الیسا بلالی — تکلیف شماره ۲۸

-۱

$f(0)=2 \qquad 1-\log_c^{-b}=2 \qquad \log_c^{-b}=-1 \qquad \frac{1}{c}=-b$

$f(-1{,}5)=0 \qquad 1-\log_c^{-\frac{3a}{2}-b}=0 \qquad \frac{-3a-2b}{2}=c \qquad -3a=2c+2b=-3$

$a=1$

$b+c=-\frac{3}{2} \qquad c-\frac{1}{c}=-\frac{3}{2} \qquad \frac{c^2-1}{c}=-\frac{3}{2}$

$2c^2-2=-3c \qquad 2c^2+3c-2=0 \qquad c^2+\frac{3}{2}c-1=0 \qquad (c+2)(c-\frac{1}{2})=0$

$c=\frac{1}{2} \to b=-2$

$c=-2 \to b=\frac{1}{2}$

$(a+c)b=(1+\frac{1}{2})(-2)=-3$

$(a+c)b=(1-2)\frac{1}{2}=-\frac{1}{2}$

-۲

$$\left.\begin{array}{lll} f(0)=\frac{2}{3} & 1+c\times 3^a=\frac{2}{3} & c\times 3^a=-\frac{1}{3} \\ f(1)=0 & 1+c\times 3^{a+b}=0 & c\times 3^{a+b}=-1 \end{array}\right\} \quad 3^b=3 \quad b=1$$

$f(-1)=1+c3^{a-b}=1+\frac{c3^a}{3^b}=1-\frac{\frac{1}{3}}{3}=1-\frac{1}{9}=\frac{8}{9}$

-۳

$$\left.\begin{array}{ll} f(0)=2 & c+\log_5^b=2 \\ f(2{,}4)=0 & c+\log_5^{2{,}4a+b}=0 \end{array}\right\} \quad \log_5^b-\log_5^{2{,}4a+b}=2 \qquad \log_5^{\frac{b}{2{,}4a+b}}=2$$

$\frac{b}{2{,}4a+b}=25 \qquad 60a+25b=b \qquad 60a=-24b$

$\frac{a}{b}=\frac{-24}{60}=-\frac{2}{5}$

-۴

$f(x)=\log_2^{|x^2-2|-x}$

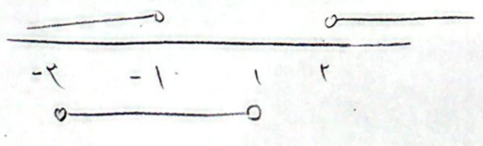
$|x^2-2|-x>0 \qquad |x^2-2|>x$

$x^2-2>x \qquad x^2-x-2>0 \qquad (x-2)(x+1)>0$

-1		2	
$+$	$-$		$+$

$x^2-2<-x \qquad x^2+x-2<0 \qquad (x+2)(x-1)<0$

-2		1	
$+$	$-$		$+$



$D_f:(-2,-1)$

-۵

$g(1)=f(1)=-1-3+8=4=2+2^{b-a} \qquad 2^{b-a}=2 \qquad b-a=1$

$f(-1)=10=2+2^{b+a}$

$$\left.\begin{array}{l} b+a=3 \\ b-a=1 \end{array}\right\} \to 2b=4 \quad \left.\begin{array}{l} b=2 \\ a=1 \end{array}\right\} \to 2b-a=3$$

۶-

$f(1)=g(1)=0=-2+\left(\frac{1}{2}\right)^{A+B} \quad \left(\frac{1}{2}\right)^{A+B}=2 \quad A+B=-1$

$f(2)=g(2)=2=-2+\left(\frac{1}{2}\right)^{2A+B} \quad \left(\frac{1}{2}\right)^{2A+B}=4 \quad 2A+B=-2$

$\Rightarrow A=-1,\ B=0$

$f(3)=-2+\left(\frac{1}{2}\right)^{-3}=6$

۷-

$A=A_0\times\left(\frac{8}{9}\right)^t \qquad \frac{1}{6}\cancel{A_0}=\cancel{A_0}\times\left(\frac{8}{9}\right)^t \quad \left(\frac{8}{9}\right)^t=\frac{1}{6} \quad \left(\frac{9}{8}\right)^t=6$

$\log_5 2=\frac{10}{24}=\frac{5}{12} \qquad \log_5 3=\frac{10}{14}=\frac{5}{7} \rightarrow \log_5 6=\frac{5}{12}+\frac{5}{7}=\frac{35+60}{84}=\frac{95}{84}$

$\left(\frac{9}{8}\right)^t=6 \xrightarrow{\log_5} t\log_5 \frac{9}{8}=\frac{95}{84} \qquad t\times(\underbrace{\log_5 9}_{2\log_5 3}+\underbrace{\log_5 \tfrac{1}{8}}_{-3\log_5 2})=t\left(\frac{10}{7}-\frac{5}{4}\right)$

$t\left(\frac{40-35}{\cancel{28}}\right)=\frac{\overset{19}{\cancel{95}}}{\underset{3}{\cancel{84}}} \qquad t=\frac{19}{3}\xrightarrow{\times 60} 19\times 20=380$

۸-

$A=A_0\times\left(\frac{7}{8}\right)^{\frac{t}{7}} \qquad \frac{1}{7}=\left(\frac{7}{8}\right)^{\frac{t}{7}} \quad \left(\frac{8}{7}\right)^{\frac{t}{7}}=7 \xrightarrow{\log_7} \frac{t}{7}\log_7 \frac{8}{7}=1$

$\frac{t}{7}\times(\underbrace{\log_7 8-\log_7 7}_{3\log_7 2-1})=1 \qquad \frac{t}{7}\left(\underbrace{\frac{9}{8}-1}_{\frac{1}{8}}\right)=1 \qquad \frac{t}{7}=8 \quad \boxed{t=56}$

$\log_3 2=\frac{10}{16}=\frac{5}{8}, \quad \log_3 7=\frac{10}{6}=\frac{5}{3} \quad \Rightarrow \log_7 2=\frac{\frac{5}{8}}{\frac{5}{3}}=\frac{3}{8}$

۹-

$A=A_0\times\left(\frac{96}{100}\right)^t \qquad \frac{1}{3}=\left(\frac{96}{100}\right)^t \qquad 3=\left(\frac{100}{96}\right)^t \xrightarrow{\log_3} 1=t\times(\log_3 100-\log_3 96)$

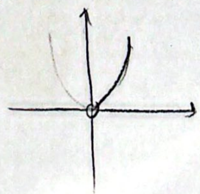
$1=t(\underbrace{2\log_3 10}_{2\times\frac{10}{4.8}=\frac{25}{6}}-\log_3 3-\underbrace{\log_3 32}_{5\log_3 2})=t\left(\underbrace{\frac{25}{6}-1}_{\frac{19}{6}}-\frac{25}{8}\right)=t\left(\frac{152-150}{48}\right)=1$

$t=24$ روز

$\log_3 2=\frac{\log 2}{\log 3}=\frac{0.3}{0.48}=\frac{30}{48}=\frac{5}{8}$

۱۰-

الف) $y=9^{\log_3 x}=x^{\log_3 9}=x^2$



ب) $y=\log x^2=2\log x$