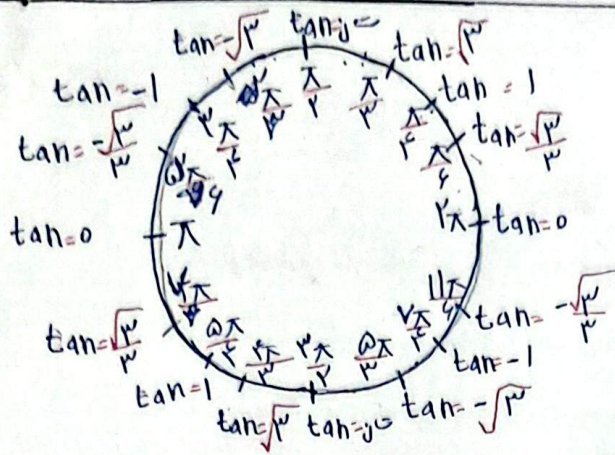




$$\text{الف) } \sin \frac{\pi}{6} + \cos \pi + 2 \tan \frac{\pi}{4} = \frac{1}{2} - 1 + 2 \cdot 1 = \frac{1}{2} - 1 + 2 = \frac{3}{2}$$

$$\text{ب) } -\cos \frac{5\pi}{6} + \sin \frac{\pi}{3} - 3 \sin \frac{\pi}{6} = -\left(-\frac{\sqrt{3}}{2}\right) + \frac{\sqrt{3}}{2} - 3 \cdot \frac{1}{2} = \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} - \frac{3}{2} = \frac{\sqrt{3}}{2}$$

$$\text{ج) } \cot \frac{\pi}{4} + 3 \cot \frac{\pi}{3} - 2 \tan \frac{\pi}{6} = \frac{\sqrt{3}}{3} + \frac{3\sqrt{3}}{3} - 2 \cdot \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3} + \sqrt{3} - \frac{2}{\sqrt{3}} = \sqrt{3}$$

$$\text{د) } \cos(\sin \pi) + \sin(\pi \cos \frac{\pi}{6}) = \cos(0) + \sin\left(\pi \cdot \frac{\sqrt{3}}{2}\right) = 1 + 1 = 2$$

$$f(x) = \begin{cases} x^2 + x & x \geq a \\ 2x + a + 2 & x < a \end{cases} \quad x=a \Rightarrow a^2 + a = 2a + a + 2 \Rightarrow a^2 + a - 2a - a - 2 = 0 \Rightarrow (a-1)(a+2) = 0 \Rightarrow a = 1 \text{ or } a = -2$$

$$f(1) = 1 + 2 \cdot 1 = 3$$

$$f(x) = \begin{cases} 2x^2 - b & |x+1| \geq 2 \\ a + x & -2 \leq x \leq -1 \end{cases} \rightarrow x = -3 \Rightarrow 2(-3)^2 - b = a + (-3) \Rightarrow 18 - b = a - 3 \Rightarrow a + b = 21$$

$$\text{الف) } y = \frac{1}{x^3 - x^2} \Rightarrow x^3 - x^2 \neq 0 \Rightarrow x^2(x-1) \neq 0 \Rightarrow x \neq 0, 1$$

$$\text{ب) } y = \frac{1}{2x^3 + x^2 + x + 2} \Rightarrow 2x^3 + x^2 + x + 2 \neq 0 \Rightarrow x^3 + 2x^2 + x + 2 \neq 0 \Rightarrow (x+2)(x^2 + 1) \neq 0 \Rightarrow x \neq -2$$

$$\text{الف) } y = \sqrt{x^2 - 1} + \sqrt{x - 2} \Rightarrow x^2 - 1 \geq 0 \Rightarrow (x-1)(x+1) \geq 0 \Rightarrow x \in (-\infty, -1] \cup [1, +\infty) \text{ (I)} \Rightarrow x-2 \geq 0 \Rightarrow x \geq 2 \Rightarrow x \in [2, +\infty) \text{ (II)}$$

$$(I) \cap (II) = [2, +\infty)$$

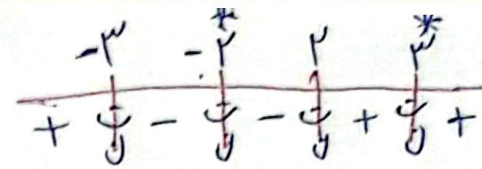
$$\text{ب) } y = \frac{\sqrt{4-3x}}{\sqrt{3x-3}} \rightarrow 4-3x \geq 0 \Rightarrow 3x \leq 4 \Rightarrow x \leq \frac{4}{3} \text{ (I)} \rightarrow \frac{\sqrt{4-3x}}{\sqrt{3x-3}} \rightarrow 3x-3 > 0 \Rightarrow 3x > 3 \Rightarrow x > 1 \text{ (II)}$$

$$(I) \cap (II) = \left(\frac{4}{3}, 1\right]$$

$$y = \sqrt{4x-a} + \sqrt{b-3x} \quad \text{چون دامنه یک عضو دارد آن عضو دو جمل را صفری کند}$$

$$x = 2 \rightarrow \sqrt{8-a} = 0 \Rightarrow a = 8 \quad ; \quad b-6 = 0 \Rightarrow b = 6 \rightarrow \frac{b}{a} = \frac{6}{8} = \frac{3}{4}$$

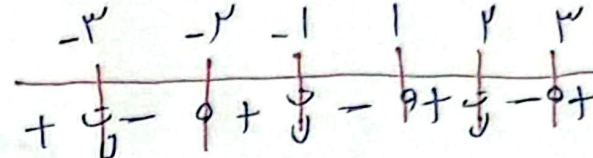
$$\text{الف) } y = \sqrt{\frac{x^2 - x - 6}{x^4 - 13x^2 + 36}} = \sqrt{\frac{(x-3)(x+2)}{(x+2)(x-2)(x+3)(x-3)}}$$



$$\Rightarrow D_f = (-\infty, -3) \cup (2, +\infty) - \{3\}$$

1

$$\text{ب) } y = \sqrt{\frac{x^3 - 2x^2 - 5x + 6}{x^3 + 2x^2 - 5x - 6}} = \sqrt{\frac{(x+2)(x-1)(x-3)}{(x-2)(x+1)(x+3)}} \rightarrow$$



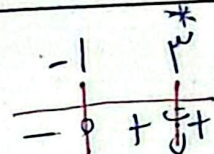
$$D_f = (-\infty, -3) \cup [-2, -1) \cup [1, 2) \cup [3, +\infty)$$

$$\text{الف) } y = \sqrt{2[x] - 4} \Rightarrow 2[x] - 4 \geq 0 \Rightarrow [x] \geq 2 \Rightarrow x \geq 2 \Rightarrow D_f = [2, +\infty)$$

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$$\text{ب) } y = \sqrt{2[x] - 6} \Rightarrow 2[x] - 6 \geq 0 \Rightarrow [x] \geq \frac{6}{2} \Rightarrow x \geq 3 \Rightarrow D_f = [3, +\infty)$$

$$\text{الف) } y = \sqrt{\frac{x+1}{x-3}} + \sqrt{\frac{4-x}{x^2+2x+4}} \Rightarrow \frac{x+1}{x-3} \geq 0 \Rightarrow$$



$$\frac{4-x}{x^2+2x+4} \geq 0$$

(مقامات مثبت)

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

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$$\text{ب) } y = \sqrt{[x] - 4} + \sqrt{2 - [x]} \rightarrow [x] - 4 \geq 0 \Rightarrow [x] \geq 4 \Rightarrow x \geq 4$$

$$2 - [x] \geq 0 \Rightarrow 2 \geq [x] \Rightarrow 3 > x \rightarrow$$

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