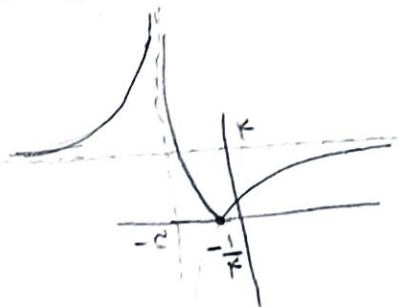
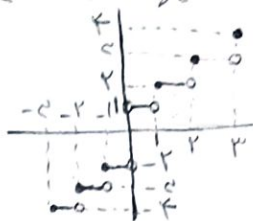


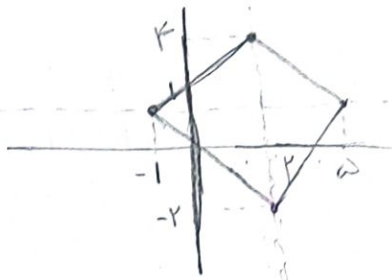
الف) $0 \leq \sin^2 x \leq 1$ $-1 \leq 2 \sin^2 x - 1 \leq 1$ $R_f = [-1, 1]$ محمّد حبيب إبراهيم

ب) $-1 \leq \cos^2 x \leq 1$ $-1 \leq 2 \cos^2 x - 1 \leq 1$ $R_g = [-1, 1]$

$$\begin{cases} [x] - 1 & x \leq 0 \\ [x] + 1 & x > 0 \end{cases}$$



$$\begin{aligned} y &= -x + 1 & x \geq 1, y \geq 1 \\ y &= x - 1 & x \geq 1, y < 1 \\ y &= -x & x < 1, y < 1 \\ y &= x + 1 & x < 1, y \geq 1 \end{aligned}$$



ج) $(\sqrt{x + \frac{1}{x}})^2 + 2\sqrt{x + \frac{1}{x}}$ $\begin{matrix} +\infty \rightarrow +\infty \\ -1 \rightarrow 3 \\ \sqrt{x} \rightarrow x + 2\sqrt{x} \end{matrix}$

$$R_f = [2 + 2\sqrt{2}, +\infty)$$

$$\frac{-9 \times 10}{2 \times d} + 90 = \sqrt{V \Delta}$$

$$a=0 \quad b+c=0 \quad b=1 \quad c=-1$$

$$g(x) = \sqrt{x^2 + 1} \quad R_g = [1, +\infty)$$

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

$$y_{\min} = -1 \Rightarrow C = -1$$

$$x^2 - x = \lambda \quad x^2 - x - \lambda = 0 \quad (x-1)(x+1) = 0$$

$$\Rightarrow \{a, b\} = \{-1, 1\}$$

$$f\left(\frac{1}{-1}\right) = f(-1) = \boxed{3}$$

$$(x-1)^2 = x^2 - 2x + 1 = x^2 + ax + b - 1 \Rightarrow a = -2, b = 1$$

$$\begin{aligned} -1 &\leq x \leq 1 \\ -1 &\leq x-1 \leq 0 \end{aligned}$$

$$R_f = [-1, 0]$$

$$\begin{aligned} y &= 1 & 1 > x > \frac{1}{2} \\ y &= 2 & \frac{1}{2} > x > 1 \\ y &= 3 & 1 > x > \frac{1}{2} \end{aligned}$$

