

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

الف) $m^2 = m + 2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0 \rightarrow m = -1, 2 \rightarrow \boxed{m = -1}$ قابل قبول

ب) $m^2 = m + 2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0 \rightarrow m = -1, 2 \rightarrow \boxed{m = 2}$ قابل قبول

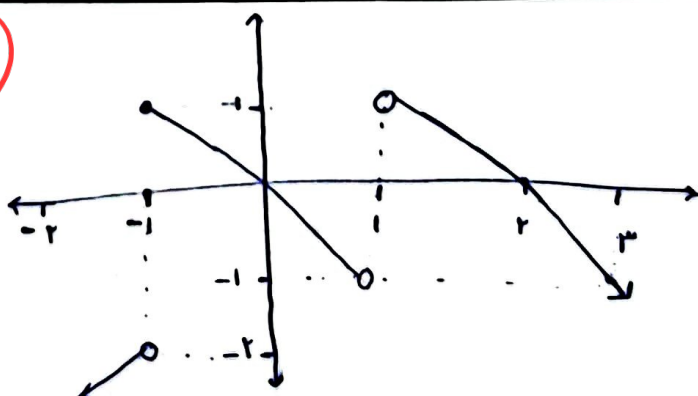
به ازای هیچ مقدار m تابع زوج و

$$\begin{aligned} x^2 - 1 &= ax + b \xrightarrow{x=1} 1 - 1 = a + b \rightarrow a + b = 0 \\ ax + b &= x^2 \xrightarrow{x=2} 2a + b = 4 \end{aligned} \rightarrow \begin{cases} a + b = 0 \\ 2a + b = 4 \end{cases} \rightarrow \begin{cases} -a - b = 0 \\ 2a + b = 4 \end{cases} \rightarrow \begin{cases} -a - b = 0 \\ a + b = -4 \end{cases} \rightarrow \boxed{a \times b = -1 \times -1 = -1}$$

$$2x - 3 = 4 - 3x \xrightarrow{x=k} 2k - 3 = 4 - 3k \rightarrow 5k = 7 \rightarrow \boxed{k = \frac{7}{5}}$$

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

$$R_f = [1, -\infty) \cup (-\infty, 1]$$



الف) $2y^2 + x^2 + 1 = 0 \rightarrow \begin{cases} 2y_1^2 = -x_1^2 - 1 \\ 2y_2^2 = -x_2^2 - 1 \end{cases} \xrightarrow{x_1=x_2} 2y_1^2 = 2y_2^2 \rightarrow y_1=y_2$
 تابع است ✓

ب) $(2y-2)^2 + (x-1)^2 = 0 \rightarrow$ (مجموع مربعات مثبت صفر) $\rightarrow$ نقطه
 $\rightarrow y=1, x=1$ تابع است ✓

الف) $x \sin y = y \sin x \xrightarrow{x=0} 0 \times \sin y = y \times 0 \rightarrow y \rightarrow$ هر عددی می تواند باشد
 (ب) ازای $x=0$ تابع نیست

ب) $1+1=2 \rightarrow x=y \rightarrow$ تابع یک به یک و وارثا یک به یک است، مع شرد
 $(\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}})^2 = 2^2$
 برابر 2 است ← عدد 1 است. ✓ تابع است ✓
 $\rightarrow \frac{x}{y} + \frac{y}{x} + 2 = 4 \rightarrow x^2 + y^2 = 2xy \rightarrow (x-y)^2 = 0 \rightarrow x=y$

الف) $y = \sqrt{\frac{x-1}{x-2}} + \sqrt{\frac{x-2}{x-1}} \rightarrow$
 $\begin{cases} \frac{x-1}{x-2} \geq 0 \rightarrow x=1 \rightarrow (-\infty, 1) \cup (2, +\infty) \\ \frac{x-2}{x-1} \geq 0 \rightarrow x=2 \rightarrow (-\infty, 2) \cup (1, +\infty) \end{cases}$
 $\rightarrow D_f = (-\infty, 1) \cup (2, +\infty)$
 ب) $\begin{cases} x \geq 0 \\ y-1 \geq 0 \rightarrow y \geq 1 \end{cases} \rightarrow D_f = \{(x, y) | x \geq 0, y \geq 1\}$
 $\sqrt{y-1} = \sqrt{x} \sqrt{y} \rightarrow x \leq y$
 $\rightarrow D_f = \{(x, y) | x \geq 0, y \geq 1, x \leq y\}$

الف) $\begin{cases} x^2 - 7x + 4 \geq 0 \rightarrow (x-4)(x-1) = 0 \rightarrow x = 1, 4 \rightarrow D_f = (-\infty, 1] \cup (4, +\infty) \\ x^2 - 10x + 14 \geq 0 \rightarrow (x-2)(x-7) = 0 \rightarrow x = 2, 7 \rightarrow D_f = (-\infty, 2] \cup (7, +\infty) \end{cases}$
 $\rightarrow D_f = (-\infty, 1] \cup (4, +\infty) \cap (-\infty, 2] \cup (7, +\infty) = (-\infty, 1] \cup (4, 2] \cup (7, +\infty)$
 ب) $\frac{x^2 - 7x + 4}{x^2 - 10x + 14} \geq 0 \rightarrow \frac{x^2 - 7x + 4}{(x-2)(x-7)} \geq 0 \rightarrow x = 1, 2, 4, 7$
 $\rightarrow D_f = (-\infty, 1] \cup (2, 4) \cup (7, +\infty)$

الف) $\begin{cases} 2x^2 - 5x + 3 \geq 0 \rightarrow x = \frac{5 \pm \sqrt{25-24}}{4} \rightarrow x = \frac{1}{2}, 3 \\ 2x^2 - 7x + 4 \geq 0 \rightarrow x = \frac{7 \pm \sqrt{49-32}}{4} \rightarrow x = \frac{7}{2}, 2 \end{cases}$
 $\rightarrow D_f \cap D_{f_1} = (-\infty, \frac{1}{2}) \cup (\frac{3}{2}, +\infty)$
 ب) $\frac{2x^2 - 5x + 3}{2x^2 - 7x + 4} \geq 0 \rightarrow x = \frac{1}{2}, \frac{3}{2}, 2, \frac{7}{2}$
 $\rightarrow D_f = \mathbb{R} - (\frac{1}{2}, \frac{3}{2}) \cup (2, \frac{7}{2})$