فاطمه تقی - ۲۵ — به نام خدا — ۱۸,۷۵

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۱) $\begin{cases}0\\2\end{cases} \to 1-\log_c^{-b}=2 \to -\log_c^{-b}=1 \to -c^{-1}=b$

$b+c=\frac{-3}{2} \to c-\frac{1}{c}=\frac{-3}{2} \xrightarrow{\times c} c^2-1+\frac{3}{2}c=0 \xrightarrow{\times 2} 2c^2+3c-2=0$

$\hookrightarrow \begin{matrix}c=-2 \times\\ c=\frac{1}{2}\checkmark\end{matrix} \to b=-2 \Rightarrow (a+c)b=-3$ ✓

$\begin{cases}-\frac{3}{2}\\0\end{cases} \to \log_2^{-\frac{3}{2}a+2}=-1 \to -\frac{3}{2}a+2=\frac{1}{2} \to a=1$

۲) $\begin{cases}0\\\frac{1}{3}\end{cases} \to 1+c\times 3^a=\frac{1}{3} \to c\times 3^a=\frac{-1}{3}$

$\begin{cases}1\\0\end{cases} \to 1+c\times 3^{a+b}=0 \to c\times 3^{a+b}=-1$

$\div \Rightarrow 3^b=3 \to b=1$ ✓

$f(-1)=1+c\times 3^{a-b} \Rightarrow 1+c\times 3^{a-1}=1+c\times 3^a\times\frac{1}{3}=1+\left(\frac{-1}{3}\right)\times\frac{1}{3}=\frac{8}{9}$

۳) $\begin{cases}0\\2\end{cases} \to c+\log_5^2=2 \to -c=\log_5^b-\log_5^{25}$

$\begin{cases}2,4\\0\end{cases} \to -c=\log_5^{2,4a+b} \Rightarrow \log_5^{2,4a+b}=\log_5^{\frac{b}{25}} \Rightarrow 2,4a+b=\frac{b}{25}$ ✓

$\hookrightarrow 25b+60a=b \to 60a=-24b \to \frac{a}{b}=\frac{-24}{60}=\frac{-2}{5}$

۴) $|x^2-2|-x>0 \Rightarrow |x^2-2|>x \xrightarrow{①\ x>\sqrt{2}\ \cup\ x<-\sqrt{2}} x^2-x-2>0$

$\hookrightarrow x<-1 \cup x>2$ $\xrightarrow{②\ (-\sqrt{2},\sqrt{2})} x^2+x-2<0$

① اشتراک $\Rightarrow (2,+\infty)\cup(-\infty,-\sqrt{2})$

② اشتراک $\Rightarrow (-\sqrt{2},1)$

$\Rightarrow D_f=(-\infty,1)\cup(2,+\infty)-\{-\sqrt{2}\}$ ۱,۷۵

۵) $x=1 \to -1-3+8=2+2^{b-a} \to 2=2^{b-a} \Rightarrow b-a=1$

$f^{-1}(10)=1 \Rightarrow 10=2+2^{b+a} \to 2^{b+a}=8 \Rightarrow b+a=3$ ✓

$\Rightarrow b=2$

$2b-a=b-a+b=1+2=3$

Arman

به نام خدا

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$x=1 \rightarrow 0 = -2 + \left(\frac{1}{2}\right)^{A+B} \rightarrow \left(\frac{1}{2}\right)^{A+B} = 2 \Rightarrow A+B=-1$ (۶)

$x=2 \rightarrow 2 = -2 + \left(\frac{1}{2}\right)^{2A+B} \rightarrow 4 = \left(\frac{1}{2}\right)^{2A+B} \Rightarrow 2A+B=-2$ $\rightarrow A=-1$ $B=0$ (۶)

$f(3) = -2 + \left(\frac{1}{2}\right)^{-3} \rightarrow -2+8 = 6$

$x\left(\frac{8}{9}\right)^h = \frac{1}{6}x \Rightarrow \left(\frac{8}{9}\right)^h = \frac{1}{6} \Rightarrow \log_{\frac{8}{9}}^{\frac{1}{6}} = h \Rightarrow \log_{\frac{8}{9}}^{6} = h$ (۷)

$h = \frac{\log_5^6}{\log_5^9 - \log_5^8} = \frac{\log_5^2 + \log_5^3}{2\log_5^3 - 3\log_5^2} \Rightarrow \frac{\frac{1}{\log_2^5} + \frac{1}{\log_3^5}}{\frac{2}{\log_3^5} - \frac{3}{\log_2^5}} = \frac{\log_3^5 + \log_2^5}{\log_2^5 \times \log_3^5} \Big/ \frac{2\log_2^5 - 3\log_3^5}{\log_2^5 \times \log_3^5}$ (۶)

$\hookrightarrow \frac{24+12}{2(24)-3(12)} = \frac{3.8}{0.6}h \Rightarrow 380\ min$

$x\left(\frac{875}{100}\right)^a = \frac{1}{7}x \Rightarrow \left(\frac{3.5}{4}\right)^a = \frac{1}{7} \Rightarrow \log_{\frac{3.5}{4}}^{\frac{1}{7}} = a \Rightarrow \log_{\frac{4}{3.5}}^{7} = a$ (۸)

$\hookrightarrow \frac{1}{a} = \log_7^4 - \log_7^{3.5} = 2\log_7^2 - \log_7^7 + \log_7^2 = 3\log_7^2 - 1$

$\frac{\frac{1}{a}+1}{3} = \frac{\log_3^2}{\log_3^7} = \frac{\log_2^3}{\log_2^7} = \frac{0.6}{1.4} = \frac{3}{8} \Rightarrow 9 = \frac{8}{a} + 8 \Rightarrow \frac{8}{a} = 1$ (۶)

$a=8$ یعنی $\Rightarrow 8\times 7 =$ روز ۵۶

فاطمه متقی - ۲۵

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۹) $p' = p\left(\frac{۹۶}{۱۰۰}\right)^a \Rightarrow p' = ۱۰۰ \times \left(\frac{۹۶}{۱۰۰}\right)^a$

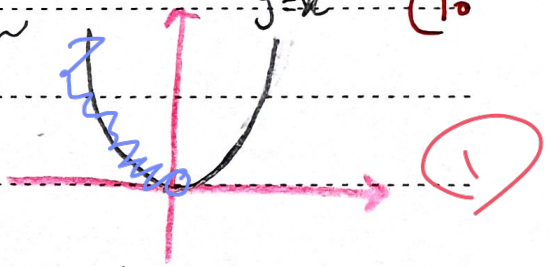
$\hookrightarrow \frac{۱۰۰}{۳} = ۱۰۰ \times \left(\frac{۲۴}{۲۵}\right)^a \Rightarrow \left(\frac{۲۴}{۲۵}\right)^a = \frac{۱}{۳} \Rightarrow \log_{\frac{۲۴}{۲۵}}^{\frac{۱}{۳}} = a$

$\hookrightarrow a = \log_{\frac{۲۵}{۲۴}}^{۳} = \frac{\log ۳}{۲\log ۵ - \log ۲۴} = \frac{\log ۳}{۲(\log ۱۰ - \log ۲) - (۳\log ۲ + \log ۳)}$

$\frac{\log ۳}{۲ - \log ۳ - ۵\log ۲} \overset{\text{جایگذاری}}{=} \frac{۰/۴۸}{۲ - ۰/۴۸ - ۱/۵} = \frac{۰/۴۸}{۰/۰۲} = ۲۴$ روز

۱۰) الف) $y = ۹^{\log_۳^x} \rightarrow x^{\log_۹^۳} = x^{۲}$ ← شرط

$D = (۰, +\infty)$



ب) $y = \log x^۲ \rightarrow ۲\log x$