سانیا حاوری

Subject
Year: Month: Date:
NOTE BOOK

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

$0 = 1 - \log_c^{-\frac{3}{2}a-b} \rightarrow (c)^{-\frac{3}{2}a-b} = 1$

$\boxed{-\frac{3}{2}a - b = 0}$

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

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

$\hookrightarrow -\frac{3}{4}a + 2 = \frac{1}{2} \rightarrow -\frac{3}{4}a = -\frac{3}{2} \rightarrow \boxed{a = 1}$

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

$c \times 2^a = -\frac{1}{3} \Rightarrow 1 + \left(-\frac{1}{3}\right) \times 2^b = 0 \Rightarrow 2^b = 3 \Rightarrow b = 1$

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

$= 1 + \left(-\frac{1}{3}\right) \times \frac{1}{2} = 1 - \frac{1}{6} = \frac{5}{6}$

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(3) $\begin{cases} 2 = c + \log_5^{(2a+b)} \\ 0 = c + \log_5^{(4a+b)} \end{cases} \Rightarrow \log_5^{(4a+b)} - \log_5^{(2a+b)} = -2$

$\Rightarrow \log_5 \frac{4a+b}{2a+b} = -2 \Rightarrow \frac{4a+b}{2a+b} = 5^{-2}$

$\Rightarrow \frac{4a+b}{2a+b} = \frac{1}{25} \Rightarrow \frac{4a}{2a+b} + 1 = \frac{1}{25}$

$\Rightarrow \frac{4}{5} \times \frac{a}{b} = -\frac{24}{25} \Rightarrow \frac{a}{b} = -\frac{3}{5}$

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Baharan

سایا جاوری

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حالت اول:

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

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

$x \leq -\sqrt{2}$ یا $x>2$ (1) ∩

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

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

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

(5) $2+2^{b-ax} = -x^2-3x+8$ $\quad 2+2^{b-a} = -1-3+8=4=2^2$

$\Rightarrow b-a=1$

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

$\log_2 = b-ax$

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

$\frac{b-2}{a} = -1$

$b-2 = -a$

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

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

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

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

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

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

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

$\log_{\frac{3}{2}}\left(\frac{4}{9}\right)^{\frac{t}{4}} = \log_{\frac{3}{2}}\frac{1}{4} \Rightarrow t\log_{\frac{3}{2}}\left(\frac{4}{9}\right) = -\log_{\frac{3}{2}}^{4}$

$\log_{\frac{3}{2}}^{\frac{3}{2}} = 1.5 = \frac{15}{10} = \frac{3}{2} \Rightarrow \log_{\frac{3}{2}}^{\frac{3}{2}} = \frac{3}{2}$ (3)

$\log_{\frac{3}{2}}^{\frac{3}{2}} = 2.25 = \frac{225}{100} = \frac{9}{4} \Rightarrow \log_{\frac{3}{2}}^{\frac{2}{3}} = \frac{3}{4}$

$t\log_{\frac{3}{2}}\left(\frac{4}{9}\right) = -\log_{\frac{3}{2}}^{4} \Rightarrow t\left(\log_{\frac{3}{2}}^{4} - \log_{\frac{3}{2}}^{9}\right) = -\left(\log_{\frac{3}{2}}^{2} + \log_{\frac{3}{2}}^{2}\right)$

$\Rightarrow t\left(2\times\frac{3}{4} - 2\times\frac{3}{2}\right) = -\left(\frac{3}{4} + \frac{3}{2}\right)$

$\Rightarrow t\left(\frac{3-2}{2}\right) = -\left(\frac{3+6}{4}\right) \Rightarrow -3t = -\frac{9}{2} \Rightarrow t = \frac{19}{2}$

$\frac{19}{2}\times 60 = 570$ min

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

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

$\frac{t}{7}\left(\log_{\frac{7}{2}}^{7} - \log_{\frac{7}{2}}^{8}\right) = -\log_{\frac{7}{2}}^{7}$

(5)

$\log_{\frac{7}{2}}^{\frac{7}{2}} = 0.4 = \frac{4}{10} = \frac{2}{5} \Rightarrow \log_{\frac{7}{2}}^{7} = \frac{5}{2}$

$\log_{\frac{7}{2}}^{\frac{7}{2}} = 1.44 = \frac{144}{100} = \frac{36}{25} \Rightarrow \log_{\frac{7}{2}}^{8} = \frac{5}{2}$

$\frac{t}{7}\left(\log_{\frac{7}{2}}^{7} - 2\log_{\frac{7}{2}}^{2}\right) = -\log_{\frac{7}{2}}^{7}$

$\frac{t}{7}\left(\frac{5}{2} - 2\times\frac{5}{2}\right) = -\frac{5}{2} \Rightarrow \frac{t}{7}\left(\frac{6-10}{4}\right) = -\frac{5}{2}$

$\frac{t}{7}\left(-\frac{4}{4}\right) = -\frac{5}{2} \Rightarrow \frac{t}{7} = 1 \Rightarrow t = 7$

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۹) $f(t) = A\left(\frac{99}{100}\right)^t \Rightarrow \frac{A}{2} = A\left(\frac{99}{100}\right)^t \Rightarrow \left(\frac{99}{100}\right)^t = \frac{1}{2}$

$\Rightarrow \log\left(\frac{99}{100}\right)^t = \log\frac{1}{2} \Rightarrow t(\log 99 - \log 100) = -\log 2$

$\xrightarrow{99 = 9\times11}$ $t(\log 9^2 + \log 11 - 2) = -\log 2$ (۶)

$\Rightarrow t(2(0.95) + 0.041 - 2) = -0.041$

$\Rightarrow t(1.9 + 0.041 - 2) = -0.041 \Rightarrow 0.05\, t = -0.041 \Rightarrow t = 0.82$

$\Rightarrow \boxed{t = 24}$

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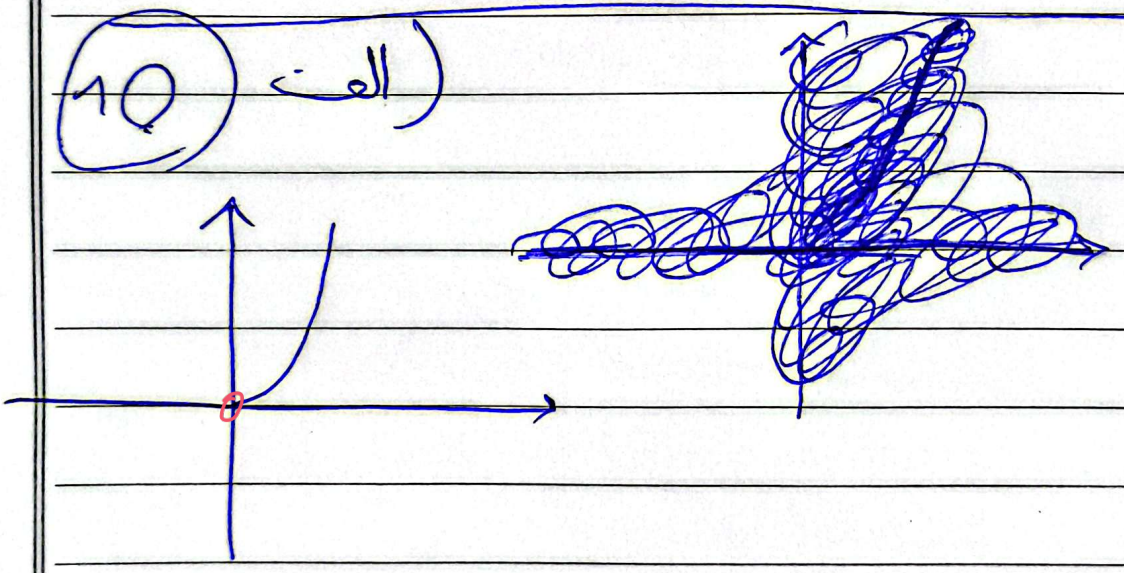

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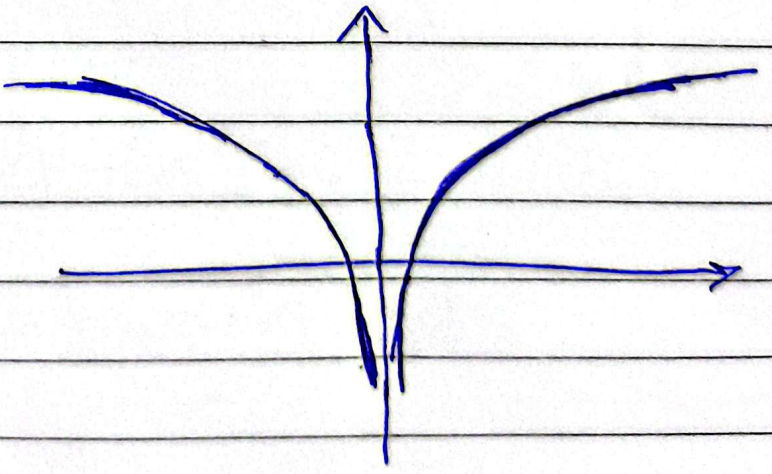

1) $x=0 \rightarrow y=1-\log_c^{-b}=2 \rightarrow bc=-1$

$$\begin{cases} b+c=-\frac{3}{2} \\ bc=-1 \end{cases} \rightarrow \begin{cases} b=-2 \checkmark \\ b=\frac{1}{2}\times \end{cases}$$

b نمی‌تواند $(+1)$ باشد چون در این صورت c صفر می‌شود

$x=-1, a=-\frac{3}{2} \rightarrow 1-\log_{-\frac{1}{2}}^{-\frac{3}{2}a+2}=0 \rightarrow a=1 \quad (a+c)b=-3$