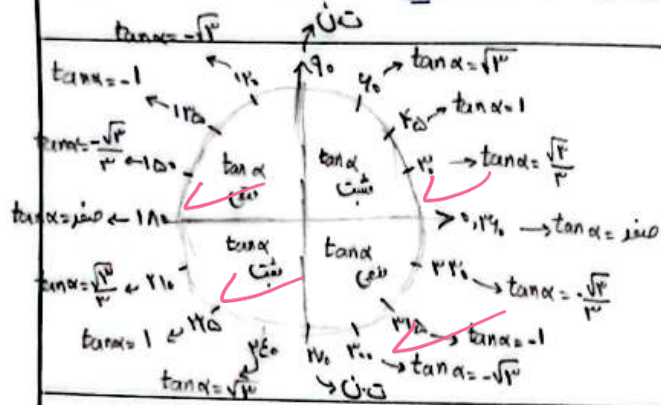




$$\tan \alpha = \frac{\sin \alpha}{\cos \alpha}$$

$$\tan 45^\circ = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = \frac{\sqrt{2}}{\sqrt{2}} = 1$$

$$\frac{\sqrt{2}}{2}$$

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

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

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

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

$$f(x) = \begin{cases} x^2 + 2x & x \geq a \\ 2x + a + 2 & x < a \end{cases}$$

$$a^2 + 2a = 2a + a + 2$$

$$a^2 + 2a - 2a - 2 = 0$$

$$a^2 + a - 2 = 0$$

$$(a+2)(a-1) = 0 \rightarrow a = 1 \checkmark$$

$$a = -2 \text{ غلط}$$

$$f(1) = 1^2 + 2 = 3$$

$$f(1) = 2 + 1 + 2 = 5$$

$$f(x) = \begin{cases} 2x^2 - 6 & |x+1| \geq 2 \\ a + 2x & -2 \leq x+1 < -1 \end{cases}$$

$$x+1 \geq 2 \rightarrow x \geq 1$$

$$x+1 < -2 \rightarrow x < -3$$

$$x = -3 \rightarrow 2(-3)^2 - 6 = a + 2(-3)$$

$$18 - 6 = a - 6$$

$$a = 18$$

الف) $y = \frac{1}{x^2 - 4x}$

$$x^2 - 4x \neq 0$$

$$x^2(x-4) \neq 0$$

$$x \neq 4, 0$$

$$\rightarrow \mathbb{R} - \{0, 4\}$$

ب) $y = \frac{1}{x^2 + 4x + 4}$

$$x^2 + 4x + 4 \neq 0$$

$$x^2 + 4x + 4 \neq 0$$

$$\rightarrow x^2 + 4x + 4 = (x+2)^2 \neq 0$$

$$\rightarrow x \neq -2$$

$$\rightarrow \mathbb{R} - \{-2\}$$

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

$$\begin{aligned} x^2-1 &> 0 \\ x^2 &> 1 \\ x > 1 \text{ or } x < -1 \\ (-\infty, -1] \cup [1, +\infty) \end{aligned}$$

$$\begin{aligned} x-2 &> 0 \\ x &> 2 \\ [2, +\infty) \end{aligned} \Rightarrow D_f = [2, +\infty)$$

$$\text{ب) } \frac{\sqrt{4-x^2}}{\sqrt{4x-1^2}} =$$

$$\begin{aligned} 4-x^2 &> 0 \\ x^2 &< 4 \\ -2 < x < 2 \end{aligned}$$

$$\begin{aligned} 4x-1^2 &> 0 \\ 4x &> 1 \\ x &> \frac{1}{4} \end{aligned}$$

$$\Rightarrow \left(\frac{1}{4}, 2 \right]$$

$$y = \sqrt{4x-a} + \sqrt{b-1^2x}$$

$$\frac{b}{a} = \frac{4}{1^2} = \frac{1}{1^2} = 1$$

$$\begin{aligned} 4x-a &= 0 \\ 1^2 \cdot a &= 1^2 \end{aligned}$$

$$\begin{aligned} b-1^2x &= 0 \\ b &= 4 \end{aligned}$$

$$4x-a \geq 0 \rightarrow x \geq \frac{a}{4}$$

$$\frac{a}{4} = 1 \rightarrow a = 4$$

$$b-1^2x \geq 0 \rightarrow x \leq \frac{b}{1^2}$$

$$\frac{b}{1^2} = 2 \rightarrow b = 4$$

$$\text{الف) } \frac{x^2-x-4}{\sqrt{x^2-1^2x+4}} \rightarrow \frac{(x-1)(x+4)}{x^2-1^2x+4} \geq 0$$

$$\begin{aligned} x^2-1^2x+4 &= 0 \\ (x-1)(x+4) &= 0 \\ x &= 1, -4 \end{aligned}$$

$$x^2 = x^2 \leq 4 \rightarrow x \leq \pm 2$$

$$\frac{-1^2-1^2+4}{+} \frac{-1^2-1^2+4}{+} \frac{1^2-1^2+4}{+} \frac{1^2-1^2+4}{+}$$

$$D_f = (-\infty, -1) \cup (1, +\infty)$$

$$\text{ب) } \frac{x^2-1^2x-a^2x+4}{x^2+1^2x-a^2x-4}$$

$$\begin{aligned} (x+1)(x-1) &\rightarrow x = -1, +1 \\ \frac{(x-1)(x^2-x-4)}{(x+1)(x^2-x-4)} &\rightarrow (x+1)(x-1) \rightarrow x = -1, +1 \end{aligned}$$

$$\frac{-1^2-1^2-1^2+4}{+} \frac{-1^2-1^2-1^2+4}{+} \frac{1^2-1^2-1^2+4}{+} \frac{1^2-1^2-1^2+4}{+}$$

$$D_f = (-\infty, -1) \cup (-1, 1) \cup (1, +\infty)$$

$$\text{الف) } y = \sqrt{2[x]-1}$$

$$2[x] \geq 1 \quad [x] \geq \frac{1}{2} \quad x \geq \frac{1}{2}$$

$$D_f = [0.5, +\infty)$$

$$\text{ب) } y = \sqrt{2[x]-5}$$

$$2[x]-5 \geq 0 \quad 2[x] \geq 5 \quad [x] \geq \frac{5}{2} = 2.5$$

$$D_f = [2.5, +\infty)$$

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

$$\begin{aligned} x+1 &> 0 \\ x &> -1 \end{aligned} \quad x \neq 1$$

$$\frac{4-x}{x^2+1^2x+1^2} \geq 0 \quad [4, +\infty)$$

$$D_f = [-1, 1) \cup (1, 4]$$

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

$$[x] \geq 1 \quad x \geq [x]$$

$$[x, +\infty) \cap (-\infty, 1] = \emptyset$$

$$D_f = \emptyset$$