

$$A \times B = \{(1,2)(1,3)(2,2)(2,3)(3,2)(3,3)\} \quad B^2 = \{(2,2)(2,3)(3,2)(3,3)\}$$

$$A \times B - B^2 = \{(1,2)(1,3)\}$$

الف) $\{(3, m^2)(2, 1)(-3, m)(-2, m)(3, m+2)(m, 4)\}$

$m^2 = m+2 \Rightarrow m^2 - m - 2 = 0 \Rightarrow (m-2)(m+1) = 0$

$m = 2$ یا $m = -1$

ب) $\{(3, m^2)(2, 1)(m, 4)(3, m+2)(-2, m)(-1, 3)\}$

اگر $m = 2$ باشد چون در زوج مرتب $(2, 1)$ و $(2, 4)$ را یکبار می‌کنند.

$$f(x) = \begin{cases} x^2 - 1 & x \leq 1 \\ ax + b & 1 \leq x \leq 2 \\ x^3 & x \geq 2 \end{cases}$$

$x=1 \rightarrow 1-1 = a+b \Rightarrow a+b=0$

$x=2 \rightarrow 2a+b=1$

$$\begin{cases} 2a+b=1 \\ -(a+b=0) \end{cases}$$

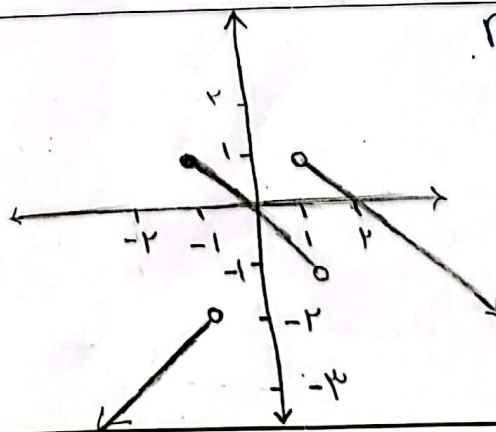
$a=1$
 $b=-1$

$a \times b = 1 \times (-1) = -1$

$$f(x) = \begin{cases} 2x-3 & x \geq k \\ k-3x & x < k \end{cases}$$

$x=k \rightarrow 2k-3 = k-3k \Rightarrow 2k-3 = -2k \Rightarrow 4k=3 \Rightarrow k=\frac{3}{4}=0.75$

$$f(x) = \begin{cases} -x+2 & x > 1 \\ -x & -1 \leq x < 1 \\ x-1 & x < -1 \end{cases}$$



$D_f = \mathbb{R} - \{1\}$

$R_f = (-\infty, 1]$

$$\text{الف) } 2y^3 + x^2 + 1 = 0 \Rightarrow 2y^3 = -x^2 - 1$$

$$\left. \begin{aligned} 2y_1^3 &= -x_1^2 - 1 \\ 2y_2^3 &= -x_2^2 - 1 \end{aligned} \right\} \xrightarrow{x_1 = x_2} 2y_1^3 = 2y_2^3 \Rightarrow y_1^3 = y_2^3 \Rightarrow y_1 = y_2 \quad \text{تابع هست} \quad (5)$$

$$\text{ب) } x^2 + 4y^2 - 2x - 12y + 10 = 0 \Rightarrow x^2 - 2x + 1 + 4y^2 - 12y + 9 = 0$$

$$1 + 9 \quad (x-1)^2 + (2y-3)^2 = 0 \quad \text{به صورت یک نقطه}$$

$$x-1 = 0 \Rightarrow x=1 \quad 2y-3 = 0 \Rightarrow 2y=3 \Rightarrow y=\frac{3}{2} \quad \text{است و تابع هست.} \quad (1, \frac{3}{2})$$

$$\text{الف) } x \sin y = y \sin x \xrightarrow{x=\pi} \sin x = 0 \Rightarrow y \times 0 = \pi \times \sin y$$

$$\begin{aligned} y &= x \\ y &= 2\pi \end{aligned} \quad \text{تابع نیست} \quad (5)$$

$$\text{ب) } \left(\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \right)^2 \Rightarrow \frac{x}{y} + \frac{y}{x} + 2 \times \sqrt{\frac{x}{y}} \times \sqrt{\frac{y}{x}} = 4$$

$$\Rightarrow \frac{x}{y} + \frac{y}{x} = 2 \Rightarrow \frac{x}{y} = \frac{y}{x} = 1 \Rightarrow x=y \quad \sqrt{2}=1 \quad \text{تابع هست} \quad (5)$$

$$\text{الف) } y = \sqrt{\frac{x-1}{x-3}} + \sqrt{\frac{3-x}{x}} \quad \frac{x-1}{x-3} y_1 \quad \frac{1}{x-3} \quad \frac{3}{x} \quad (-\infty, 1] \cup (3, +\infty) \quad (1)$$

$$\frac{3-x}{x} y_1 \quad \frac{0}{x} \quad \frac{3}{x} \quad (0, 3] \quad (2) \quad (1) \cap (2) \Rightarrow D_f = (0, 1] \quad (5)$$

$$\text{ب) } \sqrt{x} + \sqrt{y-1} = \sqrt{3} \Rightarrow \sqrt{y-1} = \sqrt{3} - \sqrt{x} \Rightarrow \sqrt{3} - \sqrt{x} \geq 0 \Rightarrow \sqrt{x} \leq \sqrt{3} \Rightarrow x \leq 3$$

$$x \geq 0 \quad D_f = [0, 3] \quad (5)$$

$$\text{الف) } y = \frac{\sqrt{x^2 - 7x + 4}}{\sqrt{x^2 - 10x + 14}} \quad x^2 - 7x + 4 y_1 \Rightarrow (x-1)(x-4) y_1 \quad (-\infty, 1] \cup [4, +\infty) \quad (1)$$

$$\frac{x^2 - 10x + 14}{x^2 - 10x + 14} y_1 \quad \frac{x^2 - 10x + 14}{x^2 - 10x + 14} \quad \frac{1}{x^2 - 10x + 14} \quad \frac{4}{x^2 - 10x + 14} \quad \frac{1}{x^2 - 10x + 14} \quad \frac{4}{x^2 - 10x + 14} \quad \frac{1}{x^2 - 10x + 14} \quad \frac{4}{x^2 - 10x + 14}$$

$$\Rightarrow D_f = (-\infty, 1] \quad (2) \quad (1) \cap (2) \Rightarrow D_f = (-\infty, 1] \cup (2, 4] \cup (11, +\infty) \quad (5)$$

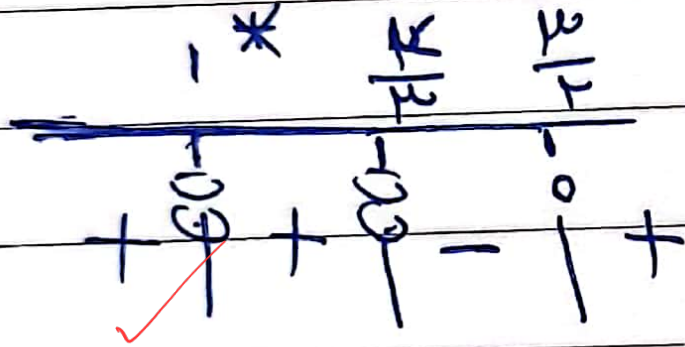
$$\text{الف) } y = \frac{\sqrt{2x^2 - 5x + 3}}{\sqrt{3x^2 - 7x + 4}} \quad 2x^2 - 5x + 3 y_1 \Rightarrow \quad \frac{2}{x^2 - 5x + 3} \quad \frac{3}{x^2 - 5x + 3} \quad \frac{1}{x^2 - 5x + 3} \quad \frac{4}{x^2 - 5x + 3} \quad \frac{1}{x^2 - 5x + 3} \quad \frac{4}{x^2 - 5x + 3}$$

$$3x^2 - 7x + 4 y_1 \Rightarrow \quad \frac{3}{x^2 - 7x + 4} \quad \frac{4}{x^2 - 7x + 4} \quad \frac{1}{x^2 - 7x + 4} \quad \frac{4}{x^2 - 7x + 4} \quad \frac{1}{x^2 - 7x + 4} \quad \frac{4}{x^2 - 7x + 4}$$

$$\Rightarrow D_f = (-\infty, 1) \cup [\frac{3}{2}, +\infty) \quad (5)$$

سوال ۵) مستجاب:

$$y = \sqrt{\frac{\mu x^2 - \omega x + \mu}{\mu x^2 - \nu x + \varepsilon}} \Rightarrow \frac{\mu x^2 - \omega x + \mu}{\mu x^2 - \nu x + \varepsilon} \geq 0$$



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