Subject

Date : Year: Month: Day: ★ یازدهم دفتر B ★ تکلیف شماره ۲۴ ★ حنانه موسوی

(۱)

$y = x^2 \rightarrow x=1 , y=1 \;\star\; x=3 , y=9$

$x=1 \rightarrow 3^{A+B} = 1 \quad A+B=0 \quad -A=B$

$x=3 \rightarrow 3^{3A+B} = 9 \rightarrow 3A+B=2 \rightarrow 3A+B=2 \rightarrow 3A-A=2 \rightarrow 2A=2 \rightarrow A=1 , B=-1$

$x=0 \rightarrow y = 3^{0-1} =$ $\boxed{\frac{1}{3} = \text{نقطه تلاقی}}$

(۲)

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

$2^x \times 8 = (2^x)^2 + 15 \xrightarrow{2^x=A} 8A = A^2+15 \rightarrow A^2 - 8A + 15 = 0 \rightarrow (A-3)(A-5)=0 \rightarrow A=3,5$

$2^x=3 , 2^x=5 \rightarrow x = \log_2^5 \rightarrow 4^x+15>0 \checkmark$

$\hookrightarrow x = \log_2^3 \rightarrow 4^x+15>0 \checkmark$ $\boxed{\log_2^3 + \log_2^5 = \log_2^{15}}$

(۳)

$(\log_{21}^3)^2 + (\log_{21}^7 + \log_{21}^{21})(\log_{21}^3 + 2\log_{21}^{21}) \Rightarrow \log_{21}^7 = 1 - \log_{21}^3$

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

(۴)

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

$\log(1-x) = 1 \rightarrow 1-x = 10 \rightarrow x = -9 , 1-x \xrightarrow{x=-9} 1+9 > 0 \checkmark \rightarrow \boxed{\log_3^9 = 2}$

(۵)

$x^2+2x+4 \rightarrow \Delta<0 \rightarrow$ همیشه مثبت $, x-2>0 \rightarrow x>2$

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

$\log_{\sqrt[3]{2}}^{\sqrt[3]{16}} = \boxed{\frac{\frac{4}{3}}{\frac{1}{3}} = 4}$

(۶)

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

$10 = 2-x \rightarrow x = -8 \rightarrow 2-x>0 \rightarrow x<2 \rightarrow x=-8 \checkmark \rightarrow \log_{\sqrt{2}}^{-x} = \log_{\sqrt{2}}^{8} = \boxed{6\log_2^2 = 6}$

(۷)

$81^x = (3^4)^x = 3^{x^2-2} \rightarrow 4x = x^2-2 \rightarrow x^2 - 4x - 2 = 0 \rightarrow (x-2)^2 = 6$

$x = 2+\sqrt{6} , \underbrace{2-\sqrt{6}}_{\text{غ ق ق}} \rightarrow \log_6^{2+\sqrt{6}-2} = \boxed{\log_6^{\sqrt{6}} = \frac{1}{2}}$

$\downarrow$

$x-2>0$

$x>2 \checkmark$

(۸)

$\log_{18}^8 = \frac{\log_2^8}{\log_2^{18}} = \frac{3}{\log_2^9+1} = \frac{3}{2\log_2^3+1} = \frac{3}{2(\frac{8}{5})+1} = \frac{3}{\frac{21}{5}} \boxed{= \frac{5}{7}}$

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(۹)

$$\log_{۱۲}^{۶} = \frac{\log_{٤}^{۶}}{\log_{٤}^{۱۲}} = \frac{\log_{٤}^{۲} + \log_{٤}^{۳}}{\log_{٤}^{۴} + \log_{٤}^{۳}} = \frac{\frac{۱}{۲} + \log_{٤}^{۳}}{۱ + \log_{٤}^{۳}} = \frac{\frac{۱}{۲} + \frac{۸}{۱۰}}{۱ + \frac{۸}{۱۰}} = \frac{\frac{۱۳}{۱۰}}{\frac{۱۸}{۱۰}} = \boxed{\frac{۱۳}{۱۸}}$$

(۱۰)

$$x = -۱ \longrightarrow a\log ۲ - a + b\log ۲ = ۰ \longrightarrow (a+b)\log ۲ = a \xrightarrow{\div a} \left(۱ + \frac{b}{a}\right)\log ۲ = ۱$$

$$\left(۱ + \frac{b}{a}\right) = \frac{۱}{\log ۲} = \log_{۲}^{۱۰} \longrightarrow \frac{b}{a} = \log_{۲}^{۱۰} - ۱ = ۱ + \log_{۲}^{۵} - ۱ = \log_{۲}^{۵} = \frac{b}{a}$$

$$\sqrt{۲}^{\log_{۲}^{۵}} = ۵^{\log_{۲}^{\sqrt{۲}}} = ۵^{\frac{۱}{۲}} = \boxed{\sqrt{۵}}$$