

الف) $y = \frac{x+3}{x^3-2x^2+3x-10}$ → جمع ضرایب صفر → $x^3-2x^2+3x-10 \mid x-1$
 $\Rightarrow (x-1)(x^2-1x+10) \neq 0 \Rightarrow (x-1)(x-2)(x-5) \neq 0$
 $\Rightarrow x \neq 1, 2, 5$
 $D_f = \mathbb{R} - \{1, 2, 5\}$

ب) $y = \frac{x+3}{x^3-2x^2+3x-10}$ → $x^3-2x^2+3x-10 \mid x+1$
 $\Rightarrow (x+1)(x^2-3x-10) \neq 0 \Rightarrow (x+1)(x-5)(x+2) \neq 0$
 $\Rightarrow x \neq -1, -2, 5$
 $D_f = \mathbb{R} - \{-1, -2, 5\}$

الف) $y = \frac{x+1}{x-\sqrt{3-2x}}$ → $x-\sqrt{3-2x} \neq 0 \Rightarrow x \neq \sqrt{3-2x}$
 $\Rightarrow x^2 \neq 3-2x \Rightarrow x^2+2x-3 \neq 0 \Rightarrow (x+3)(x-1) \neq 0 \Rightarrow x \neq -3, 1$
 $D_f = (-\infty, \frac{3}{2}] - \{1\}$

ب) $y = \frac{x+1}{x-\sqrt{3-2x}}$ → $x-\sqrt{3-2x} \geq 0 \Rightarrow x \geq \sqrt{3-2x}$
 $\Rightarrow x^2 \geq 3-2x \Rightarrow x^2+2x-3 \geq 0 \Rightarrow (x+3)(x-1) \geq 0$
 $\Rightarrow x \leq -3 \text{ or } x \geq 1$
 $D_f = (-\infty, -3] \cup [1, +\infty)$

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

ب) $y = \frac{\cos x+1}{\sin x+1}$ → $\sin x+1 \neq 0 \Rightarrow \sin x \neq -1 \Rightarrow x \neq \frac{3\pi}{2} + 2k\pi$
 $D_f = \mathbb{R} - \{\frac{3\pi}{2} + 2k\pi\}$

ج) $y = \frac{\tan x+1}{\cot x-1}$ → $\cot x-1 \neq 0 \Rightarrow \cot x \neq 1 \Rightarrow x \neq \frac{\pi}{4} + k\pi$
 $D_f = \mathbb{R} - \{\frac{\pi}{4} + k\pi\}$

الف) $x^2-5x+4 > 0 \Rightarrow (x-1)(x-4) > 0 \Rightarrow x \in (-\infty, 1) \cup (4, +\infty)$

ب) $x^2-4x+0 < 0 \Rightarrow (x-0)(x-4) < 0 \Rightarrow x \in (0, 4)$

ج) $x^2+4x+0 \geq 0 \Rightarrow (x+4)(x+0) \geq 0 \Rightarrow x \in (-\infty, -4] \cup [0, +\infty)$

د) $x^2-4x+4 \leq 0 \Rightarrow (x-2)(x-2) \leq 0 \Rightarrow x = 2$

الف) $\frac{x^2-3x+2}{x-0} < 0 \Rightarrow \frac{(x-1)(x-2)}{x-0} < 0 \Rightarrow x \in (-\infty, 0) \cup (1, 2) \cup (2, +\infty)$

ب) $\frac{x^2-1}{x^2-4x+0} \geq 0 \Rightarrow \frac{(x+1)(x-1)}{(x-0)(x-4)} \geq 0 \Rightarrow x \in (-\infty, -1] \cup (0, 1) \cup (4, +\infty)$

الف) $y = \sqrt{\frac{x^2 - 2x + 3}{x^2 - 1}} \rightarrow \frac{(x-1)(x-3)}{x^2 - 1} \geq 0 \rightarrow \frac{1}{x-1} \geq 0$
 $\Rightarrow x^2 - 1 \neq 0 \Rightarrow x \neq \pm 1 \Rightarrow D_f = [3, +\infty)$

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

الف) $y = \log(x^2 - 2x) \rightarrow x^2 - 2x > 0 \Rightarrow (x)(x-2) > 0 \rightarrow \frac{0}{x-2} > 0$
 $\Rightarrow D_f = \mathbb{R} - [0, 2]$

ب) $y = \log |x-2| \rightarrow (x-2)(x+2) > 0 \rightarrow \frac{x}{x+2} > 0$
 $\Rightarrow D_f = (-\infty, -2) \cup (2, +\infty) - \{3, -3\}$

ج) $y = \log \frac{x^2 - 2x + 3}{x^2 - 1} \rightarrow \frac{(x-3)(x-1)}{x^2 - 1} > 0 \rightarrow \frac{x-3}{x+1} > 0$
 $\Rightarrow D_f = (3, 10) - \{9\}$

د) $y = \sqrt{x^2 - 11x + 28} + \log \sqrt{4 - x^2} \rightarrow \begin{cases} x^2 - 11x + 28 \geq 0 \\ 4 - x^2 > 0 \end{cases}$
 $\Rightarrow D_f = (0, 4] - \{1\}$

$y = \frac{x^2 - 1}{x^2 + 1} \rightarrow y = \frac{x(x-1)}{x(x+1)}$

	-1	0	1
$x(x-1)$	+	+	-
$x(x+1)$	+	+	+
$f(x)$	+	+	-

	-1	0	1
$x(x-1)$	+	+	-
$x(x+1)$	+	+	+
$f(x)$	+	+	-

$y = \sqrt{\frac{x - f(x)}{f(x)}} \rightarrow \frac{x - f(x)}{f(x)} \geq 0 \rightarrow y = x - f(x) \geq 0$
 $\Rightarrow D_f = (-2, -1] \cup [2, 3]$

