نکته عضوی
مقطع یازدهم دفتر ۸

①

$$f(x)=\begin{cases} x^3-4 & x\geq a \\ 12x-20 & x<a \end{cases}$$

$12a-20 \leq a^3-4 \xrightarrow{\text{ہ}} a^3-12a+16 \geq 0 \to \underline{a\geq -4}$

②

$f^{-1}(2)=4 \quad f(x)=3x+\cancel{k}^{-10}$ $\quad f(4)=2 \to f(4)=3\times 12+k \Rightarrow \boxed{k=-10}$

الف) $f(7)=?$ $\quad f(7)=21-10 \quad 11$

ب) $f(f(x))=?$ $\quad f(3x-10) \Rightarrow 3(3x-10)-10 \Rightarrow \boxed{9x-40}$

③

$A=(2a,a)$ (x, y) $\quad f(x)=\dfrac{ax}{x-1} \Rightarrow 2\cancel{a}=\dfrac{\cancel{a}a}{a-1} \to 2a-2=a$ $\boxed{a=2}$

④

$f=\{(3,5)(4,7)(7,2)(9,6)\}$ ($5,3$ $7,4$ $2,7$ $6,9$) $\quad g=\{(3,2)(8,6)(9,5)\}$ ($2,3$ $6,8$ $5,9$)

الف) fof^{-1} $\quad f(f^{-1}(x)) \Rightarrow \{(5,5)(7,7)(2,2)(6,6)\}$

ب) $f^{-1}of=(3,3)(4,4)(7,7)(9,9)$ $\quad 3\to 5\to 3$

ج) fog^{-1} $\quad \{(2,5)(5,6)\}$

د) $g^{-1}of \Rightarrow \{(3,9)(9,8)(7,3)\}$

⑤

$f=\{(2,4)(4,8)(6,10)\}$ $\quad g=\{(2,1)(4,3)(6,5)\}$ ($1,2$ $3,4$ $5,6$) $\quad h=\{(1,2)(3,4)(4,1)\boxed{(5,1)}\}$

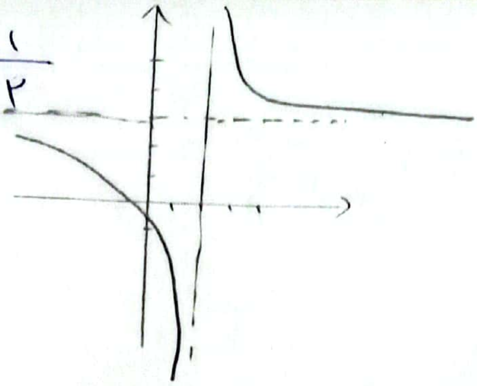
$\dfrac{h}{fog^{-1}}=? \quad \{\tfrac{1}{4}\}$

$fog^{-1} \Rightarrow 1\to 2\to 4 \quad 3\to 4\to 8 \quad 5\to 6\to 10 \quad (1,4)\ (3,8)\ \boxed{(5,10)}$

$y = \dfrac{3x+1}{x-2}$ یک مثیمت . ②

مجانب قائم $= 2$

مجانب افقی $= 3$

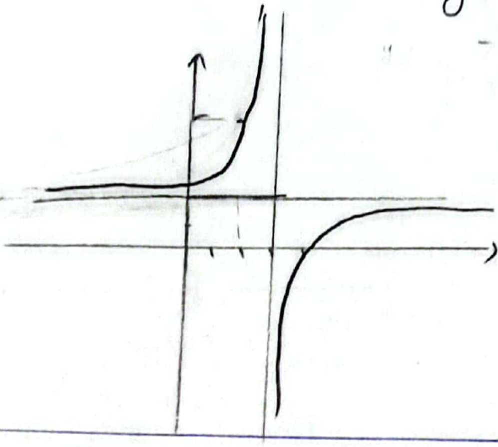


$y = \dfrac{3x+1}{x-2} \xrightarrow{\text{معکوس}} x = \dfrac{3y+1}{y-2}$

$xy - 2x = 3y + 1$

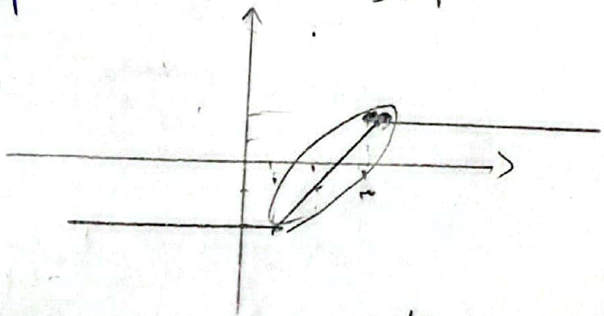
$-2x - 1 = y(3 - x) \rightarrow \boxed{y = \dfrac{2x+1}{-3+x}}$

$y = \dfrac{2x+1}{x-3}$ مجانب قائم $= 3$ مجانب افقی $= 2$



$f(x) = |x-1| - |x-3|$ $a = 1 \quad b = 3$ ⑤

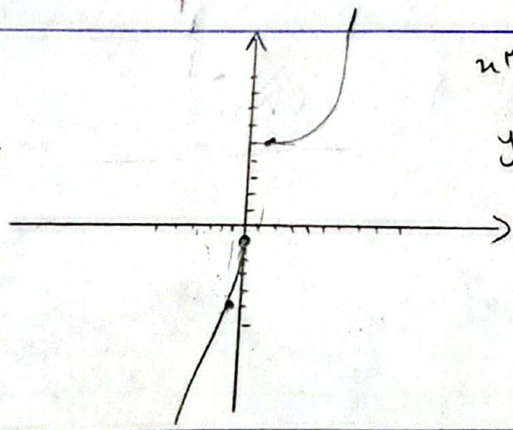
$$\begin{cases} -2 & x < 1 \\ 2x - 4 & 1 \le x \le 3 \\ 2 & x > 3 \end{cases}$$



$y = 2x - 4$

$x = 2y - 4 \xrightarrow{\text{معکوس}} \boxed{\dfrac{x+4}{2} = y}$

$f(x) = \begin{cases} x^3 + 4 & x \ge 1 \\ 4x - 1 & x \le 0 \end{cases}$ ⑦



$x^3 + 4 = y \rightarrow y^3 + 4 = x \rightarrow y = \sqrt[3]{x-4}$

$y = 4x - 1 \rightarrow x = 4y - 1 \rightarrow \dfrac{x+1}{4} = y$

$f(x) = x^2 - \dfrac{(x+1)^3}{x+3} \rightarrow f(x) = \dfrac{\cancel{x^3} + \cancel{3x^2} - \cancel{x^3} - 1 - 3x - \cancel{x^2}}{x+3} \rightarrow \overset{y}{\cancel{f(x)}} = \dfrac{3x+1}{-x-3}$ ⑨

$\xrightarrow{\text{معکوس}} x = \dfrac{3y+1}{-y-3} \rightarrow -xy - 3x = 3y + 1$

$-3x - 1 \Rightarrow y(3+x) \Rightarrow y = \dfrac{-3x-1}{3+x} \xrightarrow{\times 2} y = \dfrac{-6x-2}{6+2x}$

$f^{-1}(b) = ? \rightarrow \overset{-2}{b} = \dfrac{3x+1}{-x-3} \rightarrow 2x + 6 = 3x + 1$ $\boxed{x = 5}$

$a = -6 \quad b = -2$

$d = 6$

$f(x) = \dfrac{x}{x^2+1} \rightarrow \underset{a}{y}x^2 \underset{b}{-x} + \underset{c}{y} =$ $x \rightarrow \dfrac{\sqrt{1-4y^2} \pm 1}{2y}$ $1 - 4y^2 \geq 0 \rightarrow$ ..., $|a|$ ①

$$\boxed{f^{-1} \Rightarrow \dfrac{\sqrt{1-4x^2} \pm 1}{2x}}$$