

الف) $y = \frac{x+4}{4x^3 - 2x^2 + 31x - 15} = \frac{x+4}{(x-1)(x-\frac{1}{2})(x-\frac{3}{2})} \Rightarrow D_f = \mathbb{R} - \{1, \frac{1}{2}, \frac{3}{2}\}$

ب) $y = \frac{x+3}{3x^3 - x^2 - 11x - 4} = \frac{x+3}{(x+1)(x-2)(x-\frac{1}{3})} \Rightarrow D_f = \mathbb{R} - \{-1, 2, \frac{1}{3}\}$

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

ب) $y = \frac{x+2}{x - \sqrt{3x-2}} \Rightarrow 3x-2 \geq 0 \Rightarrow x \geq \frac{2}{3} \Rightarrow x^2 \neq 3x-2 \Rightarrow x^2 - 3x + 2 \neq 0 \Rightarrow x - \sqrt{3x-2} \neq 0 \Rightarrow x = \sqrt{3x-2} \Rightarrow x \neq \frac{2}{3} \Rightarrow D_f = [\frac{2}{3}, +\infty) - \{2, 2\}$

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

ب) $y = \frac{\cos x + 1}{2\sin x + 1} \Rightarrow 2\sin x + 1 \neq 0 \Rightarrow \sin x \neq -\frac{1}{2} \Rightarrow D_f = \mathbb{R} - \{2k\pi - \frac{\pi}{6}, 2k\pi - \frac{5\pi}{6}\}$

ج) $\tan x + 2 \Rightarrow \frac{\sin x}{\cos x} + 2 \Rightarrow \cos x \neq 0 \Rightarrow \cot x - 1 \Rightarrow \cot x - 1 \neq 0 \Rightarrow \cot x \neq 1 \Rightarrow D_f = \mathbb{R} - \{k\pi + \frac{\pi}{4}, k\pi + \frac{5\pi}{4}\}$

د) $y = \frac{\sin x + 1}{4\sin^2 x - 3} \Rightarrow 4\sin^2 x - 3 \neq 0 \Rightarrow \sin^2 x \neq \frac{3}{4} \Rightarrow \sin x \neq \pm \frac{\sqrt{3}}{2} \Rightarrow D_f = \mathbb{R} - \{k\pi + \frac{\pi}{3}, 2k\pi + \frac{2\pi}{3}, k\pi + \frac{2\pi}{3}, 2k\pi + \frac{5\pi}{3}\}$

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

ب) $x^2 - 4x + 5 < 0 \Rightarrow (x-1)(x-5) < 0 \Rightarrow D_f = (1, 5)$

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

د) $x^2 - 7x + 9 \leq 0 \Rightarrow (x-4)(x-1) \leq 0 \Rightarrow D_f = [1, 4]$

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

ب) $\frac{x^2 - 1}{x^2 - 4x + 5} \geq 0 \Rightarrow \frac{(x-1)(x+1)}{(x-1)(x-5)} \geq 0 \Rightarrow D_f = (-\infty, -1] \cup (5, +\infty)$

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

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

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

$$د) y = \log \frac{14-x^2}{|x|-2} \Rightarrow 14-x^2 > 0 \Rightarrow -4 < x < 4 \quad |x|-2 \Rightarrow x > 2 \vee x < -2, x \neq \pm 3$$

$$\Rightarrow D_f = (-4, -2) \cup (2, 4) - \{3, -3\}$$

$$ه) y = \log \frac{x^2 - 5x + 4}{1-x} \Rightarrow \frac{(x-4)(x-1)}{1-x} > 0 \Rightarrow \frac{4}{-} \frac{1}{+} \frac{+}{-} \Rightarrow D_f = (4, 1) - \{1\}$$

$$و) y = \sqrt{x^2 - 11x + 18} + \log \sqrt{34 - x^2} \Rightarrow (x-4)(x-5) \geq 0 \Rightarrow \frac{4}{+} \frac{5}{-} \frac{+}{+} \Rightarrow x < 4, x \neq 1, x > 5$$

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

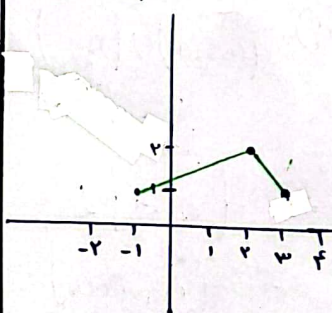
$$\frac{-1}{+} \frac{0^*}{-} \frac{1}{-} \frac{+}{+}$$

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

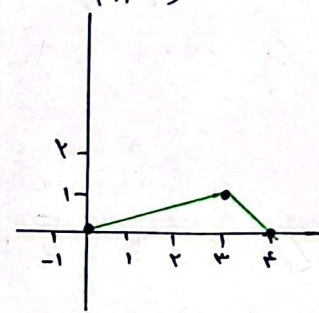
	-2	-1	0	2	3
$x - f(x)$	-	-	+	+	+
$f(x)$	+	-	-	-	+
	-	+	-	+	-

$$D_f = [-2, -1] \cup [2, 3]$$

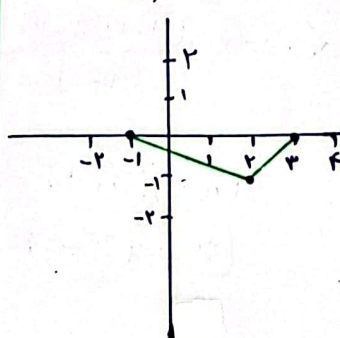
الف) $f(x) + 1$



ب) $f(x-1)$



ج) $-f(x)$



د)

