۱۹,۵

(۱)

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

$\xrightarrow{(0,2)}\log_c\frac{c}{-b}=2\Rightarrow c^2=\frac{c}{-b}\xrightarrow{c\neq0}c=\frac{-1}{b}$

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

$-\frac{1}{b}+b=-\frac{3}{2}\xrightarrow[(2b)]{b\neq0}-1+b^2=-\frac{3b}{2}\Rightarrow-2+2b^2=-3b$

$2b^2+3b-2=0$

$b^2+3b-4=0$

$(b+4)(b-1)$ ← $b=-\frac{4}{2}=-2\Rightarrow c=\frac{1}{2}$; $b=\frac{1}{2}\Rightarrow c=-2$ غ ق ق $c>0$

$\xrightarrow{(-1.5,0)}\log_{\frac{1}{2}}\frac{\frac{1}{2}}{a(-1.5)+2}=0\Rightarrow\frac{\frac{1}{2}}{a(-\frac{3}{2})+2}=1\Rightarrow\frac{1}{2}=-\frac{3a}{2}+2\Rightarrow-\frac{3a}{2}=-\frac{3}{2}\Rightarrow a=1$

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

(۲)

$f(x)=1+c\times3^{ax+bx}$

$\xrightarrow{(1,0)}0=1+c\times3^{a+b}\Rightarrow\underbrace{c\times3^a}_{-\frac{1}{3}}\times3^b=-1\Rightarrow3^b=+3\Rightarrow b=1$

$\xrightarrow{(0,\frac{7}{3})}\frac{7}{3}=1+c\times3^a\Rightarrow c\times3^a=-\frac{1}{3}$

$f(-1)=1+c\times3^{a-b}=1+\frac{c\times3^a}{3}=1+\frac{-\frac{1}{3}}{9}=1+-\frac{1}{9}=\frac{8}{9}$

(۳)

$y=c+\log_5^{(ax+b)}$

$\xrightarrow{(0,2)}2=c+\log_5^b\longrightarrow2=-\log_5^{(2.4a+b)}+\log_5^b\Rightarrow\log_5^{(\frac{b}{2.4a+b})}=2\Rightarrow\frac{b}{2.4a+b}=25\Rightarrow60a+25b=b\Rightarrow\frac{a}{b}=\frac{-24}{60}=-0.4$

$\xrightarrow{(2.4,0)}0=c+\log_5^{(2.4a+b)}\Rightarrow c=-\log_5^{(2.4a+b)}$

(۴)

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

$|x^2-2|-x>0\Rightarrow|x^2-2|>x$ → $x^2-2>x\Rightarrow x^2-x-2>0$, $x=-1,2$; $x^2-2<-x\Rightarrow x^2+x-2<0$, $x=1,-2$

(I): -1, 2: $+$ $-$ $+$

(II): -2, 1: $+$ $-$ $+$

$D_f=(I)\cap(II)=(-2,-1)$

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

۱,۵

(۵)

$2+2^{b-ax}=-x^2-3x+8\xrightarrow{x=1}2+2^{b-a}=-1-3+8\Rightarrow2^{b-a}=2^3\Rightarrow b-a=1$ (I)

$f^{-1}(10)=-1\Rightarrow f(-1)=10\Rightarrow2+2^{b+a}=10\Rightarrow b+a=3$ (II)

$\Rightarrow(I)+(II)=b-a+b+a=1+3\Rightarrow b=2$, $a=1$

$2b-a=4-1=3$

(۶)

$-2+(\frac{1}{2})^{Ax+B}=x^2-x\xrightarrow{x=1}-2+(\frac{1}{2})^{Ax+B}=0\Rightarrow2^{-Ax-B}=2\Rightarrow-Ax-B=1\Rightarrow-A-B=1$ (I)

$x=2$: $-2+(\frac{1}{2})^{Ax+B}=2\Rightarrow2^{-Ax-B}=4\Rightarrow-Ax-B=2\Rightarrow-2A-B=2$ (II)

$\Rightarrow(II)-(I)=-2A+A+B=1$

$A=-1$

$B=0$, $A=-1$

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

(۷)

$8\times(\frac{8}{9})^t=\frac{1}{6}\times8\Rightarrow\frac{8}{9}^t=\frac{1}{6}\Rightarrow\log_{\frac{8}{9}}\frac{1}{6}=t\xrightarrow{(I)}t=\frac{19}{3}h\Rightarrow\frac{19}{3}\times60=380min$

$\log_{\frac{8}{9}}\frac{1}{6}=\frac{\log_5\frac{1}{6}}{\log_5\frac{8}{9}}=\frac{\log_5^{2^{-1}3^{-1}}}{\log_5^{2^3}-\log_5^{3^2}}=\frac{(-1)\log_5^2+(-1)\log_5^3}{(3)\log_5^2+(-2)\log_5^3}\xrightarrow[\log_5^3=\frac{1}{\log_3^5}]{\log_5^2=\frac{1}{\log_2^5}}\frac{\frac{-1}{2.4}+\frac{-1}{1.6}}{\frac{3}{2.4}+\frac{-2}{1.6}}=\frac{\frac{-2.4-1.6}{(2.4)(1.6)}}{\frac{4.2-4.8}{(2.4)(1.6)}}=\frac{-4.8}{-0.6}=\frac{19}{3}$ (I)

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۹

$P\left(\frac{850}{100}\right)^t = P\left(\frac{7}{8}\right)^t \Rightarrow P\left(\frac{7}{8}\right)^t = \left(\frac{1}{2}\right)P \Rightarrow \left(\frac{7}{8}\right)^t = \frac{1}{2} \Rightarrow (t)\log_{\frac{7}{8}} = \log_{\frac{1}{2}} \Rightarrow (t)\frac{1.6-1.8}{\cancel{0.8}\times 1.6} = \frac{-1}{\cancel{0.8}}$

$\log_{\frac{7}{8}} = \log_7 - \log_8 = \frac{1}{\underbrace{\log_2}_{0.6}} - \frac{3}{\underbrace{\log_2}_{1.6}} = \frac{1.6-3(0.6)}{(0.6)(1.6)}$

$-1.6 = (-0.32)t \Rightarrow \frac{1.6}{0.32} = t = 8$ هفته $\Rightarrow$ روز ۵۶

۶

$\log_{\frac{7}{8}} = \log_7^{-1} - \log_8^{-1} = (t)\log_{\frac{7}{8}} = \frac{-1}{\log_8 - \log_7} = \frac{-1}{0.6}$

۴

$\frac{100-64}{100} = \frac{36}{50} \Rightarrow \cancel{100}\times\left(\frac{36}{50}\right)^t = \frac{1}{2}\times\cancel{100} \rightarrow \log\left(\frac{36}{50}\right)^t = \log\frac{1}{2} \rightarrow t\log\frac{36}{50} = -\log 2 \rightarrow -0.32t = -0.48$

$t = 1.5$ روز

۶

$\log\frac{36}{50} = \log\frac{36}{100} = \underbrace{\log 36}_{1.56} - \underbrace{2}_{\log 100} = -0.02$

$36 = 2\times 18 = 2\times 3\times 6$

$\log 36 = \underbrace{5\log 2}_{1.5} + \underbrace{\log 9}_{0.48}$

۱۰

الف) $y = 9^{\log_3 x} \Rightarrow x>0 \Rightarrow y = x^{\log_3 9} \Rightarrow y = x^2$

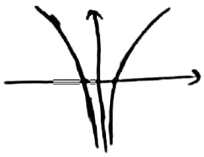
$D_y = (0, +\infty)$

۵

ب) $y = \log x^2 \rightarrow x^2 > 0 \Rightarrow x \neq 0$

$= 2\log|x|$

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



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