

(الف) $x^3 - 4x^2 + 4x - 1 \neq 0$ $\xrightarrow{\text{قسمة على } x-1} x^2 - 3x + 4$ (1)

$\Rightarrow \frac{x^3 - 4x^2 + 4x - 1}{x-1} \rightarrow +1 \left| \begin{array}{ccc|c} 1 & -4 & 4 & -1 \\ & 1 & -3 & 5 \\ & & -1 & 18 \\ & & & 0 \end{array} \right| \Rightarrow (x-1)(x^2 - 3x + 4)$

$= (x-1)(2x-3)(x-2) \Rightarrow D_A = \mathbb{R} - \{1, \frac{3}{2}, 2\}$

ب) $x^3 - x^2 - 1x - 5$ $\xrightarrow{\text{قسمة على } x+1} x = -1$

$\Rightarrow \frac{x^3 - x^2 - 1x - 5}{x+1} = (x+1)(x^2 - 2x - 5)$

$\Delta = 41 \rightarrow \begin{array}{l} \sqrt{41-4} \\ \sqrt{41+4} \end{array} \Rightarrow D_A = \mathbb{R} - \left\{ -1, \frac{\sqrt{41}-2}{2}, \frac{\sqrt{41}+2}{2} \right\}$

(الف) $\begin{cases} x-1 \neq 0 \rightarrow x \neq 1 \\ x^2 - 4x + 4 \neq 0 \rightarrow (x-2)^2 \neq 0 \rightarrow x \neq 2 \\ x^3 + 2x^2 - 4x - 4 \neq 0 \rightarrow (x+2)(x-1) \neq 0 \Rightarrow x \neq -2, x \neq 1 \\ \sqrt{4-2x} \geq 0 \rightarrow 4-2x \geq 0 \rightarrow 2 \geq x \rightarrow x \leq \frac{4}{2} \end{cases}$ (2)

$\Rightarrow D_A = (-\infty, \frac{4}{2}] - \{1, 2\}$

ب) $\begin{cases} x - \sqrt{4x-4} \neq 0 \rightarrow x \neq \sqrt{4x-4} \rightarrow x^2 \neq 4x-4 \rightarrow x^2 - 4x + 4 \neq 0 \\ \rightarrow (x-2)^2 \neq 0 \Rightarrow x \neq 2 \\ \sqrt{4x-4} \geq 0 \rightarrow 4x-4 \geq 0 \rightarrow 4x \geq 4 \rightarrow x \geq \frac{4}{4} \end{cases}$

$\Rightarrow D_A = [\frac{4}{4}, +\infty) - \{2\}$

ج) $\cos x - 1 \neq 0 \rightarrow \cos x \neq \frac{1}{2} \rightarrow D_A = \mathbb{R} - \{ \frac{\pi}{3} + 2k\pi, \frac{5\pi}{3} + 2k\pi \}$ (3)

د) $\sin x + 1 \neq 0 \rightarrow \sin x \neq -\frac{1}{2} \rightarrow D_A = \mathbb{R} - \{ \frac{7\pi}{6} + 2k\pi, \frac{11\pi}{6} + 2k\pi \}$

هـ) $\begin{cases} \cos x \neq 0 \\ \sin x \neq 0 \\ \cot x \neq 1 \end{cases} \Rightarrow D_A = \mathbb{R} - \{ \frac{k\pi}{2}, k\pi + \frac{\pi}{4} \}$

و) $\sin x \neq \frac{\sqrt{3}}{2} \Rightarrow D_A = \mathbb{R} - \{ \frac{\pi}{3} + 2k\pi, \frac{2\pi}{3} + 2k\pi \}$

(الف) $x^2 - 2x + 4 > 0 \rightarrow (x-1)(x-3) > 0 \rightarrow \frac{+}{+} \frac{-}{-} \frac{+}{+} \rightarrow D_p = (-\infty, 1) \cup (3, +\infty)$

ب) $x^2 - 4x + 4 < 0 \rightarrow (x-1)(x-3) < 0 \rightarrow \frac{+}{+} \frac{-}{-} \frac{+}{+} \rightarrow D_p = (1, 3)$

ج) $x^2 + 4x + 4 \geq 0 \rightarrow (x+1)(x+3) \geq 0 \rightarrow \frac{-}{+} \frac{-}{-} \frac{+}{+} \rightarrow D_p = (-\infty, -3] \cup [-1, +\infty)$

د) $x^2 - 4x + 4 \leq 0 \rightarrow (x-1)(x-3) \leq 0 \rightarrow \frac{+}{+} \frac{-}{-} \frac{+}{+} \rightarrow D_p = [1, 3]$

(الف) $\frac{(x-1)(x-3)}{x-2} < 0 \rightarrow \frac{+}{-} \frac{-}{+} \frac{+}{+} \rightarrow D_p = (2, 3) \cup (-\infty, 1)$

ب) $\frac{(x+1)(x-1)}{(x-1)(x-3)} \geq 0 \rightarrow \frac{-}{+} \frac{+}{-} \frac{-}{+} \rightarrow D_p = (-\infty, -1] \cup (3, +\infty)$

الف $\begin{cases} x^2 - 1 \neq 0 \rightarrow x \neq \pm 1 \end{cases}$

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

ب) $x^2 - 1 \neq 0 \rightarrow x^2 \neq 1 \Rightarrow x \neq \pm 1 \Rightarrow D_p = \mathbb{R} - \{\pm 1\}$

(الف) $x^2 - 4x > 0 \rightarrow x(x-4) > 0 \rightarrow \frac{+}{+} \frac{-}{-} \frac{+}{+} \rightarrow D_p = (-\infty, 0) \cup (4, +\infty)$

ب) $\begin{cases} (4+x)(4-x) > 0 \rightarrow \frac{+}{-} \frac{+}{-} \frac{+}{+} \rightarrow -4 < x < 4 \\ |x-4| \neq 1 \rightarrow x \neq \pm 3 \\ |x|-4 > 0 \rightarrow |x| > 4 \rightarrow x > 4 \vee x < -4 \end{cases} \Rightarrow D_p = (-\infty, -4) \cup (4, +\infty) - \{\pm 3\}$

ج) $\begin{cases} 10-x > 0 \rightarrow x < 10 \\ 1-x \neq 1 \rightarrow x \neq 0 \end{cases}$

$\frac{(x-5)(x+5)}{x-3} > 0 \rightarrow \frac{+}{-} \frac{+}{-} \frac{+}{+} \Rightarrow D_p = (5, 10) - \{3\}$

د) $(x-7)(x-5) \geq 0 \rightarrow \frac{+}{+} \frac{-}{-} \frac{+}{+} \rightarrow x \geq 7 \vee x \leq 5$

$\Rightarrow D_p = (0, 5] - \{1\}$

هـ) I II: $x \neq 1$

II II: $x > 0$

IV: $\sqrt{4-x^2} > 0 \rightarrow 0 < 4-x^2 \rightarrow 0 < (4-x)(4+x) \rightarrow \frac{-}{-} \frac{+}{+} \frac{-}{-} \rightarrow -4 < x < 4$

الف)

	-	+	+	-	+
$x^2 - x$	+	+	-	+	+
$x^2 + x$	+	-	+	+	+
y	+	-	-	+	+

ب)

	-	+	+	-	+
$x^2 - x$	+	+	-	+	+
$x^2 + x$	+	-	+	+	+
y	+	-	-	+	+

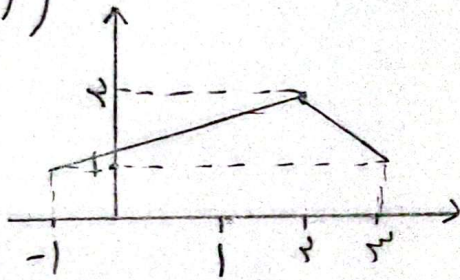
(9)

$$\begin{cases} x - f(x) = 0 \rightarrow x = f(x) \rightarrow x = -193 \\ f(x) = 0 \rightarrow x = 29-4 \end{cases}$$

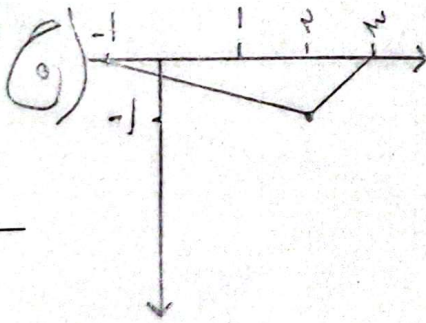
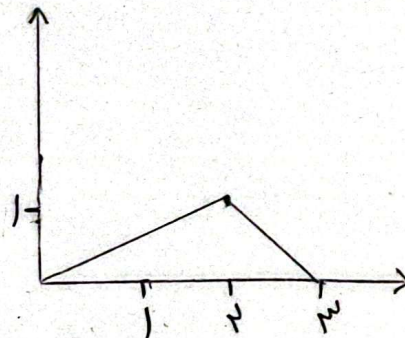
$$\frac{x^2 - 1}{x^2 + x} = \frac{2}{x^2 - 1} \Rightarrow D_f = (293] \cup (-29-1]$$

(10)

الف)



ب)



د)

