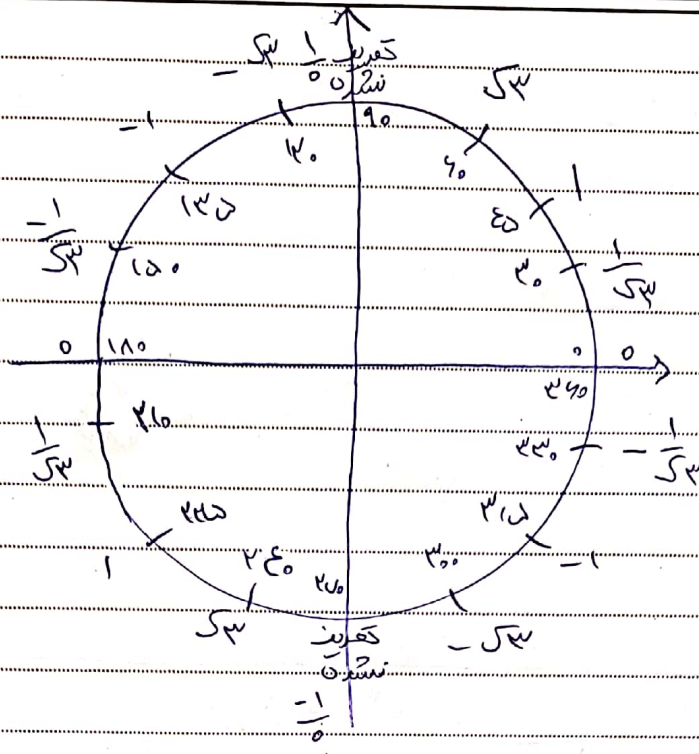




$$\text{الف) } \sin \frac{\pi}{4} + \cos \pi + 2 \tan \frac{3\pi}{4} = \frac{1}{2} - 1 + 2(-1) = \frac{1}{2} - 3 = -\frac{5}{2}$$

$$\text{ب) } -\cos \frac{5\pi}{4} + \sin \frac{2\pi}{4} - 3 \sin \frac{6\pi}{4} = +\frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} - 3(-\frac{\sqrt{3}}{2}) = \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} + \frac{3\sqrt{3}}{2} = \frac{5\sqrt{3}}{2}$$

$$\text{ج) } \cot \frac{\pi}{4} + 3 \cot \frac{5\pi}{4} - 2 \tan \frac{3\pi}{4} = -\frac{1}{\sqrt{3}} + 3(\frac{1}{\sqrt{3}}) - 2(-\frac{1}{\sqrt{3}}) = \frac{4}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$$

$$\text{د) } \cos(\sin \pi) + \sin(\pi \cos \frac{\pi}{3}) = \cos 0 + \sin \frac{\pi}{2} = 1 + 1 = 2$$

$$x = a, a^2 + 3a = 2a + a + 2$$

$$a^2 + a - 2 = 0$$

$$(a + 2)(a - 1) = 0$$

$$\boxed{a = -2} \times \quad \boxed{a = 1} \checkmark$$

$a > 0$

$$f(x) = \begin{cases} x^2 + 3x & x > 1 \\ 2x + 3 & x \leq 1 \end{cases}$$

$$f(1) = 2(1) + 3 = 5$$

$$2x + 3 \leq x^2 + 3x$$

$$x^2 + x - 3 \geq 0$$

$$f(x) = \begin{cases} x^2 - b & x > 1 \\ x^2 - b & x < -3 \\ a + x & -3 \leq x \leq 1 \end{cases}$$

$$\text{at } x = -3, x^2 - b = a + x$$

$$9 - b = a - 3$$

$$a + b = 12$$

$$\text{ii) } y = \frac{1}{x^3 - \varepsilon x^2} \rightarrow x^3 - \varepsilon x^2 \neq 0$$

$$x^2(x - \varepsilon) \neq 0$$

$$x \neq 0 \rightarrow x \neq \varepsilon$$

$$D_f = \mathbb{R} - \{0, \varepsilon\}$$

$$\text{iii) } y = \frac{1}{x^3 + \varepsilon x^2 + x + \varepsilon}$$

$$x^3 + \varepsilon x^2 + x + \varepsilon \neq 0$$

$$x(x^2 + \varepsilon x + 1) + \varepsilon \neq 0 \quad D_f = \mathbb{R} - \{-1\}$$

$$x(x + 1)^2 + \varepsilon \neq 0$$

$$\rightarrow x = -1$$

$$\text{iv) } y = \sqrt{x^2 - 1} + \sqrt{x - 2} \rightarrow x - 1 > 0 \rightarrow x > 1 \quad \text{①}$$

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

$$\text{①} \cap \text{②} = [1, +\infty)$$

$$\text{v) } y = \frac{\sqrt{4 - 3x}}{\sqrt{4x - 3}} \rightarrow 4 - 3x > 0 \rightarrow 3x \leq 4$$

$$x \leq \frac{4}{3} \quad \text{③}$$

$$4x - 3 > 0 \rightarrow 4x > 3 \rightarrow x > \frac{3}{4} \quad \text{④} \quad \text{③} \cap \text{④} \rightarrow D_f = (\frac{3}{4}, \frac{4}{3}]$$

Arman

$$y = \sqrt{4x-a} + \sqrt{b-3x} \rightarrow b-3x \geq 0$$

$$4x-a \geq 0$$

$$4x \geq a \rightarrow x \geq \frac{a}{4}$$

$$b-3x \geq 0 \rightarrow x \leq \frac{b}{3}$$

$$D_f = \left[\frac{a}{4}, \frac{b}{3} \right] = \{x\}$$

$$\frac{b}{a} = \frac{\frac{b}{3}}{\frac{a}{4}} = \frac{4}{3} \leftarrow \begin{cases} \frac{a}{4} = x \rightarrow a = 12 \\ \frac{b}{3} = x \rightarrow b = 4 \end{cases}$$

$$\text{ii) } y = \sqrt{\frac{x^3 - x - 4}{x^2 - 13x^2 + 45}}$$

$$x^3 - x - 4 = 0 \rightarrow (x+1)(x-3) = 0$$

$$x = -1$$

$$x = 3$$

$$x^2 - 13x^2 + 45 = 0$$

$$(x^2 - 9)(x^2 - 4) = 0$$

$$(x-3)(x+3)(x-2)(x+2) = 0$$

$$x = 3$$

$$x = -3$$

$$x = 2$$

$$x = -2$$

$$D_f = (-\infty, -3) \cup (-2, -1) \cup (1, 2) \cup (3, +\infty)$$

$$\therefore \sqrt{\frac{x^3 - x - 4}{x^2 - 13x^2 + 45}} \rightarrow \sqrt{\frac{(x-1)(x-3)(x+1)}{(x+1)(x-3)(x+3)}} \rightarrow \sqrt{\frac{(x-1)}{(x+3)}}$$

$$\frac{x^3 - x - 4}{x^2 - 13x^2 + 45} \div \frac{x-1}{x^2 - x - 4} = \frac{x^3 - x - 4}{x^2 - x - 4} \cdot \frac{x^2 - x - 4}{x-1}$$

$$\frac{x^3 - x - 4}{x^2 - x - 4} \cdot \frac{x^2 - x - 4}{x-1} = \frac{x^3 - x - 4}{x-1}$$

$$\frac{x^3 - x - 4}{x-1} = \frac{x^3 - x^2 + x^2 - x - 4}{x-1}$$

$$\frac{x^3 - x^2 + x^2 - x - 4}{x-1} = \frac{x^3 - x^2 + x^2 - x - 4}{x-1}$$

$$\frac{x^3 - x - 4}{x^2 - x - 4} \cdot \frac{x^2 - x - 4}{x-1} = \frac{x^3 - x - 4}{x-1}$$

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$$\frac{x^3 - x - 4}{x^2 - x - 4} \cdot \frac{x^2 - x - 4}{x-1} = \frac{x^3 - x - 4}{x-1}$$

Arman

$$\text{الف) } y = \sqrt{x[x] - 4} \rightarrow x[x] - 4 \geq 0$$

$$x[x] \geq 4$$

$$[x] \geq 4, x \rightarrow x \geq 4$$

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

$$\text{ب) } y = \sqrt{x[x] - 4} \rightarrow x[x] \geq 4$$

$$[x] \geq \frac{4}{x}$$

$$[x] \geq 4 \cdot \frac{1}{x} \rightarrow x \geq 4$$

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

$$\text{الف) } y = \sqrt{\frac{x+1}{|x-3|}} + \sqrt{\frac{4-x}{x^2+x+4}} \rightarrow x=4$$

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$$x = -1$$

$$x = 3$$

$$\frac{-1}{-4} + \frac{3}{4} + \frac{4}{4} = 1$$

$$[-1, +\infty) - \{3\}$$

$$\Delta < 0 \quad (-\infty, 4]$$

من أجل أن يكون الجذر حقيقيًا، يجب أن يكون المميز أكبر من أو يساوي صفرًا.

$$\frac{-1}{-4} + \frac{3}{4} + \frac{4}{4} = 1$$

$$D_f = [-1, 4]$$

$$\text{ب) } y = \sqrt{x[x] - 4} + \sqrt{4 - x}$$

$$4 - x \geq 0$$

$$[x] - 4 \geq 0$$

$$[x] \leq 4$$

$$[x] \geq 4 \rightarrow x \geq 4 \quad \text{①} \quad x < 3 \quad \text{②}$$

$$\text{①} \cap \text{②} \Rightarrow D_f = \emptyset$$

لا يوجد حل مشترك.