

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

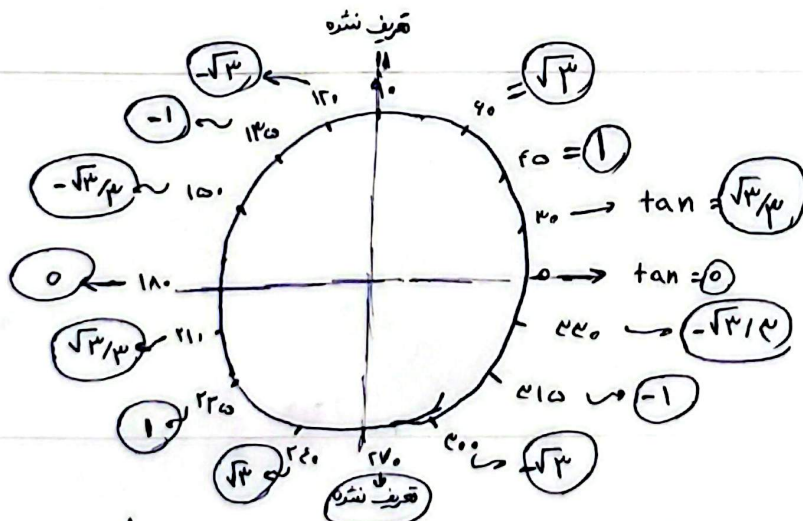
ب) $-\cos \frac{5\pi}{6} + \sin \frac{2\pi}{3} - 3 \sin \frac{\pi}{6} \Rightarrow -(-\frac{\sqrt{3}}{2}) + \frac{\sqrt{3}}{2} - 3(\frac{1}{2}) = \frac{\sqrt{3}}{2}$

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

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

$f(x) = \begin{cases} x^2 + 2x & x > 1 \\ 2x + a + 2 & x \leq 1 \end{cases} \Rightarrow f(x) \Rightarrow x^2 + 2x = 2x + a + 2$
 $\Downarrow$
 $a^2 + a - 2 = 0$
 $(a+2)(a-1) = 0 \Rightarrow a = 1$ (چون $a > 0$)
 $\Rightarrow f(1) = (1)^2 + f_x(1) \Rightarrow (3)$

$f(x) = \begin{cases} 2x^2 - b & |x+1| > 2 \\ a + 2x & -3 \leq x \leq -1 \end{cases} \Rightarrow f(-3) = 18 - b = a - 4$
 $|x+1| > 2 \Rightarrow x > 1 \text{ or } x < -3$
 $\Downarrow$
 $a + b = 22$



الف) $\frac{1}{x^2 - 4x^2} \Rightarrow x^2 - 4x^2 = 0 \Rightarrow x^2(x-4) = 0 \Rightarrow D = \mathbb{R} - \{0, 4\}$

ب) $\frac{1}{2x^3 + 4x^2 + 2x + 4} \Rightarrow 2x^3 + 4x^2 + 2x + 4 = 0 \Rightarrow (2x+4)(x^2+1) = 0$
 $\hookrightarrow D = \mathbb{R} - \{-2\}$

$$a) \quad x^2 - 1 > 0 \Rightarrow \begin{cases} x > 1 \\ x < -1 \end{cases}, \quad x - 2 > 0 \Rightarrow x > 2 \Rightarrow \boxed{x > 2}$$

$$b) \quad \begin{cases} 5 - 6x > 0 \Rightarrow 6x < 5 \Rightarrow x < \frac{5}{6} \\ 9x - 3 > 0 \Rightarrow 9x > 3 \Rightarrow x > \frac{1}{3} \end{cases} \cap \Rightarrow \frac{1}{3} < x < \frac{5}{6} \quad \left(\frac{1}{3}, \frac{5}{6} \right]$$

$$x = \sqrt{9x - 8a} + \sqrt{b - 3x}$$

$$\begin{cases} 9x - 8a > 0 \Rightarrow x > \frac{8a}{9} \\ b - 3x > 0 \Rightarrow x < \frac{b}{3} \end{cases} \cap = \{x\} \Rightarrow \frac{a}{4} = \frac{b}{3} = 3 \quad \Downarrow$$

$$a = 12, b = 9 \Rightarrow \frac{b}{a} = \boxed{\frac{1}{2}}$$

$$a) \quad \sqrt{\frac{x^5 - x - 9}{x^6 - 12x^2 + 36}} \Rightarrow \frac{(x-2)(x+2)}{(x^2-4)(x^2-9)} > 0$$

$$x^5 - 2x^4 - 5x + 9 \mid x-1 \quad \begin{array}{r} x^5 - 2x^4 - 5x + 9 \\ \underline{-(x^5 - x^4)} \\ x^4 - 5x + 9 \\ \underline{-(x^4 - x^3)} \\ x^3 - 5x + 9 \\ \underline{-(x^3 - x^2)} \\ x^2 - 5x + 9 \\ \underline{-(x^2 - x)} \\ -4x + 9 \\ \underline{-(-4x + 4)} \\ 5 \end{array}$$

$$x^5 - 2x^4 - 5x + 9 \mid x^2 - 4 \quad \begin{array}{r} x^5 - 2x^4 - 5x + 9 \\ \underline{-(x^5 - 4x^3)} \\ 2x^4 - 5x + 9 \\ \underline{-(2x^4 - 8x^2)} \\ 8x^2 - 5x + 9 \\ \underline{-(8x^2 - 16x)} \\ 11x + 9 \\ \underline{-(11x - 44)} \\ 53 \end{array}$$

$$b) \quad \sqrt{\frac{x^5 - 2x^4 - 5x + 9}{x^6 + 2x^2 - 5x - 9}} \Rightarrow \begin{matrix} \text{جميع مقامات } = 0 \\ \text{جميع مقامات فرد} \\ \text{وزوج برابر} \end{matrix}$$

$$(x-2)(x+2)(x-1) / (x+3)(x-2)(x+1)$$

$$\begin{array}{r} x^5 - 2x^4 - 5x + 9 \\ \underline{-(x^5 - 4x^3)} \\ 2x^4 - 5x + 9 \\ \underline{-(2x^4 - 8x^2)} \\ 8x^2 - 5x + 9 \\ \underline{-(8x^2 - 16x)} \\ 11x + 9 \\ \underline{-(11x - 44)} \\ 53 \end{array}$$

$$c) \quad \sqrt{2[x] - 4} \Rightarrow 2[x] > 4 \Rightarrow [x] > 2 \Rightarrow \boxed{x > 2}$$

$$d) \quad \sqrt{2[x] - 5} \Rightarrow 2[x] - 5 > 0 \Rightarrow [x] > \frac{5}{2} \Rightarrow \boxed{x > 2.5}$$

$$a) \quad \sqrt{\frac{x+1}{|x-3|}} + \sqrt{\frac{4-x}{x^2+(x+4)}} \Rightarrow \begin{matrix} [-1, 4) \cup (3, +\infty) \\ (-\infty, 3] \\ \downarrow \cap \\ [-1, 3) \cup (3, 4] \end{matrix}$$

$$\begin{array}{r} x+1 \\ \underline{-(x-3)} \\ -1+3 \\ 2 \end{array} \quad \begin{array}{r} 4-x \\ \underline{-(x^2+(x+4))} \\ -x^2-2x \\ \underline{-(-x^2-2x)} \\ 0 \end{array}$$

$$b) \quad \sqrt{[x] - 4} + \sqrt{2 - [x]} \quad \begin{matrix} ① \Rightarrow [x] > 4 \quad x > 4 \\ ② \Rightarrow 2 - [x] > 0 \Rightarrow 2 > [x] \end{matrix} \cap = \emptyset$$

$$2 > [x]$$