

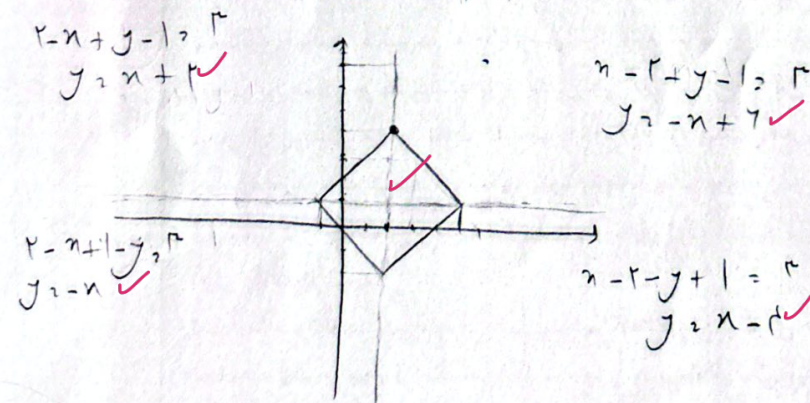
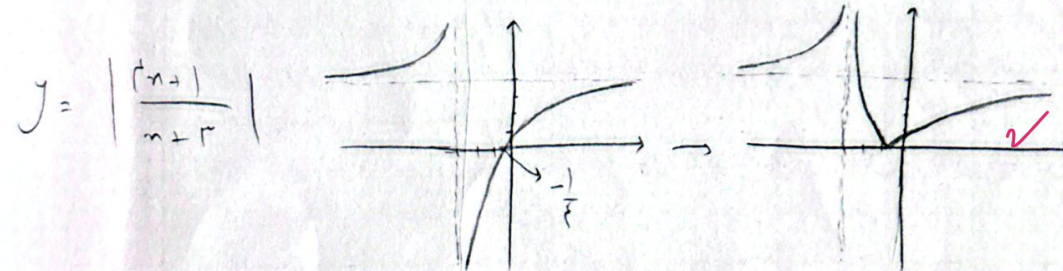
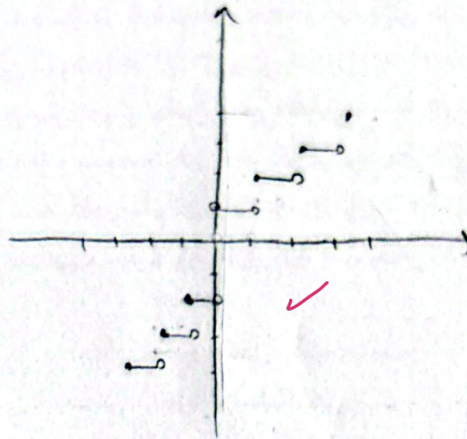
ان)  $f(x) = 2 \sin^2(x + \frac{\pi}{4}) - 1 \rightarrow -1 \leq \sin^2 \leq 1 \rightarrow -1 \leq 2 \sin^2 - 1 \leq 1$

$R_f = [-1, 1]$  ✓

ب)  $g(x) = 2 \cos^2 x - 1 \rightarrow -1 \leq \cos^2 x \leq 1 \rightarrow -1 \leq 2 \cos^2 x - 1 \leq 1$

$R_g = [-1, 1]$  ✓

$$y = \begin{cases} -1 - 2 = -3 & -2 \leq x < -1 \\ -1 - 2 = -3 & -1 \leq x < 0 \\ -1 - 2 = -3 & 0 \leq x < 1 \\ 1 + 2 = 3 & 1 \leq x < 2 \\ 1 + 2 = 3 & 2 \leq x < 3 \\ 1 + 2 = 3 & x = 3 \end{cases}$$



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

$(\sqrt{x + \frac{1}{x}} + 1)^2 - 1 \xrightarrow{\sqrt{x + \frac{1}{x}} \geq 1}$

$x + \frac{1}{x} \geq 2 \xrightarrow{x \geq 1} \sqrt{x + \frac{1}{x}} \geq \sqrt{2}$

$(\sqrt{2} + 1)^2 - 1 \rightarrow R_f = [2 + 2\sqrt{2}, \infty)$

$$-1) y = -\sin^2 x + 2\sin x + 2 \quad \begin{matrix} \rightarrow -1 + 2 + 2 = 3 \\ \rightarrow -1 - 2 + 2 = -1 \end{matrix} \quad R = [0, 3]$$

$$Df = \{1, 2, 3, \omega, \gamma, \nu, \lambda, \theta\}$$

$$Rf = \left\{10 - \frac{1}{x}, 10 - \frac{2}{x}, 10 - \frac{3}{x}, \dots, 10 - \frac{9}{x}\right\}$$

$$f(x) = 9 \times 10 - \left(\frac{1+2+\dots+9}{x}\right) = 90 - \frac{45}{x} = \checkmark$$

$$f(x) = \sqrt{bx+c}$$

✓ - تابع زیر را می توان نقطه ای در می بینیم غیر متناهی دارد

$$f(x) = \sqrt{bx+c} = \sqrt{bx+c} \quad \begin{matrix} b > 0 \\ c < -2 \end{matrix}$$

$$f(x) = \sqrt{bx+c} = \sqrt{bx+c} \quad \begin{matrix} b > 0 \\ c < -2 \end{matrix} \quad g(x) = \sqrt{x^2+1}$$

$$x^2+1 \geq 1 \rightarrow Rf = [1, +\infty)$$

$$f(x) = \frac{x^2 - (x)}{x+2} = \frac{x(x-1)(x+2)}{x+2} = x^2 - x \rightarrow Rf = [0, +\infty) = [-1, +\infty) \quad G(x) = -1$$

تفاوت محدودیت داشته در این صورت است اما تابع اینده می شود و از این مقدار به بالا فاصله می گیرد

$$f\left(\frac{x-2}{-2}\right) = f(-1) = 1+2=3$$

$$x^2 - x = 1 \quad x^2 - x - 1 = 0$$

$$(x-1)(x+2) = 0 \quad \begin{matrix} x-1 = 0 \\ x+2 = 0 \end{matrix} \quad \begin{matrix} x = 1 \\ x = -2 \end{matrix}$$

$$y = \sqrt{x^2 + ax^2 + bx - 1} = \sqrt{(x-2)^2} = \sqrt{x^2 - 4x + 4 - 1} = \sqrt{x^2 - 4x + 3}$$

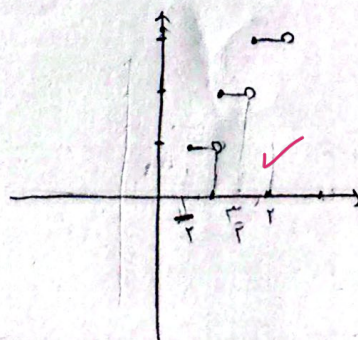
$$a = -4$$

$$b = 12$$

$$Df = [-2, 3]$$

$$y = x-2 \rightarrow Rf = [-1, 3]$$

$$y = \begin{cases} 0+1=1 & 1 \leq x < 1 \\ 1+1=2 & 1 \leq x < \frac{5}{2} \\ 1+2=3 & \frac{5}{2} \leq x < 2 \end{cases}$$



$$f(x) = 1, \quad x \in [1, 2]$$

$$R = [1, 3]$$