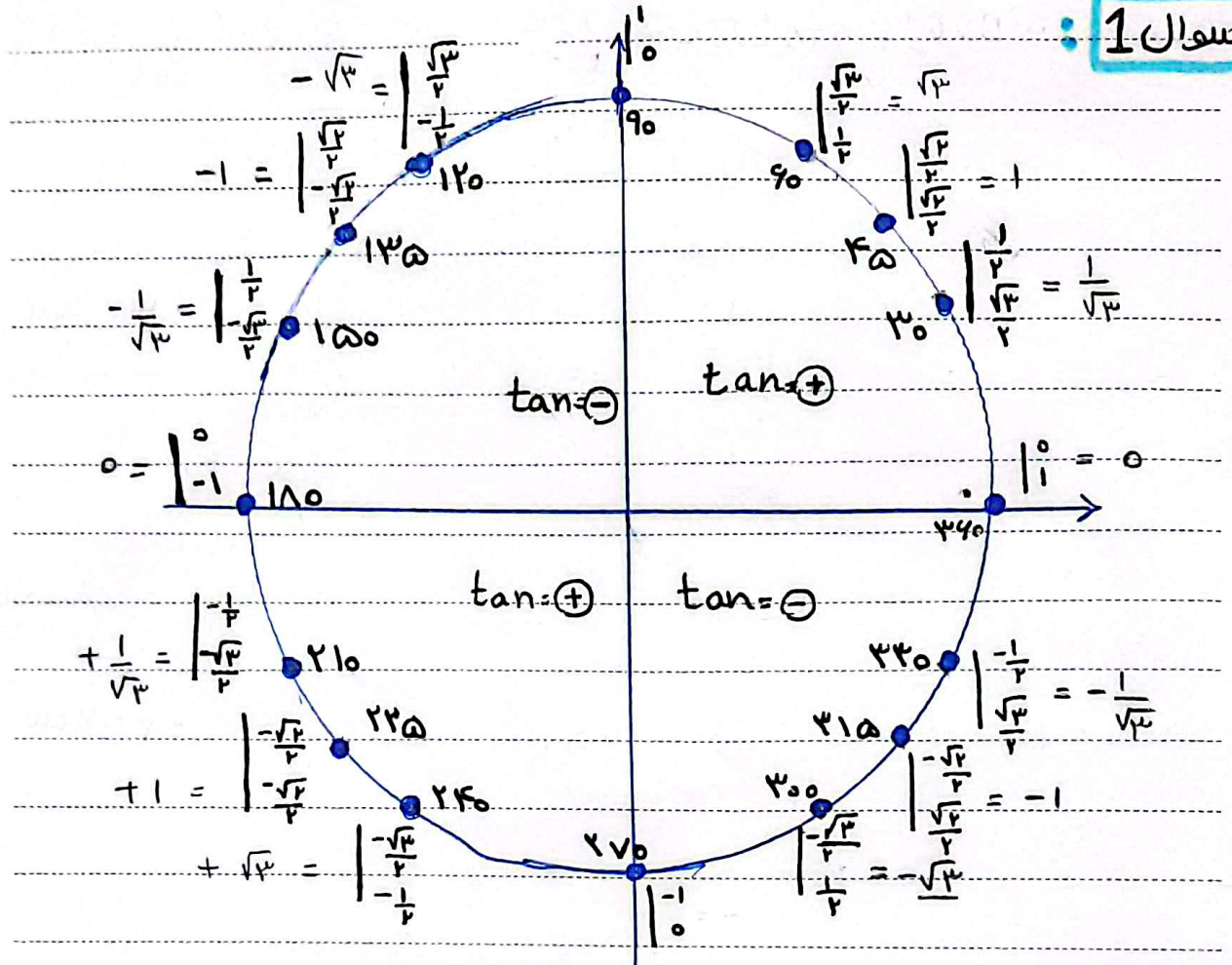




سوال 1:



سوال 2:

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

ب) $-\cos \frac{5\pi}{4} + \sin \frac{\pi}{4} - 2 \sin \frac{\pi}{4} = -\left(-\frac{\sqrt{2}}{2} \right) + \frac{\sqrt{2}}{2} - \left(2 \times \frac{\sqrt{2}}{2} \right) = \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} - \sqrt{2} = 0$

ج) $\cot \frac{\pi}{4} + 2 \cot \frac{\pi}{4} - 2 \tan \frac{\pi}{4} = -\frac{1}{\sqrt{2}} + \left(2 \times \frac{1}{\sqrt{2}} \right) - \left(2 \times -\frac{1}{\sqrt{2}} \right) = -\frac{1}{\sqrt{2}} + \frac{2}{\sqrt{2}} + \frac{2}{\sqrt{2}} = \frac{3}{\sqrt{2}}$

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$$\Rightarrow \cos(\sin \frac{\pi}{2}) + \sin(\pi \cos \frac{\pi}{2}) = \cos 0 + \sin 0 = 1$$

$\sin \frac{\pi}{2} = 1$

$$a^2 + fa = 2a + a + r$$

سوال ۳:

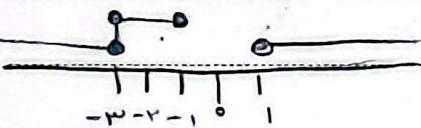
$$a^2 + fa = 3a + r \quad a^2 + a - r = 0 \quad \begin{cases} a = -2 \\ a = +1 \end{cases} \quad \text{و } a > 0$$

$$a^2 + fa = 1 + f = 0$$

$$|n+1| \geq 2 \Rightarrow n+1 \geq 2 \Rightarrow n \geq 1$$

$$-2 \geq n+1 \Rightarrow -3 \geq n$$

سوال ۴:



$$\Rightarrow n = -3 \Rightarrow 2a^2 - b = a + 2n$$

$$1a - b = a - 4$$

$$a + b = 1a + 4 = 24$$

سوال ۵:

$$f(x) = \frac{1}{x^3 - 4x^2} \Rightarrow x^3 - 4x^2 \neq 0 \quad Df = \mathbb{R} - \{0, 4\}$$

$$x(x^2 - 4x) \neq 0$$

$$x \neq 0 \quad \text{and} \quad x \neq 4$$

$$f(x) = \frac{1}{2x^3 + 5x^2 + 2x + 1} \Rightarrow 2x^3 + 5x^2 + 2x + 1 \neq 0$$

$$x^3 + 2x^2 + x + 1 \neq 0$$

$$(x^3 + 2x^2) + (x + 1) \neq 0$$

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

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$$0 = x + 2 \Rightarrow x = -2$$

$$x^2 + 1 = 0 \Rightarrow x^2 = -1$$

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سوال ۹) الف) $y = \sqrt{2[n]-4}$ $2[n]-4 \geq 0 \Rightarrow 2[n] \geq 4$

$$[n] \geq 2 \leadsto Df = [2, +\infty)$$

ب) $y = \sqrt{2[n]-9}$ $2[n]-9 \geq 0 \Rightarrow 2[n] \geq 9 \leadsto [n] \geq \frac{9}{2}$

$$Df = [3, +\infty)$$

سوال ۱۰) الف) $\frac{n+1}{n-3} \geq 0$ $\frac{n+1}{n-3} \geq 0 \leadsto n \neq 3$ $\frac{n+1}{n-3} \geq 0 \leadsto n \leq -1$ $\frac{n+1}{n-3} \geq 0 \leadsto n \geq 3$ $\frac{n+1}{n-3} \geq 0 \leadsto (-1, 3) \cup (3, +\infty)$

$\frac{4-n}{n^2+2n+4} \geq 0 \leadsto 4-n \geq 0 \leadsto n \leq 4$ $\frac{4-n}{n^2+2n+4} \geq 0 \leadsto n^2+2n+4 = (n+1)^2+3 > 0$ $\frac{4-n}{n^2+2n+4} \geq 0 \leadsto (-\infty, 4]$

$$Df = (-1, 3) \cup (3, 4]$$

ب) $y = \sqrt{[n]-4} + \sqrt{2-[n]}$ $\frac{[n]-4}{[n]-4} \geq 0 \leadsto [n]-4 \geq 0$ $\frac{2-[n]}{2-[n]} \geq 0 \leadsto 2-[n] \geq 0 \leadsto [n] \leq 2$ $Df = [4, +\infty) \cap (-\infty, 2] = \emptyset$

$$[n] \geq 4 \leadsto [4, +\infty)$$

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سوال 4) الف) $x^2 - 1 \geq 0 \Rightarrow \frac{-1}{+1} \leq \frac{1}{-1} \Rightarrow (-\infty, -1] \cup [1, +\infty)$

$x - 2 \geq 0 \Rightarrow \frac{2}{-1} \leq \frac{1}{-1} \Rightarrow [2, +\infty)$ $Df = [2, +\infty)$

ب) $4 - 3x \geq 0 \Rightarrow (-\infty, 2]$

$\frac{2}{+1}$

$Df = (-\infty, 2]$

$4x - 3 > 0$

$\frac{3}{-4}$

$\Rightarrow (3/4, +\infty)$

$4x - a \geq 0 \Rightarrow 4x \geq a \Rightarrow x \geq \frac{a}{4}$

$\frac{a}{4}$

$b - 3x \geq 4 \Rightarrow 3x \leq b - 4 \Rightarrow x \leq \frac{b-4}{3}$

$Df = \{x\}$

$(\frac{b-4}{3} = \frac{a}{4}) \Rightarrow b - 4 = \frac{3a}{4} \Rightarrow 4b - 16 = 3a \Rightarrow 4b = 3a + 16$

$b/a = \frac{3}{4}$

$Df = [\frac{a}{4}, \frac{b-4}{3}] \Rightarrow \frac{a}{4} = \frac{b-4}{3} = 2 \Rightarrow a = 12, b = 4$

سوال 1)

الف) $\frac{(x-3)(x+2)}{(x-1)(x-4)} \geq 0 \Rightarrow \frac{-3 \quad 2 \quad 1 \quad 4}{+1 \quad -1 \quad -1 \quad +1}$

$Df = (-\infty, -4] \cup [2, 1) \cup (4, +\infty)$

ب) $\frac{(x-1)(x-4)(x-3)}{-(x+1)(x+2)(x+3)} \Rightarrow \frac{-3 \quad -2 \quad -1 \quad 1 \quad 2 \quad 3}{-1 \quad +1 \quad -1 \quad +1 \quad -1 \quad +1}$

$Df = (-3, -2) \cup (-1, 1] \cup [2, 3)$

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