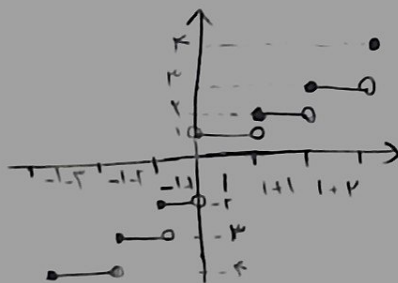


(1)

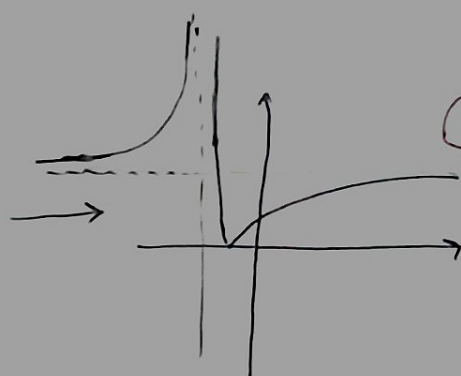
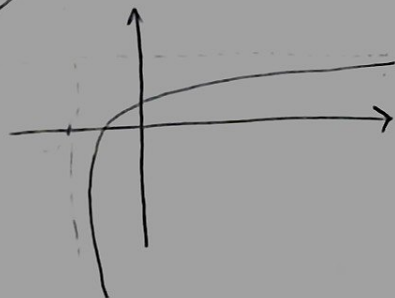
الف) $f(n) = 2 \sin^2\left(n + \frac{\pi}{4}\right) - 1$ $\xrightarrow{\sin^2=1} 2(1) - 1 = 1$
 $\xrightarrow{\sin^2=0} 2(0) - 1 = -1$ $\rightarrow R_f = [-1, 1]$
 ب) $g(n) = 3 \cos^2 n - 4$ $\xrightarrow{\cos^2=1} 3(1) - 4 = -1$
 $\xrightarrow{\cos^2=0} 3(0) - 4 = -4$ $\rightarrow R_g = [-4, -1]$

(2)

$$L = \frac{n}{|n|} + [n]$$



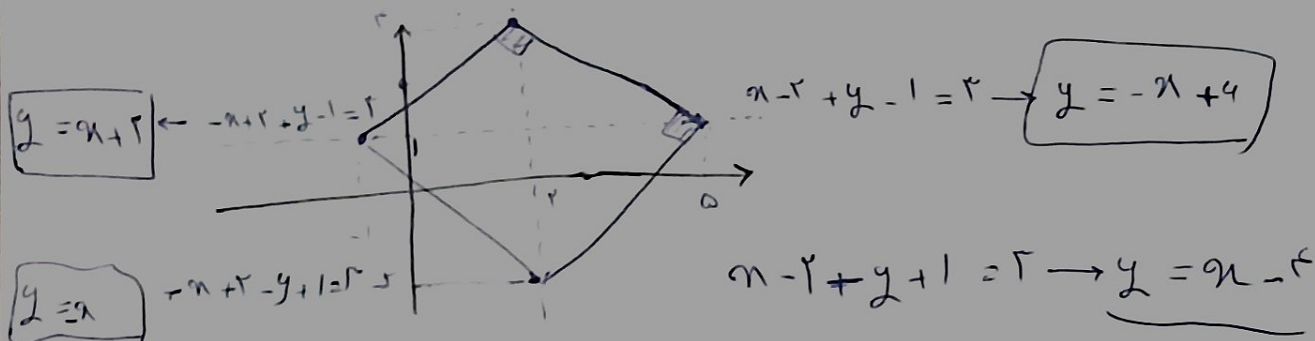
$$y = \left| \frac{4x+1}{x+3} \right|$$



(3)

$$\rightarrow R = [0, +\infty)$$

(4)



(5)

الف) $f(n) = n + \frac{1}{n} + 2\sqrt{n + \frac{1}{n}} \rightarrow \left(\sqrt{n + \frac{1}{n}} + 1\right)^2 - 1$
 $n + \frac{1}{n} \geq 2 \rightarrow \sqrt{n + \frac{1}{n}} \geq \sqrt{2} \rightarrow \sqrt{n + \frac{1}{n}} + 1 \geq \sqrt{2} + 1$
 $\rightarrow \left(\sqrt{n + \frac{1}{n}} + 1\right)^2 \geq (\sqrt{2} + 1)^2 \rightarrow \left(\sqrt{n + \frac{1}{n}} + 1\right)^2 - 1 \geq 2 + 2\sqrt{2} + 1 - 1$
 $\rightarrow R_{f_1} = [2 + 2\sqrt{2}, +\infty)$

ب) $y = (3 - \sin x)(1 + \sin x) \rightarrow -\sin^2 x + 2 \sin x + 3$

$\xrightarrow{\sin=1} -1 + 2 + 3 = 4$
 $\xrightarrow{\sin=-1} -1 - 2 + 3 = 0$ $\rightarrow R = [0, 4]$
 $\xrightarrow{\sin=-\frac{b}{2a} = 1} 4$

$$f(x) = -\frac{1}{r}x + 10 \quad D_f = 1, \dots, 9$$

$$\left. \begin{aligned} -\frac{1}{r}(1+r+\dots+n+9) &= -\frac{1}{r}(r \cdot 10) = -10 \\ 9 \times 10 &= 90 \end{aligned} \right\} \rightarrow 9, -10 = \boxed{V8}$$

$$f(x) = \sqrt{ax^r + bx + c} \rightarrow D_f = [r, +\infty)$$

$$\rightarrow \text{only } 1 \rightarrow a=0 \rightarrow f(x) = \sqrt{bx+c}$$

$$\rightarrow b(r) + c = 0 \rightarrow \begin{cases} rb+c=0 \\ rb+c=1 \end{cases} \rightarrow b=1, c=-r$$

$$\rightarrow \sqrt{rx+r} \rightarrow R = [r, +\infty)$$

$$f(x) = \frac{rx - rm}{x+r} \rightarrow f = [R - \{-r\}]$$

$$\hookrightarrow x(n-r), rx-rm \rightarrow R_f = [-1 + \infty) - \{-r\}$$

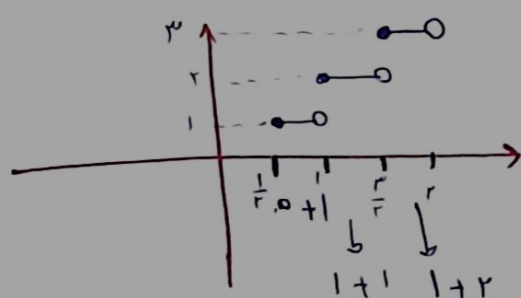
$$\rightarrow a, b = -r, c = -1$$

$$\rightarrow f\left(\frac{-r}{r(r-1)}\right) = f(r) = \frac{1-1}{r} = \underline{0}$$

$$y = \sqrt{ax^r + am^r + bx - n} \rightarrow y = \sqrt{(a-r)^r} = \sqrt{a^r - 4a^r + 15a - 1} = \underline{a-r} \quad (4)$$

$$a = -4, b = 1r \rightarrow D_f[-4, 1r] \rightarrow R_f = [-1, 10]$$

$$y = [x] + \left[x + \frac{1}{r}\right]$$



$$\rightarrow \text{too, } \frac{1}{r} \approx$$

(10)