

19/10

"میں نے اپنے استاد سے کہا کہ میں نے آپ سے سیکھا ہے"

$$f(x) = \begin{cases} x^3 - \varepsilon & ; x > a \\ 12x - 20 & ; x \leq a \end{cases}$$

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$$a^3 - \varepsilon > 12a - 20 \Rightarrow a^3 - 12a + 19 > 0 \Rightarrow (a-2)(a^2 + 2a - 1) > 0$$

$$\Rightarrow (a-2)(a-2)(a+2) > 0 \Rightarrow \frac{-2 \pm \sqrt{4+4}}{-1 \pm 1} \Rightarrow (-2, 2) \cup (2, +\infty)$$

$$f(x) = 3x + 12$$

$$f^{-1}(2) = \varepsilon \Rightarrow f(\varepsilon) = 2 \Rightarrow 12 + 1\varepsilon = 2 \Rightarrow 1\varepsilon = -10 \Rightarrow f(x) = 3x - 10$$

$$\text{ii) } f(v) = 2(-10) = -20$$

$$\Rightarrow f(f(u)) = 3(3u - 10) - 10 = 9u - 40$$

$$f(x) = \frac{ax}{x-1} \Rightarrow x = \frac{ay}{y-1} \Rightarrow xy - x = ay \Rightarrow y(a-x) = -x$$

$$\Rightarrow y = \frac{x}{x-a} \Rightarrow a = \frac{2x}{\frac{2x-a}{x}} = 2$$

$$f = \{(3, 2), (1, 2), (2, 1), (2, 2)\} \quad g = \{(1, 2), (2, 2), (2, 1)\}$$

$$\text{ii) } f \circ f^{-1} = \{(2, 2), (1, 2), (2, 1), (2, 2)\}$$

$$\Rightarrow f^{-1} \circ f = \{(2, 2), (1, 2), (2, 1), (2, 2)\}$$

$$\text{ii) } f \circ g^{-1} = \{(2, 2), (2, 1)\}$$

$$\Rightarrow g^{-1} \circ f = \{(2, 2), (1, 2), (2, 1)\}$$

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$$f = \{(2, \varepsilon) (\varepsilon, 0) (\varepsilon, 1)\} \quad g = \{(2, 1) (\varepsilon, 3) (\varepsilon, \omega)\} \quad \textcircled{A}$$

$$h = \{(1, \varepsilon) (\varepsilon, \varepsilon) (\omega, 1) (\varepsilon, 1)\} \quad \textcircled{5}$$

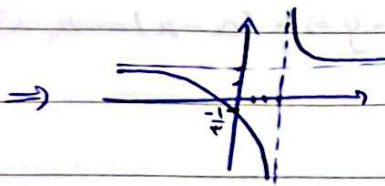
$$\Rightarrow g^{-1} = \{(1, \varepsilon) (\varepsilon, \varepsilon) (\omega, \varepsilon)\} \Rightarrow f \circ g^{-1} = \{(1, \varepsilon) (\omega, 0) (\varepsilon, 1)\}$$

$$\Rightarrow \frac{h}{f \circ g^{-1}} = \{(1, \frac{\varepsilon}{\varepsilon}) (\omega, \frac{\varepsilon}{\varepsilon}), (\varepsilon, \frac{\varepsilon}{\varepsilon})\} \Rightarrow \{(1, \frac{\varepsilon}{\varepsilon}) (\varepsilon, \frac{\varepsilon}{\varepsilon})\}$$

exc

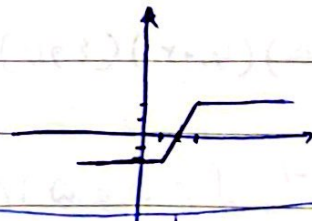
$$y = \frac{3x+1}{x-2} \Rightarrow \quad \textcircled{8}$$


$$x = \frac{3y+1}{y-2} \Rightarrow xy - 2x = 3y + 1 \Rightarrow y(x-3) = 2x+1 \Rightarrow y = \frac{2x+1}{x-3}$$



$$f(x) = |x-1| - |x-3| \quad \textcircled{V}$$

$$x = 3y - 2 \Rightarrow 3y = x + 2 \Rightarrow y = \frac{x}{3} + \frac{2}{3}$$

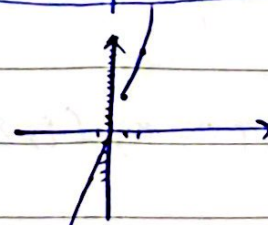


$$f(x) = \begin{cases} x^3 + 2 & ; x \geq 1 \\ \varepsilon x - 1 & ; x \leq 0 \end{cases} \quad \begin{array}{l} y|_x=1 = 3 \\ y|_x=0 = -1 \end{array}$$

$$\Rightarrow f^{-1}(x) = \begin{cases} \sqrt[3]{x-2} & ; x \geq 3 \\ \frac{x+1}{\varepsilon} & ; x \leq -1 \end{cases}$$

$$y^3 = x - 2 \Rightarrow y = \sqrt[3]{x-2}$$

$$\Rightarrow \varepsilon y = x + 1 \Rightarrow y = \frac{x+1}{\varepsilon}$$



$$f(x) = x^r \cdot \frac{x^r + 1 + rx^r + rx}{x+r} = \frac{x^r + rx^r - x^r - 1 - rx - rx^r}{x+r} \quad (9)$$

$$\Rightarrow \frac{-rx-1}{x+r} \Rightarrow x = \frac{-ry-1}{y+r} \Rightarrow xy + rx = -ry - 1 \Rightarrow y(x+r) = -rx-1$$

$$\Rightarrow y(x+r) = -rx-1 \Rightarrow y \left(\frac{-rx-1}{x+r} \right) \times \frac{1}{r} \times r = \frac{-rx-1}{x+r} \quad (5)$$

$$\Rightarrow b = -r \Rightarrow f^{-1}(-r) = \frac{-1}{1} \omega$$

$$f(x) = \frac{x}{x^r+1} \quad x = \frac{y}{y^r+1} \Rightarrow xy^r + x = y \quad (10)$$

$$xy^r - y + x = 0 \Rightarrow y = \frac{1 \pm \sqrt{1-4x^r}}{2x^r} \quad (5)$$