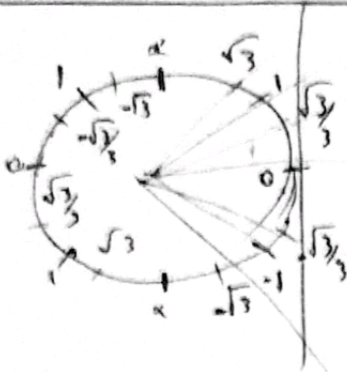




1) $\sin \frac{\pi}{6} + \cos \pi + 2 \tan 3 \frac{\pi}{4} = \frac{1}{2} + (-1) + 2(-1) = -\frac{5}{2}$

2) $-\cos 5 \frac{\pi}{6} + \sin 2 \frac{\pi}{3} - 3 \sin 4 \frac{\pi}{3} = -(-\frac{\sqrt{3}}{2}) + (\frac{\sqrt{3}}{2}) - 3(-\frac{\sqrt{3}}{2}) = 5 \frac{\sqrt{3}}{2}$

3) $\cos 2 \frac{\pi}{3} + 3 \cos 4 \frac{\pi}{3} - 2 \tan 5 \frac{\pi}{6} = -\frac{1}{2} + 3(\frac{1}{2}) - 2(-\frac{\sqrt{3}}{3}) = \frac{4\sqrt{3}}{3}$

4) $\cos(\sin \pi) + \sin(\cos \frac{\pi}{3}) = \cos(0) + \sin(\frac{1}{2}) = 1 + \frac{1}{2} = \frac{3}{2}$

$f(n) \begin{cases} n^2 + 4n \leq n \geq a & \text{if } n \geq a \\ 2n + a + 2 \leq n \leq a \end{cases} \Rightarrow a^2 + 4a = 2a + a + 2$

$\Rightarrow a^2 + a - 2 = 0 \Rightarrow (a-1)^2 = 0 \Rightarrow a = 1 \Rightarrow f(n) \begin{cases} n^2 + 4n \leq n \geq 1 \\ 2n + 3 \leq n \leq 1 \end{cases}$

$\Rightarrow f(1) = 1 + 4 = 5$

$f(n) \begin{cases} 2n^2 + b \leq |n+1| \geq 2 & \text{if } n \geq 3 \\ a + 2n \leq -3 \leq n \leq -1 \end{cases} \Rightarrow \begin{cases} 18-b \\ a-6 \end{cases} \Rightarrow a+b-24=0$

$\Rightarrow a+b=24$

1) $y = \frac{1}{n^3 - 4n^2} \Rightarrow n^3 - 4n^2 = 0 \Rightarrow n^2(n-4) = 0 \Rightarrow n = 0, 4$

2) $y = \frac{1}{2n^3 + 4n^2 + 2n + 4} \rightarrow (2n+4)(n^2+1) = (2n^2+1)(n+2) = 0$

$\Rightarrow n \neq -2 \Rightarrow P_f = \mathbb{R} - \{-2\}$

$$1) y = \sqrt{x^2-1} + \sqrt{x-2} \rightarrow x^2-1 \geq 0 \Rightarrow x \geq 1 \text{ or } x \leq -1$$

$$x-2 \geq 0 \Rightarrow x \geq 2 \quad P_f = [2, +\infty)$$

$$ب) y = \frac{\sqrt{6-3x}}{\sqrt{6x-3}} \rightarrow \begin{cases} 6-3x \geq 0 \Rightarrow 3x \leq 6 \Rightarrow x \leq 2 \\ 6x-3 > 0 \Rightarrow 6x > 3 \Rightarrow x > \frac{1}{2} \end{cases} \quad P_f = (\frac{1}{2}, 2]$$

$$y = \sqrt{6x-a} + \sqrt{b-3x} \xrightarrow{x=2} \sqrt{12-a} + \sqrt{b-6} = 0$$

$$P_f = \{2\} \quad \begin{matrix} a=12 \\ b=6 \end{matrix}$$

$$\Rightarrow \frac{b}{a} = \frac{1}{2}$$

$$الف) \sqrt{\frac{x^2-x-6}{x^4-13x^2+36}} = \sqrt{\frac{(x-3)(x+2)}{(x-3)(x+3)(x-2)(x+2)}}$$

$$\Rightarrow \begin{matrix} -3 & -2^+ & 2 & 3^+ \\ + & - & - & + \end{matrix}$$

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

$$ب) \sqrt{\frac{(x-3)(x-1)(x+2)}{(x-2)(x+1)(x+3)}}$$

$$\begin{matrix} -3 & -2 & -1 & 1 & 2 & 3 \\ + & - & + & - & + & - \end{matrix}$$

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

$$1) y = \sqrt{2[x]-4} \rightarrow 2[x]-4 \geq 0 \Rightarrow [x] \geq 2 \Rightarrow x \geq 2 \Rightarrow P_f = [2, +\infty)$$

$$ب) y = \sqrt{2[x]-5} \Rightarrow 2[x] \geq 5 \Rightarrow [x] \geq 2.5 \Rightarrow [x] \geq 3 \Rightarrow x \geq 3$$

$$\Rightarrow P_f = [3, +\infty)$$

$$الف) \begin{cases} x \geq -1 \\ x \neq 3 \end{cases}, \begin{cases} x \leq 6 \\ 0 < x < 1 \text{ or } x > 2 \end{cases} \Rightarrow P_f = [-1, 6] - \{3\}$$

$$ب) \sqrt{[x]-4} + \sqrt{2-[x]} \Rightarrow \begin{cases} [x]-4 \geq 0 \Rightarrow [x] \geq 4 \Rightarrow x \geq 4 \\ 2-[x] \geq 0 \Rightarrow [x] \leq 2 \end{cases} \quad ①$$

$$[x]-4 \geq 0 \Rightarrow [x] \geq 4 \Rightarrow x \geq 4 \quad ② \quad P_f = \emptyset$$