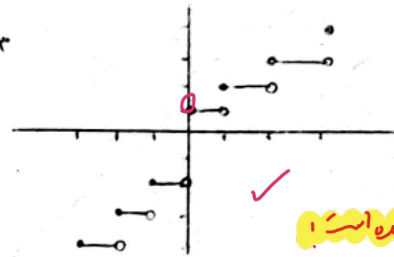


ا)  $f(x) = 2 \sin^2(x + \frac{\pi}{4}) - 1 \rightarrow 0 \leq \sin^2(x + \frac{\pi}{4}) \leq 1 \Rightarrow 0 \leq 2 \sin^2(x + \frac{\pi}{4}) \leq 2$  (1)

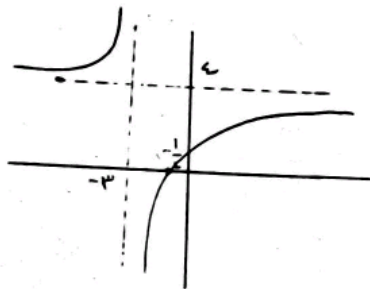
$-1 \leq f(x) \leq 1 \rightarrow Rf = [-1, 1]$  (2)

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

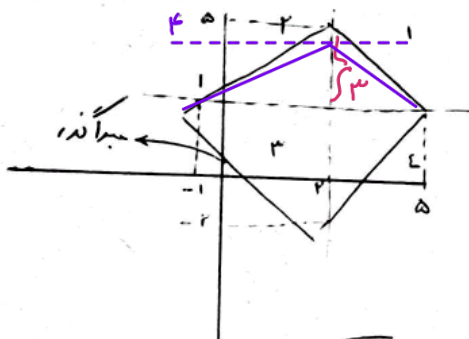
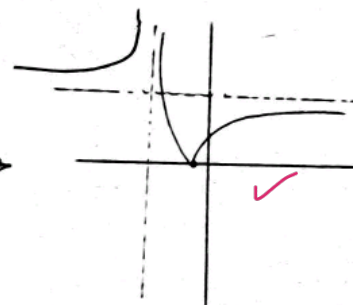
$-1 - 3 = -4 \quad -3 \leq x < -1 \quad 1 + 2 = 3 \quad 2 \leq x < 3$   
 $-1 - 2 = -3 \quad -2 \leq x < -1 \quad 1 + 3 = 4 \quad x = 3$   
 $-1 - 1 = -2 \quad -1 \leq x < 0$   
 $1 + 0 = 1 \quad 0 \leq x < 1$   
 $1 + 1 = 2 \quad 1 \leq x < 2$



صفر تعريف شده است



مدرست



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

ا)  $f(x) = x + \frac{1}{x} + 2 \sqrt{x + \frac{1}{x}} \xrightarrow{\sqrt{x + \frac{1}{x}} = t} f(x) = t^2 + 2t$   $\min = \sqrt{2} \Rightarrow 2 + 2\sqrt{2} = f(x)$  (2)

$x > 0 \quad x + \frac{1}{x} \geq 2 \xrightarrow{x + \frac{1}{x} \geq 2} x + \frac{1}{x} \geq 2 \Rightarrow \sqrt{x + \frac{1}{x}} \geq \sqrt{2}$   
 $x < 0 \quad x + \frac{1}{x} \leq -2 \xrightarrow{x + \frac{1}{x} \leq -2} x + \frac{1}{x} \leq -2 \Rightarrow \sqrt{x + \frac{1}{x}} \geq \sqrt{2}$   
 $\Rightarrow Rf = [2 + 2\sqrt{2}, +\infty)$

ب)  $y = -\sin^2 x + 2 \sin x + 3 \rightarrow \min = -1 \rightarrow 0$   
 $\rightarrow \max = 1 \rightarrow 4$   
 $Rf = [0, 4]$   
 $\sin x = \frac{1}{2} \Rightarrow x = \frac{\pi}{6}$

$1 + 2 + 3 + \dots + 9 \rightarrow 45$   
 $-\frac{1}{3} (45) + 9 = -15 + 9 = -6$

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

(2) -V

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

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

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

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

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

(2) -A

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

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

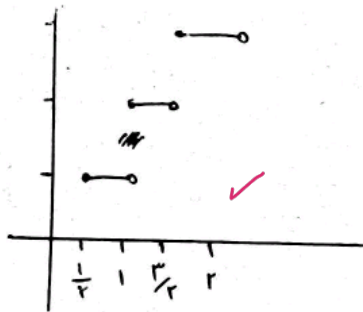
$$f\left(\frac{a+b}{rc}\right) = f(-1) = 1 - r(-1) = r+1$$

(2) -9

$$f(x-k)^r \xrightarrow{-1} (-k)^r = -1 \rightarrow k^r = 1 \Rightarrow k=r$$

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

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



$$y = \begin{array}{l} 0+1=1 \quad \frac{1}{r} \leq x < 1 \\ 1+1=r \quad 1 \leq x < \frac{r}{r} \\ 1+r=r \quad \frac{r}{r} \leq x < r \end{array}$$

(2) -1.