D تکلیف شماره ۲۴ S

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یازدهم رضند A

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$x=1$ و $x=3$

$f(x)=3^{Ax+B}$

$f(0)=?$

$y=x^2 \Rightarrow \begin{cases} x=1 \Rightarrow y=1 \\ x=3 \Rightarrow y=9 \end{cases}$

$3^{A+B}=1 \Rightarrow A+B=0 \Rightarrow 2A=2 \Rightarrow A=1$

$3^{3A+B}=9 \Rightarrow 3A+B=2$ و $B=-1$

$f(0)=3^B=\frac{1}{3}$

۲-

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

$\Rightarrow 2^{x+3}=2^{2x}+15 \Rightarrow 2^x=t \Rightarrow t^2-8t+15=0$

$\Rightarrow (t-3)(t-5)=0 \Rightarrow t=3$ یا $t=5$

$2^x=3 \Rightarrow \log_2 3=x \qquad 2^x=5 \Rightarrow \log_2 5=x \Rightarrow \log_2 3+\log_2 5=\log_2 15$

۳-

$(\log_{21} 3)^2+\log_{21}(147)\,\log_{21}(1323)$

$\log_{21} 7=\log_{21}\frac{21}{3}=\log_{21} 21-\log_{21} 3$

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

$\log_{21} 1323=\log_{21} 21^2\times 3=2+\log_{21} 3$ $\xRightarrow{\text{مزدوج}} (4-(\log_{21} 3)^2)$

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

۴-

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

$2t+3t=5 \Rightarrow t=1 \Rightarrow 10=1-x$

$\Rightarrow x=-9$

$\log_3 {-x}=? \Rightarrow \log_3 {-(-9)}=2$

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

5-

$\log_2^{(x^2+2x+4)}+\log_2^{(x-2)}=3$ $\qquad$ $\log_{\sqrt[3]{2}}^{x}=?$

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

$\Rightarrow (x-2)(x^2+2x+4)=8$

$x^3+\cancel{2x^2}+\cancel{4x}-\cancel{2x^2}-\cancel{4x}-8=8$

$x^3-8=8 \Rightarrow x^3=16 \Rightarrow x=\sqrt[3]{16}=2^{\frac{4}{3}}$

$\log_{2^{\frac{1}{3}}}^{2^{\frac{4}{3}}}=\dfrac{\frac{4}{3}}{\frac{1}{3}}=4$

6-

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

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

$\Rightarrow \log\dfrac{(2-x)}{\frac{1}{(x-2)^2}}=\log^{(2-x)(x-2)^2}=3$

$\Rightarrow (2-x)(x-2)^2=1000$

$(-t)(t^2)=1000$

$-t^3=1000 \Rightarrow (2-x)^3=1000$

$2-x=10 \Rightarrow x=-8$

7-

$\log_6^{(x-2)}$ $\qquad$ $3^{x^2-2}=81^x$

$\log_6^{6^{\frac{1}{2}}}=\frac{1}{2} \Leftarrow x-2=\dfrac{\sqrt{24}}{2}=\dfrac{2\sqrt{6}}{2}$ $\qquad$ $3^{x^2}=3^2\times 3^{4x}\Rightarrow 3^{x^2}=3^{2+4x}$

$\log_b^a \Rightarrow a>0$

$x^2=2+4x \Rightarrow x^2-4x-2=0$

$\Leftarrow \Delta=16-4(1)(-2)=24$

$x=\dfrac{4+\sqrt{24}}{2} \Leftarrow x=\dfrac{4\pm\sqrt{24}}{2}$

✓ 2-

8-

$\log_3^2=\frac{5}{8}$ $\qquad$ $\log_{18}^{8}=?$ $\qquad$ $\log_3^4=2\log_3^2 \Rightarrow \frac{10}{8}$

$\log_{18}^{8}=\dfrac{\log_3^8}{\log_3^{18}}=\dfrac{\log_3^2+\log_3^4}{\log_3^9+\log_3^2}=\dfrac{\frac{5}{8}+\frac{10}{8}}{\frac{16}{8}+\frac{5}{8}}=\dfrac{\frac{15}{8}}{\frac{21}{8}}=\frac{5}{7}$

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$\log_{4}^{3} = 0.8 \qquad \log_{12}^{6} = ?$

$$\log_{12}^{6} = \frac{\log_4^6}{\log_4^{12}} = \frac{\underbrace{\log_4^2}_{\frac{1}{2}} + \underbrace{\log_4^3}_{0.8}}{\underbrace{\log_4^3}_{0.8} + \underbrace{\log_4^4}_{1}} = \frac{1.3}{1.8} = \frac{13}{18}$$

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$(a\log 2)x^2 + ax + b\log 2 = 0$

$x = -1 \qquad a\log 2 - a + b\log 2 = 0$

ax^2+bx+c

$(\sqrt{2})^{\frac{b}{a}} = ?$

یکی از ریشه‌های معادله درجه ۲ $= -1$

الف) ریشه دیگر $= \frac{-c}{a} \Leftarrow$

$\frac{-b\cancel{\log 2}}{a\cancel{\log 2}} = \frac{-b}{a}$

ب) در معادله درجه ۲ $\alpha+\beta = \frac{-b}{a}$

$$\Downarrow$$

$$-1 - \frac{b}{a} = -\frac{\cancel{a}}{\cancel{a}\log 2} = -\log_2^{10}$$

$$\cancel{-1} - \frac{b}{a} = -\log_2^5 \cancel{-1} \Rightarrow \frac{b}{a} = \log_2^5$$

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