

الف) $\frac{x+4}{(x-1)(x^2-14x+15)}$ $\rightarrow P_f = IR - \{1, \frac{5}{2}, \frac{3}{2}\}$ $\frac{x^3-20x^2+31x-15}{x^3-14x^2+15x}$

ب) $P_f = IR - \{1, \frac{5}{2}, \frac{3}{2}\}$ $\rightarrow \frac{x^3-20x^2+31x-15}{x^3-14x^2+15x}$

ج) $P_f = IR - \{1, \frac{5}{2}, \frac{3}{2}\}$ $\rightarrow \frac{x^3-20x^2+31x-15}{x^3-14x^2+15x}$

الف) $\frac{x+1}{x-\sqrt{3-2x}}$ $\rightarrow \begin{cases} 3-2x \geq 0 \rightarrow 2x \leq 3 \rightarrow x \leq \frac{3}{2} \\ x-\sqrt{3-2x} \neq 0 \rightarrow \sqrt{3-2x} \neq x \rightarrow x^2 \neq 3-2x \rightarrow x^2+2x-3 \neq 0 \rightarrow (x-1)(x+3) \neq 0 \end{cases}$ $\textcircled{I}$

ب) $P_f = (-\infty, 1, 3] - \{1\}$ $\leftarrow I \cap II$ $\textcircled{I}$

ج) $\begin{cases} 3-2x \geq 0 \rightarrow 2x \leq 3 \rightarrow x \leq \frac{3}{2} \textcircled{I} \\ x-\sqrt{3-2x} \neq 0 \rightarrow x \neq \sqrt{3-2x} \rightarrow x^2 \neq 3-2x \rightarrow x^2+2x-3 \neq 0 \rightarrow (x-1)(x+3) \neq 0 \end{cases}$ $\textcircled{II}$

الف) $\cos x - 1 \neq 0 \rightarrow \cos x \neq 1 \rightarrow x \neq 2k\pi$ $\textcircled{I}$ $P_f = IR - \{2k\pi\}$

ب) $\sin x + 1 \neq 0 \rightarrow \sin x \neq -1 \rightarrow x \neq -\frac{\pi}{2} + 2k\pi$ $\textcircled{II}$ $P_f = IR - \{-\frac{\pi}{2} + 2k\pi\}$

ج) $\tan x - 1 \neq 0 \rightarrow \tan x \neq 1 \rightarrow x \neq \frac{\pi}{4} + k\pi$ $\textcircled{III}$ $P_f = IR - \{\frac{\pi}{4} + k\pi\}$

الف) $x^2-5x+4 > 0 \rightarrow (x-1)(x-4) > 0 \rightarrow x < 1 \text{ or } x > 4 \rightarrow P_f = (-\infty, 1) \cup (4, \infty)$

ب) $(x-1)(x-5) < 0 \rightarrow 1 < x < 5 \rightarrow P_f = (1, 5)$

ج) $x^2+4x+5 \geq 0 \rightarrow (x+1)(x+5) \geq 0 \rightarrow x \leq -5 \text{ or } x \geq -1 \rightarrow P_f = (-\infty, -5] \cup [-1, \infty)$

الف) $(x-1)(x-2) < 0 \rightarrow 1 < x < 2 \rightarrow P_f = (1, 2)$

ب) $(x-1)(x+1) \geq 0 \rightarrow x \leq -1 \text{ or } x \geq 1 \rightarrow P_f = (-\infty, -1] \cup [1, \infty)$

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

ب) $x^2-1 \neq 0 \rightarrow (x-1)(x+1) \neq 0 \rightarrow D_f = \mathbb{R} - \{ \pm 1 \}$

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

ب) $14-x^2 > 0 \rightarrow (x-4)(x+4) > 0 \rightarrow \frac{+}{-} - \frac{+}{-} \rightarrow (-4, 4)$

$|x|-2 > 0 \rightarrow |x| > 2 \rightarrow x > 2, x < -2 \rightarrow D_f = (-\infty, -2) \cup (2, +\infty)$

ج) $\frac{x^2-4x+12}{x-2} > 0 \rightarrow \frac{(x-2)(x-6)}{x-2} > 0 \rightarrow \frac{+}{+} - \frac{+}{-} \rightarrow (2, +\infty) \cup (-\infty, 2)$
 $10-x > 0 \rightarrow x < 10$
 $10-x \neq 1 \neq x \neq 9 \rightarrow D_f = (2, 10) - \{9\}$

$\frac{x(x-1)}{x^2+x} \rightarrow \frac{x(x-1)}{x(x+1)} \rightarrow \frac{+}{+} - \frac{+}{-} \rightarrow (-1, 0) \cup (1, +\infty)$

الف) $\rightarrow$

	-1	0	1
x^2-x	+	+	-
x^2+x	+	-	+
$\frac{x^2-x}{x^2+x}$	+	-	+

$\frac{x-f(x)}{f'(x)} \geq 0 \rightarrow \frac{+}{-} - \frac{+}{+} \rightarrow D_f = [-1, -1] \cup [1, 3]$

