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الف) $x^2 - 8x + 6 > 0 \rightarrow (x-2)(x-3) > 0 \rightarrow \begin{array}{c|ccc} x & 2 & 3 & \\ \hline y & + & - & + \end{array} \quad x = (3, +\infty) \cup (-\infty, 2)$

ب) $x^2 - 6x + 8 < 0 \rightarrow (x-2)(x-4) < 0 \rightarrow \begin{array}{c|ccc} x & 2 & 4 & \\ \hline y & + & - & + \end{array} \quad x = (2, 4)$

ج) $x^2 + 6x + 8 > 0 \rightarrow (x+1)(x+8) > 0 \rightarrow \begin{array}{c|ccc} x & -1 & -8 & \\ \hline y & + & - & + \end{array} \quad x = (-\infty, -1] \cup [-8, +\infty)$

د) $x^2 - 7x + 6 < 0 \rightarrow (x-1)(x-6) < 0 \rightarrow \begin{array}{c|ccc} x & 1 & 6 & \\ \hline y & + & - & + \end{array} \quad x = (1, 6)$

الف) $\frac{x^2 - 2x + 2}{x-5} < 0 \rightarrow \frac{(x-1)(x-1)}{x-5} < 0 \rightarrow \begin{array}{c|ccc} x & 1 & 5 & \\ \hline y & - & + & - \end{array} \quad x = (-\infty, 1) \cup (5, +\infty)$

ب) $\frac{x^2 - 1}{x^2 - 6x + 8} \geq 0 \rightarrow \frac{(x-1)(x+1)}{(x-2)(x-4)} \geq 0 \rightarrow \begin{array}{c|ccc} x & -1 & 2 & 4 \\ \hline y & + & - & + \end{array} \quad x = (-\infty, -1] \cup (2, 4) \cup (4, +\infty)$

الف) $y = \sqrt{\frac{x^2 - 1}{x^2 - x}} \rightarrow y = \sqrt{\frac{(x-1)(x+1)}{x(x-1)(x+1)}} \rightarrow \begin{array}{c|ccc} x & -1 & 0 & 1 \\ \hline y & + & - & + \end{array} \quad D_f = (-\infty, -1) \cup (0, 1) \cup (1, +\infty)$

ب) $y = \sqrt{\frac{x^2 - 16}{x^2 - 8x + 16}} \rightarrow y = \sqrt{\frac{(x-4)(x+4)}{(x-4)(x-4)}} \rightarrow \begin{array}{c|ccc} x & -4 & 4 & \\ \hline y & + & - & + \end{array} \quad D_f = (-\infty, -4] \cup (4, 4) \cup (4, +\infty)$

الف) $y = \sqrt{4 - 2x^2} \rightarrow 4 - 2x^2 \geq 0 \rightarrow 2x^2 \leq 4 \rightarrow x^2 \leq 2 \rightarrow -\sqrt{2} \leq x \leq \sqrt{2} \quad D_f = [-\sqrt{2}, \sqrt{2}]$

ب) $y = \sqrt{4|x-9|} \rightarrow 4|x-9| \geq 0 \rightarrow |x-9| \geq 0 \rightarrow |x| \geq 9 \rightarrow x \geq 9 \text{ or } x \leq -9 \quad D_f = (-\infty, -9] \cup [9, +\infty)$

$$\text{الف) } y = \sqrt{4 - \sqrt{2-x}} \rightarrow 4 - x \geq 0 \rightarrow x \leq 4 \rightarrow D_f = [-1, 4]$$

$$4 - \sqrt{2-x} \geq 0 \rightarrow \sqrt{2-x} \leq 4 \rightarrow 2-x \leq 16 \rightarrow x \geq -14$$

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$$\text{ب) } y = \sqrt{4 - \sqrt{2-x}} \rightarrow x - 2 \geq 0 \rightarrow x \geq 2 \rightarrow D_f = [2, 11]$$

$$4 - \sqrt{2-x} \geq 0 \rightarrow \sqrt{2-x} \leq 4 \rightarrow 2-x \leq 16 \rightarrow x \geq -14$$

$$\text{الف) } y = \sqrt{\frac{|x|+1}{|x|-2}} \rightarrow |x|-2 \neq 0 \quad |x| \neq 2 \quad x \neq \pm 2 \rightarrow D_f = \mathbb{R} - \{-2, 2\}$$

$$\text{ب) } y = \sqrt{\frac{\sqrt{x}+1}{\sqrt{x}-2}} \rightarrow x \geq 0, \sqrt{x}-2 \neq 0 \rightarrow \sqrt{x} \neq 2 \quad x \neq 4$$

$$D_f = [0, +\infty) - \{4\}$$

$$\text{الف) } y = \frac{\sin x}{\cos x - 1} \rightarrow \cos x - 1 \neq 0 \rightarrow \cos x \neq 1 \rightarrow D_f = \mathbb{R} - \{k\pi \pm \frac{\pi}{2}\}$$

$$\text{ب) } y = \frac{\cos x + 1}{\sin x + 1} \rightarrow \sin x + 1 \neq 0 \quad \sin x \neq -1 \rightarrow D_f = \mathbb{R} - \{k\pi + \frac{3\pi}{2}, k\pi + \frac{11\pi}{2}\}$$

$$\text{ج) } y = \frac{\tan x + 1}{\cot x - 1} \rightarrow \begin{matrix} \cos x \neq 0 \\ \sin x \neq 0 \end{matrix}, \cos x \neq \sin x \rightarrow D_f = \mathbb{R} - \{k\pi, k\pi + \frac{\pi}{4}, k\pi + \frac{3\pi}{4}\}$$

$$\text{د) } y = \frac{\sin x + 1}{\sinh x - 2} \rightarrow \sinh x - 2 \neq 0 \rightarrow \sinh x \neq 2 \rightarrow \sin x \neq \pm \frac{\sqrt{5}}{2} \rightarrow D_f = \mathbb{R} - \{k\pi \pm \frac{\pi}{2}\}$$

$$y = \frac{1}{\sqrt{2|x-2| - \frac{1}{2}}} \rightarrow 2|x-2| - \frac{1}{2} > 0 \rightarrow 2|x-2| > \frac{1}{2}$$

$$\rightarrow |x-2| > \frac{1}{4} \rightarrow \begin{matrix} x-2 > \frac{1}{4} \\ x-2 < -\frac{1}{4} \end{matrix} \rightarrow \begin{matrix} x > \frac{9}{4} \\ x < \frac{7}{4} \end{matrix} \rightarrow D_f = (-\infty, \frac{7}{4}) \cup (\frac{9}{4}, +\infty)$$

$$\text{الف) } y = \sqrt{4 - 2|x|} \rightarrow 4 - 2|x| \geq 0 \rightarrow 2|x| \leq 4 \rightarrow |x| \leq 2 \rightarrow -2 \leq x \leq 2$$

$$D_f = [-2, 2]$$

$$\text{ب) } y = \sqrt{\frac{|x|}{|x|}} \rightarrow |x| \neq 0 \rightarrow x \neq 0$$

$$\frac{|x|}{|x|} \geq 0 \rightarrow \text{مستقيم برقرار است}$$

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