

۱) $y = (x - 2[\frac{x}{2}])^2$ $\rightarrow$ $[0, 4] = R_y$

$\log y = \frac{\sin x + \varepsilon}{[3, 5]} \rightarrow R_y = [10^3, 10^5]$

$-1 \leq \sin x \leq 1 \rightarrow 3 \leq \sin x + \varepsilon \leq 5$

۲) $F(x) = \sqrt{\frac{x^2 - \varepsilon}{x^2 - 9}}$ $[a, b] \cup (c, +\infty)$ $a+b+c?$

$\frac{x^2 - \varepsilon}{x^2 - 9} \rightarrow 1$ $\frac{x^2 - \varepsilon}{x^2 - 9} \rightarrow 0$ $\rightarrow (-\infty, \frac{3}{2}] \cup [1, +\infty)$ $\rightarrow [0, \frac{3}{2}] \cup (1, +\infty)$

$a=0, b=\frac{3}{2}, c=1 \rightarrow 0 + \frac{3}{2} + \frac{3}{2} = 3$

۳) $F(x) = x + \frac{1}{x} + 2\sqrt{x + \frac{1}{x}}$ $y = (3 - \sin x)(1 + \sin x)$

$F(x) = (\sqrt{x + \frac{1}{x}} + 1)^2 - 1$ $y = 3 + 3\sin x - \sin x - \sin^2 x \rightarrow y = -\sin^2 x + 2\sin x + 3$

$\sqrt{x + \frac{1}{x}} = t$ $R = [2\sqrt{2}, +\infty)$ $R_y = [0, 4]$

$F(x) = (t+1)^2 - 1$ $\frac{-b}{a} = \frac{2}{-1} = -2$ $\frac{4 - 4}{4} = 0$

$F_{\min}(x) = (2\sqrt{2} + 1)^2 - 1 = 2 + 2\sqrt{2}$ $F_{\max}(x) = +\infty$

۴) $F(x) = -\frac{1}{x}x + 10$ $D_F = \{1, 2, 3, \dots, 9\}$

$x=1 \rightarrow \frac{29}{3}$ $\frac{21}{3} + \frac{22}{3} + \dots + \frac{29}{3} = \frac{225}{3} = 75$

$x=2 \rightarrow \frac{21}{3}$ $(29-21) + 1 = 9$

$x=9 \rightarrow \frac{21}{3}$ $\frac{29+21}{2} \times 9 = 225$

۵) $F(x) = \sqrt{ax^2 + bx + c}$ $[2, +\infty)$ $F(3) = 1$ $R_g = ?$ $g = \sqrt{bx^2 + ax - c}$

$D_F = [2, +\infty)$ $F(x) = \sqrt{a(x-2)^2}$ $\rightarrow \sqrt{a}(x-2)$ $F(3) = 1 \rightarrow \sqrt{a}(1) = 1 \rightarrow a = 1$

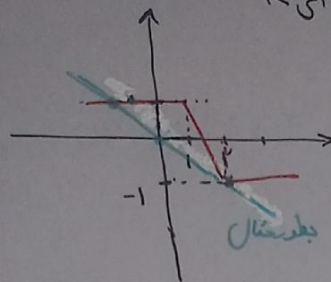
$F(x) = \sqrt{(x-2)^2} = x-2$ $g = \sqrt{\varepsilon x^2 + x - 1}$ $1 \leq x \rightarrow F(x) = \sqrt{x-2}$ $a=0, b=1$

$\sqrt{x^2 - \varepsilon x + \varepsilon} \rightarrow b = -\varepsilon, c = \varepsilon$ $g(x) = \sqrt{x^2 + \varepsilon}$ $\rightarrow R_g = [2, +\infty)$ $c = -2$

$$|x-2| - |x-1| = Kx \quad \text{جواب}$$

سرسره ای ↗

۲۰ K غ ق ن جواب می دهد



$$K \rightarrow \begin{bmatrix} 2 \\ -1 \end{bmatrix} \rightarrow K_2 = \frac{1}{2} \begin{bmatrix} 2 \\ -1 \end{bmatrix}$$

الف) $y = x[n]$

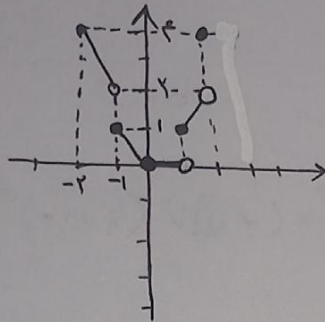
$$-2 \leq x < -1 \xrightarrow{[x] = -2} -2x$$

$$-1 \leq n < 0 \quad \frac{[n]_{z^{-1}}}{z^{-1}} = -n$$

$$0 \leq x < 1 \quad \xrightarrow{[x]_{c_0}} 0$$

$$1 \leq a < r \xrightarrow{[n]_Z} n$$

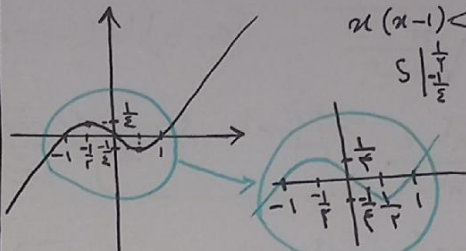
$$u \in V \xrightarrow[u \in V]{[u] = \gamma} \Sigma$$



→) $y = x|x| - x$

$$\begin{cases} n^T - n & n > 0 \\ -n^T - n & n \leq 0 \end{cases}$$

$$n(n-1) < \frac{1}{\frac{1}{2}}$$



$$y = \frac{1}{\underbrace{x}_{x \neq 0}} + \frac{1}{\underbrace{x+1}_{x \neq -1}} + \frac{1}{\underbrace{x^2+x}_{\frac{1}{x} - \frac{1}{x+1}}}$$

$$R_y = \mathbb{R} - \{a, b\} \quad a+b?$$

$$y = \frac{1}{n} + \frac{1}{n+1} + \left(\frac{1}{n} - \frac{1}{n+1} \right) = \frac{2}{n}$$

$$R_y = \mathbb{R} - \{0, -1\} \quad 0 + (-1) = -1$$

$x = -1 \rightarrow y \neq -2$ (هم نمی پذیرد) $y \neq 0$ هر نمی پذیرد

$$f(x) = \frac{x - \epsilon\sqrt{x} + \gamma}{x - \gamma\sqrt{x} + 1} \quad R?$$

$$\frac{1}{2} = \sqrt{x}$$

$$x \geq 0, t \geq 0$$

$$t \neq 1$$

$$\frac{t^2 - 2t + 5}{t^2 - 2t + 1} = \frac{(t-1)(t-3)}{(t-1)^2} = \frac{t-3}{t-1} \rightarrow 3$$

$$R_y = (-\infty, 1) \cup [2, +\infty)$$

$$F(x) = \frac{x^3 + 2x^2 - x - 2}{x^2 - 1} \rightarrow \begin{matrix} \text{مجموع ضرایب} \\ \text{جس نسبت به (x-1)} \end{matrix}$$

$$\frac{(\cancel{n-1})(\cancel{n+1})(n+2)}{\quad} = n+2$$

$$f(n) = n + 1 \xrightarrow{*} \begin{cases} n = 1 \rightarrow \infty \\ n = -1 \rightarrow 1 \end{cases} \quad y \neq \infty, 1$$

$$R_y = \mathbb{R} - \{1, \infty\}$$

$$1 + r = \overline{f}$$