SUBJECT

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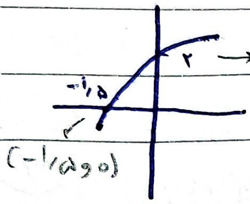
(۱)

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

$(0,2) \to 2 = 1 - \log_c^{ax-b} \to -1 = \log_c^{-b}$



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

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

$2c^2 + 3c - 2 = 0 \to c = -2$ × غ ق ق $c = \frac{1}{2}$ ✓ $c = \frac{1}{2}$

$(-1/5, 0) \to 0 = 1 - \log_{\frac{1}{2}}^{-1/5a+2} \Rightarrow \frac{1}{2} = -1/5a + 2 \to a = 1$

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

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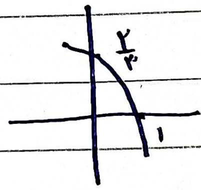
$f(x) = 1 + c \times 3^{a+bx}$ $f(-1) = ?$

$(1,0) \to 0 = 1 + c \times 3^{a+b} \to \frac{-1}{-\frac{1}{3}} = \frac{c \times 3^{a+b}}{c \times 3^{a}}$



$3 = 3^b$ $\boxed{b = 1}$ $(0, \frac{2}{3}) \to \frac{2}{3} = 1 + c \times 3^a$

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

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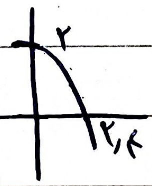
$y = c + \log_a^{ax+b}$ $\frac{a}{b} = ?$



$(0,2) \to \begin{cases} 2 = c + \log_a^{b} \\ (2/4, 0) \to 0 = c + \log_a^{2/4a+b} \end{cases}$ $\log_a^{\frac{b}{2/4a+b}}$

$2 = \log_a^{b} - \log_a^{2/4a+b} \to 5^2 = \frac{b}{2/4a+b}$

$60a + 25b = b \to 60a = -24b$ $\frac{a}{b} = \frac{-24}{60} = \boxed{-0/4}$

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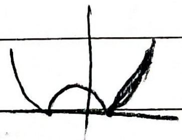
$f(x) = \log_4^{(|x^2-x|-x)}$



$|x^2 - x| = x$

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$(x-2)(x+1) = 0$

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$|x^2 - x| > x$ $D_f = (-\infty, 1) \cup (2, +\infty)$

$x^2 - 2 + x = 0$ $(x+2)(x-1) = 0$

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$f(-1)=10$

$f(x)=2+2^{b-ax}$ $\quad g(x)=x^2-3x+8$ $\quad f^{-1}(10)=-1$

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

$f(-1)=10 \longrightarrow 10=2+2^{b+a}$ $\quad 2^3=2^{b+a} \longrightarrow b+a=3$

$\begin{cases} b-a=1 \\ b+a=3 \end{cases}$ $\quad \boxed{2b-a=3}$

$2b=4 \to b=2 \quad a=1$

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(6)

$f(x)=-2+(\frac{1}{2})^{Ax+B}$ $\quad y=+x^2-x$ $\quad f(3)=?$

$x=1 \Rightarrow 0=-2+(\frac{1}{2})^{A+B} \longrightarrow 2=2^{-A-B} \longrightarrow A+B=-1$

$x=2 \Rightarrow 2=-2+2^{-2A-B} \longrightarrow -2=2A+B$

$\begin{cases} A+B=-1 \\ 2A+B=-2 \end{cases}$ $\quad f(x)=-2+2^x \to f(3)=\boxed{6}$

$A=-1 \quad B=0$

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(7)

$m(t)=m_0\times(\frac{8}{9})^{\frac{t}{40}}=\frac{1}{9}m_0 \longrightarrow (\frac{8}{9})^{\frac{t}{40}}=\frac{1}{9}$

$\frac{t}{40}=\frac{\log_5 \frac{1}{9}}{\log_5 \frac{8}{9}}=\frac{\log_5 1-\log_5 9}{\log_5 8-\log_5 9}=\frac{0-\log_5 3-\log_5 3}{3\log_5 2-2\log_5 3}$

$\log_5 2=\frac{1}{\log_2 5}=\frac{1}{2.4}=\frac{5}{12}$ $\quad =\frac{-\frac{5}{12}-\frac{5}{7}}{3\times\frac{5}{12}-2\times\frac{5}{7}}=\frac{19}{2}$

$\log_5 3=\frac{1}{\log_3 5}=\frac{1}{1.4}=\frac{5}{7}$

$t=380\ \text{min}$

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(8)

$m(t)=m_0\times(\frac{7}{8})^{\frac{t}{7}}=\frac{1}{7}m_0 \Rightarrow (\frac{7}{8})^{\frac{t}{7}}=\frac{1}{7}$

$\Rightarrow \frac{t}{7}=\log_{\frac{7}{8}}\frac{1}{7} \longrightarrow \frac{t}{7}=\frac{\log_3 \frac{1}{7}}{\log_3 \frac{7}{8}}$ $\quad \frac{t}{7}=\frac{\log_3 1-\log_3 7}{\log_3 7-\log_3 8}=\frac{0-\log_3 7}{\log_3 7-3\log_3 2}$

$\log_3 2=\frac{1}{\log_2 3}=\frac{1}{1.6}=\frac{5}{8}$ $\quad =\frac{-\frac{5}{3}}{\frac{5}{3}\times-3+\frac{5}{8}}=8$

$\log_3 7=\frac{1}{\log_7 3}=\frac{1}{0.6}=\frac{5}{3}$ $\quad t=7\times8=56$ روز $\quad -\frac{5}{24}$

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$m(t) = m \times \left(\frac{96}{100}\right)^t = \frac{1}{3} m \longrightarrow \left(\frac{96}{100}\right)^t = \frac{1}{3} \rightarrow t = \log_{\frac{96}{100}} \frac{1}{3}$

$t = \log_{\frac{96}{100}} \frac{1}{3} = \frac{\log \frac{1}{3}}{\log \frac{96}{100}} = \frac{\log 1 - \log 3}{\log 96 - \log 100} = \frac{0 - \log 3}{\log 96 - 2}$

$96 = 3 \times 2^5 \Rightarrow \frac{-0.48}{1.5 + 0.48 - 2} = \frac{-0.48}{-0.02} = \boxed{24}$ $\quad 5\log 2 + \log 3$

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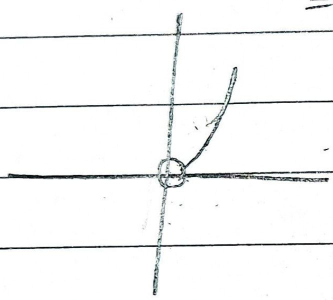
الف) $y = 9^{\log_3 x} \longrightarrow x > 0$ $\quad D_f = (0, +\infty)$

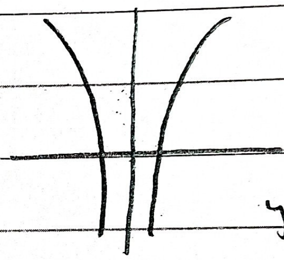
$y = x^{\log_3 9} = y = x^2$



ب) $\log x^2 \rightarrow |x|^2$

$y = 2\log_{10} |x|$

$D_f = \mathbb{R} - \{0\}$



$y = 2\log_{10} |x|$