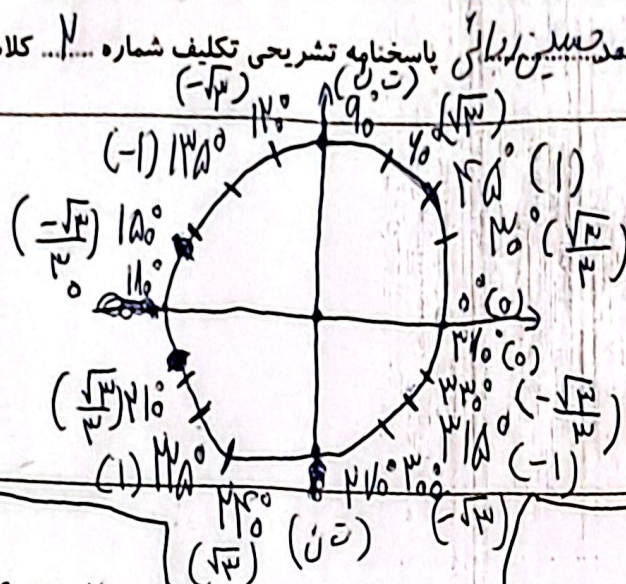




1

$$\sin \frac{\pi}{4} + \cos \frac{\pi}{4} + \frac{1}{\sqrt{2}} \sin \left(\frac{3\pi}{4} \right) = \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} = \frac{3}{\sqrt{2}}$$

$$2) \cot \frac{\pi}{3} + \cot \frac{\pi}{3} - \tan \frac{\pi}{4} = \frac{1}{\sqrt{3}} + \frac{1}{\sqrt{3}} - 1 = \frac{2}{\sqrt{3}} - 1$$

$$3) \cos(\sin \frac{\pi}{4}) + \sin(\pi \cos \frac{\pi}{4}) = \cos\left(\frac{1}{\sqrt{2}}\right) + \sin(\pi \cdot \frac{1}{\sqrt{2}})$$

$$f(n) = n^N + Nn - n \quad n \geq 1$$

$$f_1 = (1)^N + N(1) = 1 + N$$

$$n^N + Nn = Nn + N \Rightarrow n^N + n - N = (n+N)(n-1)$$

$$\Rightarrow n = 1$$

$$f(n) = \begin{cases} n^N - b & |n+1| \geq N \Rightarrow n+1 \geq N \text{ or } n+1 \leq -N \\ n+N & -N \leq n \leq -1 \end{cases} \quad n \in \{[-N, -1] \cup [N, \infty)\}$$

$$N(-N)^N - b = n - N$$

$$\Rightarrow n + b = N^N$$

$$y = \frac{1}{n^N - Nn^N} = \frac{1}{n^N(n-N)}$$

$$\Rightarrow n \neq 0, n \neq N \quad D_f = \mathbb{R} - \{0, N\}$$

$$y = \frac{1}{N^N + N^N + N + N} = \frac{1}{2N^N + 2N} = \frac{1}{2N(N^{N-1} + 1)}$$

$$\Rightarrow n \neq N \quad D_f = \mathbb{R} - \{N\}$$

$$\text{الف) } y = \sqrt{m^2 - 1} + \sqrt{m - 1} \quad [1, +\infty) \cup (-\infty, -1] \quad m^2 - 1 \geq 0 \Rightarrow (m-1)(m+1) \geq 0 \Rightarrow m \leq -1 \text{ or } m \geq 1$$

$$D_f = [1, +\infty) \cup (-\infty, -1] \cap [1, +\infty) = [1, +\infty)$$

$$\text{ب) } y = \frac{\sqrt{4 - 3m}}{\sqrt{4m - 3}} \quad (\frac{1}{4}, +\infty) \cup (-\infty, \frac{4}{3}] \quad 4 - 3m \geq 0 \Rightarrow 3m \leq 4 \Rightarrow m \leq \frac{4}{3}$$

$$D_f = (\frac{1}{4}, +\infty) \cap [1, +\infty) = [1, +\infty)$$

$$y = \sqrt{4m - a} + \sqrt{b - 3m} \Rightarrow b \geq 3m, a \leq 4m$$

$$(-\infty, \frac{b}{3}] \cap [\frac{a}{4}, +\infty) = \{1\}$$

$$\Rightarrow \frac{b}{3} = \frac{a}{4} = 1 \Rightarrow b = 3, a = 4$$

$$\text{الف) } y = \sqrt{\frac{m^2 - m - 4}{m^2 - 13m^2 + 34}} = \sqrt{\frac{(m-4)(m+1)}{(m-1)(m+1)(m-3)(m+4)}}$$

$$D_f = (-\infty, -4) \cup (-1, 3) \cup (3, +\infty)$$

$$\text{ب) } \sqrt{\frac{m^2 - 13m^2 - 4m + 4}{m^2 + 13m^2 - 4m - 4}} = \sqrt{\frac{(m-1)(m-3)(m+1)}{(m+1)(m+3)(m+4)}}$$

$$D_f = (-\infty, -4) \cup (-1, 3) \cup (3, +\infty)$$

$$\text{الف) } y = \sqrt{1[n] - 1} \Rightarrow 1[n] \geq 1 \Rightarrow [n] \geq 1$$

$$\Rightarrow n \geq 1 \quad D_f = [1, +\infty)$$

$$\text{ب) } y = \sqrt{1[n] - 4} \Rightarrow 1[n] \geq 4 \Rightarrow [n] \geq 4$$

$$D_f = [4, +\infty)$$

$$\text{الف) } y = \sqrt{\frac{n+1}{n-1}} + \sqrt{\frac{4-n}{n^2+n+1}}$$

$$D_f = [1, 3) \cup (3, +\infty) \cap (-\infty, 4] = [1, 3) \cup (3, 4]$$

$$\text{ب) } y = \sqrt{[n] - 1} + \sqrt{1 - [n]}$$

$$\Rightarrow [n] \geq 1 \quad [n] \leq 1 \Rightarrow n \geq 1 \quad D_f = (-\infty, 3) \cup [4, +\infty)$$