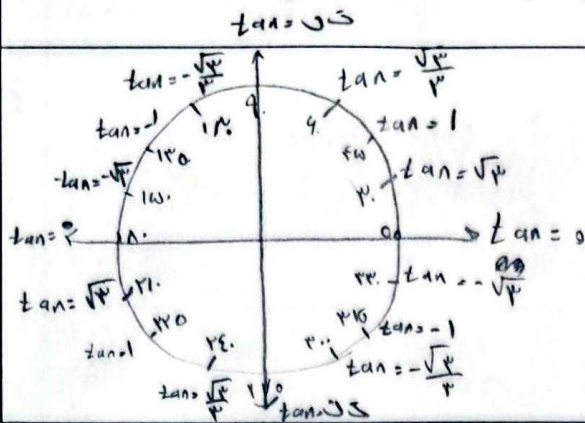




۱

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

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

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

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

$f(x) = \begin{cases} x^2 + 2x & x \geq a \\ 2x + a + 2 & x < a \end{cases}$ $\frac{a-a}{x=a} \rightarrow a^2 + 2a = 2a + a + 2 \rightarrow a^2 + a - 2 = 0$
 $(a-1)(a+2) = 0$
 غلط -2 ✓ 1 $\rightarrow$ فرض $a=1$ $\checkmark$ $\rightarrow$ افق

$\rightarrow f(x) = \begin{cases} x^2 + 2x & x \geq 1 \\ 2x + 3 & x < 1 \end{cases} \rightarrow f(1) = 3$

۳

$f(x) = \begin{cases} 2x^2 - b & |x+1| \geq 2 \\ a + 2x & -2 \leq x \leq -1 \end{cases}$ $\xrightarrow{x \geq -1} x \geq 1$ $\xrightarrow{x < -1} x \leq -2$ $x = -2 \rightarrow 18 - b = a + 4 \rightarrow 18 - b = a + 4$

$\rightarrow 18 - b = a + 4 \rightarrow a + b = 14$

۴

$g = \frac{1}{x^2 - 2x^2} \rightarrow x^2(x-2) \neq 0 \rightarrow x \in \mathbb{R} - \{0, 2\}$

۵

$g = \frac{1}{2x^2 + 2x^2 + 2x + 2} = \frac{1}{2(x^2 + x^2 + x + 1)} \rightarrow \frac{1}{2((x+1)(x^2+1))}$
 $P_f = \mathbb{R} - \{-1, i, -i\}$

$$y = \sqrt{x^2 - 1} + \sqrt{x - 2} \rightarrow D_f = [2, +\infty)$$

$$x^2 - 1 \geq 0 \rightarrow x \geq 1$$

$$y = \frac{\sqrt{4 - 3x}}{\sqrt{4x - 3}} \rightarrow \begin{cases} 4 \geq 3x \rightarrow x \leq \frac{4}{3} \\ 4x - 3 \geq 0 \rightarrow x \geq \frac{3}{4} \end{cases} \rightarrow D_f = \left[\frac{3}{4}, \frac{4}{3}\right]$$

$$y = \sqrt{4x - a} + \sqrt{b - 3x}$$

وقتی باشد
به عنوان یکتا در ۲ مشتق هستند

$$\frac{a}{4} = 2 \rightarrow a = 8$$

$$\frac{b}{3} = 2 \rightarrow b = 6$$

$$\frac{b}{a} = \frac{6}{8} = \frac{3}{4}$$

$$y = \sqrt{\frac{x^2 - x - 4}{x^3 - 11x^2 + 34x - 4}} = \sqrt{\frac{(x+2)(x-3)}{(x-4)(x-9)}}$$

$$x^2 = t \rightarrow t^2 - 11t + 34 = 0$$

$$t = 4 \rightarrow x = 2$$

$$t = 9 \rightarrow x = 3$$

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

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

$$y = \sqrt{2[x] - 8} \rightarrow 2[x] - 8 \geq 0 \rightarrow [x] \geq 4 \rightarrow [4, +\infty)$$

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

$$D_f = [-1, 4]$$

$$y = \sqrt{[x] - 4} + \sqrt{2 - [x]} \rightarrow [4, +\infty) \cap (-\infty, 2] = \emptyset \rightarrow D_f = \emptyset$$