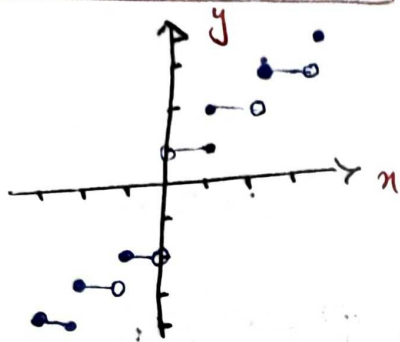


الف) $0 \leq \sin^2\left(n + \frac{\pi}{2}\right) \leq 1 \Rightarrow 0 \leq \sin^2(n + \frac{\pi}{2}) \leq 1 \Rightarrow -1 \leq \sin(n + \frac{\pi}{2}) \leq 1$

$R = [-1, 1]$

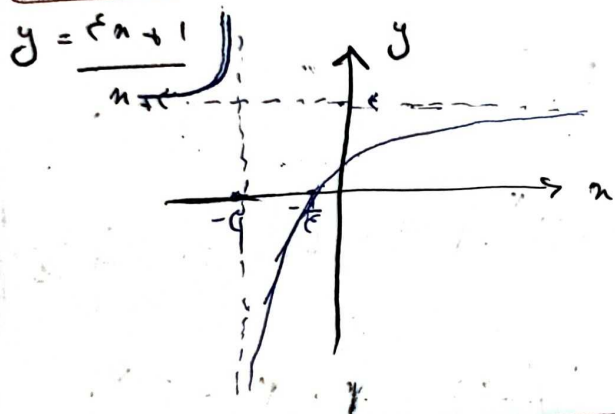
$-1 \leq \cos^2 n \leq 1 \Rightarrow -1 \leq \cos n \leq 1 \Rightarrow -1 \leq \cos n \leq 1$

$\Rightarrow R = [-1, 1]$

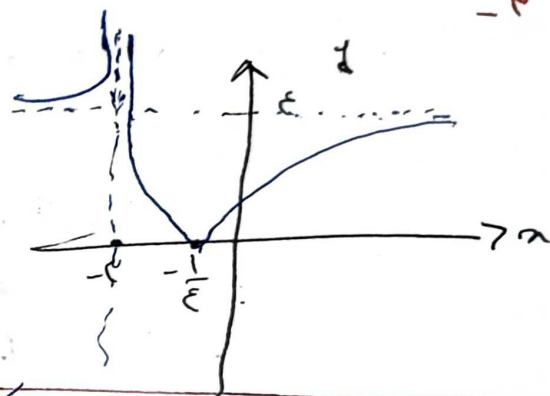


$n = 2$

$-4 \leq n < -2$
$-2 \leq n < -1$
$-1 \leq n < 0$
$0 \leq n < 1$
$1 \leq n < 2$
$2 \leq n < 3$

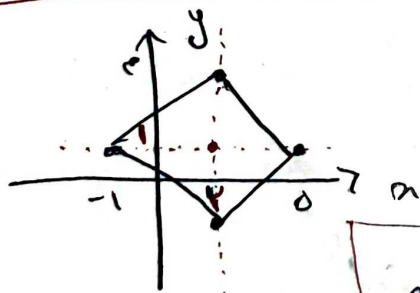


نقطه
بهره



ر = 2, (2, 1)

تابع فردی شکل



$f(n) = n + \frac{1}{n} + 2\sqrt{n + \frac{1}{n}}$

$n + \frac{1}{n} = t \Rightarrow f(n) = t + 2\sqrt{t}$

$t \leq 2 \leq t \Rightarrow t \geq 2 \Rightarrow t \geq 2 \Rightarrow f_{min} = 2 + 2\sqrt{2} \Rightarrow R_f = [2 + 2\sqrt{2}, +\infty)$

$t = \sin n, -1 \leq t \leq 1 \Rightarrow y = (2-t)(t+1) \Rightarrow y = 2 + 2t - t^2$

$\Rightarrow y = 2 - (t-1)^2 \Rightarrow 0 \leq y \leq 2 \Rightarrow R_f = [0, 2]$

$$-6 \quad 9 \Rightarrow (9 \times 10) + \frac{1+2+3+\dots+9}{9} = 90 - 12 = 78$$

$$\star \Rightarrow \frac{(9 \times 10) + 8}{9} = 18 \quad \left. \begin{array}{l} f(r) = 0 \Rightarrow 9a + 3b + c = 0 \\ f(r) = 1 \Rightarrow 9a + 3b + c = 1 \end{array} \right\} -7$$

$$\Rightarrow 3a + b = 1 \quad D_f = [2, +\infty) \Rightarrow f \text{ نتيجه} = a = 0$$

$$\Rightarrow b = 1, c = -2$$

$$R_f = [9, +\infty)$$

$$g(n) = \sqrt{n^2 - 2(-2)} = \sqrt{n^2 + 4}$$

$$f(n) = \frac{n(n+2)(n-1)}{n+2} \xrightarrow{n \neq -2} f(n) = n^2 - 2n, \quad \bullet \bullet \bullet \wedge \notin R_f \quad -8$$

$$\Rightarrow n^2 - 2n - \wedge \neq 0 \Rightarrow (n+2)(n-1) \rightarrow \text{فاصله ها را میانه} \quad n \neq -2, n \neq 1$$

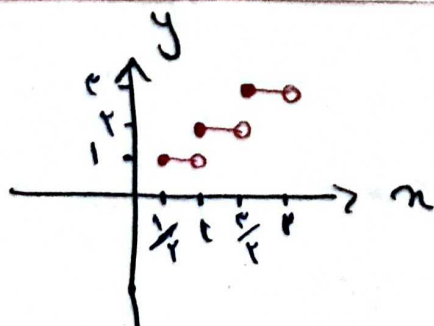
$$\Rightarrow a = -2, b = 1 \quad n^2 - 2n = (n-1)^2 - 1 \Rightarrow -1 = \text{کمترین مقدار تابع} \quad \text{مربع کامل}$$

$$\Rightarrow c = -1 \rightarrow f\left(\frac{-2+1}{-2}\right) = f(-1) = 1 + 2 + 1 = 4$$

$$\sqrt{(n+k)^2} = \frac{n+k}{1} \Rightarrow k^2 = -\wedge \Rightarrow k = -2 \Rightarrow \text{تابع معکوس} \quad -9$$

$$\sqrt{(n-2)^2} = n^2 + an^2 + bn - 1 = n^2 + 9n^2 + 12n - 1 \Rightarrow a = 9$$

$$D_f = [9, 12] \Rightarrow R_f = [-\wedge, 10] \quad b = 12$$



$$\begin{aligned} 1 &\leftarrow n \leq \frac{1}{2} \\ 2 &\leftarrow \frac{1}{2} < n \leq 1 \\ 3 &\leftarrow 1 < n \leq 1.5 \\ 4 &\leftarrow 1.5 < n \leq 2 \end{aligned}$$