۴ یازدهم دختر

۱. $f(x) = 3^{Ax+B}$, $y = x^2$

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

$\xrightarrow{x=1} 1^2 = 3^{A+B}$

$\rightarrow \begin{cases} 3A+B=2 \\ A+B=0 \end{cases} \rightarrow A=1,\ B=-1$

$f(x) = 3^{x-1} \xrightarrow{x=0} f(x) = \frac{1}{3}$

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۲. $\log_2 (4^x+15) = x+3$

$4^x+15 = 2^{x+3} \longrightarrow 2^{2x} - 2^{x+3} + 15 \longrightarrow t^2 - 8t + 15$

$4^x+15>0 \rightarrow 2^x > -16$, $2^x = t$

$(t-3)(t-5)$, $\begin{cases} t=3=2^x \\ t=5=2^x \end{cases}$

$x = \log_2 5,\ \log_2 3 \rightarrow x_1 + x_2 = \log_2 15$

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۳. $(\log_{21} 3)^2 + \log_{21} (21\times 7) \log_{21} (21^2\times 3) \longrightarrow (\log_{21} 3)^2 + (\log_{21} 21 + \log_{21} 7)(\log_{21} 21^2 + \log_{21} 3)$

$\longrightarrow (1+1-\log_{21} 3)(2+\log_{21} 3) + (\log_{21} 3)^2 = 4$

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۴. $\log (x^2-2x+1) + 3\log (1-x) = 5 \rightarrow -(x-1)^2(x-1)^3 = 10^5 \rightarrow -(x-1)^5 = 10^5$

$x-1 = -10$

$x = -9$

$\log_3 -x = 2$

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۵. $\log_2 (x^2+2x+4) + \log_2 (x-2) = \log_2 8 \longrightarrow (x^2+2x+4)(x-2) = 8$

$(x^3-8) = 8 \rightarrow x^3 = 16$

$x = 2^{\frac{4}{3}}$

$\log_{2^{\frac{1}{3}}} 2^{\frac{4}{3}} \rightarrow$ (4)

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۶. $\log_2 -x - \log \frac{1}{(x-2)^3} = 3 \rightarrow -(x-2)^3 = 1000 \rightarrow -(x-2)^3 = 10^3 \rightarrow x-2 = -10$

$x = -8$

$\log_{\sqrt{2}} -x = 6$

$(2^{\frac{1}{2}})^6 \rightarrow$

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7. $3^{x^2-2} = 3^{4x}$ بدون $x^2-4x-2=0 \longrightarrow \frac{4\pm\sqrt{16+8}}{2} = 2\pm\sqrt{6}$

$\log_6^{2+\sqrt{6}-2} = \frac{1}{2}$ (2)

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8. $\log_3 2 = \frac{5}{8}$

$\log_{18} 8 = \frac{5}{7}$

$\frac{3\log_3 2}{2\log_3 3 + \log_3 2} \quad \left(\frac{15}{8};\ 2,\ \frac{5}{8}\right), \quad \frac{\log_3 8}{\log_3 18} = \log_{18} 8 = \frac{15}{21} = \frac{5}{7}$ (2)

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9. $\log_4 3 = 0.8$

$\log_{12} 6 = \frac{13}{18}$

$\frac{\log_4 3 + \log_4 2}{\log_4 3 + \log_4 4} = \frac{0.8 + \frac{1}{2}}{0.8 + 1} = \frac{13}{18}$ (2)

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10. $a(a\log 2)x^2 + ax + b\log 2 = 0 \xrightarrow{x=-1} a\log 2 - a + b\log 2 \longrightarrow (\log 2)(a+b) = a$

$\log_{10} 2 = \frac{a}{a+b} \longrightarrow \log_2 10 = \frac{a+b}{a} \longrightarrow 1 + \frac{b}{a}$ (2)

$\rightarrow \frac{b}{a} = \log_2 10 - 1 = \log_2 5$

$\sqrt{2}^{\log_2 5} = 5^{\frac{1}{2}\log_2 2} = \sqrt{5}$

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