گروه یازدهم تجربی — دنیا جمشیدی — تکلیف شماره ۲۵

① $y = 1 - \log_c (ax - b)$

$b + c = -\frac{3}{2}$ $\quad (a+c)\,b = ?$

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

$\log_c^{-b} = -1 \qquad -b = \frac{1}{c} \qquad b = -\frac{1}{c}$

$-\frac{1}{c} + c = -\frac{3}{2} \xrightarrow{\times c}$

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

$2c^2 + 3c - 2 = 0 \qquad c^2 + 3c - 4 = 0$

$(c - 1)(c + 4) = 0$

$c \begin{cases} \frac{1}{2} \ \checkmark \text{ قق} \leftarrow 1 \\ -2 \times \text{ غق} \leftarrow -4 \end{cases}$

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

$(-\frac{3}{2}, 0) \to 1 - \log_{\frac{1}{2}}^{(-\frac{3}{2}a)+2} = 0$

$-\frac{3}{2}a + 2 = \frac{1}{2} \qquad -\frac{3}{2}a = -\frac{3}{2}$

$\boxed{a = 1}$

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

② $f(x) = 1 + c \times 3^{a + bx}$

$f(-1) = ?$

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

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

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

$(2)\ c \times 3^{a} = -\frac{1}{3}$

$(1) \div (2) \to \frac{3^{a+b}}{3^{a}} = 3^{b} = 3$

$\boxed{b = 1}$

$f(-1) = 1 + \underbrace{c \times 3^{a-1}}_{\frac{c \times 3^a}{3^1} = -\frac{1}{9}} = 1 - \frac{1}{9} = \frac{8}{9}$

③ $y = c + \log_5^{(ax + b)} \qquad \frac{a}{b} = ?$

$(0, 2) \to \begin{cases} c + \log_5 b = 2 \\ \ominus\, c + \log_5^{\frac{12}{5}a + b} = 0 \end{cases}$ $\quad \leftarrow (\frac{12}{5}, 0)$

$\log_5^{b} - \log_5^{\frac{12}{5}a + b} = 2 \to \log_5^{\frac{b}{\frac{12}{5}a + b}} = 2$

$\frac{b}{\frac{12}{5}a + b} = 25 \qquad b = 60a + 25b$

$* \ 60a = -24b$

$* \to \frac{a}{b} = -\frac{2}{5}$

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ادامه سوال ۵:

$f^{-1}(10) = -1$

$\to f(-1) = 10$

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

$2^{b+a} = 8$

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

$\boxed{a=1}$ $\boxed{b=2}$

$2b - a = ?$ $2(2) - 1 = 3$

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$f(x) = -2 + \left(\frac{1}{2}\right)^{Ax+B}$

$y = x^2 - x = g(x)$

$f(1) = g(1) = 0$

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

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

$f(2) = g(2) = 2$

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

$\left(\frac{1}{2}\right)^{2A+B} = 4$ $\quad \begin{cases} 2A+B = -2 \\ A+B = -1 \end{cases}$

$\boxed{\begin{matrix} A = -1 \\ B = 0 \end{matrix}}$

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

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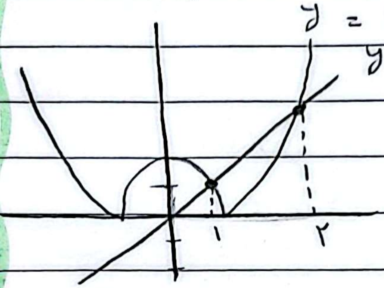
$f(x) = \log_2 (|x^2 - 2| - x)$

$D_f = ?$

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



$|x^2 - 2| = x$

$\begin{cases} 2 - x^2 = x \to x^2 + x - 2 = 0 \begin{cases} x = 1 \\ x = -2 \end{cases} \\ x^2 - 2 = x \to x^2 - x - 2 = 0 \begin{cases} x = -1 \\ x = 2 \end{cases} \end{cases}$

$D_f = \mathbb{R} - [1, 2]$

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$\begin{cases} f(x) = 2 + 2^{b-ax} \\ g(x) = -x^2 - 3x + 8 \end{cases}$

$f(1) = 2 + 2^{b-a} = 4 \to 2^{b-a} = 2$

$g(1) = -1 - 3 + 8 = 4$ $\quad \boxed{b - a = 1}$

$\log_2 3 = 1.6 \rightarrow \log_3 2 = \frac{5}{8}$

$\log_3 7 = 0.6 \qquad \log_3 7 = \frac{5}{3}$

$\cancel{m} \times \left(\frac{7}{8}\right)^n = \frac{1}{7}\cancel{m}$ 8

$\left(\frac{7}{8}\right)^n = \frac{1}{7} \qquad n = \log_{\frac{7}{8}} \frac{1}{7}$

$= -\left(\underbrace{\log_{\frac{7}{8}} 7}\right)$

$\log_7 8 = \cancel{\log_7 7} - \overbrace{\log_7 8}^{3\log_7 2} =$
1

$\log_7 2 = ? \qquad \log_7 2 = \frac{\log_3 2}{\log_3 7} = \frac{\frac{5}{8}}{\frac{5}{3}}$

$= \frac{3}{8}$

$\log_7 \frac{8}{7} = 1 - \frac{9}{8} = -\frac{1}{8}$

$\log_{\frac{7}{8}} \frac{1}{7} = 8$ هفته $= 8 \times 7 =$ ۵۶ روز

$\log_2 5 = 2.4 \longrightarrow \frac{\log_5 2}{\log_5 3} : \frac{\frac{5}{12}}{\frac{5}{7}}$ 7

$\log_3 5 = 1.4$

$\cancel{m} \times \left(\frac{8}{9}\right)^n = \frac{1}{4}\cancel{m} \qquad \log_3 2 = \frac{7}{12}$

$\left(\frac{8}{9}\right)^n = \frac{1}{4} \qquad n = \log_{\frac{8}{9}} \frac{1}{4} = ?$

$\log_{\frac{8}{9}} \frac{1}{4} = -\left(\underbrace{\log_{\frac{8}{9}} 4}\right)$

$= \underbrace{\log_{\frac{8}{9}} 2} + \log_{\frac{8}{9}} 3$

$= \frac{1}{\log_2 \frac{8}{9}} = \frac{1}{\underbrace{\cancel{\log_2 8}}_{3} - \underbrace{\log_2 9}} = \frac{1}{-\frac{3}{7}}$

$2\log_2 3 = 2\left(\frac{12}{7}\right)$

$= -\frac{7}{3} = \log_{\frac{8}{9}} 2$ ★

$\log_{\frac{8}{9}} 3 = \frac{1}{\log_3 \frac{8}{9}} = \frac{1}{\underbrace{\log_3 8} - \cancel{\log_3 9}^{\,2}}$

$3\log_3 2 = \cancel{3}\left(\frac{7}{12}\right)$ 4

$= \frac{1}{-\frac{1}{4}} = -4 = \log_{\frac{8}{9}} 3$ ★

$n = \log_{\frac{8}{9}} \frac{1}{4} = -1\left(-\frac{7}{3} - 4\right) = 4\frac{7}{3} = \frac{19}{3}$

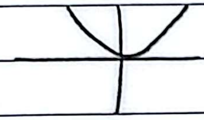
$\frac{19}{3} h = \frac{19}{3} \times 60\ \text{min} = 380\ \text{min}$ s.a.m

$\log 2 = 0.3$ $\qquad$ $\log 3 = 0.48$

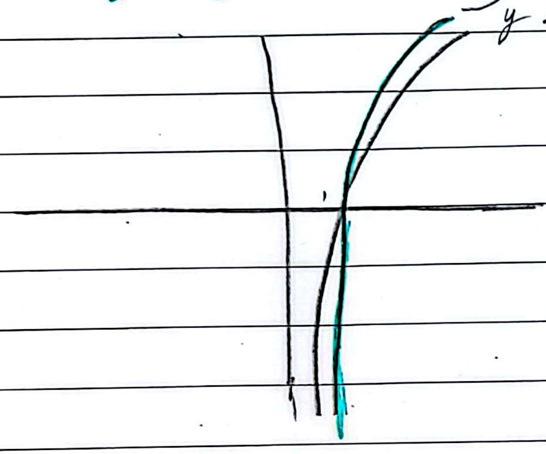
(10)

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

$\Rightarrow \quad y = x^2$



ب) $y = \log x^2 = 2\log x$ $\qquad y = \log x$



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$\cancel{x} \times \left(\frac{96}{100}\right)^n = \frac{1}{3}\cancel{x}$

$n = \log_{\frac{96}{100}} \frac{1}{3} = -\left(\log_{\frac{96}{100}} 3\right) =$

$\log_{0.96} 3 = \frac{1}{\log_3 \frac{96}{100}} \longrightarrow -24$

$\log_3 \frac{96}{100} = \log_3 96 - \log_3 100$

$\underbrace{5\log_3 2}_{\frac{25}{8}} + \underbrace{\log_3 3}_{1} \qquad \underbrace{2\log_3 10}_{\frac{25}{6}}$

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

$\log_3 10 = \frac{1}{\log 3} = \frac{100}{48} = \frac{25}{12}$

جواب $= 24$

$\boxed{n = 24 \text{ روز}}$

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