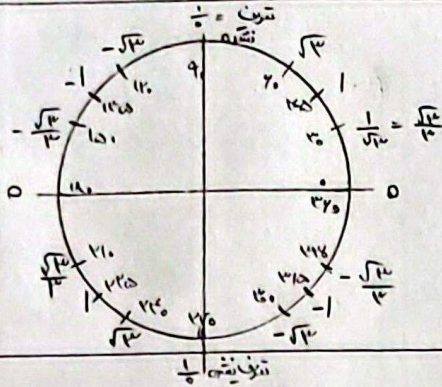




۱

$$\text{الف) } \frac{1}{4} + 1 + 2 \times \left(-\frac{1}{4}\right) = \frac{1}{4}$$

$$\text{ب) } \left(-\frac{\sqrt{3}}{4}\right) + \frac{\sqrt{3}}{4} - 2 \left(-\frac{\sqrt{3}}{4}\right) = \frac{\sqrt{3}}{4} + \frac{\sqrt{3}}{4} + \frac{2\sqrt{3}}{4} = \frac{4\sqrt{3}}{4}$$

$$\text{ج) } -\frac{\sqrt{3}}{4} + 2 \times \frac{\sqrt{3}}{4} - 2 \times \left(-\frac{\sqrt{3}}{4}\right) = -\frac{\sqrt{3}}{4} + \frac{2\sqrt{3}}{4} + \frac{2\sqrt{3}}{4} = \frac{3\sqrt{3}}{4}$$

$$\text{د) } \cos(0) + \sin\left(\frac{\pi}{4}\right) = 1 + 1 = 2$$

۲

$$\xrightarrow{n=a} a^2 + 4a = 2a + a + 2 \rightarrow a^2 + a - 2 = 0 \rightarrow a = 1, \text{ (نمی‌تواند برابر ۰ باشد)}$$

$$f(n) \begin{cases} n^2 + 4n & n \geq 1 \\ 2n + 2 & n \leq 1 \end{cases} \rightarrow n = 1 \rightarrow f(1) = 1 + 4 = 5$$

۳

$$f(n) \begin{cases} 2n^2 - 6 & n \geq 1, n \leq -3 \\ a + 4n & -3 \leq n \leq -1 \end{cases} \rightarrow |n+1| \geq 2 \begin{cases} n+1 \geq 2 \rightarrow n \geq 1 \\ n+1 \leq -2 \rightarrow n \leq -3 \end{cases}$$

$$\xrightarrow{n=-3} 11 - 6 = a - 4 \rightarrow a + 6 = 11 + 6 = 17$$

۴

$$\text{الف) } n^3 - 4n^2 \neq 0 \rightarrow n^2(n-4) \neq 0 \rightarrow \frac{n}{n-4} \rightarrow D_f = (4, +\infty)$$

$$\text{ب) } 2n^3 + 4n^2 + 2n + 4 \neq 0 \rightarrow 2n(n^2 + 1) + 4(n^2 + 1) = (n^2 + 1)(2n + 4) =$$

$$= 2(n^2 + 1)(n + 2) \neq 0 \rightarrow \frac{n}{n+2} \rightarrow D_f = (-2, +\infty)$$

ریشه‌ها را در نظر بگیرید

۵

$$\text{الف) } \begin{cases} x^2 - 1 > 0 \rightarrow x^2 > 1 \rightarrow x < -1, x > 1 \quad ① \\ x - 2 > 0 \rightarrow x > 2 \quad ② \end{cases} \quad ① \cap ② \Rightarrow D_f = [2, +\infty)$$

$$\text{ب) } \begin{cases} 4 - 3x > 0 \rightarrow 3x \leq 4 \rightarrow x \leq \frac{4}{3} \quad ① \\ 4x - 2 > 0 \rightarrow 4x > 2 \rightarrow x > \frac{1}{2} \quad ② \end{cases} \quad \{ ① \cap ② \Rightarrow D_f = \emptyset$$

$$\begin{cases} 4x - a > 0 \rightarrow x > \frac{a}{4} \\ b - 3x > 0 \rightarrow x \leq \frac{b}{3} \end{cases} \quad \left\{ \frac{b}{3} > x > \frac{a}{4} \rightarrow D = \left[\frac{a}{4}, \frac{b}{3} \right] = \{x\} \right.$$

$$\Rightarrow \frac{a}{4} = \frac{b}{3} = x \quad \begin{cases} a = 4x \\ 3b = 4x \rightarrow b = \frac{4}{3}x \end{cases} \quad \left\{ \frac{b}{a} = \left(\frac{1}{3} \right) \right.$$

$$\text{الف) } \frac{(x-3)(x+2)}{(x^2-4)(x^2-9)} \geq 0 \rightarrow \frac{(x-3)(x+2)}{(x-2)(x+2)(x-3)(x+3)} \geq 0 \rightarrow \frac{-3 \quad -2^* \quad 2 \quad 3^*}{+ \quad - \quad - \quad +} \rightarrow D = (-\infty, -3) \cup (2, 3) \cup (3, +\infty)$$

$$\text{ب) } \frac{(x-1)(x-2)(x+3)}{(x+1)(x-2)(x+3)} \geq 0 \rightarrow \frac{-1 \quad -2 \quad -1 \quad 1 \quad 2 \quad 3}{+ \quad - \quad + \quad - \quad + \quad +} \rightarrow D = (-\infty, -3) \cup [-2, -1) \cup [1, 2) \cup [3, +\infty)$$

$$\text{الف) } 2[x] - 4 \geq 0 \rightarrow [x] \geq 2 \rightarrow x \geq 2 \rightarrow D = [2, +\infty)$$

$$\text{ب) } 2[x] - 5 \geq 0 \rightarrow [x] \geq \frac{5}{2} \rightarrow x \geq \frac{5}{2} \rightarrow D = \left[\frac{5}{2}, +\infty \right)$$

$$\text{الف) } \begin{cases} \frac{x+1}{|x-1|} \geq 0 \rightarrow \frac{-1 \quad 1^*}{- \quad + \quad +} \rightarrow [-1, +\infty) - \{1\} \quad ① \\ \frac{4-x}{x^2+x+4} \geq 0 \rightarrow \frac{4}{+ \quad + \quad -} \rightarrow (-\infty, 4] \quad ② \end{cases} \quad \{ ① \cap ② \Rightarrow D = [-1, 4] - \{1\}$$

$$\text{ب) } \begin{cases} [x] - 4 \geq 0 \rightarrow [x] \geq 4 \rightarrow x \geq 4 \quad ① \\ 2 - [x] \geq 0 \rightarrow [x] \leq 2 \rightarrow x < 3 \quad ② \end{cases} \quad \{ ① \cap ② \Rightarrow D = \emptyset$$