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

۱

$x=1 \rightarrow y=(1)^2=1=2^{A+B} \rightarrow A+B=0$

$x=2 \rightarrow y=(2)^2=2^{2A+B} \rightarrow 2A+B=2$

$\Big\} \quad 2A=2 \rightarrow A=1 \Rightarrow B=-1$

$\rightarrow f(x)=2^{x-1}$ ⇒ نمودی نمایی با کوچکتر از ۱ ... $\rightarrow x=0 \Rightarrow f(0)=2^{-1}=\frac{1}{2} \quad (0,\frac{1}{2})$

۲

$\log_2^{(4^x+10)} = x+2 \Rightarrow 4^x+10 = 2^{(x+2)} = 2^{2x}+10 = 2^x \times 2^2 \xrightarrow{2^x=A} A^2+10=4A$

$\Rightarrow A^2-4A+10=(A-5)(A-2) \rightarrow \begin{cases} A=2=2^x \rightarrow x=\log_2^2 \\ A=5=2^x \rightarrow x=\log_2^5 \end{cases} \Rightarrow \log_2^3+\log_2^5=\log_2^{15}$

۳

$\log_{21}^{147} = \log_{21}^{3\times 7} = \log_{21}^3+\log_{21}^7 = 1+\log_{21}^7 \longrightarrow \log_{21}^7 = \log_{21}^{\frac{21}{3}} = \log_{21}^{21}-\log_{21}^3 = 1-\log_{21}^3$

$\Rightarrow \log_{21}^{147} = 1+1-\log_{21}^3 = 2-\log_{21}^3$

$\log_{21}^{1323} = \log_{21}^{3^2\times 7^2} = 2\log_{21}^3+\log_{21}^7 = 2+\log_{21}^3$

$\rightarrow (\log_{21}^{147})(\log_{21}^{1323}) = (2-\log_{21}^3)(2+\log_{21}^3) = 4-(\log_{21}^3)^2 \rightarrow (\log_{21}^3)^2+4-(\log_{21}^3)^2=4$

۴

$x^2-2x+1=(x-1)^2=(1-x)^2 \rightarrow \log^{x^2-2x+1} = \log^{(1-x)^2} = 2\log^{(1-x)}$

$\rightarrow 2\log^{(1-x)}+3\log^{(1-x)} = 5\log^{(1-x)} = 5 \rightarrow \log^{(1-x)}=1 \rightarrow 1-x=10 \rightarrow x=-9$

$\rightarrow \log_3^{-x} = \log_3^9 = 2$

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

$\rightarrow (x^2+2x+8)(x-2) = x^3+2x^2+8x-4x^2-8x-16 = x^3-2x^2-16$

$\rightarrow \log_2^{(x^3-8)} = 4 \rightarrow x^3-8=2^4=8 \rightarrow x^3=16 \rightarrow x=\sqrt[3]{16}=2^{\frac{4}{3}}$

$\log_{\sqrt[3]{2}}^{x} = \log_{2^{\frac{1}{3}}}^{2^{\frac{4}{3}}} = \frac{\frac{4}{3}}{\frac{1}{3}}\log_2^2 = 4$

۶

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

$$\rightarrow \log_{(2-x)} + 2\log_{(2-x)} = 3\log_{(2-x)} = 3 \rightarrow \log_{(2-x)} = 1 \rightarrow 2-x = 10 \rightarrow x = -8$$

$$\log_{\sqrt{2}}^{-8} = \log_{\sqrt{2}}^{8} = \frac{6}{\frac{1}{2}}\log_2^2 = 4$$

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$$3^{x^2-2} = (3^4)^x = 3^{4x} \rightarrow x^2 - 2 = 4x \rightarrow x^2 - 4x - 2 = 0$$

$$\rightarrow \Delta = 16 - 4(-2) = 16 + 8 = 24 \rightarrow x = \frac{4 \pm 2\sqrt{6}}{2} = 2 \pm \sqrt{6}$$

$\log_4^{(2-\sqrt{6}-2)}$ → تعریف نشده

$\log_4^{(2+\sqrt{6}-2)} = \log_4^{\sqrt{6}} = \frac{1}{2}$

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$$\log_8^{12} = \log_8^9 + \log_8^2 = \frac{2}{3}\log_2^3 + \frac{1}{3}\log_2^2 = \frac{2}{3}\log_2^3 + \frac{1}{3}$$

$$\rightarrow \log_{10}^2 = \frac{3}{8} \Rightarrow \log_2^3 = \frac{1}{\log_{10}^2} = \frac{8}{3} \rightarrow \frac{2}{3}\log_2^3 + \frac{1}{3} = \frac{2}{3} \times \frac{8}{3} + \frac{1}{3} = \frac{16+3}{15} = \frac{19}{15} = \frac{7}{5}$$

$$\rightarrow \log_8^{18} = \frac{7}{5} \Rightarrow \log_{18}^8 = \frac{1}{\log_8^{18}} = \frac{3}{7}$$

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$$\log_6^{30} = \frac{1}{2}\log_2^{30} = 0,8 \rightarrow \log_2^{30} = 1,6$$

$$\log_{12}^4 = \frac{\log_2^4}{\log_2^{12}} = \frac{\log_2^3 + \log_2^2}{\log_2^{30} + \log_2^6} = \frac{\log_2^3 + 1}{\log_2^5 + 2\log_2^2 + 1} = \frac{1,6+1}{1,6+2} = \frac{2,6}{3,6} = \frac{26}{36} = \frac{13}{18}$$

۱۰

$$x = -1 \rightarrow a\log_2^2 - a + b\log_2^2 = 0 \Rightarrow a\log_2^2 + b\log_2^2 = (a+b)\log_2^2 = \log_2^{2^{(a+b)}} = a$$

$$\rightarrow 2^{(a+b)} = 10^a \rightarrow \log_2^{10^a} = a\log_2^{10} = a+b \Rightarrow \log_2^{10} = \frac{a+b}{a} = 1 + \frac{b}{a}$$

$$\rightarrow 10 = 2^{(1+\frac{b}{a})} = 2^1 \times 2^{(\frac{b}{a})} \Rightarrow 2^{(\frac{b}{a})} = \frac{10}{2} = 5 \rightarrow (\sqrt{2})^{\frac{b}{a}} = (2)^{\frac{1}{2}\frac{b}{a}} = (2^{\frac{b}{a}})^{\frac{1}{2}} = (5)^{\frac{1}{2}} = \sqrt{5}$$