ساینا جاوری

Subject

Year: Month: Date:

NOTE BOOK

(1) $y = 1 - \log_c^{(ax-b)}$

$0 = 1 - \log_c^{-\frac{3}{2}a-b} \longrightarrow \log_c^{-\frac{3}{2}a-b} = 1$

$\boxed{-\frac{3}{2}a - b = c}$

$2 = 1 - \log_c^{-b} \longrightarrow 1 = -\log_c^{-b}$

$1 = \log_c^{-\frac{1}{b}} \begin{cases} -\frac{1}{b} = c \\ b + c = -\frac{3}{2} \end{cases} \longrightarrow b - \frac{1}{b} = -\frac{3}{2}$

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

(2) $\begin{cases} f(0) = \frac{2}{3} \Rightarrow 1 + c \times 3^a = \frac{2}{3} \Rightarrow c \times 3^a = -\frac{1}{3} \\ f(1) = 0 \Rightarrow 1 + c \times 3^{a+b} = 0 \Rightarrow 1 + c \times 3^a \times 3^b = 0 \end{cases}$

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

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

$= 1 + (-\frac{1}{3}) \times \frac{1}{3} = 1 - \frac{1}{9} = \boxed{\frac{8}{9}}$

(3) $\begin{cases} 2 = c + \log_5^{b} \\ 0 = c + \log_5^{(2.4a+b)} \end{cases} \Rightarrow \log_5^{(2.4a+b)} - \log_5^{b} = -2$

$\Rightarrow \log_5 \frac{2.4a+b}{b} = -2 \Rightarrow \frac{2.4a+b}{b} = 5^{-2}$

$\Rightarrow \frac{2.4a+b}{b} = \frac{1}{25} \Rightarrow \frac{2.4a}{b} + 1 = \frac{1}{25}$

$\Rightarrow \frac{24}{10} \times \frac{a}{b} = -\frac{24}{25} \Rightarrow \boxed{\frac{a}{b} = -\frac{2}{5}}$

سانیا جابری

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حالت اول:

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$x^2-2 \geq 0 \Rightarrow x^2 \geq 2 \Rightarrow x \geq \sqrt{2}$ یا $x \leq -\sqrt{2}$

$\Rightarrow x^2-2-x>0 \Rightarrow x<-1$ یا $x>2$

$x \leq -\sqrt{2}$ یا $x>2$ (1) $\cap$

حالت دوم: $x^2-2<0 \Rightarrow x^2<2 \Rightarrow -\sqrt{2}<x<\sqrt{2}$ (2)

$\Rightarrow -x^2+2-x>0 \Rightarrow -2<x<1 \cap \Longrightarrow -\sqrt{2}<x<1$

$D_f = (-\infty, 1) \cup (2, +\infty)$

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$2+2^{b-ax} = -x^2-3x+8 \qquad 2+2^{b-a} = -1-3+8 = 4 \Rightarrow 2^{b-a} = 2 \Rightarrow \boxed{b-a=1}$

$f(x)-2 = 2^{b-ax} \longrightarrow \log_2^{f(x)-2} = b-ax$

$x = b - \log_2^{f(x)-2} \qquad \boxed{\frac{b-3}{a} = -1}$

$b-3 = -a \begin{cases} b+a=3 \\ b-a=1 \\ 2b=4 \to b=2 \to a=1 \to \boxed{2b-a=3} \end{cases}$

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$y = x^2-x \xRightarrow{x=1} y=0 \Rightarrow A(1,0)$

$y = x^2-x \xRightarrow{x=2} y=2 \Rightarrow B(2,2)$

$\begin{cases} -2+\left(\frac{1}{2}\right)^{A+B} = 0 \Rightarrow \left(\frac{1}{2}\right)^{A+B} = 2 \Rightarrow A+B = -1 \\ -2+\left(\frac{1}{2}\right)^{2A+B} = 2 \Rightarrow \left(\frac{1}{2}\right)^{2A+B} = 4 \Rightarrow 2A+B = -2 \end{cases}$

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

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

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سانیا جاری

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$m(t) = m_0\left(\frac{8}{9}\right)^{\frac{t}{1}} \Rightarrow \frac{1}{4}m_0 = m_0\left(\frac{8}{9}\right)^t \Rightarrow \left(\frac{8}{9}\right)^t = \frac{1}{4}$

$\log_5\left(\frac{8}{9}\right)^t = \log_5\frac{1}{4} \Rightarrow t\log_5\left(\frac{8}{9}\right) = -\log_5^4$

$\log_3^5 = 1.4 = \frac{14}{10} = \frac{7}{5} \Rightarrow \log_5^3 = \frac{5}{7}$

$\log_2^5 = 2.4 = \frac{24}{10} = \frac{12}{5} \Rightarrow \log_5^2 = \frac{5}{12}$

$t\log_5\left(\frac{8}{9}\right) = -\log_5^4 \Rightarrow t(\log_5^8 - \log_5^9) = -(\log_5^2 + \log_5^2)$

$\Rightarrow t\left(3\times\frac{5}{12} - 2\times\frac{5}{7}\right) = -\left(\frac{5}{12}+\frac{5}{7}\right)$

$\Rightarrow t\left(\frac{35-40}{28}\right) = -\left(\frac{35+60}{84}\right) \Rightarrow -5t = -\frac{95}{3} \Rightarrow t = \frac{19}{3}$

$\frac{19}{3}\times 60 = \boxed{380}\ min$

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

$\log_3\left(\frac{7}{8}\right)^{\frac{t}{7}} = \log_3\left(\frac{1}{7}\right) \Rightarrow \frac{t}{7}\log_3\left(\frac{7}{8}\right) = \log_3\left(\frac{1}{7}\right)$

$\frac{t}{7}(\log_3^7 - \log_3^8) = -\log_3^7$

$\log_7^3 = 0.6 = \frac{6}{10} = \frac{3}{5} \Rightarrow \log_3^7 = \frac{5}{3}$

$\log_2^3 = 1.6 = \frac{16}{10} = \frac{8}{5} \Rightarrow \log_3^2 = \frac{5}{8}$

$\frac{t}{7}(\log_3^7 - 3\log_3^2) = -\log_3^7$

$\frac{t}{7}\left(\frac{5}{3} - 3\times\frac{5}{8}\right) = -\frac{5}{3} \Rightarrow \frac{t}{7}\left(\frac{40-45}{24}\right) = -\frac{5}{3}$

$\frac{t}{7}\left(-\frac{5}{24}\right) = -\frac{5}{3} \Rightarrow \frac{t}{56} = 1 \Rightarrow \boxed{t = 56}$

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$f(t) = A\left(\frac{96}{100}\right)^t \Rightarrow \frac{A}{3} = A\left(\frac{96}{100}\right)^t \Rightarrow \left(\frac{96}{100}\right)^t = \frac{1}{3}$

$\Rightarrow \log\left(\frac{96}{100}\right)^t = \log\frac{1}{3} \Rightarrow t(\log 96 - \log 100) = -\log 3$

$\xrightarrow{96 = 2^5 \times 3} t(\log 2^5 + \log 3 - 2) = -\log 3$

$\Rightarrow t(5(0.3) + 0.48 - 2) = -0.48$

$\Rightarrow t(1.5 + 0.48 - 2) = -0.48 \Rightarrow -0.02t = -0.48$

$\Rightarrow \boxed{t = 24}$

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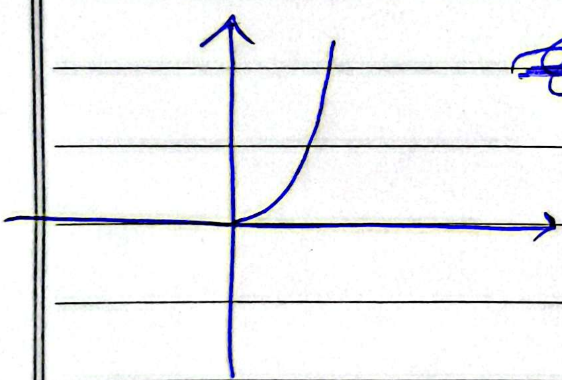

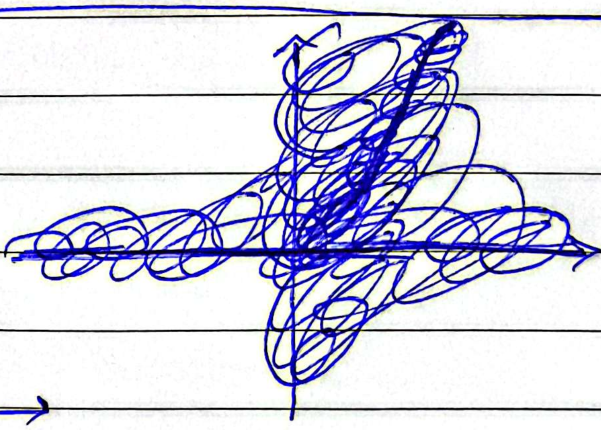

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