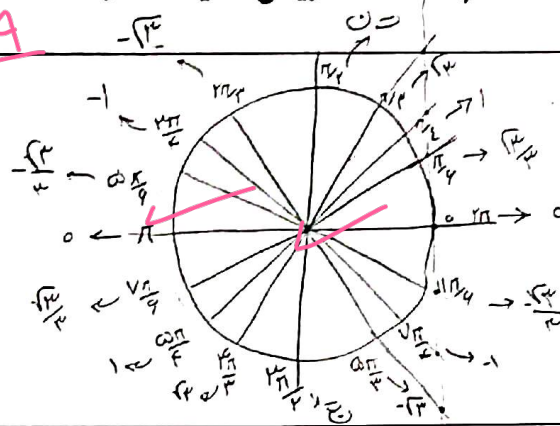




الف) $\sin \frac{\pi}{4} + \cos \pi + 2 \tan \frac{3\pi}{4} = \frac{1}{\sqrt{2}} - 1 + 2(-1) = -\frac{3}{\sqrt{2}} = -\frac{3\sqrt{2}}{2}$

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

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

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

برای a هر x و y داریم: $\begin{cases} x^2 + \varepsilon x & x=a \\ 2x+a+2 & \end{cases} \rightarrow \begin{cases} a^2 + \varepsilon a = 2a + a + 2 \\ a^2 + a - 2 = 0 \end{cases} \rightarrow \begin{matrix} x = \frac{-1 \pm \sqrt{1+8}}{2} \\ a+b+c=0 \end{matrix} \rightarrow \boxed{x=1}$

$\begin{cases} x^2 + \varepsilon x & x \geq 1 \\ 2x + 2 & x \leq 1 \end{cases} \rightarrow \begin{cases} f(1) = (1)^2 + \varepsilon(1) = \omega \\ f(1) = 2(1) + 2 = \omega \end{cases}$

برای $x = -1$ هر a صدق کند: $\begin{cases} 2x^2 - b & |x+1| \geq 2 \\ a+2x & -3 \leq x \leq -1 \end{cases} \xrightarrow{x=-1} \begin{cases} 2 - b = a - 4 \\ a + b = 2\varepsilon \end{cases}$

الف) $y = \frac{1}{x^2 - \varepsilon x^2} \rightarrow x^2 - \varepsilon x^2 = 0$ $\Rightarrow \{ \mathbb{R} - \{0, \varepsilon\} \}$
 $x^2(x - \varepsilon) = 0 \rightarrow x \neq 0, x \neq \varepsilon$

ب) $\frac{1}{2x^3 + \varepsilon x^2 + 2x + \varepsilon} \xrightarrow{\text{جزء ۰}} \begin{cases} 2x^3 + \varepsilon x^2 + 2x + \varepsilon = 0 \\ 2x(x^2 + 1) + \varepsilon(x^2 + 1) = 0 \end{cases} \rightarrow (2x + \varepsilon)(x^2 + 1) = 0 \rightarrow \mathbb{R} - \{ -\frac{\varepsilon}{2} \}$

$$\text{الف) } y = \sqrt{x^2-1} + \sqrt{x-2} \rightarrow \begin{matrix} x^2-1 \geq 0 \rightarrow x \geq 1 \\ x-2 \geq 0 \rightarrow x \geq 2 \end{matrix} \rightarrow \begin{matrix} x \geq 1 \\ x \leq -1 \end{matrix} \rightarrow \begin{matrix} x \geq 2 \\ x \leq -1 \end{matrix}$$

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$$\text{ب) } y = \frac{\sqrt{4-3x}}{\sqrt{9x-2}} \rightarrow \begin{matrix} 4-3x \geq 0 \rightarrow 4 \geq 3x \rightarrow 2 \geq x \\ 9x-2 \geq 0 \rightarrow 9x \geq 2 \rightarrow x \geq \frac{2}{9} \end{matrix} \rightarrow \frac{2}{9} \leq x \leq 2$$

$$y = \sqrt{4x-a} + \sqrt{b-4x} \rightarrow \begin{matrix} 4x-a \geq 0 \rightarrow x \geq a/4 \\ b-4x \geq 0 \rightarrow x \leq b/4 \end{matrix} \rightarrow \begin{matrix} a/4 \leq x \leq b/4 \end{matrix}$$

$\frac{a}{4} = \frac{b}{4} = 2$
 $a=16, b=16$

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$$\text{الف) } y = \sqrt{\frac{x^2-x-4}{x^2-12x^2+4}} = \sqrt{\frac{(x-2)(x+2)}{(x^2-4)(x^2-9)}} \rightarrow \frac{(x-2)(x+2)}{(x^2-4)(x^2-9)} \geq 0$$

جمع کسرها

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

ب) $\frac{x^3-2x^2-5x+4}{x^4+2x^2-5x-4} \rightarrow \frac{x^3-2x^2-5x+4}{x^4+2x^2-5x-4} \geq 0$

جمع کسرها

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$$\text{الف) } y = \sqrt{2[x]-5} \rightarrow 2[x]-5 \geq 0 \rightarrow 2[x] \geq 5 \rightarrow [x] \geq 2.5 \rightarrow x \geq 3$$

$$\text{ب) } y = \sqrt{2[x]-5} \rightarrow 2[x]-5 \geq 0 \rightarrow 2[x] \geq 5 \rightarrow [x] \geq \frac{5}{2} \rightarrow x \geq 3$$

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همواره نامتنه می‌آزی به تعیین علامت نبود!

$$\text{الف) } y = \sqrt{\frac{x+1}{|x-3|}} + \sqrt{\frac{4-x}{x^2+2x+5}} \rightarrow \frac{x+1}{|x-3|} \geq 0 \rightarrow \frac{x+1}{|x-3|} \geq 0$$

پاسن ضمه اصل

$$\frac{4-x}{x^2+2x+5} \geq 0 \rightarrow \frac{4-x}{x^2+2x+5} \geq 0$$

$D = (-\infty, -1] \cup (3, +\infty)$

$D = (-2, 4]$

$D = (-2, -1] \cup (3, 4]$

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

$$\begin{matrix} 2-[x] \geq 0 \\ [x] \leq 2 \end{matrix} \rightarrow x < 3$$

$D = (-\infty, 2) \cup (4, +\infty)$

$D = \emptyset$

(الف-۱۰) $y = \sqrt{\frac{n+1}{|n-4|}} + \sqrt{\frac{4-n}{n^2+2n+2}}$

$\begin{cases} \frac{n+1}{|n-4|} \geq 0 \rightarrow n \geq -1, n \neq 4 \text{ I} \\ \frac{4-n}{n^2+2n+2} \geq 0 \rightarrow n \leq 4 \text{ II} \end{cases}$

به نفعاً مقدریت مفروضه!
 به Δ ، محواره مثبت و بدون مقدریت

$I \cap II \rightarrow D_f = [-1, 4) \cup (4, 4] \subseteq [-1, 4] - \{4\}$

(ب-۱۰) $y = \sqrt{[n]-4} + \sqrt{2-[n]}$

$\begin{cases} [n]-4 \geq 0 \rightarrow n \geq 4 \text{ I} \\ \quad \hookrightarrow [n] \geq 4 \\ 2-[n] \leq 0 \rightarrow n < 3 \text{ II} \\ \quad \hookrightarrow [n] \leq 2 \end{cases}$

$I \cap II \rightarrow D_f = \emptyset$
 هیچ عددی نداریم که از ۴ بزرگتر و ۳ کمتر باشد