رضا آقاسی

۱) $12x-20 \le x^3-4 \Rightarrow (x-2)(x^2+2x-8) \ge 0$

$-4 \quad 2$

$-\ |\ +\ |\ +$

$\Rightarrow [-4, +\infty)$

۲)

$f(4)=3$

الف) $f(7)=11$

ب) $3(3x-10)-10 \Rightarrow 9x-40$

۳)

$$\frac{a(a)}{a-1} = 2a \Rightarrow a^2-2a=0 \begin{cases} a=0 \\ a=2 \end{cases}$$

۴)

الف) $\{(2,2)(5,5)(4,4)(7,7)\}$

ب) $\{(2,3)(4,4)(7,7)(9,9)\}$

ج) $\{(2,5)\}$

د) $\{(2,9)(7,4)(9,8)\}$

۵ -

$fog^{-1} = \{(1,4)(3,8)(5,0)\}$

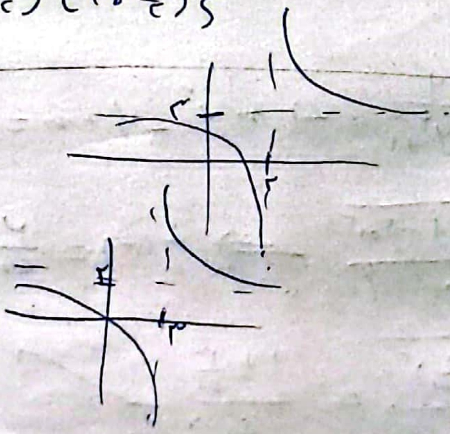
$\frac{h}{fog^{-1}} = \{(1,\frac{2}{4})(3,\frac{4}{8})\}\{(\cancel{5}$

$\frac{h}{fog^{-1}} = \{(1,\frac{1}{2})(3,\frac{1}{2})\}$

۶ -

$f(x) = \frac{3x+1}{x-4}$

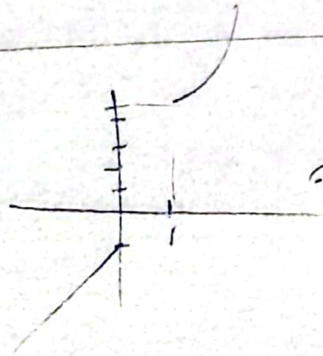
$f^{-1}(x) = \frac{4x+1}{x-3}$



ص ← بازه $[1,3]$

$\rightarrow f(x) = 2x-4 \rightarrow \cancel{x = 2y-4} \rightarrow f^{-1}(x) = \frac{x}{2}+2$

۸-



دارای وارون پذیر

$$x \begin{cases} y^2+4 & x \geq 5 \\ 4y-1 & x \leq -1 \end{cases}$$

$$\rightarrow \begin{cases} \sqrt{x-4} & x \geq 5 \\ \frac{x+1}{4} & x \leq -1 \end{cases}$$

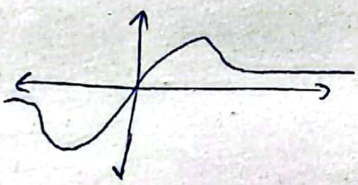
۹-

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

$$\Rightarrow y = \frac{3x+1}{x+3} \longrightarrow \frac{-6x-2}{2x+6} \Rightarrow \boxed{b=-2}$$

$$\Rightarrow f^{-1}(-1) = \frac{12-1}{-4+6} = \frac{11}{2}$$

۱۰- نمودار تابع مقابل به شکل روبرو است و یک به یک نیست.



با این حال ...

$$x = \frac{y}{y^2+1} \Rightarrow xy^2 - y + x = 0$$

$$\Rightarrow y = \frac{1 \pm \sqrt{1-4x^2}}{2x} \longrightarrow f(2) = \frac{2}{5} \Rightarrow f^{-1}\left(\frac{2}{5}\right) = 2$$

$$\Rightarrow \frac{1 \pm \sqrt{1-4\left(\frac{2}{5}\right)^2}}{2\left(\frac{2}{5}\right)} = \frac{1 \pm \frac{3}{5}}{\frac{4}{5}} \begin{cases} \rightarrow 2 \\ \rightarrow \frac{1}{2} \end{cases}$$