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آروشا یادی   یازدهم دفتر A   تکلیف شماره ۲۴

۱-

$$y=x^2 \rightarrow x=1 \rightarrow y=1 \rightarrow (1,1) \Rightarrow 1=3^{(A+B)} \rightarrow A+B=0$$

$$\rightarrow x=3 \rightarrow y=9 \rightarrow (3,9) \Rightarrow 9=3^{(3A+B)} \rightarrow 3A+B=2$$

$$2A=2 \rightarrow \boxed{A=1} \quad \boxed{B=-1}$$

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$$\rightarrow f(x)=3^{(x-1)} \longrightarrow x=0 \rightarrow \boxed{y=3^{-1}=\frac{1}{3}} \qquad \left(0,\frac{1}{3}\right)$$

۲-

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

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

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$$\rightarrow (A-3)(A-5)=0 \longrightarrow A=3 \rightarrow 2^x=3 \rightarrow \boxed{x=\log_2^3} \longrightarrow 4^x+15>0 \checkmark$$

$$\rightarrow A=5 \rightarrow 2^x=5 \rightarrow \boxed{x=\log_2^5} \longrightarrow 4^x+15>0 \checkmark$$

$$\Rightarrow \log_2^3+\log_2^5=\log_2^{15}$$

۳-

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

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

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

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

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

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$$1-x>0 \rightarrow x<1 \rightarrow x=-9 \checkmark \rightsquigarrow \log_3^9=2$$

Subject. Day. Month. Year.

۵- $x^2+2x+4 \to \Delta<0 \to$ همیشه مثبت $\to x-2>0 \to x>2$

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

$\to x^3=8+8=16 \to x=2^{\frac{4}{3}} \to \log_{2^{\frac13}} x = \underbrace{\log_{2^{\frac13}} 2^{\frac43}}_{1} = \frac{4}{3}\times 3 = 4$

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

$\to \log(2-x)-(-2\log(2-x))=3 \to 3\log_{10}(2-x)=3 \to \log_{10}(2-x)=1$

$\to 2-x=10 \to x=-8 \to 2-x>0 \to x<2 \to x=-8\ ✓$

$\to \log_{\sqrt2}(-x) \to \log_{\sqrt2}8=\log_{2^{\frac12}}2^3=3\times2=6$

۷- $81^x=(3^4)^x=3^{x^2-2} \to 4x=x^2-2 \to x^2-4x-2=0$

$x=\frac{4\pm\sqrt{(-4)^2-4(1)(-2)}}{2}=\frac{4\pm2\sqrt6}{2}=2\pm\sqrt6 \to x-2>0 \to x>2$

$\to x=2+\sqrt6\ ✓ \to \log_6(2+\sqrt6-2)=\log_6\sqrt6=\frac12$

۸-

$\log_{18}8=\frac{\log_3 8}{\log_3 18}=\frac{3\log_3 2}{2\log_3 3+\log_3 2}=\frac{3(\frac{5}{8})}{2+\frac58}=\frac{15}{8}\times\frac{8}{21}=\frac{15}{21}=\frac57$

۹- $\log_{12}6=\frac{\log_4 6}{\log_4 12}=\frac{\log_4 2+\log_4 3}{\log_4 4+\log_4 3}=\frac{\frac12+\frac{8}{10}}{1+\frac{8}{10}}=\frac{13}{10}\times\frac{10}{18}=\frac{13}{18}$

۱۰- $x=-1 \to a\log2-a+b\log2=0 \to (a+b)\log2=a \xrightarrow{\div a} (1+\frac ba)\log2=1$

$\to 1+\frac ba=\frac{1}{\log2}=\log_2 10 \to \frac ba=\log_2 10-1=1+\log_2 5-1=\log_2 5=\frac ba$

$\to \sqrt2^{\log_2 5}=5^{\log_2\sqrt2}=5^{\frac12}=\sqrt5$