

الف) $y = \frac{x+1}{x^2-2x+1}$ $\Rightarrow x^2-2x+1 \neq 0 \Rightarrow x^2-2x+1 = (x-1)^2 \neq 0 \Rightarrow x \neq 1$
 $x^2-2x+1 = 0 \Rightarrow x = 1$
 $(x-1)^2 \neq 0 \Rightarrow x \neq 1$
 $DF = \mathbb{R} - \{1\}$

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الف) $y = \frac{x+1}{x-\sqrt{3-2x}}$ $\Rightarrow x-\sqrt{3-2x} \neq 0 \Rightarrow x \neq \sqrt{3-2x}$
 $x^2 \neq 3-2x \Rightarrow x^2+2x-3 \neq 0 \Rightarrow (x+3)(x-1) \neq 0 \Rightarrow x \neq -3, x \neq 1$
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الف) $y = \frac{\sin x}{\cos x - 1}$ $\Rightarrow \cos x - 1 \neq 0 \Rightarrow \cos x \neq 1 \Rightarrow x \neq 2k\pi$
 $DF = \mathbb{R} - \{2k\pi\}$
 ب) $y = \frac{\cos x + 1}{\sin x + 1}$ $\Rightarrow \sin x + 1 \neq 0 \Rightarrow \sin x \neq -1 \Rightarrow x \neq \frac{3\pi}{2} + 2k\pi$
 $DF = \mathbb{R} - \{\frac{3\pi}{2} + 2k\pi\}$
 ج) $y = \frac{\tan x + 1}{\cot x - 1}$ $\Rightarrow \cot x - 1 \neq 0 \Rightarrow \cot x \neq 1 \Rightarrow x \neq \frac{\pi}{4} + k\pi$
 $DF = \mathbb{R} - \{\frac{\pi}{4} + k\pi\}$

الف) $x^2 - 5x + 6 > 0 \Rightarrow (x-2)(x-3) > 0 \Rightarrow x < 2 \text{ or } x > 3 \Rightarrow DF = (-\infty, 2) \cup (3, +\infty)$
 ب) $x^2 - 4x + 5 < 0 \Rightarrow (x-2)^2 + 1 < 0 \Rightarrow (x-2)^2 < -1 \Rightarrow \text{No solution}$
 ج) $x^2 + 4x + 5 > 0 \Rightarrow (x+2)^2 + 1 > 0 \Rightarrow (x+2)^2 > -1 \Rightarrow \text{All real numbers}$
 د) $x^2 - 4x + 4 \leq 0 \Rightarrow (x-2)^2 \leq 0 \Rightarrow x = 2 \Rightarrow DF = \{2\}$

الف) $\frac{x^2-3x+2}{x-5} < 0 \Rightarrow \frac{(x-1)(x-2)}{x-5} < 0 \Rightarrow x < 1 \text{ or } 2 < x < 5$
 $DF = (-\infty, 1) \cup (2, 5)$

ب) $\frac{x^2-1}{x^2-2x+1} > 0 \Rightarrow \frac{(x-1)(x+1)}{(x-1)^2} > 0 \Rightarrow \frac{x+1}{x-1} > 0 \Rightarrow x < -1 \text{ or } x > 1$
 $DF = (-\infty, -1) \cup (1, +\infty)$

الف) $y = \sqrt{\frac{x^2 - 4x + 4}{x^2 - 1}} \geq 0 \Rightarrow \sqrt{\frac{(x-1)(x-2)}{(x-1)(x+1)}} \geq 0 \Rightarrow \frac{x-2}{x+1} \geq 0$
 $DF: [2, +\infty)$

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

الف) $y = \log(x^2 - 4x) \Rightarrow x^2 - 4x > 0 \Rightarrow x(x-4) > 0 \Rightarrow \frac{x}{x-4} > 0 \Rightarrow DF: (-\infty, 0) \cup (4, +\infty)$
 ب) $y = \log_{1-x^2} \frac{1-x^2}{1-x^2} \Rightarrow \log_{1-x^2} 1 \Rightarrow (1-x^2)(1-x^2) > 0 \Rightarrow \frac{-1}{1-x^2} > 0 \Rightarrow x = (-1, 1) \ominus$

ج) $\log \frac{x^2 - 4x + 4}{x-2} \Rightarrow \log \frac{(x-2)^2}{x-2} \Rightarrow \log(x-2) \Rightarrow \frac{x-2}{x-2} > 0 \Rightarrow \frac{x-2}{x-2} > 0 \Rightarrow x = (-\infty, 2) \cup (2, +\infty) \ominus$
 د) $y = \log \frac{1-x}{1+x} \Rightarrow \log \frac{1-x}{1+x} > 0 \Rightarrow \frac{1-x}{1+x} > 1 \Rightarrow \frac{-2}{1+x} > 0 \Rightarrow x = (-\infty, -1) \cup (-1, 0) \ominus$

هـ) $y = \sqrt{x^2 - 11x + 28} + \log \sqrt{x^2 - 4x} \Rightarrow (x-4)(x-7) > 0 \Rightarrow \frac{x-4}{x-7} > 0 \Rightarrow x = (-\infty, 4) \cup (7, +\infty) \ominus$
 و) $y = \sqrt{x^2 - 11x + 28} + \log \sqrt{x^2 - 4x} \Rightarrow (x-4)(x-7) > 0 \Rightarrow \frac{x-4}{x-7} > 0 \Rightarrow x = (-\infty, 4) \cup (7, +\infty) \ominus$

ز) $y = \frac{x^2 - x}{x^2 + x} \Rightarrow \frac{x(x-1)}{x(x+1)} \Rightarrow \frac{-1}{x+1} - \frac{x-1}{x-1} \geq 0 \Rightarrow DF: R. \{-1, 0\} \cup (-\infty, -1) \cup (-1, 0) \cup (0, 1] \cup (1, +\infty)$

	-1	0	1
$x^2 - x$	+	+	-
$x^2 + x$	+	-	+
$P(x)$	+	-	+

$y = \sqrt{\frac{x - P(x)}{P(x)}} \geq 0$
 $x - P(x) \geq 0 \Rightarrow x - P(x) \geq 0 \Rightarrow x, -1$
 $P(x) \geq 0 \Rightarrow x = 2$
 $DF: (-2, -1] \cup (2, 3]$

