نام و نام خانوادگی ..... پاسخنامه تشریحی تکلیف شماره ۲۴ کلاس ..... پایه دهم .....

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$y=a^x \xrightarrow{x=1} (1,1) \rightarrow f(1)=1=a^{A+B} \rightarrow A+B=0 \rightarrow A=-B$

$\xrightarrow{x=3} (3,9) \rightarrow f(3)=9=a^{3A+B} \rightarrow 3A+B=2^{6-A} \rightarrow 2A=2 \rightarrow A=1 \rightarrow B=-1$

$f(x)=a^{x-1}$

$f(6)=a^{A\times 0+B}=a^{1\times 0-1}=a^{-1}=\frac{1}{a} \rightarrow (0,\frac{1}{a})$

۲

$\log_2^{(4^x+15)} = x+3 \rightarrow a^{x+3}=4^x+15 \rightarrow 4^x-2^x\times 8+15=0 \xrightarrow{2^x=t} t^2-8t+15=0$

$(t-3)(t-5)=0 \rightarrow \begin{cases} 2^x=5 \rightarrow \log_2^5=x \\ 2^x=3 \rightarrow \log_2^3=x \end{cases} \rightarrow \log_2^5+\log_2^3=\log_2^{3\times 5}=\log_2^{15}$

۳

$(\log_{21}^3)^2+\log_{21}^{147} \propto \log_{21}^{1323} = \log_{21}^3\times\log_{21}^3+\log_{21}^{7\times 7\times 3} \propto \log_{21}^{21\times 21\times 3} = \log_{21}^3 \propto \log_{21}^3+(\log_{21}^7+\log_{21}^3)\times(\log_{21}^7+\log_{21}^3+\log_{21}^3)=\log_{21}^3\times\log_{21}^3+(1+\log_{21}^7)\times(2+\log_{21}^3)=$

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

۴

$\log(x^2-2x+1)+3\log(1-x)=5 \xrightarrow{\times 3} 3\log(x-1)^2+\log(1-x)^3=3 \rightarrow (x-1)^2(1-x)^3=10^5$

$\rightsquigarrow (x-1)^2\times(-(x-1)^3)=10^5 \rightarrow -(x-1)^5=10^5 \rightarrow -(x-1)=10 \rightarrow -x+1=10 \rightarrow -9=x$

$\log_3^{(-9)}=\log_3^9=2$

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$\log_2^{(x^2+2x+4)}+\log_2^{(x-2)}=3 \rightarrow (x^2+2x+4)(x-2)=2^3 \rightarrow x^3-8=2^3$

$\rightarrow x^3=16 \rightarrow x=\sqrt[3]{16}=\sqrt[3]{2^4}=2\sqrt[3]{2}$

$\log_{\sqrt[3]{2}}^x=\log_{2\sqrt[3]{2}}=\log_{2^{\frac{4}{3}}}^{2\times 2^{\frac{1}{3}}}=\log_{2^{\frac{1}{3}}}^{2^{\frac{2}{3}}}=4$

$\frac{\frac{2}{3}}{\frac{1}{3}}$

۶

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

$-x+2 = 10 \rightarrow -8 = x$

$\log_{\sqrt{2}}^{-x} = \log_{\sqrt{2}}^{8} = \log_{2^{\frac{1}{2}}}^{2^3} = \frac{3}{\frac{1}{2}} = 6$

۷

$3^{x^2-2x} = 81^{x} \rightarrow 3^{x^2-2x} = 3^{4x} \xrightarrow{x^2-6x=0} x^2-6x=0 \rightarrow x = \frac{6 \pm \sqrt{14+8}}{2}, \frac{6 \pm 2\sqrt{7}}{2}$

$\xrightarrow{x>0} x = \frac{6+2\sqrt{7}}{2} = 3+\sqrt{7}$

$\log_{6}^{(x-2)} = \log_{4}^{(3-\sqrt{7}+2)} = \log_{4}^{\sqrt{7}} = \frac{1}{2}$

۸

$\log_{3}^{2} = \frac{a}{b}$

$\log_{18}^{8} = \frac{\log_{3}^{8}}{\log_{3}^{18}} = \frac{3\log_{3}^{2}}{\log_{3}^{9}+\log_{3}^{2}} = \frac{3\frac{a}{b}}{2+\frac{a}{b}} = \frac{\frac{15}{b}}{\frac{a}{b}+\frac{12}{b}} = \frac{\frac{15}{b}}{\frac{12}{b}} = \frac{15}{12} = \frac{a}{7}$

۹

$\log_{3}^{4} = 0/15$

$\log_{12}^{6} = \frac{\log_{4}^{6}}{\log_{4}^{12}} = \frac{\log_{4}^{2}+\log_{4}^{3}}{\log_{4}^{3}+\log_{4}^{3}} = \frac{\frac{1}{2}+\frac{1}{10}}{1+\frac{1}{10}} = \frac{\frac{6}{10}}{\frac{11}{10}} = \frac{13}{11}$

۱۰

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

$\log 2 = \frac{a}{a+b} \rightsquigarrow \frac{1}{\log 2} = \frac{a+b}{a} \rightarrow \log_{2}^{10} = \frac{a}{a}+\frac{b}{a} \rightarrow \frac{b}{a} = \log_{2}^{10} - 1$

$\frac{b}{a} = \log_{2}^{10} - \log_{2}^{2} = \log_{2}^{5}$

$(\sqrt{2})^{\frac{b}{a}} = (\sqrt{2})^{\log_{2}^{5}} = (5)^{\log_{2}^{\sqrt{2}}} = 5^{\frac{1}{2}} = \sqrt{5}$