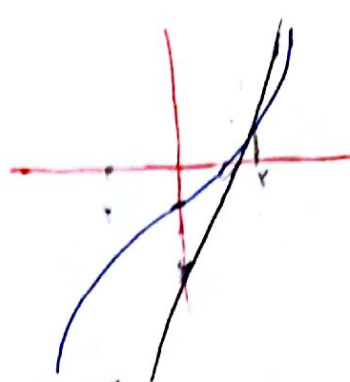


$f(n) = \begin{cases} n^2 - \varepsilon & ; n > a \\ n^2 - \varepsilon & ; n \leq a \end{cases}$
 $n^2 - \varepsilon = n^2 - \varepsilon$
 $n^2 - \varepsilon - n^2 + \varepsilon = 0$
 $0 = 0$
 $a = (-\infty, \infty)$



$f(n) = n^2 + k$ $f(n) = n^2 + 1$
 $f^{-1}(y) = \varepsilon \rightarrow f(\varepsilon) = y \rightarrow y = \varepsilon^2 + k$
 $\rightarrow k = -1$

$f(n) = ?$ $f(n) = n^2 - 1$
 $f(f(n)) = ?$ $f(n^2 - 1) = (n^2 - 1)^2 - 1 = n^4 - 2n^2 + 1 - 1 = n^4 - 2n^2$

$A \Big|_a^{\infty} \xrightarrow{f^{-1}(n)} \Rightarrow B \Big|_a^{\infty} \xrightarrow{f(n)}$
 $f(n) = \frac{an}{n-1}$
 $\hookrightarrow f(a) = \frac{a^2}{a-1} \rightarrow \frac{a^2}{a-1} = \frac{a^2}{a-1} \rightarrow a^2 - a^2 = 0$
 $a \neq 0$

$a = ?$ $0 \leq r$

$f(n) = \{(r, \omega)(\varepsilon, \nu)(\nu, r)(q, \eta)\}$ $g(n) = \{(r, \omega)(\omega, \eta)(\eta, \omega)\}$

$f(f^{-1}(n)) = \{(r, \omega)(\omega, \eta)(\eta, \omega)(q, \eta)\}$ $f(g^{-1}(n)) = \{(r, \omega)(\omega, \eta)(\eta, \omega)\}$

$f^{-1}(f(n)) = \{(r, \varepsilon)(\varepsilon, \varepsilon)(\nu, \nu)(q, \eta)\}$ $g^{-1}(g(n)) = \{(r, \eta)(\nu, \nu)(q, \eta)\}$

$f = \{(r, \varepsilon)(\varepsilon, \eta)(\eta, \cdot)\}$ $g = \{(r, \eta)(\varepsilon, \eta)(\eta, \cdot)\}$ $h = \{(r, \eta)(\varepsilon, \eta)(\eta, \cdot)\}$

$f(g^{-1}(n)) = \{(r, \varepsilon)(\varepsilon, \eta)(\eta, \cdot)\}$

$\frac{h}{f(g^{-1}(n))} = ? = \left\{ \left(1, \frac{r}{\varepsilon}\right), \left(r, \frac{\varepsilon}{\eta}\right), \left(\omega, \frac{1}{\cdot}\right) \right\} = \left\{ \left(1, \frac{r}{\varepsilon}\right), \left(r, \frac{\varepsilon}{\eta}\right) \right\}$

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

هسته افقی

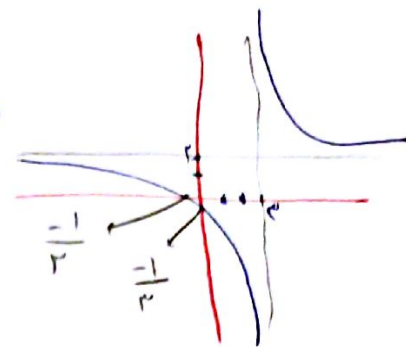
یک به یک است



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

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

هسته افقی
یک به یک است



$$f(x) = |x-1| - |x-3|$$

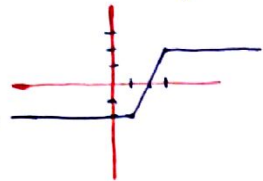
در بازه $[a, b]$ یک به یک است

$$a=1, b=3$$

یک به یک است

در بازه $[1, 3]$

$$\frac{1}{-2} |x-1| \frac{3}{2}$$



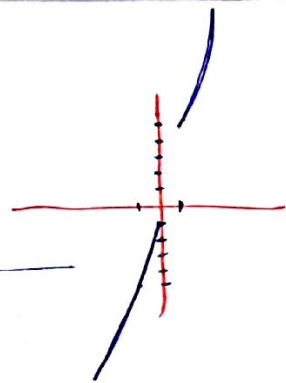
$$Q: x = 2y - 1 \quad 1 \leq y \leq 3$$

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

$$y = \frac{x+1}{2} \quad -1 \leq x \leq 5$$

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

یک به یک است



$$\rightarrow \text{وارد} \begin{cases} x = y^2 + 1 \rightarrow y = \sqrt{x-1}; y \geq 1 \\ x = \varepsilon y - 1 \rightarrow y = \frac{x+1}{\varepsilon}; y \leq 0 \end{cases}$$

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

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

$$f^{-1}(x) = \frac{ax+b}{cx+d}$$

$$\text{وارد} \rightarrow x = \frac{ay+b}{cy+d} \rightarrow \frac{f(x)}{y} = \frac{-dx+b}{cx-a}$$

$$\begin{cases} x \rightarrow 2x \\ -2 = -\frac{d}{x} \rightarrow d = 4 \\ -1 = \frac{b}{x} \rightarrow b = -1 \\ 2 = -\frac{a}{x} \rightarrow a = -4 \end{cases}$$

$$f^{-1}(b) = ? (b < 0) \rightarrow f^{-1}(-1) = \frac{-4(-1) - 1}{2(-1) + 4} = 0$$

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

$$\text{وارد} \rightarrow x = \frac{y}{y^2+1} \rightarrow y = \frac{x}{1-yx}$$

$$y = \frac{x_1}{x_1^2+1}$$

$$y = \frac{x_2}{x_2^2+1}$$

$$\left\{ \begin{aligned} \frac{x_1}{x_1^2+1} &= \frac{x_2}{x_2^2+1} \\ \frac{x_1^2+1}{x_1} &= \frac{x_2^2+1}{x_2} \end{aligned} \right. \rightarrow x_1 + \frac{1}{x_1} = x_2 + \frac{1}{x_2} \rightarrow \begin{cases} x_1 = x_2 \\ x_1 = \frac{1}{x_2} \end{cases}$$

$$y = \frac{x}{x^2+1} \quad x_2 = \frac{1}{x_1}$$