

$$f(x) = \begin{cases} x^3 - c; & x > a \rightarrow x^3 - c > a^3 - c \\ 3x - c_0; & x \leq a \rightarrow 3x - c_0 \leq 3a - c_0 \end{cases}$$

①

$$\rightarrow 3a - c_0 \leq a^3 - c \Rightarrow 0 \leq a^3 - 3a + 1 \Rightarrow 0 \leq (a-1)(a^2 + a + 1)$$

$$\frac{-c}{-c + c} \rightarrow -c \leq 0$$

$$\alpha = [-c, +\infty)$$

$$f^{-1}(c) = c \Rightarrow \left. \begin{matrix} f(c) = c \\ f(c) = 3c + k \end{matrix} \right\} = (k = -10) \Rightarrow f(x) = 3x - 10$$

②

$$\text{الف)} f(7) = 3(7) - 10 = 11$$

$$\text{ب)} f(f(x)) = 3(3x - 10) - 10 = 9x - 40$$

$$f(x) = \frac{ax}{x-1} \rightarrow f^{-1}(x) = x = \frac{ay+0}{y-1} \rightarrow y = \frac{x}{x-a} \Rightarrow a = \frac{ya}{x-a-a} = 2$$

$$\alpha = 2$$

③

$$f^{-1}(x) = \{(4,9), (2,7), (7,4), (5,3)\}$$

④

$$g^{-1}(x) = \{(2,3), (9,1), (5,9)\}$$

$$\text{الف)} f \circ f^{-1} = \{(4,4), (2,2), (7,7), (5,5)\} \quad \text{ب)} f \circ f^{-1} = \{(3,3), (4,4), (7,7), (9,9)\}$$

$$\text{ج)} f \circ g^{-1} = \{(5,4), (2,5)\} \quad \text{د)} g \circ f^{-1} = \{(2,9), (7,3), (9,1)\}$$

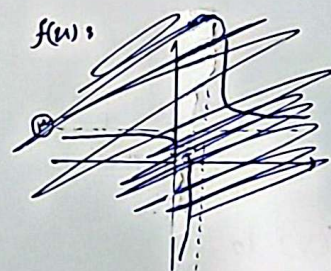
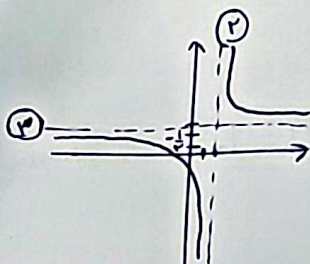
(5)

$$f \circ g^{-1} = \{(1, 4), (3, 8), (5, 16)\}$$

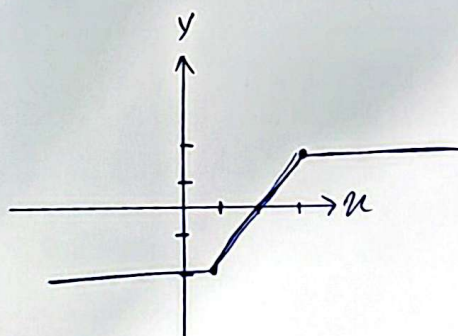
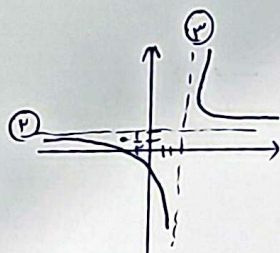
$$\Rightarrow \frac{h}{f \circ g^{-1}} = \left\{ (1, \frac{4}{8}), (3, \frac{8}{16}), (5, \frac{16}{32}) \right\} \Rightarrow \frac{h}{f \circ g^{-1}} = \left\{ (1, \frac{1}{2}), (3, \frac{1}{2}), (5, \frac{1}{2}) \right\}$$

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

$$x = \frac{3y+1}{y-2} \rightarrow y = \frac{2x+1}{x-3}$$



تابع همگرا نیست است
↓
دایره پذیر است!



$$x \in [1, 3] \quad \frac{f(x)}{1 \leq x \leq 3}$$

$$f(x) = 2x - 1$$

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

(7)

بازدم به

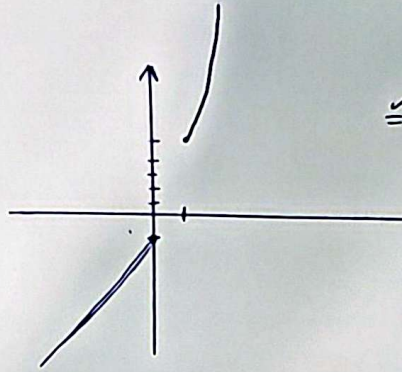
معین نصری

تکلیف شماره ۱۱

یادگیری است

۸

$$f(u) = \begin{cases} u^3 + 1 & ; u > 1 \\ fu - 1 & ; u \leq 0 \end{cases}$$



$$y = u^3 + 1 ; u > 1 \rightarrow u = y^{\frac{1}{3}} + 1$$

$$\sqrt[3]{u-1} = y ; u > 0$$

$$f^{-1}(u) = \begin{cases} \sqrt[3]{u-1} & ; u > 0 \\ \frac{u}{2} + 0.5 & ; u \leq -1 \end{cases}$$

$$y = fu - 1 ; u \leq 0 \rightarrow u = \frac{y+1}{f}$$

$$\rightarrow \frac{u+1}{2} = y ; u \leq -1$$

تابع معکوس را بیابید

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

$$f^{-1}(b) = f^{-1}(-1) = \frac{-4x-2-1}{2(-2)+3} = \textcircled{d}$$

$$f^{-1}(u) = \frac{-4u-2}{2u+3} \xrightarrow{f(u) = \frac{2u-1}{2u+3}} \begin{cases} a = -4 \\ b = -2 \\ c = 2 \\ d = 3 \end{cases}$$

$$f(u) = \frac{u}{u+1} \rightarrow u = \frac{y}{y+1} \rightarrow y^2 u + u - y = 0$$

$$u y^2 - y + u = 0 \rightarrow y = \frac{1 \pm \sqrt{1-4u^2}}{2u} \xrightarrow{u > 0} \frac{1 + \sqrt{1-4u^2}}{2u} = f^{-1}(u) \textcircled{b}$$

$$Df = [-0.10, 0.10]$$

$$Df = R \rightarrow Rf = R$$

$$Df^{-1} = [-0.10, 0.10]$$