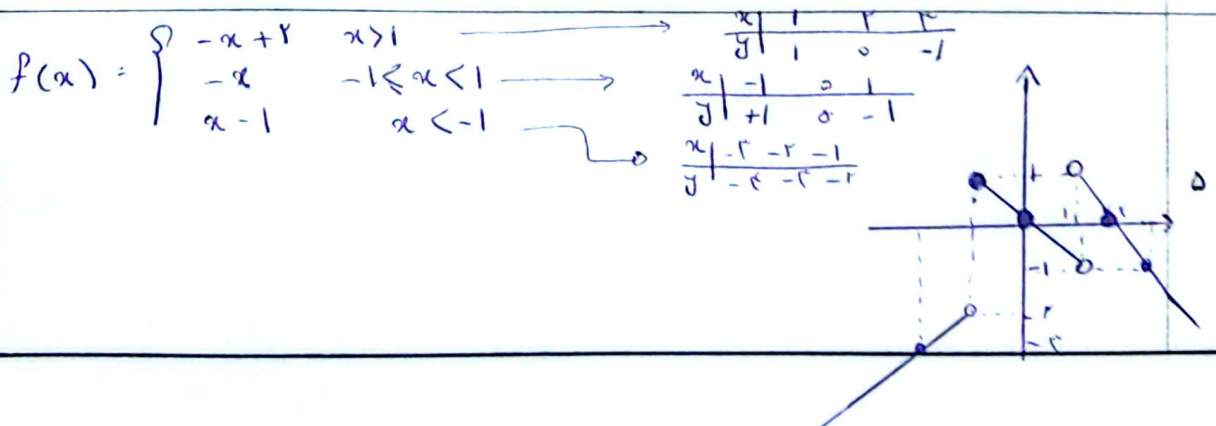


1
 $A = \{1, 2, 3\}$ $B = \{2, 3\}$ $A \times B = \{(1, 2), (1, 3), (2, 2), (2, 3), (3, 2), (3, 3)\}$
 $B \times B = \{(2, 2), (2, 3), (3, 2), (3, 3)\}$
 $A \times B - B^2 = \{(1, 2), (1, 3), (2, 2), (2, 3), (3, 2), (3, 3)\} - \{(2, 2), (2, 3), (3, 2), (3, 3)\}$
 $= \{(1, 2), (1, 3)\}$

2
 الف) $m^2 - m - 2 = 0 \Rightarrow (m-2)(m+1) = 0 \Rightarrow m = 2$ یا $m = -1$
 برای اینکه تابع زوج باشد باید $m^2 = m + 2$
 جمع کنیم دو طرف را داریم $m^2 - m - 2 = 0$
 اگر $m = 2$ $\{(2, 4), (2, 1), (-3, 2), (-2, 2), (2, 4)\}$
 اگر $m = -1$ $\{(2, 1), (2, 1), (-2, -1), (-2, -1), (-1, 4)\}$
 به نظر می آید $m = -1$ است
 ب) $m^2 = m + 2 \Rightarrow m^2 - m - 2 = 0 \Rightarrow (m-2)(m+1) = 0 \Rightarrow m = 2$ یا $m = -1$
 جمع کنیم دو طرف را داریم $m^2 - m - 2 = 0$
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 به نظر می آید $m = -1$ است

3
 $f(x) = \begin{cases} x^2 - 1 & x \leq 1 \\ a + b & 1 < x \leq 2 \\ x^2 & x > 2 \end{cases}$
 $x = 1 \Rightarrow (1)^2 - 1 = a + b \Rightarrow a + b = 0$
 $x = 2 \Rightarrow 2a + b = 1$
 $a + b = 0 \xrightarrow{a = -b} -b + b = 0 \Rightarrow b = -1$
 $a + b = 0 \Rightarrow a = 1$
 $a + b = 1$
 $a = 1, b = -1$
 $a + b = 1x - 1x = -4x$

4
 $f(x) = \begin{cases} 2x - 3 & x \geq k \\ 6 - 2x & x \leq k \end{cases}$
 $\Rightarrow x = k \Rightarrow 2k - 3 = 6 - 2k \Rightarrow 4k = 9 \Rightarrow k = \frac{9}{4}$



$$\text{الف) } xy^2 + x^2 + 1 = 0 \Rightarrow \begin{cases} xy^2 + 1 = -x^2 \\ xy^2 + 1 = -x^2 \end{cases} \xrightarrow{x=y} \begin{cases} xy^2 = -x^2 - 1 \\ xy^2 = -x^2 - 1 \end{cases} \Rightarrow xy^2 = -x^2 - 1 \Rightarrow xy^2 + x^2 + 1 = 0$$

$$\text{ب) } x^2 + 9y^2 - 2x - 12y + 10 = 0 \Rightarrow (x-1)^2 + (3y-2)^2 = 0$$

$$\Rightarrow \begin{cases} x-1=0 \\ 3y-2=0 \end{cases} \Rightarrow \begin{cases} x=1 \\ y=\frac{2}{3} \end{cases}$$

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

$$\text{ب) } \left(\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} \right)^2 = 0 \Rightarrow \frac{x}{y} + \frac{y}{x} + 2\sqrt{\frac{xy}{yx}} = 0 \Rightarrow \sqrt{1} = 1$$

$$\frac{x}{y} + \frac{y}{x} + 2 = 0 \Rightarrow \frac{x}{y} + \frac{y}{x} = -2 \Rightarrow \frac{x^2 + y^2}{xy} = -2 \Rightarrow x^2 + y^2 + 2xy = 0 \Rightarrow (x+y)^2 = 0 \Rightarrow x+y=0 \Rightarrow x=-y$$

$$y \geq \sqrt{\frac{x-1}{x-2}} + \sqrt{\frac{x-2}{x-1}} \Rightarrow \frac{x-1}{x-2} \geq 0 \Rightarrow x-1 \geq 0 \Rightarrow x \geq 1$$

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

$$\text{الف) } \frac{x^2 - \sqrt{x+4}}{\sqrt{x-10x+14}} > 0 \Rightarrow \frac{x^2 - \sqrt{x+4}}{\sqrt{x-10x+14}} > 0 \Rightarrow x^2 - \sqrt{x+4} > 0 \Rightarrow x^2 > \sqrt{x+4} \Rightarrow x < \frac{1}{4} \Rightarrow x < 1$$

$$\text{ب) } \frac{x^2 - \sqrt{x+4}}{x - 10x + 14} > 0 \Rightarrow \frac{x^2 - \sqrt{x+4}}{x^2 - 10x + 14} > 0 \Rightarrow x^2 - \sqrt{x+4} > 0 \Rightarrow (x-1)(x-4) > 0 \Rightarrow x < 1 \text{ or } x > 4$$

$$\text{الف) } \sqrt{x^2 - 2x + 3} > 0 \Rightarrow \Delta = 4 - 12 = -8 < 0 \Rightarrow x = \frac{2 \pm \sqrt{-8}}{2} \Rightarrow x_1 = 1 - \sqrt{2}, x_2 = 1 + \sqrt{2}$$

$$\text{ب) } \sqrt{x^2 - 2x + 3} > 0 \Rightarrow \Delta = 4 - 12 = -8 < 0 \Rightarrow x = \frac{2 \pm \sqrt{-8}}{2} \Rightarrow x_1 = 1 - \sqrt{2}, x_2 = 1 + \sqrt{2}$$