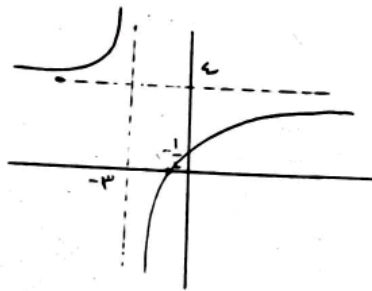
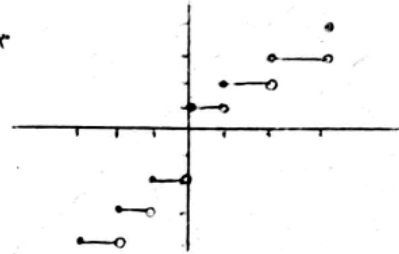


ا) $f(x) = 2 \sin^2(x + \frac{\pi}{4}) - 1 \rightarrow 0 \leq \sin^2(x + \frac{\pi}{4}) \leq 1 \Rightarrow 0 \leq 2 \sin^2(x + \frac{\pi}{4}) \leq 2$ (1)

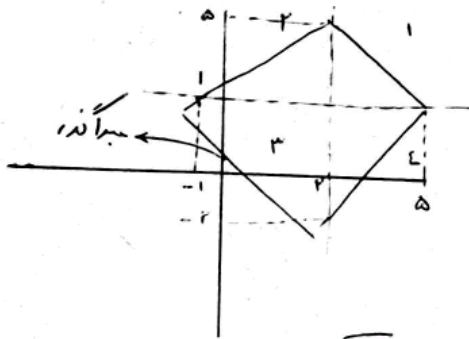
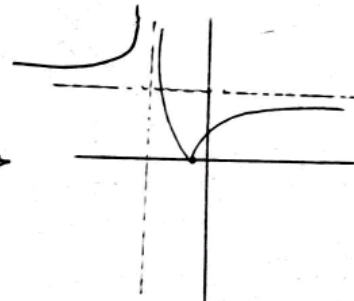
$-1 \leq f(x) \leq 1 \rightarrow Rf = [-1, 1]$

ب) $g(x) = 3 \cos^2 x - 2 \rightarrow -3 \leq 3 \cos^2 x \leq 3 \rightarrow -1 \leq g(x) \leq 1 \rightarrow Rg = [-1, 1]$

$-1 - 3 = -4 \quad -3 \leq x < -1 \quad 1 + 3 = 4 \quad 3 \leq x < 4$
 $-1 - 2 = -3 \quad -2 \leq x < -1 \quad 1 + 3 = 4 \quad x = 3$
 $-1 - 1 = -2 \quad -1 \leq x < 0$
 $1 + 0 = 1 \quad 0 \leq x < 1$
 $1 + 1 = 2 \quad 1 \leq x < 2$



مدرجاً



$1 \rightarrow x - 2 + y - 1 = 3 \Rightarrow y = -x + 6$
 $2 \rightarrow -x + 2 + y - 1 = 3 \Rightarrow y = x + 2$
 $3 \rightarrow -x + 2 - y + 1 = 3 \Rightarrow y = -x$
 $4 \rightarrow x - 2 - y + 1 = 3 \Rightarrow y = x - 4$

ا) $f(x) = x + \frac{1}{x} + 2 \sqrt{x + \frac{1}{x}} \xrightarrow{\sqrt{x + \frac{1}{x}} = t} f(x) = t^2 + 2t$
 $\min = \sqrt{2} \Rightarrow 2 + 2\sqrt{2} = f(x)$
 $\max = \infty \Rightarrow f(x) = +\infty$
 $t = \frac{-2}{2} = -1$
 $x > 0 \quad x + \frac{1}{x} \geq 2 \xrightarrow{x + \frac{1}{x} \geq 2} x + \frac{1}{x} \geq 2 \Rightarrow \sqrt{x + \frac{1}{x}} \geq \sqrt{2}$
 $x < 0 \quad x + \frac{1}{x} \leq -2 \xrightarrow{x + \frac{1}{x} \leq -2} x + \frac{1}{x} \leq -2 \Rightarrow \sqrt{x + \frac{1}{x}} \geq \sqrt{2}$
 $\Rightarrow Rf = [2 + 2\sqrt{2}, +\infty)$

ب) $y = -\sin^2 x + 2 \sin x + 3 \rightarrow \min -1 \rightarrow 0$
 $\max 1 \rightarrow 4$
 $Rf = [0, 4]$
 $\sin x = \frac{-1}{2} = 1 \rightarrow y = 4$

$1 + 2 + 3 + \dots + 9 \rightarrow 45$

$-\frac{1}{2} (45) + 9 = -22.5 + 9 = -13.5$

$$a=0 \Rightarrow f(x) = \sqrt{bx+c} \Rightarrow f(r) = \sqrt{rb+c} = 1 \Rightarrow rb+c=1$$

-V

$$f(r) = \sqrt{rb+c} = 0 \rightarrow rb+c=0 \rightarrow \begin{matrix} b=1 \\ c=-r \end{matrix}$$

$$Df = [r, +\infty)$$

$$g(x) = \sqrt{x^r + \varepsilon}$$

$$\left. \begin{matrix} x^r > 0 \\ x^r + \varepsilon > \varepsilon \end{matrix} \right\} g(x) > r \quad Dg = [r, +\infty)$$

$$f(x) = \frac{(x+r)(x^r - rx)}{x+r} = \frac{x(x-r)(x+r)}{x+r} = x^r - rx \quad x \neq -r$$

-A

$$x^r - rx \neq 1 \rightarrow x^r - rx - 1 \neq 0 \rightarrow (x-c)(x+r) \neq 0 \quad \begin{matrix} x \neq c \\ x \neq -r \end{matrix}$$

$$Df = \mathbb{R} \setminus \{-r, c\} \Rightarrow a+b=r, \quad Df = [-1, +\infty) \setminus \{1\} \Rightarrow c = -1$$

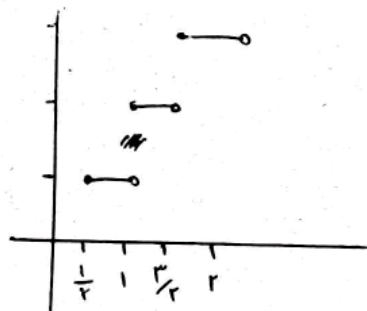
$$f\left(\frac{a+b}{rc}\right) = f(-1) = 1 - r(-1) = r$$

-9

$$r \text{ جز } \mathbb{R} \Rightarrow (x-k)^r \xrightarrow{-\infty} (-k)^r = -1 \rightarrow k^r = 1 \Rightarrow k=r$$

$$x^r + ax^r + bx - 1 = (x-r)^r = x^r - 4x^r + 12x - 1 \quad \begin{matrix} a = -4 \\ b = 12 \end{matrix} \quad D = [-r, 1r]$$

$$\sqrt[r]{(x-r)^r} = x-r < \frac{-1}{1} \rightarrow R = [-1, 1]$$



$$y = \begin{matrix} 0+1=1 & \frac{1}{r} \leq x < 1 \\ 1+1=2 & 1 \leq x < \frac{r}{r} \\ 1+r=r & \frac{r}{r} \leq x < r \end{matrix}$$

-1.