

$\frac{(x-1)(x^2-x-4)}{(x+1)(x^2+x-4)} = \frac{(x-1)(x-2)(x+2)}{(x+1)(x+2)(x-2)} = \frac{-1}{x-2} = \frac{-1}{x-2} = \frac{-1}{x-2}$
 $\Rightarrow P_f = (-\infty, -2) \cup (-2, 2) \cup (2, +\infty)$

ا) $y = \sqrt{x^2-1} + \sqrt{x-2}$ $x^2-1 \geq 0 \Rightarrow \frac{-1+1}{+2-2+}$

$x-2 \geq 0 \Rightarrow x \geq 2 \Rightarrow (-\infty, -1] \cup [1, +\infty) \cap [2, +\infty) = [2, +\infty)$

ب) $y = \frac{\sqrt{4-x}}{\sqrt{4x-2}}$ $4-x \geq 0 \Rightarrow x \leq 4 \Rightarrow x \leq 4$
 $4x-2 \geq 0 \Rightarrow 4x \geq 2 \Rightarrow x \geq \frac{1}{2}$ $\Rightarrow P_f = [\frac{1}{2}, 4]$

$4x-a \geq 0 \Rightarrow 4x \geq a \Rightarrow x \geq \frac{a}{4}$
 $b-2x \geq 0 \Rightarrow -2x \geq -b \Rightarrow x \leq \frac{b}{2}$ $\Rightarrow P = \{x\}$
 $\Rightarrow \frac{a}{4} = \frac{b}{2} = 1 \Rightarrow a=4, b=2 \Rightarrow \frac{a}{b} = \frac{4}{2} = 2$

ا) $\frac{x^2-x-4}{x^2-14x+4} = \frac{(x-2)(x+2)}{(x^2-2)(x^2-2)} = \frac{-1}{x-2} = \frac{-1}{x-2}$
 $\Rightarrow P_f = (-\infty, -2) \cup (-2, 2) \cup (2, +\infty) = \mathbb{R} \setminus \{2\}$
 ب) $\frac{x^2-2x^2-11x+4}{x^2+2x^2-11x-4} = \frac{(x-1)^2+(x+1)(x-4)}{(x+1)^2+(x+1)(x+4)} = \frac{(x-1)^2+(x+1)(x-4)}{(x+1)^2+(x+1)(x+4)}$

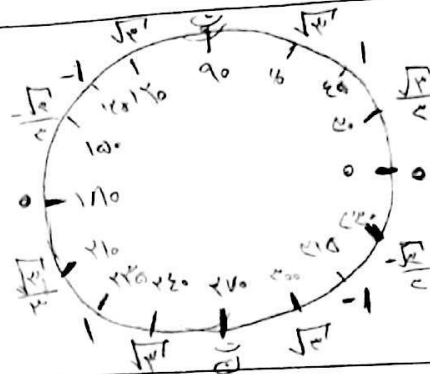
ا) $y = \sqrt{x[x]-2}$ $x[x]-2 \geq 0 \Rightarrow [x] \geq 2 \Rightarrow P_f = [2, +\infty)$

ب) $y = \sqrt{x[x]-a}$ $x[x]-a \geq 0 \Rightarrow [x] \geq \frac{a}{x} \Rightarrow P_f = [\frac{a}{x}, +\infty)$

ا) $y = \sqrt{\frac{x+1}{|x-1|}} + \sqrt{\frac{4-x}{x^2+x+2}}$
 $\frac{-1}{+2-2+} \cap \frac{+1}{+2+2-} = (-\infty, -1] \cup (1, 2) \cup \{2\}$

ب) $\sqrt{x[x]-2} + \sqrt{x-[x]}$
 $[x]-2 \geq 0 \Rightarrow [x] \geq 2 \Rightarrow x \geq 2$, $x-[x] \geq 0 \Rightarrow [x] \leq x \Rightarrow x < 2$

$\Rightarrow P_f = \emptyset$



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

$$b) -\cos \frac{\pi}{4} + \sin \frac{\pi}{4} - \tan \frac{\pi}{4} + \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} - \sqrt{3} \times \frac{\sqrt{3}}{2} = -\frac{\sqrt{3}}{2}$$

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

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

$$f(x) \begin{cases} x^2 + \varepsilon x & x > a \\ 2x + a + \varepsilon & x \leq a \end{cases} \quad x=a: a^2 + \varepsilon a \Rightarrow a^2 + \varepsilon a = 2a + \varepsilon \quad \begin{cases} a=1 \\ a=\frac{1}{2} \\ a>0 \end{cases}$$

$\Rightarrow f(1) = 1 + \varepsilon(1) = a$

$$f(x) \begin{cases} 2x^2 - b & |x+1| \geq 2 \quad x = -3: 11-b \\ a + 2x & -4 \leq x \leq -1 \quad x = -3: a-4 \end{cases}$$

$$\Rightarrow 11-b = a-4 \Rightarrow a+b = 15$$

$$D_f = \frac{1}{x^2 - \varepsilon x^2} \quad x^2 - \varepsilon x^2 \neq 0 \Rightarrow x^2(x - \varepsilon) \neq 0 \Rightarrow x \neq \varepsilon, 0$$

$$D_f = \mathbb{R} - \{0, \varepsilon\}$$

$$p) y = \frac{1}{2x^2 + \varepsilon x^2 + 2x + \varepsilon} \quad 2(x^2(x+1) + (x+1)) \neq 0 \Rightarrow 2(x+1)(x^2+1) \neq 0 \Rightarrow x \neq -1 \quad x^2 \neq -1 \Rightarrow \mathbb{R} - \{-1\}$$