

18,5

Year: Month: Date: ()

تاریخ

روز و ماه و سال

ایستادن و نوشتن

$$f(n) = \begin{cases} n^2 - 4 & ; n > a \\ 12n - 20 & ; n \leq a \end{cases}$$

تابع

خوبه تا به آخره و مثبت و منفی و صفر

(1)

$$\begin{aligned} \text{مثبت و منفی} \quad \left\{ \begin{array}{l} n > a \\ n \leq a \end{array} \right\} &\rightarrow 12a - 20 \leq a^2 - 4 \rightarrow 12a \leq a^2 \rightarrow a^2 - 12a + 14 \geq 0 \rightarrow (a-2)(a+6) \geq 0 \\ &\rightarrow a+6 \geq 0 \rightarrow a \geq -6 \rightarrow a = [-6, +\infty) \end{aligned}$$

$$f(n) = 12n - 20$$

$$f(2) = 2 \rightarrow 12 \cdot 2 - 20 = 2 \rightarrow 24 - 20 = 4 \rightarrow 4 = 2^2$$

(2)

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

$$f(n) = 12n - 20$$

$$f(n) = 12n - 20 = 11 \rightarrow 12n = 31 \rightarrow n = \frac{31}{12}$$

$$A(2, a) \rightarrow f(a) = \frac{a^2}{a-1} = 2a \rightarrow a^2 = 2a(a-1) \rightarrow a^2 = 2a^2 - 2a \rightarrow a^2 - 2a = 0 \rightarrow a(a-2) = 0$$

$a = 0$ نمی تواند باشد زیرا در این صورت $f(a)$ معنی ندارد و در این بین $a = 2$ می شود.

$$f = \{(3, 5), (4, 7), (5, 9), (6, 11)\}, g = \{(2, 3), (3, 5), (4, 7), (5, 9)\}$$

(3)

$$f^{-1} = \{(5, 3), (7, 4), (9, 5), (11, 6)\}, g^{-1} = \{(3, 2), (5, 3), (7, 4), (9, 5)\}$$

$$f \circ f^{-1} = \{(5, 5), (7, 7), (9, 9), (11, 11)\}$$

$$f^{-1} \circ f = \{(3, 3), (4, 4), (5, 5), (6, 6)\}$$

$$g \circ g^{-1} = \{(2, 2), (3, 3), (4, 4), (5, 5)\}$$

$$g^{-1} \circ f = \{(3, 3), (5, 4), (7, 5), (9, 6)\}$$

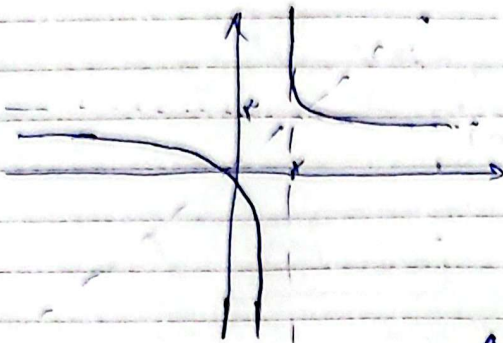
$$f = \{(2, 4), (3, 6), (4, 8)\}, g = \{(1, 2), (2, 4), (3, 6)\}, h = \{(1, 2), (2, 4), (3, 6)\}$$

(4)

$$g^{-1} = \{(2, 1), (4, 2), (6, 3)\} \rightarrow f \circ g^{-1} = \{(2, 4), (4, 8), (6, 12)\}$$

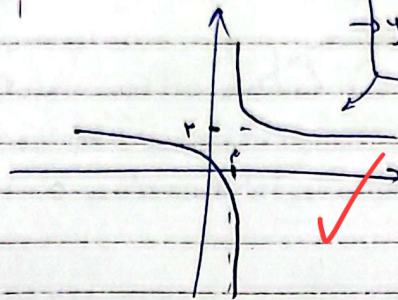
$$\rightarrow \frac{h}{f \circ g^{-1}} = \{(1, \frac{1}{2}), (2, \frac{1}{4}), (3, \frac{1}{6})\} \rightarrow \frac{h}{f \circ g^{-1}} = \{(1, \frac{1}{2}), (2, \frac{1}{4}), (3, \frac{1}{6})\}$$

$y = \frac{x+1}{x-2}$ سے $x = \frac{y+1}{y-2}$ حاصل ہے۔
 معادلات کو مساوی کر کے $x = 2$ یا $y = 2$ حاصل ہے۔

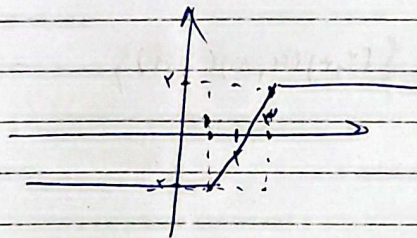


$x = \frac{y+1}{y-2} \Rightarrow xy - 2x = y + 1$
 $\Rightarrow xy - 2y = x + 1 \Rightarrow y(x-2) = x+1$

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



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



$[a, b] = [1, 2]$

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

$f(x) = \begin{cases} x^2 + 1 & ; x \geq 1 \\ 2x - 1 & ; x \leq 0 \end{cases}$

$R_1 = (-\infty, 0] \text{ and } R_2 = [1, +\infty) \Rightarrow (-\infty, 0) \cup [1, +\infty)$

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

$y = \sqrt{x-1}$

جواب

$f^{-1}(x) = \begin{cases} \frac{x+1}{2} & ; x \leq 0 \\ \sqrt{x-1} & ; x \geq 1 \end{cases}$

$$f(m) = x^2 - \frac{(m+1)^2}{m+2} \rightarrow f^{-1}(m) = \frac{a+b}{c+d} \rightarrow f^{-1}(b) = ? \rightarrow b < 0 \quad (9)$$

$$f(m) = x^2 - \frac{(m+1)^2}{m+2} \rightarrow y = \frac{x^2 - \frac{(m+1)^2}{m+2}}{m+2} = \frac{x^2(m+2) - (m+1)^2}{(m+2)^2} = \frac{x^2m + 2x^2 - m^2 - 2m - 1}{(m+2)^2} = \frac{-m^2 - 2m - 1 + x^2m + 2x^2}{(m+2)^2} \quad (10)$$

$$\rightarrow y = \frac{-m^2 - 2m - 1 + x^2m + 2x^2}{(m+2)^2} \rightarrow x = \frac{-y - 1}{y + 2} \rightarrow xy + 2x = -y - 1 \rightarrow xy + 2y = -1 - 2x$$

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

$$\rightarrow f^{-1}(-2) = \infty \leftarrow \text{مطلوبه}$$

$$f(m) = \frac{m}{m^2 + 1} \rightarrow y(m^2 + 1) = m \rightarrow ym^2 + y = m \rightarrow ym^2 - m + y = 0 \quad (11)$$

$$\rightarrow m = \frac{-(-1) \pm \sqrt{(-1)^2 - 4y^2}}{2y} = \frac{1 \pm \sqrt{1 - 4y^2}}{2y} \rightarrow y = \frac{2m}{1 \pm \sqrt{1 - 4m^2}} \quad (12)$$

چون x و y هم علامت پس فقط $+$ قابل قبول است.

$$f^{-1}(a) = \frac{1 + \sqrt{1 - 4a^2}}{2a}, \quad |a| \leq \frac{1}{2}$$