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الف) $y = \frac{x^2}{x^2 - 10x + 21}$ $\Rightarrow x^2 - 10x + 21 = 0 \Rightarrow (x-3)(x-7) \neq 0$
 $Df = R - \{3, 7\}$ ✓

ب) $y = \frac{x^2 + 3}{x^2 - x - 12}$ $\Rightarrow (x+1)(x^2 - x - 12) \neq 0$
 $Df = R - \{-1, -4, 3\}$ ✓

الف) $y = \frac{x}{x - \sqrt{3 - x}}$ $\Rightarrow x - \sqrt{3 - x} \neq 0 \Rightarrow \sqrt{3 - x} \neq x \Rightarrow 3 - x \neq x^2$
 $Df = (-\infty, \frac{3}{4}] - \{\frac{3}{2}\}$ ✓

ب) $y = \frac{x^2}{2x - \sqrt{3 - x}}$ $\Rightarrow 2x - \sqrt{3 - x} \neq 0 \Rightarrow \sqrt{3 - x} \neq 2x \Rightarrow 3 - x \neq 4x^2$
 $Df = [\frac{3}{4}, +\infty) - \{1, 2\}$ ✓

الف) $y = \frac{\sin x}{\cos x - 1}$ $\Rightarrow \cos x \neq 1 \Rightarrow x \neq 2k\pi$
 $Df = R - \{2k\pi\}$ ✓

ب) $y = \frac{\cos x + 1}{\sin x + 1}$ $\Rightarrow \sin x \neq -1 \Rightarrow x \neq -\frac{\pi}{2} + 2k\pi$
 $Df = R - \{-\frac{\pi}{2} + 2k\pi\}$ ✓

ج) $y = \frac{\tan x + 1}{\cot x - 1}$ $\Rightarrow \tan x \neq 1 \Rightarrow x \neq \frac{\pi}{4} + k\pi$
 $Df = R - \{\frac{\pi}{4} + k\pi\}$ ✓

الف) $x^2 - 5x + 4 > 0 \Rightarrow (x-1)(x-4) > 0 \Rightarrow x < 1 \vee x > 4$
 $Df = (-\infty, 1) \cup (4, +\infty)$ ✓

ب) $x^2 - 4x + 5 < 0 \Rightarrow (x-2)^2 + 1 < 0$ (No solution)
 $Df = \emptyset$

ج) $x^2 + 4x + 5 \geq 0 \Rightarrow (x+1)(x+5) \geq 0 \Rightarrow x \leq -5 \vee x \geq -1$
 $Df = (-\infty, -5] \cup [-1, +\infty)$ ✓

الف) $y = \sqrt{x^2 - 4x + 3}$
 $x^2 - 4x + 3 \geq 0 \Rightarrow x^2 - 1 \geq 0 \Rightarrow (x-1)(x+1) \geq 0$
 $Df = (-\infty, -1] \cup [1, +\infty)$

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

الف) $y = \log(x^2 - 3x)$
 $x^2 - 3x > 0 \Rightarrow x(x-3) > 0 \Rightarrow x < 0 \text{ or } x > 3$
 $Df = (-\infty, 0) \cup (3, +\infty)$

ب) $y = \log_{10} x$
 $x > 0$
 $Df = (0, +\infty)$

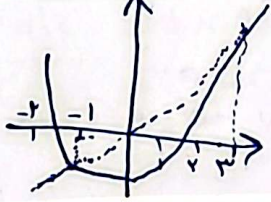
ج) $y = \sqrt{x^2 - 11x + 28} + \log x$
 $x^2 - 11x + 28 \geq 0 \Rightarrow (x-4)(x-7) \geq 0 \Rightarrow x < 4 \text{ or } x > 7$
 $x > 0$
 $Df = (0, 4) \cup (7, +\infty)$

د) $y = \sqrt{(x-1)(x-4)}$
 $(x-1)(x-4) \geq 0 \Rightarrow x < 1 \text{ or } x > 4$
 $Df = (-\infty, 1) \cup (4, +\infty)$

الف) $y = \frac{x^2 - 2x}{x^2 + x}$

x	-1	0	1	2
$x^2 - 2x$	1	0	-1	0
$x^2 + x$	0	0	2	6
$f(x)$	+	-	-	+

 $Df = (-\infty, -1) \cup (2, +\infty)$

ب) $y = \sqrt{\frac{x - f(x)}{f(x)}}$
 $f(x) \neq 0$
 $\frac{x - f(x)}{f(x)} \geq 0$


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

 $Df = [-1, 0] \cup (2, +\infty)$

