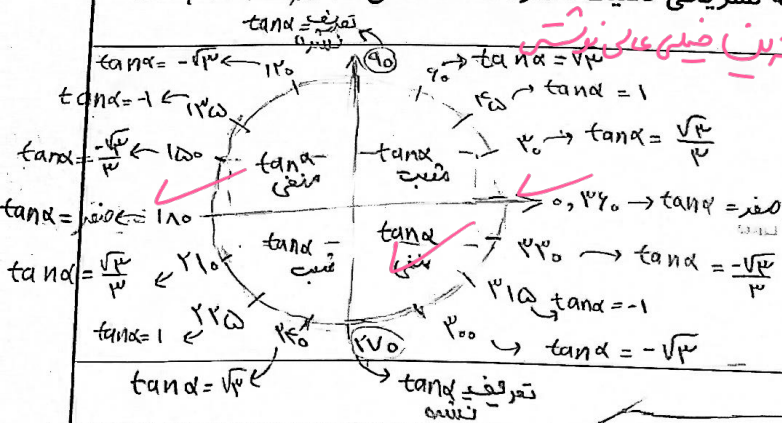




$$\tan \alpha = \frac{\sin \alpha}{\cos \alpha}$$

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

$$\tan 60^\circ = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \frac{\sqrt{3}}{1} = \sqrt{3}$$

$$\tan 135^\circ = \frac{-\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = -1$$

$$\tan 90^\circ = \frac{1}{0} = \text{تعیین نشده}$$

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

ب) $-\cos \frac{5\pi}{4} + \sin \frac{3\pi}{4} - 3 \sin \frac{7\pi}{4} = +\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} - 3(-\frac{\sqrt{2}}{2}) = +\frac{5\sqrt{2}}{2}$

ج) $\cot \frac{\pi}{4} + 2 \cot \frac{5\pi}{4} - 2 \tan \frac{5\pi}{4} = \frac{1}{1} + 2(\frac{1}{1}) - 2(\frac{1}{1}) = \frac{1+2-2}{1} = \frac{1}{1}$

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

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

$$a^2 + 2a = 2a + a + 2 \quad a > 0$$

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

$$a^2 + a - 2 = 0 \quad (a+2)(a-1) \Rightarrow a = 1$$

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

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

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

$$a + b = ?$$

$$x = -3$$

$$2 \times 9 - b = a + 2(-3)$$

$$18 - b = a - 6$$

$$a + b = 24$$

الف) $y = \frac{1}{x^3 - 2x^2}$

$$x^3 - 2x^2 \neq 0$$

$$x^2(x-2) \neq 0 \rightarrow x \neq 0, 2 \rightarrow \mathbb{R} - \{0, 2\}$$

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

$$2x^3 + 2x^2 + 2x + 2 \neq 0$$

$$2(x^3 + x^2 + x + 1) \neq 0$$

$$2(x^2(x+1) + (x+1)) = 2(x+1)(x^2+1)$$

$$DF = \mathbb{R} - \{-2\}$$

ملاحظه: $x^2 + 1 > 0$ و $x \neq -2$

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

$$x^2-1 \geq 0 \quad x^2 \geq 1 \quad x \geq 1 \quad x \leq -1$$

$$x-2 \geq 0 \quad x \geq 2 \rightarrow \cancel{(-\infty, 2)} \cup [2, +\infty) \text{ II}$$

$$(-\infty, -1] \cup [1, +\infty) \text{ I}$$

$$\text{المجال} \rightarrow I \cap \text{II} \rightarrow Df : [2, +\infty)$$

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

$$4-x^2 \geq 0 \quad 4 \geq x^2 \quad 2 \geq x$$

$$4x-4 \geq 0 \quad 4x \geq 4 \quad x \geq 1 \quad x \geq \frac{4}{4} = 1$$

$$\Rightarrow \cancel{(-\infty, 1)} \cup [1, 2]$$

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

$$4x^2-a=0$$

$$4x=a$$

$$b-x^2=0$$

$$b=4$$

$$\frac{b}{a} = \frac{4}{16} = \frac{1}{4}$$

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

$$\text{الف) } \sqrt{\frac{(x^2-x-6)}{(x^2-1)(x^2-4)}} \quad \begin{array}{c} -3 \quad -1 \quad 1 \quad 3 \\ + \quad - \quad - \quad + \end{array}$$

$$t^2-13t+34=0$$

$$(t-9)(t-4)=0 \rightarrow t=9, 4$$

$$=x^2=4 \leq 9 \rightarrow x \leq \pm 2$$

$$Df : (-\infty, -3) \cup (2, 3) \cup (3, +\infty)$$

$$\text{ب) } \sqrt{\frac{x^3-3x^2-5x+4}{x^4+5x^2-5x-4}} \rightarrow (x-1) \sqrt{\frac{(x-1)(x^2-x-4)}{(x+1)(x^2+x-4)}}$$

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

$$\begin{array}{c} -3 \quad -1 \quad 1 \quad 2 \quad 3 \\ + \quad - \quad + \quad - \quad + \end{array}$$

$$\text{الف) } y = \sqrt{2[x]-4}$$

$$2[x] \geq 4 \quad [x] \geq 2 \quad 2 \leq x$$

$$Df = [2, +\infty)$$

$$\text{ب) } y = \sqrt{2[x]-5}$$

$$2[x]-5 \geq 0$$

$$2[x] \geq 5$$

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

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

$$\text{الف) } y = \sqrt{\frac{x+1}{|x-3|}} + \sqrt{\frac{4-x}{x^2+2x+1}}$$

$$Df : [-1, 3) \cup (3, 4]$$

$$\begin{array}{c} x+1 \geq 0 \\ x \geq -1 \\ x \neq 3 \end{array}$$

$$\begin{array}{c} 4-x \geq 0 \\ x \leq 4 \end{array}$$

$$\text{ب) } y = \sqrt{[x]-4} + \sqrt{4-[x]}$$

$$[x] \geq 4$$

$$[4, +\infty)$$

$$4 \geq [x] \quad (-\infty, 4)$$

$$Df = \emptyset$$