

(11)

سمايرة تيسيف 1. آية محمد زكريا

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

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

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

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

$$m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow m = -1 \text{ مقبول } \quad m = 2 \rightarrow \text{مرفوض}$$

$$\{(3, 1), (2, 1), (-2, -1), (-2, -1), (3, 1), (-1, 4)\}$$

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

$$m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow m = -1 \text{ مقبول } \quad m = 2 \rightarrow \text{مرفوض}$$

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

$$f(1) = 1^2 - 1 = 0 \rightarrow a + b = 0$$

$$f(2) = 2^2 = 4 \rightarrow 2a + b = 4$$

$$a + b = 0 \rightarrow b = -a$$

$$2a - a = 4 \rightarrow a = 4 \rightarrow b = -4$$

$$ax + b = -4x + 4$$

$$f(x) = \begin{cases} 2x - c; & x \geq k \\ c - x; & x \leq k \end{cases}$$

$$2k - c = c - 3k \Rightarrow 5k = 2c \rightarrow k = \frac{2c}{5}$$

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

$$f(1) = -1 + 2 = 1$$

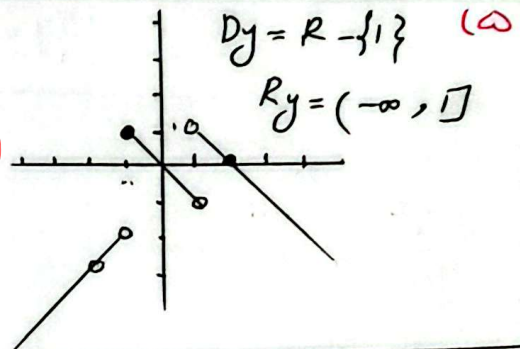
$$f(-1) = -(-1) = 1$$

$$f(2) = -2 + 2 = 0$$

$$f(-2) = -(-2) = 2$$

$$f(3) = -3 + 2 = -1$$

$$f(-3) = -(-3) = 3$$



الف) $xy^2 + x^2 + 1 = 0 \rightarrow \begin{cases} y_1^2 = -x^2 - 1 \\ y_2^2 = -x^2 - 1 \end{cases} \rightarrow y_1 = y_2 \rightarrow y_1 = y_2$

ب) $x^2 + 4y^2 - 2x - 12y + 10 = 0$

$$x = 1 \rightarrow 1 + 4y^2 - 2 - 12y + 10 = 0 \rightarrow 4y^2 - 12y + 9 = 0$$

$$(2y - 3)^2 = 0 \rightarrow 2y - 3 = 0 \rightarrow y = \frac{3}{2}$$

$$(1, \frac{3}{2}) \rightarrow \text{نقطة}$$

الف) $x \sin y = y \sin x$ ب) $\sin y = \frac{y \sin x}{x}$ ج) $x \neq 0$

$x=1 \rightarrow \sin y = \frac{y \sin 1}{1}$

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

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

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

① $\frac{x-1}{x-2} \geq 0 \rightarrow x=1, x \neq 2$

② $\frac{2-x}{x} \geq 0 \rightarrow x=2, x \neq 0$

$I \cap II \rightarrow [0, 1) \cup (2, +\infty)$

$D_f = (-\infty, 1] \cup (2, +\infty)$

$D_f = (0, 2]$

ب) $\sqrt{x} + \sqrt{y-1} = \sqrt{2} \quad x \geq 0, y \geq 1 \rightarrow x \leq 2 \rightarrow \sqrt{x} \leq \sqrt{2} \rightarrow 0 \leq \sqrt{x} - \sqrt{2}$

$D_y = [0, 2]$

الف) $y = \frac{\sqrt{x^2 - 5x + 4}}{\sqrt{x^2 - 10x + 19}}$

$x^2 - 5x + 4 \geq 0 \rightarrow (x-1)(x-4) \geq 0 \rightarrow x \leq 1, x \geq 4$

$x^2 - 10x + 19 \geq 0 \rightarrow (x-2)(x-11) \geq 0 \rightarrow x \leq 2, x \geq 11$

$D_y = (1, +\infty)$

ب) $y = \sqrt{\frac{x^2 - 5x + 4}{x^2 - 10x + 19}} \geq 0$

حروف $\rightarrow x=1, x=4$
ج $\rightarrow x=2, x=11$

Sign chart for $x^2 - 10x + 19$ with roots 2 and 11.

$D_y = (-\infty, 1] \cup (2, 4] \cup (11, +\infty)$

الف) $y = \frac{\sqrt{2x^2 - 5x + 2}}{\sqrt{2x^2 - 7x + 4}}$

$2x^2 - 5x + 2 \geq 0 \rightarrow \Delta = 25 - 16 = 9 \rightarrow x = \frac{5 \pm 3}{4} \rightarrow x = \frac{1}{2}, x = 2$

$\frac{-b \pm 1}{a} = \frac{5 \pm 1}{2} \rightarrow \frac{3}{2}, \frac{7}{2}$

$(x-1/2)(x-2) \geq 0 \rightarrow x \leq 1/2, x \geq 2$

$x - 7/2 \geq 0 \rightarrow x \geq 7/2$

$2x^2 - 7x + 4 \geq 0 \rightarrow (x-1/2)(x-8) \geq 0 \rightarrow x \leq 1/2, x \geq 8$

$D_y = x \geq 7/2$

$D = (-\infty, 1/2] \cup [7/2, +\infty)$

ب)

$y = \sqrt{\frac{2x^2 - 5x + 2}{2x^2 - 7x + 4}} \geq 0$

$x=1, x=7/2$

$x=1, x=8$

Sign chart for $2x^2 - 7x + 4$ with roots 1 and 8.

$D_y = (-\infty, 1) \cup (1, 7/2] \cup (8, +\infty)$