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میان

$$f(x) = \begin{cases} x^2 - 2 & x > a \\ 2(x-2) & x \leq a \end{cases}$$

$$\begin{aligned} a^2 - 2 &\geq 12a - 2 \\ a^2 - 12a + 12 &\geq 0 \\ (a-2)^2(a+4) &\geq 0 \end{aligned}$$

$$\frac{-2}{-1} \pm \frac{1}{1} = -1 \pm 1$$

$$a = [-4, \infty) \checkmark$$

$$y = 2x + k \Rightarrow 2y + 12 = x \Rightarrow 2y = x - 12 \Rightarrow y = \frac{x-12}{2} = f^{-1}(x) = \frac{x-12}{2}$$

$$f^{-1}(12) = \frac{12-12}{2} = 0 \checkmark \quad f(x) = 2x - 10$$

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الف)

$$f(v) = (11) \checkmark$$

ب)

$$f(f(x)) =$$

$$2x - 2 - 10 = 2x - 12 \checkmark$$

$$y = \frac{a^2}{x-1} \Rightarrow x = \frac{ay}{y-1} \Rightarrow y(a-x) = -x \Rightarrow$$

$$f^{-1}(2a) = \frac{-2a}{a-2a} = a \rightarrow$$

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$$y = \frac{x}{a-x} \rightarrow f^{-1}(x) = \frac{x}{a-x}$$

$$الف) f \circ f^{-1} = f^{-1} = \{(0,2), (2,4), (4,6), (6,8)\} \rightarrow \{(0,0), (2,2), (4,4), (6,6)\} \quad (2,2)$$

$$ب) f^{-1} \circ f = \{(2,2), (4,4), (6,6), (8,8)\} \checkmark$$

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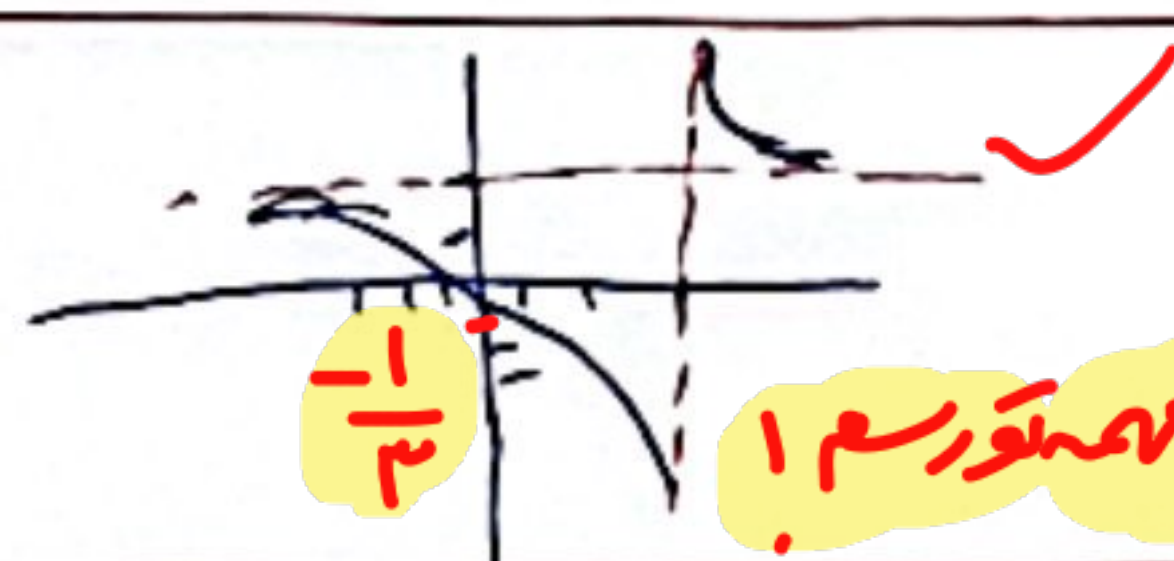
$$ج) f \circ g^{-1} = g^{-1} = \{(2,2), (4,4), (6,6)\} \rightarrow \{(2,0), (4,2)\} \checkmark$$

$$د) g^{-1} \circ f = \{(2,2), (4,4)\} \quad (7,3)$$

$$g^{-1} = \{(1,2), (2,4), (4,8)\} \quad f \circ g^{-1} = \{(1,2), (2,4), (4,8)\} \quad \frac{h}{f \circ g^{-1}} = \{(1, \frac{1}{2}), (2, \frac{1}{4})\} \checkmark$$

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



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محل برخورد با محورهای مختصات

$$f(x) = |x-1| - |x-2| \quad [a,b] \supset [1,2] \quad f(x) = 2x - 1 - 2 = 2x - 3 \Rightarrow 2y - 3 = x \Rightarrow 2y = x + 3 \Rightarrow f^{-1}(x) = \frac{x+3}{2} \checkmark$$

$$D_{f^{-1}}: [-2,2] \checkmark \quad R_{f^{-1}}: [1,2]$$

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۵. اشکال صفتی بعد ...

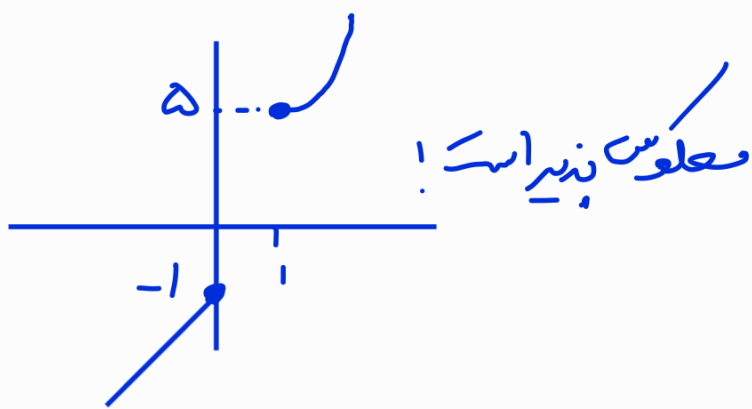
۶. اشکال صفتی بعد ...

$$f(x) = \frac{x}{x+1} \quad x = \frac{y}{y+1} \rightarrow xy^2 + x - y = 0 \rightarrow y = \frac{1 \pm \sqrt{1-4x^2}}{2x} \quad R_{f(x)} = [-\frac{1}{2}, \frac{1}{2}]$$

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$$f^{-1}(x) = \frac{1 \pm \sqrt{1-4x^2}}{2x} \quad D_{f^{-1}}(x) = [-\frac{1}{2}, \frac{1}{2}] - \{0\}$$

به صفر تقریف نشه



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$$f^{-1}(x) = \begin{cases} \sqrt{x-1} & x \geq 1 \\ \frac{x+1}{2} & x < 1 \end{cases}$$

بدرستی تابع

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

$$\begin{matrix} a = -1 \\ f(x) = f^{-1}(x) \end{matrix}$$

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

$$f^{-1}(x) = \frac{ax+b}{cx+d}$$

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

$$\rightarrow b = -2 \quad f^{-1}(-2) = 1$$