

$$A \times B \Rightarrow \{(1,2)(1,3)(2,2)(2,3)(3,2)(3,3)\}$$

$$B^2 = \{(2,2)(2,3)(3,2)(3,3)\}$$

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

$$f(x) = \{(3, m^2)(2, 1)(-2, m)(-2, m)(2, m+2)(m+2)\}$$

$$m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) \rightarrow \begin{matrix} m=2 \\ m=-1 \end{matrix}$$

$$g(x) = \{(3, m^2)(2, 1)(m+2)(2, m+2)(-2, m)(-1, 2)\}$$

$$m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) \rightarrow \begin{matrix} m=2 \\ m=-1 \end{matrix}$$

$$f(x) = \begin{cases} x^2-1 & x \leq 1 \\ ax+b & 1 < x \leq 2 \\ x^2 & x > 2 \end{cases} \quad x=1 \quad x^2-1 = ax+b \Rightarrow 0 = a+b \Rightarrow a = -b$$

$$x=2 \rightarrow x^2 = ax+b \Rightarrow 4 = 2a+b \Rightarrow -2b+b=4 \Rightarrow -b=4 \Rightarrow b=-4 \Rightarrow a=4$$

$$a \times b = -16$$

$$f(x) = \begin{cases} x^2-2 & x \geq K \\ \varepsilon - x & x \leq K \end{cases} \quad \begin{matrix} x^2-2 = \varepsilon - x \\ \varepsilon = x^2 + x \end{matrix}$$

$$\varepsilon = x^2 + x \rightarrow x = \frac{\varepsilon}{2} \rightarrow K = \frac{\varepsilon}{2}$$

$$f(x) = \begin{cases} -x+2 & x > 1 \\ -x & -1 \leq x \leq 1 \\ x-1 & x \leq -1 \end{cases} \rightarrow \begin{matrix} 1 & 2 & 3 \\ 1 & 0 & -1 \end{matrix}$$

$$\begin{matrix} -1 & -2 & -3 \\ -2 & -3 & -4 \end{matrix}$$



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

$$R = (-\infty, 1]$$

$$x^2 + y^2 + x + 2 = 0 \rightarrow x^2 + x + y^2 + 2 = 0$$

$$y_1^2 = \frac{-x^2-1}{2}$$

$$\Rightarrow y_1^2 = y_2^2 \rightarrow y_1 = y_2$$

$$\rightarrow x^2 + y^2 - 2x - 4y + 1 = 0 \rightarrow (x-1)^2 + (y-2)^2 = 2$$

$$\rightarrow (1, 2)$$

$$\rightarrow y = \frac{2}{x}$$

$$\rightarrow (1, 2)$$

ا) $x \sin y = y \sin x \rightarrow x = 0$
 $0 \times \sin y = y \times \sin 0$ ✓ $y \rightarrow$ هر عدد πy $\neq$

ب) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2$ (2)
 $\rightarrow \sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \rightarrow \frac{x}{y} + \frac{y}{x} + 2 = 4 \rightarrow \frac{x}{y} + \frac{y}{x} = 2$
 $x^2 y^2 - 2xy = (x-y)^2 = 0 \rightarrow \frac{x^2 y^2}{xy} = 2 \rightarrow x^2 y^2 = 2xy$
 $\hookrightarrow x = y \rightarrow x = 0$

ج) $y = \sqrt{\frac{x-1}{x-3}} + \sqrt{\frac{x-3}{x}} \Rightarrow \frac{x-1}{x-3} \geq 0$ ✓ $\frac{1}{x-3} + \frac{1}{x} \rightarrow (-\infty, 1] \cup (3, +\infty)$

$\frac{x-3}{x} \geq 0 \rightarrow \frac{x}{x-3} \rightarrow (0, 3]$ (2) $D = (0, 1]$

د) $\sqrt{x} + \sqrt{y-1} = \sqrt{3} \quad y-1 = \sqrt{3} - \sqrt{x} \quad \sqrt{y-1} \geq 0 \rightarrow \sqrt{x} \geq 0 \quad I$
 $\sqrt{3} - \sqrt{x} \geq 0 \quad \sqrt{3} \geq \sqrt{x} \quad x \leq 3 \quad II$
 $x \in [0, 3]$

ه) $\frac{\sqrt{x^2 - \sqrt{x+4}}}{\sqrt{x^2 - 10x + 4}} \geq 0 \quad (x-4)(x-1) \rightarrow \frac{x}{x-4} \rightarrow \frac{1}{x-4} + \frac{1}{x} \rightarrow (-\infty, 1] \cup (4, +\infty)$
 $x^2 - 10x + 4 \geq 0 \rightarrow (x-1)(x-9) \rightarrow \frac{x}{x-9} + \frac{1}{x-1} \rightarrow (-\infty, 1] \cup (9, +\infty)$
 $x^2 - 10x + 4 \geq 0 \rightarrow (x-1)(x-9) \rightarrow \frac{x}{x-9} + \frac{1}{x-1} \rightarrow (-\infty, 1] \cup (9, +\infty)$
 $x < 1$ (10)

و) $y = \sqrt{\frac{x^2 - 8x + 4}{x^2 - \sqrt{x+4}}} \rightarrow x^2 - 8x + 4 \geq 0 \quad x < \frac{1}{2}$
 $x^2 - 8x + 4 \geq 0 \rightarrow (x-1)(x-4) \rightarrow \frac{x}{x-4} + \frac{1}{x-1} \rightarrow (-\infty, 1] \cup (4, +\infty)$
 $x^2 - 8x + 4 \geq 0 \rightarrow (x-1)(x-4) \rightarrow \frac{x}{x-4} + \frac{1}{x-1} \rightarrow (-\infty, 1] \cup (4, +\infty)$
 $x < \frac{1}{2}$ (2)
 $y = \sqrt{\frac{x^2 - 8x + 4}{x^2 - \sqrt{x+4}}} \rightarrow \frac{(x-1)(x-4)}{(x-1)(x-4)} \rightarrow \frac{x}{x-4} + \frac{1}{x-1} \rightarrow (-\infty, 1] \cup (4, +\infty)$