

الف) $y = \frac{x+5}{5x^2 - 10x^2 + 31x - 15}$ $\frac{x+5}{(x-1)(x-3)(x-5)}$

$$\begin{array}{r} 5x^2 - 10x^2 + 31x - 15 : x-1 \\ \underline{5x^2 + 5x} \\ -15x - 15 \\ \underline{-15x + 15} \\ 30x - 15 \\ \underline{30x - 30} \\ 15 \end{array}$$

$D_f = R - \{1, \frac{3}{5}, \frac{5}{3}\}$

ب) $y = \frac{x+3}{x^2 - x^2 - 11x - 6}$ $\frac{x+3}{x^2 - 11x - 6}$

$$\begin{array}{r} x^2 - 11x - 6 : x+3 \\ \underline{x^2 + 3x} \\ -14x - 6 \\ \underline{-14x - 42} \\ 36 \end{array}$$

$D_f = R - \{-1, 2, -\frac{2}{3}\}$

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

$3-2x \geq 0 \rightarrow 2x \leq 3 \rightarrow x \leq \frac{3}{2}$
 $x - \sqrt{3-2x} \neq 0 \rightarrow x \neq \sqrt{3-2x} \rightarrow x^2 \neq 3-2x \rightarrow x^2 + 2x - 3 \neq 0$
 $(x-1)(x+3) \neq 0 \rightarrow x \neq 1$ و $x \neq -3$

$D_f = (-\infty, \frac{3}{2}] - \{1\}$

ب) $y = \frac{x+2}{x - \sqrt{3x-2}}$

$3x-2 \geq 0 \rightarrow 3x \geq 2 \rightarrow x \geq \frac{2}{3}$
 $x - \sqrt{3x-2} \neq 0 \rightarrow x \neq \sqrt{3x-2} \rightarrow x^2 \neq 3x-2 \rightarrow x^2 - 3x + 2 \neq 0$
 $(x-1)(x-2) \neq 0 \rightarrow x \neq 1$ و $x \neq 2$

$D_f = [\frac{2}{3}, +\infty) - \{1, 2\}$

الف) $y = \frac{\sin x}{\sqrt{\cos x - 1}}$

$\sqrt{\cos x - 1} \neq 0 \rightarrow \cos x \neq 1 \rightarrow \cos x \neq \frac{1}{1} \rightarrow x \neq \frac{\pi}{2}, \frac{3\pi}{2}$
 $D_f = R - \{2k\pi \pm \frac{\pi}{2}\}$

ب) $y = \frac{\cos x + 1}{\sqrt{\sin x + 1}}$

$\sqrt{\sin x + 1} \neq 0 \rightarrow \sin x \neq -1 \rightarrow \sin x \neq -\frac{1}{1} \rightarrow x \neq \frac{3\pi}{2}, \frac{5\pi}{2}$
 $D_f = R - \{2k\pi + \frac{3\pi}{2}, 2k\pi + \frac{5\pi}{2}\}$

ج) $y = \frac{\tan x + 1}{\cot x - 1}$

$\cos x \neq 0 \rightarrow x \neq \frac{\pi}{2}, \frac{3\pi}{2}$ $\cot x \neq 1 \rightarrow x \neq \frac{\pi}{4}, \frac{5\pi}{4}$
 $D_f = R - \{\frac{k\pi}{2}, k\pi + \frac{\pi}{4}\}$

د) $y = \frac{\sin x + 1}{\sqrt{\sin^2 x - 3}}$

$\sqrt{\sin^2 x - 3} \neq 0 \rightarrow \sin^2 x \neq 3 \rightarrow \sin^2 x \neq \frac{3}{1} \rightarrow \sin x \neq \pm \frac{\sqrt{3}}{1}$
 $x \neq \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{6}, \frac{7\pi}{6} \rightarrow D_f = R - \{k\pi \pm \frac{\pi}{6}\}$

الف) $x^2 - 2x + 4 > 0 \rightarrow (x-1)(x-3) > 0$

$\frac{1}{x-1} > 0 \rightarrow D_f = (-\infty, 1) \cup (3, +\infty)$

ب) $x^2 - 9x + 15 < 0 \rightarrow (x-1)(x-15) < 0$

$\frac{1}{x-1} < 0 \rightarrow D_f = (1, 15)$

ج) $x^2 + 4x + 15 \geq 0 \rightarrow (x+1)(x+15) \geq 0$

$\frac{-1}{x+1} \geq 0 \rightarrow D_f = (-\infty, -1] \cup [-15, +\infty)$

د) $x^2 - 7x + 12 \leq 0 \rightarrow (x-1)(x-12) \leq 0$

$\frac{1}{x-1} \leq 0 \rightarrow D_f = [1, 12]$

الف) $\frac{x^2 - 3x + 2}{x - 1} < 0 \rightarrow \frac{(x-1)(x-2)}{x-1} < 0$

$\frac{1}{x-2} < 0 \rightarrow D_f = (-\infty, 1) \cup (2, \infty)$

ب) $\frac{x^2 - 1}{x^2 - 9x + 15} > 0 \rightarrow \frac{(x+1)(x-1)}{(x-1)(x-15)} > 0$

$\frac{-1}{x-15} > 0 \rightarrow D_f = (-\infty, -1] \cup (15, +\infty)$

الف) $y = \sqrt{\frac{x^2 - \varepsilon x + \varepsilon}{x^2 - 1}} = \sqrt{\frac{(x-1)(x-\varepsilon)}{(x-1)(x+1+\varepsilon)}}$ $\frac{1^* \varepsilon}{-\frac{1}{2} - \frac{1}{2} +}$ $D_f \subset [r, +\infty)$

فائدة ريسه صقيتي $\Delta = b^2 - 4ac = 1 - \varepsilon(1)(1) = 1 - \varepsilon = 1 - \varepsilon < 0 \rightarrow$

ب) $y = \sqrt{\frac{x^2 - \varepsilon x + \varepsilon}{x^2 - 1}}$ $x^2 - 1 \neq 0 \rightarrow x^2 \neq 1 \rightarrow x \neq \pm 1 \rightarrow D_f \subset \mathbb{R} - \{\pm 1\}$

الف) $y = \log(x^2 - 3x)$ $x^2 - 3x > 0 \rightarrow x(x-3) > 0$ $\frac{0^* \varepsilon}{+\frac{1}{2} - \frac{1}{2} +}$ $D_f \subset (-\infty, 0) \cup (3, +\infty)$

ب) $y = \log \frac{14 - x^2}{|x| - 2}$ $14 - x^2 > 0 \rightarrow x^2 < 14 \rightarrow -\sqrt{14} < x < \sqrt{14}$
 $|x| - 2 > 0 \rightarrow |x| > 2 \rightarrow x > 2$ or $x < -2$ $\left\{ \begin{array}{l} |x| - 2 \neq 1 \rightarrow |x| \neq 3 \rightarrow x \neq \pm 3 \end{array} \right.$ $D_f \subset (-\sqrt{14}, -2) \cup (2, \sqrt{14}) - \{\pm 3\}$

ج) $y = \log \frac{x^2 - 5x + 14}{10 - x}$ $\frac{x^2 - 5x + 14}{10 - x} = \frac{(x-2)(x-3)}{10 - x} > 0$ $\frac{1^* \varepsilon}{-\frac{1}{2} - \frac{1}{2} +}$ $D_f \subset (2, 10) - \{9\}$
 $10 - x > 0 \rightarrow x < 10$, $10 - x \neq 1 \rightarrow x \neq 9$

د) $y = \sqrt{x^2 - 11x + 28} + \log \frac{\sqrt{49 - x^2}}{x}$ $\left\{ \begin{array}{l} (x-7)(x-4) > 0 \rightarrow 4 < x < 7 \\ 49 - x^2 > 0 \rightarrow x^2 < 49 \rightarrow -7 < x < 7 \\ x > 0, x \neq 1 \end{array} \right.$ $D_f \subset (0, 4] - \{1\}$

$y = \frac{x^2 - x}{x^2 + x} = \frac{x(x-1)}{x(x+1)}$ $x \geq 0$
 $x - 1 \geq 0 \rightarrow x \geq 1$ $\frac{-1^* 1}{+\frac{1}{2} - \frac{1}{2} +} \rightarrow \mathbb{R}$
 $x + 1 \geq 0 \rightarrow x \geq -1$

x	-1	0	1
x+1	-	0	+
x	-	-	0
x-1	-	-	0
y	+	0	-

$\rightarrow$ كارتاني

$y = \sqrt{\frac{x - f(x)}{f(x)}}$ $f(x) \neq 0 \rightarrow x \neq \pm 2$
 $\frac{x - f(x)}{f(x)} > 0$

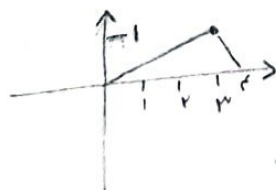
x	-2	-1	1	2
x - f(x)	-	-	0	+
f(x)	+	0	-	-
y	-	0	+	+

$D_f \subset (-2, -1] \cup (1, 2]$

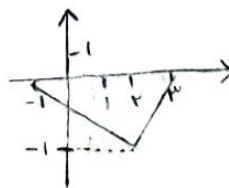
الف) $f(x) + 1$



ب) $f(x-1)$



ج) $-f(x)$



د) $f(x+1) + 1$

