

الف) $y = \frac{x+4}{2x^3-2x^2+3x-1}$ $\rightarrow \frac{x+4}{x+1}$ $\rightarrow x+1 \neq 0$ $\rightarrow x \neq -1$ $Df = R - \{-1\}$

ب) $y = \frac{x+4}{2x^3-2x^2-1x-4}$ $\rightarrow \frac{x+4}{x+1}$ $\rightarrow x+1 \neq 0$ $\rightarrow x \neq -1$ $Df = R - \{-1\}$

الف) $y = \frac{x+1}{x-\sqrt{14-2x}}$ $\rightarrow x^2 = 14-2x$ $x^2+2x-14=0$ $\rightarrow \frac{-2 \pm \sqrt{4+56}}{2} = \frac{-2 \pm \sqrt{60}}{2}$ $Df = R - \{1\}$

ب) $y = \frac{x+2}{x-\sqrt{4x-2}}$ $\rightarrow x^2 = 4x-2$ $x^2-4x+2=0$ $\Delta = 16-8=8$ $\rightarrow \frac{4 \pm \sqrt{8}}{2} = 2 \pm \sqrt{2}$ $Df = R - \{1, 2\}$

الف) $y = \frac{\sin x}{2\cos x - 1}$ $\rightarrow \cos x \neq \frac{1}{2}$ $Df = R - \{2k\pi + \frac{\pi}{3}, 2k\pi - \frac{\pi}{3}\}$

ب) $y = \frac{\cos 2x+1}{2\sin x+1}$ $\rightarrow 2\sin x+1 \neq 0$ $\rightarrow \sin x \neq -\frac{1}{2}$ $Df = R - \{2k\pi + \frac{7\pi}{6}, 2k\pi + \frac{5\pi}{6}\}$

ج) $y = \frac{\tan x+2}{\cot x-1}$ $\cot x \neq 1 \rightarrow k\pi + \frac{\pi}{4}$ $\sin x \neq 0 \rightarrow k\pi$ $Df = R - \{k\pi + \frac{\pi}{4}, k\pi\}$

د) $y = \frac{\sin x+1}{2\sin^2 x-3}$ $\rightarrow \sin^2 x \neq \frac{3}{2}$ $\rightarrow \sin x \neq \pm \frac{\sqrt{3}}{2}$ $Df = R - \{k\pi \pm \frac{\pi}{3}\}$

الف) $x^2-5x+4 > 0$ $(x-1)(x-4) > 0$ $\rightarrow \frac{1}{x-1} + \frac{1}{x-4} > 0$ $Df: (3, +\infty) \cup (-\infty, 2)$

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

ج) $x^2+4x+5 \geq 0$ $(x+1)(x+5) \geq 0$ $\rightarrow \frac{-5}{x+1} + \frac{-1}{x+5} \geq 0$ $Df: (-\infty, -5] \cup [-1, +\infty)$

د) $x^2-7x+4 \leq 0$ $(x-1)(x-4) \leq 0$ $\rightarrow \frac{1}{x-1} + \frac{1}{x-4} \leq 0$ $Df: [1, 4]$

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

ب) $\frac{x^2-1}{x^2-4x+4} \geq 0$ $\frac{(x+1)(x-1)}{(x-1)(x-2)} \geq 0$ $\rightarrow \frac{-1}{x-1} + \frac{1}{x-2} \geq 0$ $Df: (-\infty, -1] \cup (2, +\infty)$

الف) $y = \sqrt{\frac{x^2 - 4x + 4}{x^2 - 1}} \geq 0$

$\frac{(x-1)(x-2)}{x^2-1} \rightarrow x \neq 1$

$\frac{1}{x-1}$

سوال ٤

$Df = (-\infty, 1) \cup [2, +\infty)$

ب) $y = \sqrt[3]{\frac{x^2 - 4x + 4}{x^2 - 1}}$

$\rightarrow x^2 - 1 \neq 0 \quad x^2 \neq 1 \quad x \neq \pm 1$

$Df = \mathbb{R} - \{\pm 1\}$

الف) $y = \log(x^2 - 4x)$

$x^2 - 4x > 0 \rightarrow x(x-4) > 0 \rightarrow$

$\frac{0}{x-4}$

سوال ٧
١, ٧, ٥

$Df = (-\infty, 0) \cup (4, +\infty)$

ب) $y = \log \frac{14 - x^2}{|x| - 2}$

$14 - x^2 > 0 \rightarrow 14 > x^2 \rightarrow -\sqrt{14} < x < \sqrt{14}$
 $|x| - 2 > 0 \rightarrow |x| > 2 \rightarrow x > 2 \text{ or } x < -2$
 $|x| - 2 \neq 0 \rightarrow |x| \neq 2 \rightarrow x \neq \pm 2$

$Df = (-\sqrt{14}, -2) \cup (2, \sqrt{14}) - \{\pm 2\}$

ج) $y = \log \frac{x^2 - 4x + 4}{10 - x}$

$\frac{x^2 - 4x + 4}{10 - x} > 0 \rightarrow \frac{(x-2)^2}{(10-x)} > 0 \rightarrow (x-2)^2 > 0$
 $10 - x > 0 \rightarrow x < 10$
 $10 - x \neq 0 \rightarrow x \neq 10$

$Df = (10, +\infty) - \{9\}$
 ~~$(10, 10)$~~

د) $y = \sqrt{x^2 - 11x + 28} + \log \frac{\sqrt{4 - x^2}}{x}$

$\sqrt{x^2 - 11x + 28} \geq 0 \rightarrow \frac{x^2 - 11x + 28}{(x-4)(x-7)} \geq 0$
 $\frac{x^2 - 11x + 28}{(x-4)(x-7)} \geq 0$
 $Df = (0, 4] - \{1\}$

$y = \frac{x^2 - 4}{x^2 + 4}$

	-1	0	1	2	3
$x^2 - 4$	+	+	0	-	0
$x^2 + 4$	+	0	-	0	+
y	+	+	-	-	+

$\frac{-1}{x-2}$

سوال ٨

$y = \sqrt{\frac{x + f(x)}{f(x)}}$

$x - f(x) = 0 \quad x = f(x)$
 $x = -19$

$f(x) = 0 \begin{cases} x = 2 \\ x = -2 \end{cases}$

$\frac{-2}{x-2}$

$Df = (-2, -1] \cup (2, 3]$

سوال ٩