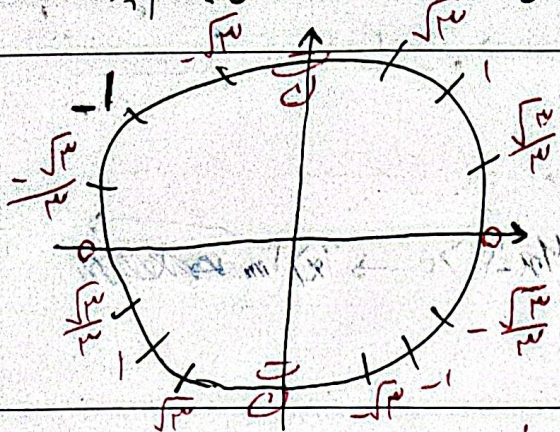




الف) $\sin \frac{\pi}{4} + \cos \pi + 2 \tan \frac{\pi}{4} = \frac{1}{\sqrt{2}} + (-1) + 2(-1) = -\frac{5}{\sqrt{2}}$

ب) $-\cos \frac{5\pi}{4} + \sin \frac{2\pi}{4} - 3 \sin \frac{1\pi}{4} = -(-\frac{\sqrt{2}}{2}) + \frac{\sqrt{2}}{2} - 3(-\frac{\sqrt{2}}{2}) = \frac{5\sqrt{2}}{2}$

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

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

$$f(a) = \begin{cases} a^2 + 2a & (n > a) \\ 2a + a + 2 & (n \leq a) \end{cases} \rightarrow \begin{cases} a^2 + 2a = 2a + 2 \rightarrow a^2 + a - 2 = 0 \\ (a+2)(a-1) = 0 \end{cases}$$

$$\begin{cases} a = -2 \text{ غلط} \rightarrow a \neq 1/2 \\ a = 1 \rightarrow f(1) = 1 + 2 = 3 \end{cases}$$

$$f(n) = \begin{cases} 2n^2 - b, & |n+1| \geq 2 \\ a + 2n, & -3 \leq n \leq -1 \end{cases} \rightarrow \begin{cases} n+1 \geq 2 \rightarrow n \geq 1 \\ n+1 \leq -2 \rightarrow n \leq -3 \end{cases} \rightarrow (-\infty, -3] \cup [1, +\infty)$$

با بازار سه با عدد سه با یک جواب باید دهند

$$\rightarrow 2(-3)^2 - b = a - 4 \rightarrow \boxed{a + b = 22}$$

الف) $y = \frac{1}{x^3 - 4x^2} = \frac{1}{x^2(x-4)}$
 $x^2(x-4) \neq 0 \rightarrow \begin{cases} x^2 = 0 \rightarrow x = 0 \\ x - 4 = 0 \rightarrow x = 4 \end{cases} \rightarrow D_f = \mathbb{R} - \{0, 4\}$

ب) $y = \frac{1}{2n^3 + 2n^2 + 2n + 2} = \frac{1}{2n(n^2 + 1) + 2(n+1)} = \frac{1}{(2n+2)(n^2+1)}$

$$(n^2+1)(2n+2) \neq 0 \rightarrow \begin{cases} n^2+1 = 0 \text{ غلط} \\ 2n+2 = 0 \rightarrow \boxed{n = -1} \end{cases} \rightarrow D_f = \mathbb{R} - \{-1\}$$

$$y = \sqrt{x^2 - 1} + \sqrt{x - 1} =$$

$$\textcircled{1} x^2 - 1 \geq 0 \rightarrow \underline{x \geq 1} \quad \textcircled{2} x - 1 \geq 0 \rightarrow \underline{x \geq 1}$$

$$\textcircled{2} x - 1 \geq 0 \rightarrow \underline{x \geq 1}$$

$$Df = [1, +\infty)$$

$$y = \frac{\sqrt{4 - 13x}}{\sqrt{4x - 13}} =$$

$$\textcircled{1} 4 - 13x \geq 0 \rightarrow 4 \geq 13x \rightarrow \underline{13x \leq 4}$$

$$\textcircled{2} 4x - 13 \geq 0 \rightarrow 4x \geq 13$$

$$Df = \left(\frac{13}{4}, 4\right]$$

$$x \geq \frac{13}{4}$$

$$y = \sqrt{4x - a} + \sqrt{b - 13x} \rightarrow b - 13x \geq 0 \rightarrow b \geq 13x \xrightarrow{x=1} \boxed{b=9}$$

$$Df = \{x\} \rightarrow 4x - a \geq 0 \rightarrow a \leq 4x \rightarrow \frac{a}{4} \leq x \xrightarrow{x=1} \frac{a}{4} = 1$$

$$\frac{b}{a} = ? \rightarrow \frac{9}{13} = \boxed{\frac{1}{13}}$$

$$\boxed{a=13}$$

$$\text{الف) } y = \sqrt{\frac{x^2 - x - 4}{x^2 - 13x^2 + 13y}} = \sqrt{\frac{(x-1)(x+1)}{(x-1)(x+1)(x+1)(x-1)}}$$

$$\rightarrow (x^2 - 1)(x^2 - 9)$$

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

$$\text{ب) } y = \sqrt{\frac{x^2 - 13x^2 - 5x + 4}{x^2 + 13x^2 - 5x - 4}} = \sqrt{\frac{(x-1)(x+1)(x+1)(x-1)}{(x+1)(x+1)(x-1)(x-1)}}$$

$$\rightarrow (x-1)(x^2 - 13x^2 - 5x + 4)$$

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

$$\text{ج) } y = \sqrt{13[x] - 1} \rightarrow 13[x] - 1 \geq 0 \rightarrow [x] - \frac{1}{13} \geq 0 \rightarrow [x] \geq \frac{1}{13} \rightarrow x \geq 1$$

$$Df = [1, +\infty)$$

$$\text{د) } y = \sqrt{13[x] - 5} \rightarrow 13[x] - 5 \geq 0 \rightarrow [x] \geq \frac{5}{13} \rightarrow [x] \geq 1$$

$$Df = [1, +\infty) \rightarrow x \geq 1$$

$$\text{هـ) } y = \sqrt{\frac{x+1}{|x-1|}} + \sqrt{\frac{4-x}{x^2 + 13x + 13}}$$

$$|x-1| \neq 0 \rightarrow x \neq 1$$

$$x+1 \geq 0 \rightarrow x \geq -1$$

$$4-x \geq 0 \rightarrow 4 \geq x$$

$$x^2 + 13x + 13 \geq 0 \rightarrow x \in (-\infty, -1) \cup (1, +\infty)$$

$$\Rightarrow -1 \leq x \leq 4 - \{1\}$$

$$Df = [-1, 4] - \{1\}$$

$$\text{و) } y = \sqrt{[x] - 1} + \sqrt{1 - [x]}$$

$$[x] - 1 \geq 0 \rightarrow [x] \geq 1 \rightarrow x \geq 1$$

$$1 - [x] \geq 0 \rightarrow [x] \leq 1 \rightarrow x \leq 2 \rightarrow x \in (-\infty, 2)$$