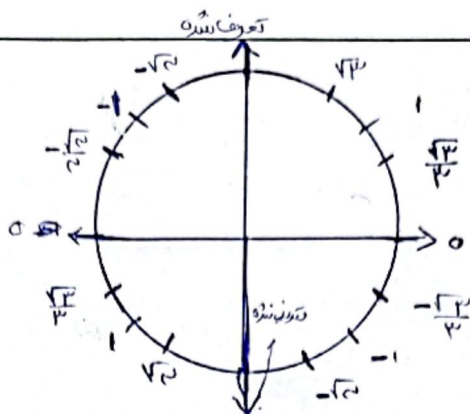




الف) $\frac{1}{\sqrt{3}} + (-1) + (-2) = -\frac{5}{\sqrt{3}} = -\frac{5\sqrt{3}}{3}$

ب) $\frac{\sqrt{3}}{\sqrt{3}} + \frac{\sqrt{3}}{\sqrt{3}} - 2\left(-\frac{\sqrt{3}}{\sqrt{3}}\right) = \sqrt{3} + \sqrt{3} = 2\sqrt{3}$

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

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

$P(x) \Rightarrow$ برای a معادله باید داشته باشیم $\Rightarrow a^2 + 6a = 3a + 2$

$\Rightarrow a^2 + 3a - 2 = 0$ $\xrightarrow{\text{مربع کامل}}$ $x = \frac{-3 \pm \sqrt{9 + 8}}{2} \Rightarrow a = 1, -2$ $\xrightarrow{\text{و چون}}$ $a = 1$

$P(x) \begin{cases} x^2 + 6x & x \geq 1 \\ 3x + 2 & x < 1 \end{cases} \Rightarrow P(x) = a = 1 \text{ و } 3 = \boxed{4}$

$P(x) \begin{cases} x^2 - b & |x+1| \geq 2 \\ a + 2x & -2 \leq x < -1 \end{cases} \Rightarrow \begin{cases} x+1 \geq 2 \Rightarrow x \geq 1 \\ x+1 < -2 \Rightarrow x < -3 \end{cases}$

$\Rightarrow$ برای $x = -3$ $\Rightarrow x = -3 \Rightarrow 1 - b = a + (-4) \Rightarrow a + b = \boxed{5}$

الف) $y = \frac{1}{x^2 - 5x^2} \Rightarrow x^2 - 5x^2 \neq 0 \Rightarrow x^2(x-5) \neq 0 \Rightarrow \begin{cases} x \neq 0 \\ x \neq 5 \end{cases}$

$\Rightarrow D_f = \mathbb{R} - \{0, 5\}$

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

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

الف) $y = \sqrt{x^2-1} + \sqrt{x-2} \Rightarrow \begin{cases} x^2-1 \geq 0 \Rightarrow x^2 \geq 1 \Rightarrow x \geq 1 \wedge x \leq -1 \\ x-2 \geq 0 \Rightarrow x \geq 2 \end{cases} \Rightarrow x \geq 2$ $\Rightarrow D_f = [2, +\infty)$ ب) $y = \frac{\sqrt{4-x}}{\sqrt{4x-2}} \Rightarrow \begin{cases} 4-x \geq 0 \Rightarrow x \leq 4 \\ 4x-2 > 0 \Rightarrow 4x > 2 \Rightarrow x > \frac{1}{2} \end{cases} \Rightarrow \frac{1}{2} < x \leq 4$ $\Rightarrow D_f = (\frac{1}{2}, 4]$	6
$y = \sqrt{4x-a} + \sqrt{b-x} \Rightarrow \begin{cases} b-x \geq 0 \Rightarrow x \leq \frac{b}{1} \\ 4x-a \geq 0 \Rightarrow x \geq \frac{a}{4} \end{cases} \Rightarrow D_f = \left\{ \frac{b}{4} \right\}$ $\Rightarrow a=12, b=4 \Rightarrow \frac{b}{a} = \frac{1}{3}$ $\frac{b}{a} = \frac{a}{4} = 2$	7
الف) $y = \sqrt{\frac{x^2-x-4}{x^2-13x^2+24}} = f(x) \Rightarrow \frac{x^2-x-4}{x^2-13x^2+24} = \frac{(x-2)(x+2)}{(x-2)(x+2)(x-2)(x+2)} \geq 0$ $\Rightarrow D_f = (-\infty, -2) \cup (2, 2) \cup (2, +\infty)$ ب) $y = \sqrt{\frac{x^2-2x^2-8x+4}{x^2+2x^2-8x-4}} \rightarrow 0 = \text{مخرج} \rightarrow (x-1)(x-2)(x+2) \geq 0$ $\Rightarrow D_f = (-\infty, -2) \cup [-2, -1) \cup [1, 2) \cup [2, +\infty)$	8
الف) $y = \sqrt{2[x]-5} = f(x) \Rightarrow \begin{cases} 2[x]-5 \geq 0 \\ 2[x] \geq 5 \\ [x] \geq 2.5 \end{cases}$ $\Rightarrow x \geq 2.5 \Rightarrow D_f = [2.5, +\infty)$ ب) $y = \sqrt{2[x]-5} = g(x) \Rightarrow \begin{cases} 2[x]-5 \geq 0 \\ 2[x] \geq 0 \\ [x] \geq 2.5 \end{cases}$ $\Rightarrow D_g = [2.5, +\infty)$	9
الف) $y = \sqrt{\frac{x+1}{ x-1 }} + \sqrt{\frac{4-x}{x^2+2x+1}} \Rightarrow \frac{x+1}{ x-1 } \geq 0, \frac{4-x}{x^2+2x+1} \geq 0$ $\Rightarrow D_f = [-1, 3) \cup (3, 4] = [-1, 4] - \{3\}$ ب) $y = \sqrt{[x]-5} + \sqrt{2-[x]} \Rightarrow \begin{cases} [x]-5 \geq 0 \\ 2-[x] \geq 0 \end{cases}$ $[x] \geq 5, [x] \leq 2 \Rightarrow D_f = \emptyset$ $\downarrow$ $[2.5, +\infty)$	10