

$$f(x) = \begin{cases} x^3 - c; & x > a \rightarrow x^3 - c > a^3 - c \\ 3x - 2; & x \leq a \rightarrow 3x - 2 \leq 3a - 2 \end{cases}$$

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

$$\frac{-c}{-1} \leq \frac{2}{1} \Rightarrow -c \leq 2$$

$$-c \leq 0$$

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

$$f^{-1}(v) = c \Rightarrow \left. \begin{matrix} f(c) = 2 \\ f(c) = 3c + k \end{matrix} \right\} =, \quad \boxed{k = -10} \Rightarrow \boxed{f(x) = 3x - 10}$$

$$\text{الف) } f(v) = 3(v) - 10 = 11$$

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

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

$$\boxed{a = 2}$$

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

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

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

$$\text{ج) } f \circ g^{-1} = \{(5, 4), (2, 5)\}$$

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

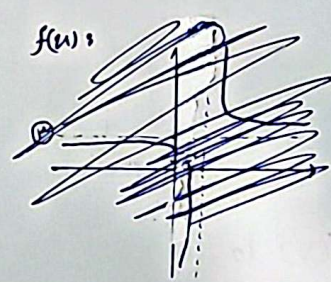
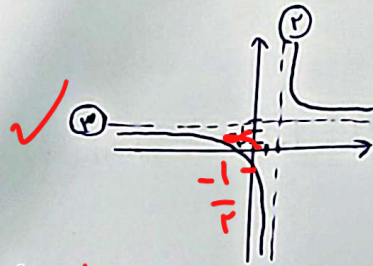
⑤

$$f \circ g^{-1} = \{(1, 4), (3, 8), (5, 20)\}$$

②

$$\Rightarrow \frac{h}{f \circ g^{-1}} = \left\{ (1, \frac{4}{8}), (3, \frac{8}{16}), (5, \frac{20}{40}) \right\} \Rightarrow \frac{h}{f \circ g^{-1}} = \left\{ (1, \frac{1}{2}), (3, \frac{1}{2}), (5, \frac{1}{2}) \right\} \checkmark$$

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

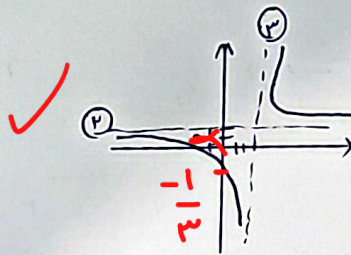


⑥ (۱, ۷۵)

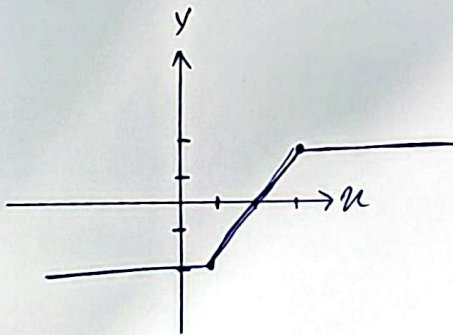
تابع همگرا نیست است
↓
دامنه پذیر است!

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

محل برخورد با محورهای مختصات را پیدا کنید!



⑦ (۱, ۷۵)



$$x \in [1, 3] \quad \text{که بریک} \quad 1 \leq x \leq 3$$

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

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

$$-2 \leq x \leq 2$$

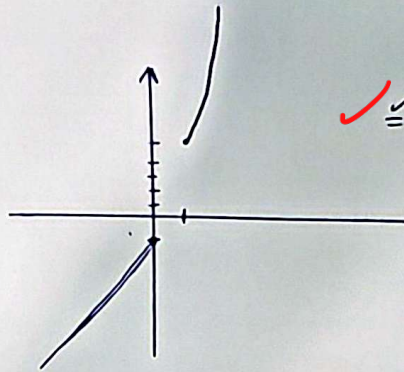
همیشه وقتی معلوم تابعی را بدست می‌دهی باید دامنه‌اش را مشخص کنی!

بازدم به

معین نصری

تکلیف شماره ۱۱

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



یک به یک است ✓

① ②

$$y = u^3 + 1 ; u > 1 \rightarrow u = \sqrt[3]{y-1}$$

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

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

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

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

تابع معکوس یک به یک است ✓

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

$$f^{-1}(b) = f^{-1}(-1) = \frac{-4x-2-1}{2(-2)+3} = \textcircled{5} \checkmark$$

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

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

$$uy^2 - y + u = 0 \rightarrow y = \frac{1 \pm \sqrt{1-4u^2}}{2u} \xrightarrow{u > 0} \frac{1 + \sqrt{1-4u^2}}{2u} = f^{-1}(u) \textcircled{6}$$

$$Df = [-0.15, 0.15]$$

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

$$Df^{-1} = [-0.15, 0.15] - \{0\} \checkmark$$

صفر تعریف نشده است!

① ② ③ ④ ⑤ ⑥