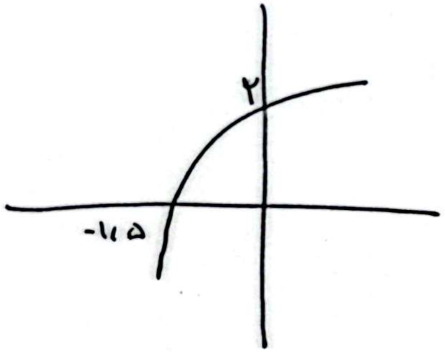
۱۹,۷۵

-۱



① $b+c=\frac{-۳}{۲}$

$x=-۱,۵ \to y=0 \to 0=1-\log_c^{(-۱,۵a-b)} \to \log_c^{(-۱,۵a-b)}=1 \to$

② $c=-۱,۵a-b$

$x=0 \to y=۲ \to 1-\log_c^{-b}=۲ \to \log_c^{-b}=-1 \to$ ③ $-b=\frac{1}{c} , b=-\frac{1}{c}$

①,③ $\to b+c=\frac{-۳}{۲} \to c-\frac{1}{c}=\frac{-۳}{۲} \xrightarrow{\times ۲c} ۲c^۲-۲+۳c=0 \to$

$۲c^۲+۳c-۲=0 \xrightarrow{ac} c^۲+۳c-۴=0 \xrightarrow{\text{جمع ضرایب} = 0} c=1$

$c=-۴$

$\xrightarrow{\div ۲} c=\frac{1}{۲}$, ⓶-

c نمی‌تواند منفی باشد چون پایه log است.

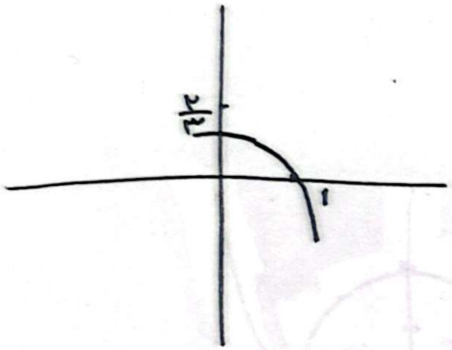
$c=\frac{1}{۲} \to b=-\frac{1}{c} \to b=-۲$

② $\to c=-۱,۵a-b \to \frac{1}{۲}=-۱,۵a+۲ \to ۱,۵a=۱,۵ \to a=1$

$(a+c)b=(1+\frac{1}{۲})(-۲)=-۲-1=\boxed{-۳}$

پریا_امینی

-۲



$f(x)=1+c\times ۳^{a+bx}$

$x=0 \longrightarrow f(x)=\frac{۲}{۳} \Longrightarrow 1+c\times ۳^{a+b(0)}=\frac{۲}{۳} \longrightarrow 1+c\times ۳^{a}=\frac{۲}{۳}$

$c\times ۳^{a}=\frac{-1}{۳} \longrightarrow ۳^{a}=\frac{-1}{۳c}$

$x=1 \longrightarrow f(x)=0 \Longrightarrow 1+c\times ۳^{a+b}=0 \longrightarrow c\times ۳^{a}\times ۳^{b}=-1 \longrightarrow \underbrace{c\times \frac{-1}{۳c}}_{\frac{-1}{۳}}\times ۳^{b}=-1$ ۵

$۳^{b}=\frac{-1}{\frac{-1}{۳}}=۳ \longrightarrow b=1$

$f(-1)=1+c\times ۳^{a-b}=1+c\times ۳^{a-1}=1+c\times\frac{۳^{a}}{۳} \xrightarrow{۳^{a}=\frac{-1}{۳c}} 1+c\times\frac{\frac{-1}{۳c}}{\frac{۳}{1}}=$

$1+\cancel{c}\times\frac{-1}{۹\cancel{c}} \longrightarrow 1+\left(\frac{-1}{۹}\right)=\frac{۹}{۹}-\frac{1}{۹}=\frac{۸}{۹}$

۳ -

$y = c + \log_{5}(ax+b)$

$x = ۲٫۴ \,,\, y = ۰ \longrightarrow c + \log_{5}^{۲٫۴a+b} = ۰ \longrightarrow \log_{5}^{۲٫۴a+b} = -c \longrightarrow 5^{-c} = ۲٫۴a+b \longrightarrow \frac{۱}{5^{c}} = ۲٫۴a+b$

$x = ۰ \,,\, y = ۲ \longrightarrow c + \log_{5}^{b} = ۲ \longrightarrow \log_{5}^{b} = ۲-c \longrightarrow 5^{(۲-c)} = b \longrightarrow \frac{۲۵}{5^{c}} = b \longrightarrow 5^{c} = \frac{۲۵}{b}$

$\frac{۱}{5^{c}} = ۲٫۴a+b \xrightarrow{5^{c} = \frac{۲۵}{b}} \frac{۱}{\frac{۲۵}{b}} = ۲٫۴a+b \longrightarrow \frac{b}{۲۵} = ۲٫۴a + \frac{۲۵b}{۲۵} \longrightarrow \frac{-۲۴b}{۲۵} = ۲٫۴a \longrightarrow$

$-۲۴b = ۶۰a \longrightarrow \frac{a}{b} = \frac{-۲۴}{۶۰} = -۰٫۴$

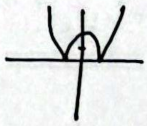
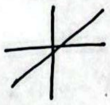
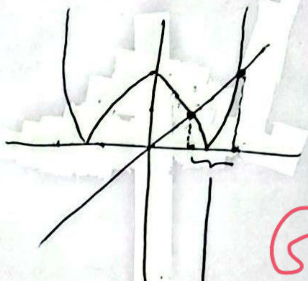
(۲)

پویا احسنی

۴-

$\log_4 |x^2-2|-x \to |x^2-2|-x>0$

$|x^2-2|>x$

$|x^2-2| \to$  $x \to$  $\}$ 

جزء جواب نیست زیرا نمودار x بالاتر از نمودار $|x^2-2|$ است.

نقاط برخورد $\to |x^2-2|=x$

شرط $\to x\geq 0$
$$\begin{cases} x^2-2=x \to x^2-x-2=0 \to x=-1 \times ,\ x=2 \\ x^2-2=-x \to x^2+x-2 \to x=1 ,\ x=-2 \times \end{cases} \Rightarrow x=1,\ x=2$$

$$D_{f(x)} = \mathbb{R}-[1,2] = (-\infty,1)\cup(2,+\infty)$$

۵-

$f(x)=2+2^{b-ax}$, $g(x)=-x^2-3x+8$

$\xrightarrow{x=1} f(1)=g(1) \to 2+2^{b-a} = \underbrace{-1-3+8}_{4} \to 2^{b-a}=2 \to b-a=1 \to b=a+1$

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

$a+(a+1)=3 \to 2a+1=3$, $2a=2$, $a=1$, $b=2$

$2b-a = 2(2)-1 = 4-1 = \boxed{3}$

۶-

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

$x=1 \to f(x)=y \to -2+(\frac{1}{2})^{A+B} = 0 \to (\frac{1}{2})^{A+B}=2 \to 2^{-A-B}=2 \to -A-B=1 \to -A+2A+2=1 \to A=-1$ $\to B=0$

$x=2 \to f(x)=y \to -2+(\frac{1}{2})^{2A+B}=2 \to (\frac{1}{2})^{2A+B}=4 \to 2^{-2A-B}=2^2 \to -2A-B=2 \to B=-2A-2$

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

$$x_2 = \frac{1}{6} x_1 \to \frac{1}{6} x_1 = x_1 \left(\frac{8}{9}\right)^{\frac{t}{60}} \to \left(\frac{8}{9}\right)^{\frac{t}{60}} = \frac{1}{6} = 6^{-1}$$

$T = 60\,\text{min}$ – V

(9)

$$\log_{\frac{8}{9}} 6^{-1} = \frac{t}{60} \to -\log_{\frac{8}{9}} 6 = \frac{t}{60} = \frac{+19}{3} \to t = 20 \times 19 \to \boxed{t = 380\,\text{min}}$$

$$\frac{1}{\log_2 5} = \frac{10}{24}$$

$$\log_{\frac{8}{9}} 6 = \frac{\log_5 6}{\log_5 \frac{8}{9}} = \frac{\frac{380}{336}}{\frac{-40}{336}} = \frac{19}{-3}$$

$$\log_5 6 = \log_5 2 + \log_5 3 \to \frac{1}{\log_3 5} = \frac{10}{14} \to = \frac{380}{336}$$

$$\frac{20}{14}$$

$$\log_5 \frac{8}{9} = \log_5 8 - \log_5 9 = 3\log_5 2 - 2\log_5 3 = \frac{-40}{336}$$

$$\frac{30}{24}$$

$$A_2 = \frac{1}{7} A_1$$

$$A_1 \left(\frac{7}{8}\right)^t = \frac{1}{7} A_1 \xrightarrow{\text{طرفین وسطین}} 7^t \times 7 = 8^t \times 1 \Rightarrow 7^{t+1} = 2^{3t} \xrightarrow{\log_3}$$

$$\log_3 7^{t+1} = \log_3 2^{3t} \Rightarrow (t+1)\log_3 7 = 3t \log_3 2 \Rightarrow \frac{10}{9}(t+1) = \frac{10}{16} \times 3t$$

$$\log_2 3 = 1.6 \rightarrow \log_3 2 = \frac{10}{16}$$

$$\log_7 3 = 0.9 \rightarrow \log_3 7 = \frac{10}{9}$$

$$\frac{10}{9}t + \frac{10}{9} = \frac{30}{16}t \rightarrow \frac{10}{9} = \frac{180t - 160t}{144}$$

$$\frac{10}{9} = \frac{20t}{144} \rightarrow 12t = 96 \rightarrow \boxed{t = 8 \text{ روز}}$$

۸ هفته

$8 \times 7 = 56$

اخر

۹-

$t=1$ روز

$$M_2 = 0.99 M_1$$

$$A_2 = \frac{1}{3}A_1 \to A_1(0.99)^t = \frac{1}{3}A_1$$

$$\log_{0.99}\frac{1}{3} = t \to \log_{\frac{1}{3}} 0.99 = \frac{1}{t} = \frac{1}{24} \to \boxed{t = 24}$$

$$\log_{\frac{1}{3}} 0.99 = \log_{\frac{1}{3}} 3 + \log_{3^{-1}} 25 + \log_{3^{-1}} 10^{-2} = \frac{0.5}{0.48} - \frac{0.48}{0.48} = \frac{0.02}{0.48} = \frac{1}{24}$$

$$\log_{\frac{1}{3}} 3 \to -1 \qquad \log_{3^{-1}} 25 \to \frac{-1.5}{0.48} \qquad \log_{3^{-1}} 10^{-2} \to \frac{2}{0.48}$$

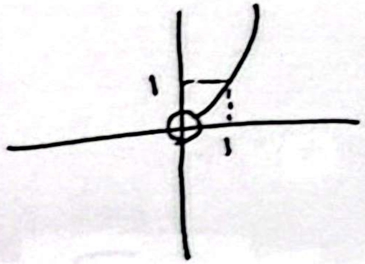
$$\log_3 2 = \frac{\log 2}{\log 3} = \frac{0.3}{0.48}$$

۱۰- پریا احسینی

الف) $y = 9^{\log_3^x} \xrightarrow{x>0} y = x^{\log_3^9} \to y = x^2$ ($\log_3^9 \to 2$)

$D = x > 0$

$R = x > 0$



۲

ب) $y = \log_{10}^{x^2} \to \log_{10}^{x^2} = 2\log_{10}^{x}$

x	$\sqrt{10}$	10	$-\sqrt{10}$	-10	1	-1	$\frac{1}{10}$	$-\frac{1}{10}$
y	1	2	1	2	0	0	-1	-1

$D \Rightarrow x^2 > 0 \to D = \mathbb{R} - \{0\}$

$R = \mathbb{R}$