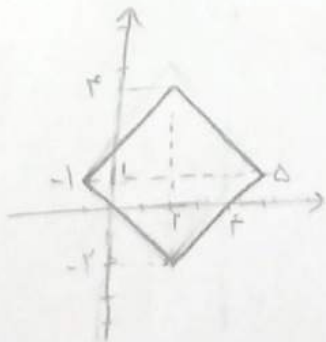
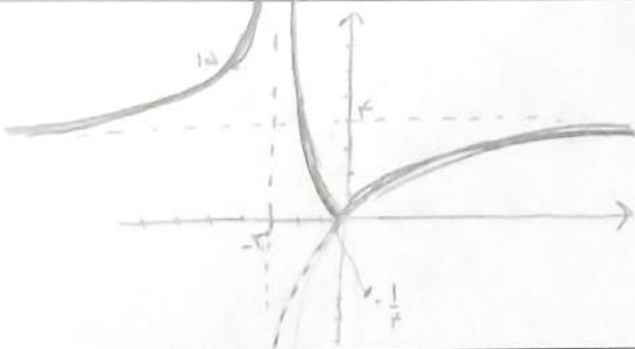
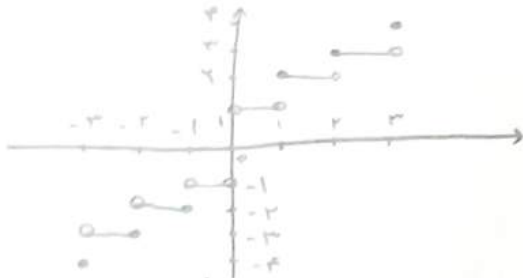


الف) $f(x) = 2\sin^2\left(x + \frac{\pi}{4}\right) - 1$

$$\begin{aligned} & -1 \leq \sin^2\left(x + \frac{\pi}{4}\right) \leq 1 \\ & -2 \leq 2\sin^2\left(x + \frac{\pi}{4}\right) \leq 2 \\ & -1 \leq 2\sin^2\left(x + \frac{\pi}{4}\right) - 1 \leq 1 \\ & R_f = [-1, 1] \end{aligned}$$

ب) $g(x) = 3\cos^2 x - 4$

$$\begin{aligned} & -1 \leq \cos^2 x \leq 1 \\ & -3 \leq 3\cos^2 x \leq 3 \\ & -7 \leq 3\cos^2 x - 4 \leq -1 \\ & R_g = [-7, -1] \end{aligned}$$



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

الف) $f(x) = x + \frac{1}{x} + 2\sqrt{x + \frac{1}{x}} + 1 - 1 \Rightarrow$

$$\left(\sqrt{x + \frac{1}{x}} + 1\right)^2 - 1$$

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

ب) $y = (3 - \sin x)(1 + \sin x) \Rightarrow$

$$y = -\sin^2 x + 2\sin x + 3$$

$$\begin{aligned} & \begin{matrix} 1 \\ \nearrow \\ \sin x \end{matrix} \begin{matrix} \searrow \\ 1 \end{matrix} \begin{matrix} f \\ \nearrow \\ 1 \end{matrix} \begin{matrix} \searrow \\ f \end{matrix} \\ & +1 = \frac{2}{\sqrt{2}} \end{aligned} \Rightarrow R_f = [0, 4]$$

$$\frac{9}{7}(9+1) = 12$$

$$-\frac{1}{7}(12) + 9 \times 1 = -12 + 9 = \boxed{-3}$$

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$$f(n) = \sqrt{an^2 + bn + c} \sim \boxed{a=0} \rightarrow \sqrt{bn+c} \sim \sqrt{bn+c}, 0$$

$$bn > -c \rightarrow n > -\frac{c}{b} \sim \frac{-c}{b} = 2 \sim -c = 2b$$

$$f(r) = \sqrt{b(r) - 2b} = 1 \rightarrow \sqrt{b} = 1 \rightarrow \boxed{b=1} \quad \boxed{c=-2}$$

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$$g(n) = \sqrt{n^2 + 4} \sim \left| \frac{0}{1} \right| \sim \mathbb{R}_f: \sqrt{[1, +\infty)} \rightarrow \mathbb{R}_f: [1, +\infty)$$

$$f(n) = \frac{n^2 - 4n}{n+2} \rightarrow \mathbb{D}_f: \mathbb{R} - \{-2\} \sim a=b=-2$$

$$\frac{n(n-4)}{n+2} = \frac{n(n-2)(n+2)}{n+2} = n^2 - 2n \sim \begin{cases} 1 \\ -1 \end{cases} \sim \mathbb{R}_f: [-1, +\infty) - \{1\} \quad \boxed{1} \quad ?$$

$c = -1$

$$f\left(\frac{-4}{-2}\right) = f(2) = \frac{4-8}{4} = \boxed{-1}$$

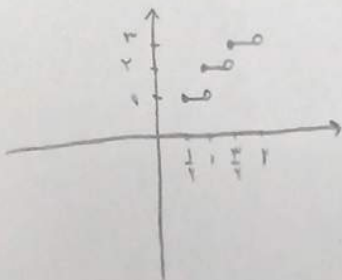
$$\sqrt[n]{m^3 + am^2 + bm - 1} = \sqrt[n]{(m^3 - 4m^2 + 12m - 1)} = \sqrt[n]{(m-2)^3} = (m-2) \leftarrow$$

$$a = -4$$

$$b = 12 \sim \mathbb{D}_f: [-2, 12]$$

$$\mathbb{R}_f: [-1, 12]$$

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أو 0, 1, 2

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