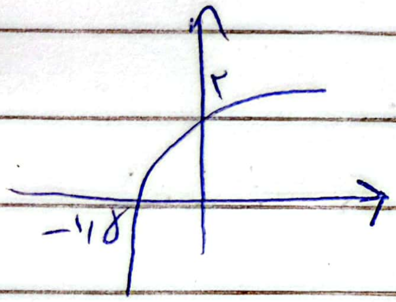
(۱) $y = 1 - \log_c(ax - b)$, $b + c = \frac{-3}{2}$

$(a+c)b = ?$



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

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

$\frac{1}{c} = -b \rightarrow b = \frac{-1}{c}$

$\log_c^{-1.5a-b} = 1 \rightarrow c = -1.5a - b$

$b + c = -1.5a$

$\frac{-3}{2} = -1.5a \rightarrow a = 1$

$b + c = \frac{-3}{2} \rightarrow c = \frac{-1}{b}$

$b - \frac{1}{b} = \frac{-3}{2} \rightarrow \frac{b^2 - 1}{b} = \frac{-3}{2} \rightarrow 2b^2 - 2 + 3b = 0$

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

$b = \frac{-3 \pm \sqrt{25}}{4} = \frac{-3 \pm 5}{4}$

$b = \frac{1}{2}$ ق ق ق → $\frac{1}{2} + c = \frac{-3}{2} \rightarrow c = -2$ غ ق ق ، $c > 0$

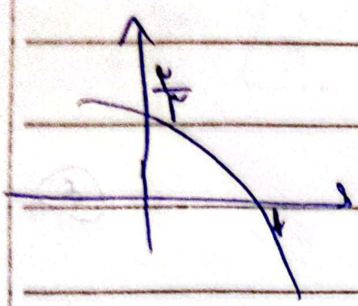
$b = -2$ ق ق → $-2 + c = \frac{-3}{2} \rightarrow c = \frac{1}{2}$ ق ق

$(a+c)b = \left(1 + \frac{1}{2}\right) \cdot -2 = \frac{3}{2} \times -2 = \boxed{-3}$

(2)

$f(x) = 1 + c \times 3^{a+bx}$

$f(-1) = ?$



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

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

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

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

$3^{a+b} \times c = -1 \rightarrow 3^{a} \times 3^{b} \times c = -1 \rightarrow \frac{-1}{3} \times 3^{b} = -1$

$3^{b} = 3$

$b = 1$

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

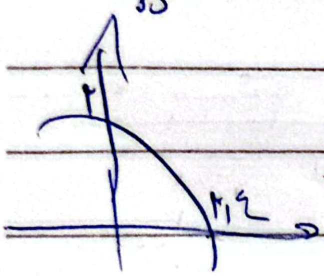
$f(-1) = 1 + c \times 3^{a-1} = 3^{a} \times \frac{1}{3} \times c + 1 = \frac{-1}{3} \times \frac{1}{3} + 1 =$

$\frac{-1}{9} + 1 = \boxed{\frac{8}{9}}$

(3)

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

$\frac{a}{b} = ?$



$c + \log_5^{2.4a+b} = 0$

$-\quad c + \log_5^{b} = 2$

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

$\log_5^{2.4a} \times \log_5^{b} - \log_5^{b} = -2$

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

$5^{-2} = \frac{2.4a+b}{b} \rightarrow \frac{1}{25} = \frac{2.4a+b}{b} \rightarrow b = 25b + 2.4a \times 25$

$24b = -2/4a \times 25$

$b = \frac{-a}{10} \times 25 \rightarrow \frac{b}{a} = -2/5 = \frac{-25}{10}$

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

④ $f(x) = \log_{4}\left(|x^2-2|-x\right)$

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

$|x^2-2| > x$

$x^2-2 > x \rightarrow x^2-x-2 > 0 \rightarrow (x-2)(x+1) = 0$

$x = 2$

$x = -1$

$-1 \quad 2$

$+ \quad | \quad - \quad | \quad +$

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

$|x^2-2| > x \rightarrow -x^2+2 > x$

$x^2+x-2 < 0$

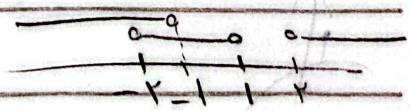
$(x+2)(x-1) < 0$

$x = -2$

$x = 1$

$-2 \quad 1$

$+ \quad | \quad - \quad | \quad +$



② $D_f = (-2,1)$

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

(۵)

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

$g(x) = -x^2 - 3x + 8$ } $x = 1$

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

$2b - a = ?$

$2 + 2^{b-a} = -1 - 3 + 8 \rightarrow 2 + 2^{b-a} = 4$

$2^{b-a} = 2$

$b - a = 1$

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

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

$2^{b+a} = 8 = 2^3$

$b + a = 3$

$b - a = 1$

$b + a = 3$

$2b = 4 \rightarrow b = 2 \rightarrow a = 1$

$2b - a = 2 \times 2 - 1 = \boxed{3}$

(۶)

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

$y = x^2 - x$ } $x = 1$, $x = 2$

$f(3) = ?$

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

$A + B = -1$

$-2 + \frac{1}{2}^{2A+B} = 2 \rightarrow \frac{1}{2}^{2A+B} = 4 = (\frac{1}{2})^{-2}$ $\quad 2A + B = -2$

$$A+B=-1$$
$$2A+B=-2$$

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

$$f(3)=-2+\frac{1}{2}^{-1\times 3+0}=-2+\left(\frac{1}{2}\right)^{-3}=-2+8=\boxed{6}$$

(7)

$$A(t)=A_0\times k^{\frac{t}{m}}$$
$$A(t)=A_0\times\left(\frac{8}{9}\right)^{t}$$
$$\frac{1}{6}=\left(\frac{8}{9}\right)^{t}$$
$$\log\frac{1}{6}=t\log\frac{8}{9}$$

$$\log_{10}1-\log_{10}6=t\left(\log_{10}8-\log_{10}9\right)$$
$$-\log_{10}6=t\left(\log_{10}8-\log_{10}9\right)$$

$$-\frac{\log_5 6}{\log_5 10}=t\times\left(\frac{\log_5 8}{\log_5 10}-\frac{\log_5 9}{\log_5 10}\right)$$

$$\log_2 5=\frac{24}{10}\rightarrow\log_5 2=\frac{10}{24}=\frac{5}{12}$$
$$\log_3 5=\frac{14}{10}\rightarrow\log_5 3=\frac{10}{14}=\frac{5}{7}$$

$$-\frac{\left(\log_5 2+\log_5 3\right)}{\left(\log_5 2+\log_5 5\right)}=t\times\left(\frac{3\log_5 2}{\log_5 2+\log_5 5}-\frac{2\log_5 3}{\log_5 2+\log_5 5}\right)$$

$$-\frac{\left(\frac{5}{12}+\frac{5}{7}\right)}{\left(\frac{5}{12}+1\right)}=t\times\left(\frac{3\times\frac{5}{12}}{\frac{5}{12}+1}-\frac{2\times\frac{5}{7}}{\frac{5}{12}+1}\right)$$

$$-\frac{\frac{95}{84}}{\frac{17}{14}} = t \times \frac{\frac{15}{12} - \frac{10}{7}}{\frac{17}{14}}$$

$$-\frac{95}{84} = t \times \frac{-15}{84}$$

$$95 = t \times 15 \rightarrow t = \frac{95}{15} h \times 60 = 380 \, min$$

⑧

$$100 - 12{,}5 = 87{,}5$$

$$A(t) = A_0 \times r^{\frac{t}{n}}$$

$$A(t) = A_0 \times \left(\frac{87{,}5}{100}\right)^t$$

$$A(t) = A_0 \times \left(\frac{875}{1000}\right)^t$$

$$\frac{1}{7} = \left(\frac{875}{1000}\right)^t$$

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

$$\log_3 \frac{1}{7} = t \log_3 \frac{7}{8}$$

$$\log_2 3 = \frac{16}{10}$$

$$\rightarrow \log_3 2 = \frac{10}{16} = \frac{5}{8}$$

$$\log_7 3 = \frac{6}{10}$$

$$\rightarrow \log_3 7 = \frac{10}{6} = \frac{5}{3}$$

$$-\log_3 7 = t(\log_3 7 - \log_3 8)$$

$$-\log_3 7 = t(\log_3 7 - 3\log_3 2)$$

$$-\frac{5}{3} = t\left(\frac{5}{3} - 3 \times \frac{5}{8}\right)$$

$$-\frac{5}{3} = t\left(\frac{5}{3} - \frac{15}{8}\right)$$

$$-\frac{5}{3} = t \; \frac{-5}{24} \rightarrow t = \frac{-\frac{5}{3}}{-\frac{5}{24}} = 8$$ هفته

$$8 \times 7 = 56$$ روز

⑨

$$A(t) = A_0 \times k^{\frac{t}{m}}$$

$$A(t) = A_0 \times \left(\frac{96}{100}\right)^t$$

$$\frac{100}{3} = 100 \times \left(\frac{96}{100}\right)^t$$

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

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

$$-\log 3 = t\left(\log 2^5 \times 3 - \log 100\right)$$

$$-0.48 = t\left(5\log 2 + \log 3 - 2\right)$$

$$-0.48 = t\left(5 \times 0.3 + 0.48 - 2\right)$$

$$-0.48 = -t \times 0.02$$

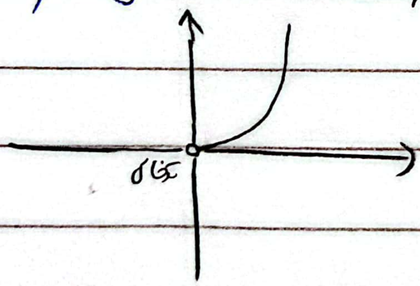
$$t = \frac{0.48}{0.02} = \frac{48}{2} = 24$$ روز

⑩

الف) $y = 9^{\log_3 x} = x^{\log_3 9} = x^{2\log_3 3} = x^2$

$D_f = x > 0$

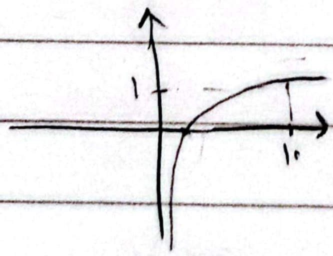
$x \neq 0$



ب) $y = \log x^2 = 2\log x$

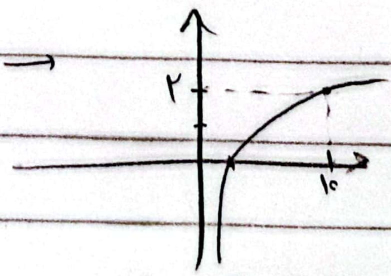
$x > 0$

$x \neq 0$



$y = \log x$

$(1, 0)$ $(10, 1)$



$y = 2\log x$

$(1, 0)$ $(10, 2)$