

« بابا انوری - دهم ۵ »

سؤال ۱:

الف) $y = \frac{x+2}{x^3 - 20x^2 + 11x - 15}$

$\Rightarrow D_f = \mathbb{R} - \left\{1, \frac{5}{2}, \frac{5}{3}\right\}$

$$\begin{array}{l} x^3 - 20x^2 + 11x - 15 \mid x-1 \\ \underline{-(x^3 - x^2 + x - 1)} \\ 19x^2 - 10x + 16 \\ 19x^2 - 19x + 19 \\ \underline{-(19x^2 - 19x + 19)} \\ 0 \end{array} \quad \begin{array}{l} x-1 \\ 19x-19 \\ 19x-19 \\ \underline{-(19x-19)} \\ 0 \end{array}$$

$$(x-1)(19x-19)(x-1)$$

ب) $y = \frac{x+3}{x^3 - x^2 - 8x - 6}$

$\Rightarrow D_f = \mathbb{R} - \left\{-1, \frac{-2}{3}, 2\right\}$

$$\begin{array}{l} x^3 - x^2 - 8x - 6 \mid x+1 \\ \underline{-(x^3 - x^2 - 8x - 6)} \\ 0 \end{array} \quad \begin{array}{l} x+1 \\ 3x^2 - 7x - 5 \\ 3x^2 - 3x - 3 \\ \underline{-(3x^2 - 3x - 3)} \\ 0 \end{array}$$

$$(x+1)(3x^2 - 7x - 5)$$

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

(سؤال ۲)

الف) $y = \frac{x+1}{x - \sqrt{3-2x}}$

$\Rightarrow D_f = (-\infty, \frac{3}{2}] - \{-1, +1\}$

I: $3-2x \geq 0 \rightarrow -2x \geq -3 \rightarrow x \leq \frac{3}{2}$

II: $x - \sqrt{3-2x} \neq 0 \rightarrow x \neq \sqrt{3-2x} \rightarrow x^2 \neq 3-2x$

$\rightarrow x^2 + 2x - 3 \neq 0 \rightarrow (x+3)(x-1) \neq 0$

ب) $y = \frac{x+2}{x - \sqrt{3x-2}}$

$D_f = [\frac{2}{3}, +\infty) - \{1, 2\}$

I: $3x-2 \geq 0 \rightarrow 3x \geq 2 \rightarrow x \geq \frac{2}{3}$

II: $x - \sqrt{3x-2} \neq 0 \rightarrow x \neq \sqrt{3x-2} \rightarrow x^2 \neq 3x-2$

$x^2 - 3x + 2 \neq 0$
 $(x-1)(x-2) \neq 0$

(سؤال ۳)

الف) $y = \frac{\sin x}{y \cos x - 1}$

I: $y \cos x - 1 \neq 0 \rightarrow y \cos x \neq 1 \rightarrow \cos x \neq \frac{1}{y}$

$\Rightarrow D_f = \mathbb{R} - \left\{2k\pi \pm \frac{\pi}{y}\right\}$



ب) $y = \frac{\cos x + 1}{y \sin x + 1}$

$y \sin x + 1 \neq 0 \rightarrow \sin x \neq -\frac{1}{y}$

$D_f = \mathbb{R} - \left\{2k\pi + \frac{\pi}{y}, 2k\pi + \frac{3\pi}{y}\right\}$



سؤال ٤

$$ج) y = \frac{\tan x + 1}{\cot x - 1}$$

$$I \cot x - 1 \neq 0 \rightarrow \cot x \neq 1 \rightarrow \text{Unit Circle}$$

$$II: \sin x \neq 0 \rightarrow \text{Unit Circle}$$

$$D_f = \mathbb{R} - \left\{ k\pi + \frac{\pi}{4}, k\pi \right\}$$

د) $y = \frac{\sin x + 1}{f \sin^2 x - 1}$

$$f \sin^2 x - 1 \neq 0 \rightarrow \sin^2 x \neq \frac{1}{f} \rightarrow \sin x \neq \pm \frac{1}{\sqrt{f}} \rightarrow \text{Unit Circle}$$

$$D_f = \mathbb{R} - \left\{ k\pi + \frac{\pi}{f}, k\pi + \frac{\pi}{f} \right\}$$

سؤال ٤

الف) $x^2 - 5x + 4 > 0 \rightarrow (x-1)(x-4) > 0$

$$D = (-\infty, 1) \cup (4, +\infty)$$

ب) $x^2 - 4x + 5 < 0 \rightarrow (x-1)(x-5) < 0$

ج) $x^2 + 4x + 5 > 0 \rightarrow (x+1)(x+5) > 0$

د) $x^2 - 7x + 4 < 0 \rightarrow (x-1)(x-4) < 0$

سؤال ٥

الف) $\frac{x^2 - 3x + 2}{x - 5} < 0 \rightarrow \frac{(x-1)(x-2)}{(x-5)}$

ب) $\frac{x^2 - 1}{x^2 - 4x + 5} \geq 0 \rightarrow \frac{(x+1)(x-1)}{(x-2)(x-1)}$

سؤال ٦

الف) $y = \sqrt{\frac{x^2 - 4x + 4}{x^2 - 1}}$

سؤال ٣

ج) $y = \frac{\tan x + 1}{\cot x - 1}$

I: $\cot x - 1 \neq 0 \rightarrow \cot x \neq 1 \rightarrow$

II: $\sin x \neq 0 \rightarrow$ $D_f = \mathbb{R} - \{k\pi + \frac{\pi}{2}, k\pi\}$

د) $g = \frac{\sin x + 1}{\sqrt{\sin^2 x - 3}}$

$\sqrt{\sin^2 x - 3} \neq 0 \rightarrow \sin^2 x \neq \frac{3}{4} \rightarrow \sin x \neq \pm \frac{\sqrt{3}}{2}$



$D_f = \mathbb{R} - \{k\pi + \frac{\pi}{3}, k\pi + \frac{2\pi}{3}\}$

(سؤال ٤)

$D_f = (-\infty, 1) \cup (3, +\infty)$

الف) $x^2 - 5x + 4 > 0 \rightarrow (x-1)(x-4) > 0$

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

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

د) $x^2 - 6x + 7 < 0 \rightarrow (x-1)(x-4) < 0$ $\Rightarrow D_f = [1, 4]$

سؤال ٥

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

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

(سؤال ٦)

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

(سؤال ٤)

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

(سؤال ٥)

الف) $y = \log(x^2 - 3x)$

I: $x^2 - 3x > 0 \rightarrow x^2 > 3x \rightarrow x^2 - 3x > 0 \rightarrow x(x-3) > 0$

$D_f = (-\infty, 0) \cup (3, +\infty) \Leftarrow \frac{0}{+} - \frac{+}{+} +$

ب) $\log \frac{14 - x^2}{|x| - 2} \rightarrow$ I: $14 - x^2 > 0 \rightarrow 14 > x^2 \rightarrow -\sqrt{14} < x < \sqrt{14}$

II: $|x| - 2 > 0 \rightarrow |x| > 2 \rightarrow x > 2$ or $x < -2 \Rightarrow D_f = (-\sqrt{14}, -2) \cup (2, \sqrt{14})$

III: $|x| - 2 \neq 0 \rightarrow |x| \neq 2 \rightarrow x \neq \pm 2$

ج) $y = \log \frac{x^2 - 5x + 12}{10 - x} \rightarrow$ I: $\frac{x^2 - 5x + 12}{x - 3} > 0 \rightarrow \frac{(x-3)(x-4)}{(x-3)} > 0 \rightarrow \frac{x-4}{1} > 0 \rightarrow x > 4$

II: $10 - x > 0 \rightarrow -x > -10 \rightarrow x < 10$

III: $10 - x \neq 0 \rightarrow -x \neq -10 \rightarrow x \neq 10 \Rightarrow D_f = (4, 10) - \{10\}$

د) $y = \sqrt{x^2 - 11x + 28} + \log \sqrt{34 - x^2}$

I: $x^2 - 11x + 28 > 0 \rightarrow (x-4)(x-7) > 0 \Rightarrow (-\infty, 4) \cup (7, +\infty)$

II: $34 - x^2 > 0 \rightarrow 34 > x^2 \rightarrow -\sqrt{34} < x < \sqrt{34}$

III: $x > 0, x \neq 1 \Rightarrow D_f = (-\sqrt{34}, \sqrt{34}) \cap [4, 7] - \{1\}$

(سؤال ٦)

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

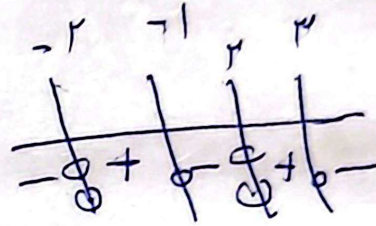
جداول: $\frac{0}{+} - \frac{+}{+} - \frac{+}{+} + \Rightarrow D_f = (-\infty, -1) \cup [1, +\infty)$

جداول: $\frac{0}{+} - \frac{+}{+} - \frac{+}{+} + \Rightarrow D_f = (-\infty, -1) \cup [1, +\infty)$

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

(سؤال ٩)

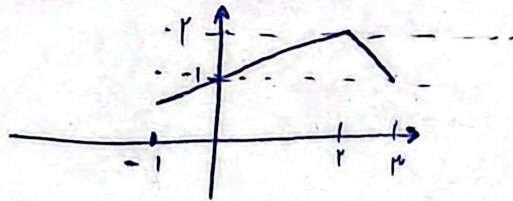
$$y = \sqrt{\frac{x - f(x)}{f(x)}} \rightarrow \frac{x - f(x)}{f(x)} \geq 0$$



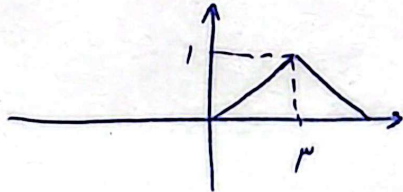
$$\Rightarrow D_f = (-2, -1] \cup (2, 3]$$

(سؤال ١٥)

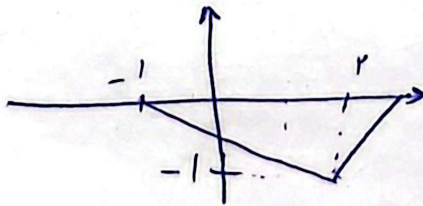
الف) $f(x) + 1$



ب) $f(x-1)$



ج) $-f(x)$



د) $f(x+1) + 1$

