

$$x^3 - 4 = 12x - 20 \Rightarrow x^3 - 12x + 16 = 0 \Rightarrow (x-2)^2 (x+4)$$

$$\frac{-4}{-} \quad \frac{2}{+} \quad \frac{2}{+} \quad a = [4, +\infty)$$

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$$3K + K \xrightarrow{f(1)=4} f(4) = 3(4) + K = 2 \quad K = -10 \quad f(x) = 3x - 10 \quad \text{الف}$$

$$f(1) = 3(1) - 10 = -7 \quad f(f(x)) = 3(3x - 10) - 10 \Rightarrow 9x - 30 - 10 = 9x - 40 \quad \text{ب)}$$

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$$y = \frac{ax}{x-1}$$

$$2a = \frac{a^2}{a-1} \rightarrow 2a^2 - 2a = a^2 \Rightarrow a^2 - 2a = 0 \quad a = \frac{2}{1} \quad \text{الف}$$

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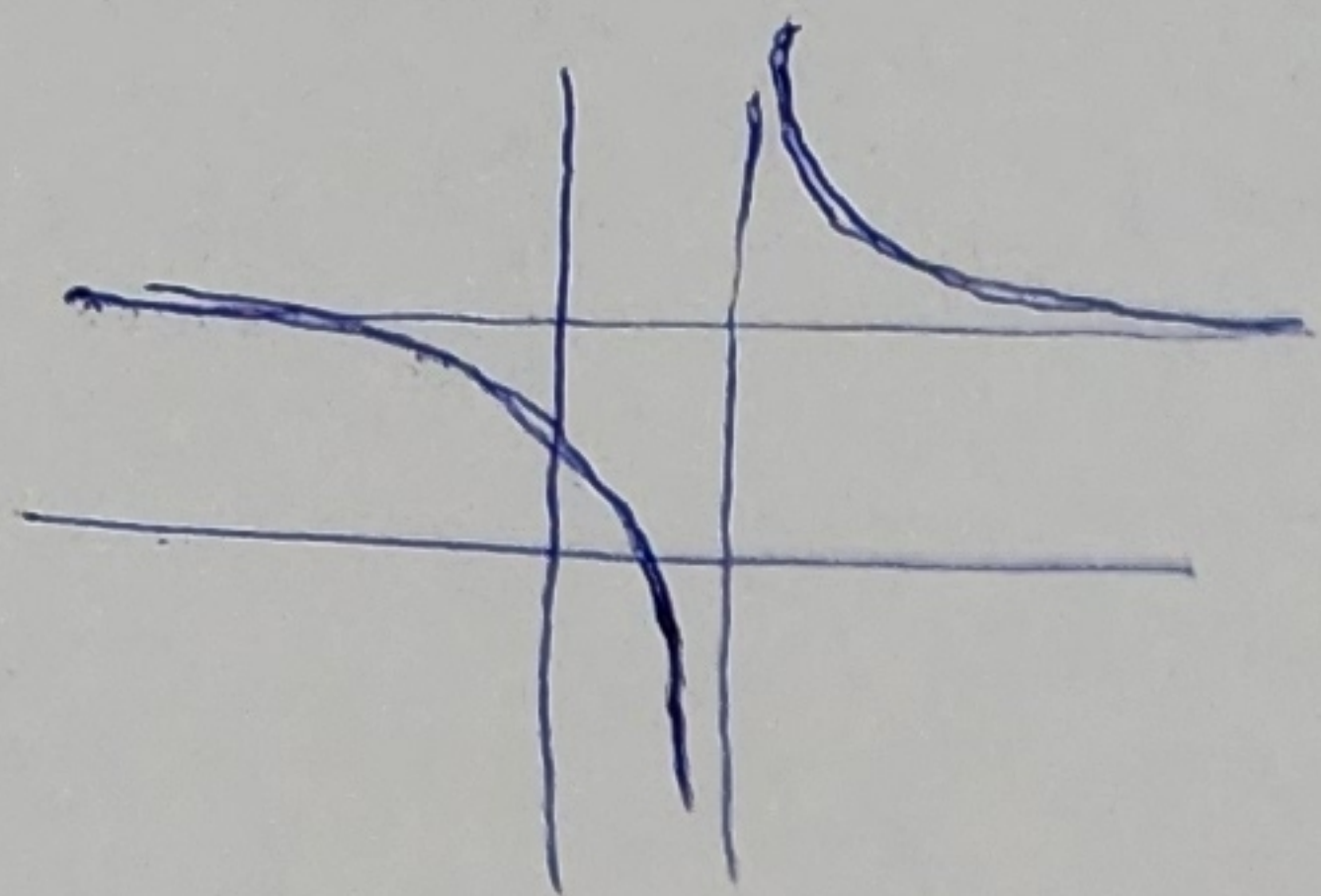
$$\text{الف)} \{ (5,5) (7,7) (2,2) (4,4) \} \quad \text{ج)} \{ (2,5) (5,4) \}$$

$$\text{ب)} \{ (2,3) (4,4) (7,7) (9,9) \} \quad \text{د)} \{ (3,9) (7,7) (9,8) \}$$

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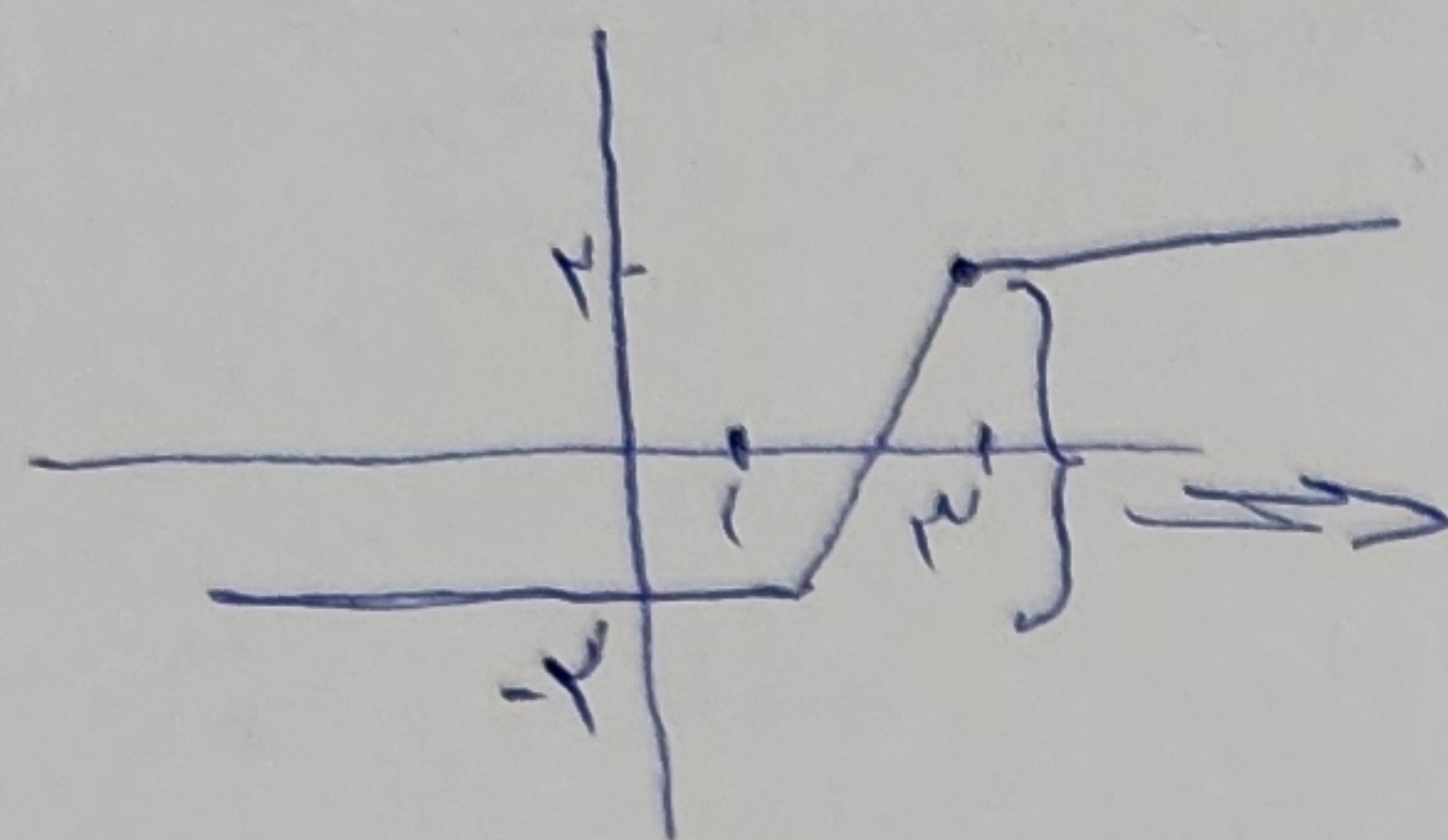
$$\frac{h}{f, g^{-1}} = \{ (1, \frac{2}{4}) (3, \frac{4}{1}) (\frac{4}{2}, \frac{1}{2}) \cdot X \}$$

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

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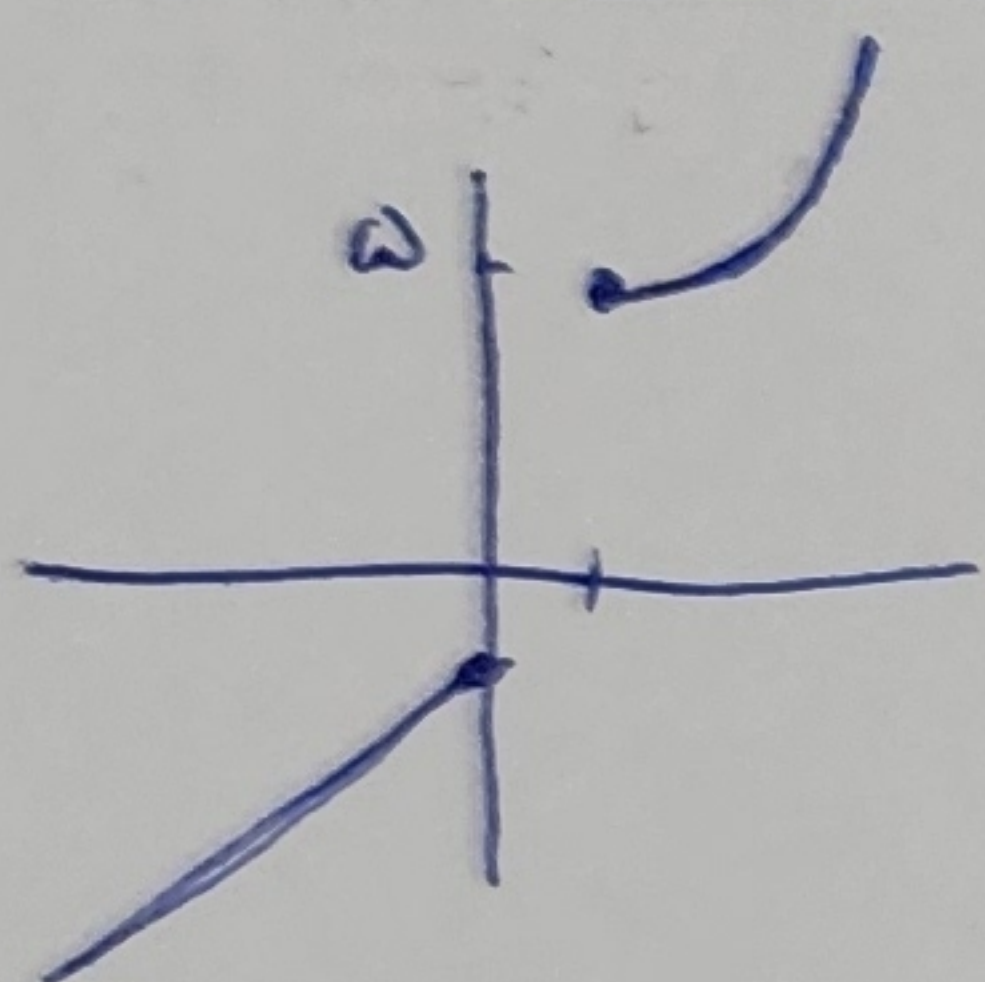
$$R_f = [-2, 2]$$

مستطیل منظم

$$y = 2x - 4 \rightarrow x = \frac{y+4}{2}$$

$$y = \frac{x+4}{2} \quad D_f = [-2, 2]$$

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$$\begin{aligned} x+1 &\rightarrow R_f \quad x \geq 1 \xrightarrow{\text{مکعب}} y \Rightarrow y = \sqrt[3]{x-1} \\ x-1 &\rightarrow R_f = x, x-1 \xrightarrow{\text{مکعب}} y \Rightarrow y = \frac{x+1}{2} \end{aligned}$$

$$f^{-1}(x) = \begin{cases} \sqrt[3]{x-1} & x \in [1, \infty) \\ \frac{x+1}{2} & x \in (-\infty, 1) \end{cases}$$

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

$$y = \frac{-2x+1}{x+3} \quad a = -3 \quad b = -1 \quad a = 3 - x$$

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

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$$y = \frac{x}{x+1} \rightarrow x = \frac{y}{y+1}$$

$$x = \frac{y}{y+1} \Rightarrow \frac{1 \pm \sqrt{1-4x^2}}{2x} \Rightarrow x = \frac{1 \pm \sqrt{1-4x^2}}{2x}$$

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