

CS Scanned with CamScanner

الف) $xy^3 + x^3 + 1 = 0$ (تفاضل جزئی) $\begin{cases} xy_1^3 = -x_1^3 - 1 \\ xy_2^3 = -x_2^3 - 1 \end{cases} \xrightarrow{x_1 = x_2} xy_1^3 = xy_2^3$
 $\frac{dy_1}{dx_1} = \frac{dy_2}{dx_2}$ ✓ است
 $x^3 + xy^3 - 1 = 0 \Rightarrow (xy - 1)^3 + (x - 1)^3 = 0$ | $\frac{1}{x} \checkmark$ است

الف) $x \sin y = y \sin x$ اگر $x = 0$ یا $y = 0$ هر عدد دلخواه می تواند باشد پس $x = 0$ یا $y = 0$ است
 (مثال نقض)

ب) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2$ $\frac{x}{y} + \frac{y}{x} + 2 = k$ $\frac{x}{y} + \frac{y}{x} = 2$ $\frac{x^2 + y^2}{xy} = 2$
 $x^2 + y^2 - 2xy = 0 \Rightarrow (x - y)^2 = 0 \Rightarrow y = x$ ✓ است

الف) $y = \sqrt{\frac{x-1}{x-3}} + \sqrt{\frac{3-x}{x}}$ $\frac{x-1}{x-3} \geq 0 \Rightarrow \frac{1}{x-3} \geq 0 \Rightarrow x > 3$ $\frac{3-x}{x} \geq 0 \Rightarrow -\frac{1}{x} \geq 0 \Rightarrow x < 0$
 $D_f = (0, 1]$

ب) $\sqrt{x} + \sqrt{y-1} = \sqrt{4}$ (I) $x \geq 0$
 $\sqrt{x} - \sqrt{4} = -\sqrt{y-1} \Rightarrow -\sqrt{y-1} \leq 0 \Rightarrow \sqrt{x} - \sqrt{4} \leq 0 \Rightarrow \sqrt{x} \leq 2 \Rightarrow x \leq 4$
 $D: (I) \cap (II) = [0, 4]$

الف) $y = \frac{\sqrt{x^2 - 2x + 4}}{\sqrt{x^2 - 1.2x + 4}}$ $x^2 - 2x + 4 \geq 0$ $x^2 - 1.2x + 4 \geq 0$
 $a+b+c \geq 0 \Rightarrow x \geq 1$ (I) $x^2 - 1.2x + 4 \geq 0$ $x \geq 1$ (II)
 $D: (I) \cap (II) = (-\infty, 1] \cup (1, +\infty)$

ب) $y = \sqrt{\frac{x^2 - 2x + 4}{x^2 - 1.2x + 4}}$ $\frac{(x-1)(x+4)}{(x-2)(x-1)} \geq 0$ $\frac{1}{x-2} \geq 0 \Rightarrow x > 2$
 $D: (-\infty, 1] \cup (2, 4] \cup (1, +\infty)$

الف) $y = \frac{\sqrt{x^2 - 2x + 4}}{\sqrt{x^2 - 2x + 4}}$ $x^2 - 2x + 4 \geq 0$ $x^2 - 2x + 4 \geq 0$
 $a+b+c \geq 0 \Rightarrow x \geq 1$ (I) $x^2 - 2x + 4 \geq 0$ $x \geq 1$ (II)
 $D: (I) \cap (II) = (-\infty, 1] \cup [\frac{4}{3}, +\infty)$

ب) $y = \sqrt{\frac{x^2 - 2x + 4}{x^2 - 2x + 4}}$ $\frac{x^2 - 2x + 4}{x^2 - 2x + 4} \geq 0$ $\frac{1}{x-2} \geq 0 \Rightarrow x > 2$
 $D: [\frac{4}{3}, +\infty) \cup (-\infty, \frac{4}{3}) - \{1\}$