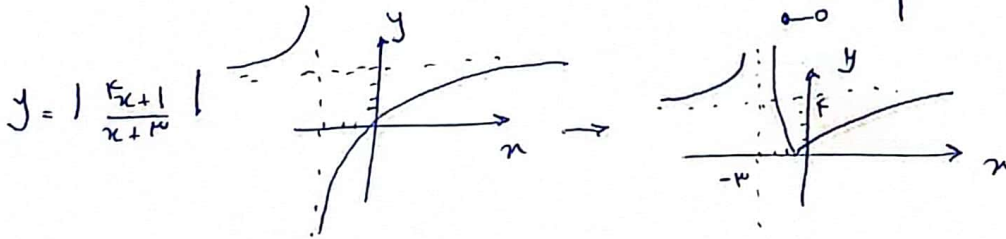
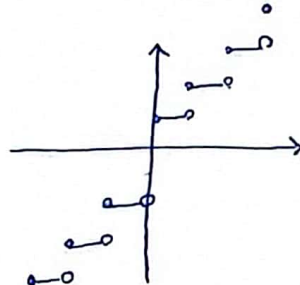


الف) $f(x) = \sqrt{x^2 + \frac{1}{x}} - 1$ $\xrightarrow{\min} f(0) - 1 = -1$ $\xrightarrow{\max} f(1) - 1 = 1$ $R_f = [-1, 1]$

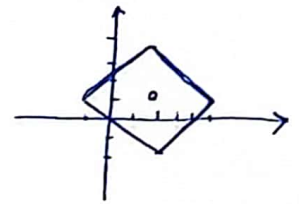
ب) $g(x) = \sqrt{x^2 - 1}$ $\xrightarrow{\min} g(-1) - 1 = -1$ $\xrightarrow{\max} g(1) - 1 = -1$ $R_g = [-1, -1]$

$y = \frac{x}{|x|} + [x] \rightarrow y = \begin{cases} x < 0 & [x] - 1 \\ x > 0 & [x] + 1 \end{cases}$



$|x-2| + |y-1| = 3$

$$\begin{cases} x > 2, y > 1 \rightarrow x - 2 + y - 1 = 3 & y = 4 - x \\ x > 2, y < 1 \rightarrow x - 2 + 1 - y = 3 & y = x - 4 \\ x < 2, y > 1 \rightarrow 2 - x + y - 1 = 3 & y = x + 2 \\ x < 2, y < 1 \rightarrow 2 - x + 1 - y = 3 & y = -x \end{cases}$$



الف) $f(x) = x + \frac{1}{x} + \sqrt{x + \frac{1}{x}} = (\sqrt{x + \frac{1}{x}} + 1)^2 - 1 \rightarrow x + \frac{1}{x} \rightarrow R_f = (-\infty, -2] \cup [2, +\infty)$ سؤال ٣)

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

ب) $y = (\sqrt{x} \sin x)(1 + \sin x) = \sqrt{x} + \sqrt{x} \sin x - \sin^2 x \rightarrow \sin x = \frac{-1}{\sqrt{x+1}} = 1 \rightarrow \begin{cases} \sqrt{x+1} - 1 = 1 \\ \sqrt{x+1}(-1) - 1 = 0 \end{cases}$

$R_{f(x)} = [0, 1]$

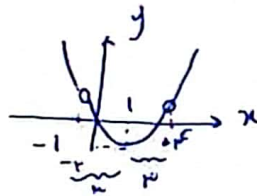
$D_{f(x)} = \{1, 2, \dots, 9\} \rightarrow \varepsilon = \varepsilon \omega \quad R_{f(x)} = -\frac{1}{\omega} \{1, 2, \dots, 9\} + 10$ سؤال ٤)

$-\frac{1}{\omega} \times \varepsilon \omega + 10 = -\omega$

$f(x) = \sqrt{ax^2 + bx + c} \xrightarrow{a=0} \begin{cases} 2b+c=0 \\ 3b+c=1 \end{cases} \quad b=1, c=-1 \quad g(x) = \sqrt{x^2 + 1} \rightarrow R_g = [1, +\infty)$ سؤال ٧)

سوال ۸

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



$$R_f = [-1, \infty) - \{1\}$$

$$C = -1$$

$$a = -2$$

$$b = 2$$

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

$$y = \sqrt[3]{x^3 + ax^2 + bx - 1} = \sqrt[3]{(x-2)^3} = \sqrt[3]{x^3 - 6x^2 + 12x - 8}$$

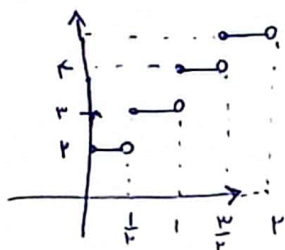
$$a = -6$$

$$b = 12$$

سوال ۹

$$D_f: [-8, 12] \rightarrow R_f: [-1, 10]$$

$$f(x) = [x] + \left[x + \frac{1}{x}\right]$$



از ۱/۳ تا ۲ خط میانی را می بینیم

سوال ۱۰