

الف) $y = \frac{x+2}{x^3 - 2x^2 + 3x - 12}$ $\rightarrow x^3 - 2x^2 + 3x - 12 = 0 \rightarrow (x-4)(x^2 + x - 3) = 0$ $\rightarrow x = 4, x = \frac{-1 \pm \sqrt{13}}{2}$ $\rightarrow D_f = \mathbb{R} - \{4, \frac{-1 \pm \sqrt{13}}{2}\}$

ب) $y = \frac{x+2}{x^3 - 2x^2 + 3x - 12}$ $\rightarrow x^3 - 2x^2 + 3x - 12 = 0 \rightarrow (x-4)(x^2 + x - 3) = 0$ $\rightarrow x = 4, x = \frac{-1 \pm \sqrt{13}}{2}$ $\rightarrow D_f = \mathbb{R} - \{4, \frac{-1 \pm \sqrt{13}}{2}\}$

الف) $y = \frac{x+1}{x - \sqrt{3x-2}}$ $\rightarrow x - \sqrt{3x-2} \neq 0 \rightarrow x \neq \sqrt{3x-2} \rightarrow x^2 \neq 3x-2 \rightarrow x^2 - 3x + 2 = 0 \rightarrow (x-1)(x-2) = 0 \rightarrow x = 1, 2$ $\rightarrow D_f = \mathbb{R} - \{1, 2\}$

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الف) $y = \frac{\sin x}{x \cos x - 1}$ $\rightarrow x \cos x - 1 \neq 0 \rightarrow x \cos x \neq 1 \rightarrow (x, y) \rightarrow D_f = \mathbb{R} - \{x \mid x \cos x = 1\}$

ب) $y = \frac{\cos x + 1}{x \sin x + 1}$ $\rightarrow x \sin x + 1 \neq 0 \rightarrow x \sin x \neq -1 \rightarrow (x, y) \rightarrow D_f = \mathbb{R} - \{x \mid x \sin x = -1\}$

ج) $y = \frac{\tan x + 2}{\cot x - 1}$ $\rightarrow \cot x - 1 \neq 0 \rightarrow \cot x \neq 1 \rightarrow (x, y) \rightarrow D_f = \mathbb{R} - \{x \mid \cot x = 1\}$

د) $y = \frac{\sin x + 1}{x \sin x - 2}$ $\rightarrow x \sin x - 2 \neq 0 \rightarrow x \sin x \neq 2 \rightarrow (x, y) \rightarrow D_f = \mathbb{R} - \{x \mid x \sin x = 2\}$

الف) $x^2 - 8x + 4 > 0 \rightarrow (x-4)(x-1) > 0 \rightarrow x < 1 \text{ or } x > 4 \rightarrow D_f = (-\infty, 1) \cup (4, \infty)$

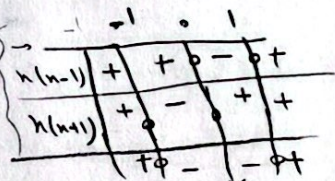
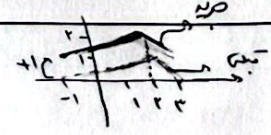
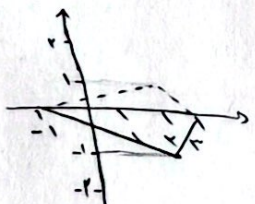
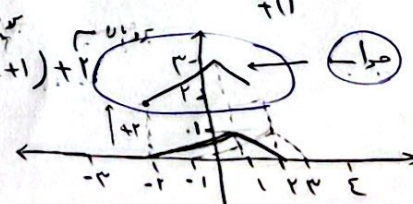
ب) $x^2 - 4x + 8 < 0 \rightarrow (x-1)(x-3) < 0 \rightarrow 1 < x < 3 \rightarrow D_f = (1, 3)$

ج) $x^2 + 4x + 8 > 0 \rightarrow (x+1)(x+8) > 0 \rightarrow x < -8 \text{ or } x > -1 \rightarrow D_f = (-\infty, -8) \cup (-1, \infty)$

د) $x^2 - 7x + 4 \leq 0 \rightarrow (x-1)(x-4) \leq 0 \rightarrow 1 \leq x \leq 4 \rightarrow D_f = [1, 4]$

الف) $\frac{x^2 - 3x + 2}{x - 8} < 0 \rightarrow \frac{(x-1)(x-2)}{(x-8)} < 0 \rightarrow D_f = (-\infty, 1) \cup (2, 8) \cup (8, \infty)$

ب) $\frac{x^2 - 1}{x^2 - 4x + 8} > 0 \rightarrow \frac{(x-1)(x+1)}{(x-2)(x-4)} > 0 \rightarrow D_f = (-\infty, -1) \cup (1, 2) \cup (4, \infty)$

الف) $y = \sqrt{\frac{x^2 - 4x + 3}{x^2 - 1}} \Rightarrow \frac{(x-1)(x-3)}{(x-1)(x^2+1)} \rightarrow \frac{1}{x-3} + \frac{1}{x+1} \rightarrow DR = [3, +\infty) \cup \{1\}$ ب) $y = \sqrt{\frac{x^2 - 4x + 3}{x^2 - 1}} \rightarrow x^2 - 1 \neq 0 \rightarrow x \neq 1 \rightarrow x \neq (-1, 1) \rightarrow DR = \mathbb{R} - \{1, -1\}$	6
الف) $y = \log(x^2 - 2x) \rightarrow x^2 - 2x > 0 \rightarrow x(x-2) > 0 \rightarrow \frac{1}{x-2} + \frac{1}{x} \rightarrow DR = (-\infty, 0) \cup (2, +\infty)$ ب) $y = \log \frac{4-x^2}{x^2-1} \rightarrow \frac{4-x^2}{x^2-1} > 0 \rightarrow 4 > x^2 \rightarrow -2 < x < 2 \rightarrow DR = (-2, 2)$ ج) $y = \log \frac{x^2 - 4x + 3}{x^2 - 1} \rightarrow \frac{x^2 - 4x + 3}{x^2 - 1} > 0 \rightarrow \frac{(x-1)(x-3)}{(x-1)(x+1)} > 0 \rightarrow \frac{1}{x-3} + \frac{1}{x+1} \rightarrow DR = (-\infty, -1) \cup (3, +\infty)$ د) $y = \sqrt{x^2 - 4x + 3} + \log_x \sqrt{4-x^2} \rightarrow \sqrt{4-x^2} > 0 \rightarrow -2 < x < 2$	7
$y = \frac{x^2 - x}{x^2 + x} \rightarrow \frac{x(x-1)}{x(x+1)} \rightarrow \frac{-1}{x-1} + \frac{1}{x+1}$ ل) $\frac{x(x-1)}{x(x+1)}$ 	8
$y = \sqrt{\frac{x-f(x)}{f(x)}} \rightarrow (3, -1) \quad \begin{matrix} -2 & -1 & 2 & 3 \\ - & + & - & + \end{matrix} \rightarrow f(x) > x$ $DR = (-2, -1] \cup [2, 3]$	9
الف) $f(x) + 1$  ب) $f(x-1)$  ج) $-f(x)$  د) $f(x+1) + 1$ 	10