

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

$$B = \{2, 3\}$$

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

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

$$\text{الف) } f(x) = \{(3, m^2), (2, 1), (-2, m), (-2, m), (3, m+2), (m, 4)\} \rightarrow m^2 = m+2 \rightarrow m^2 - m - 2 = 0$$

$$\begin{cases} a+c=b \\ m = -1 \quad \checkmark \\ m = 2 \quad \times \end{cases}$$

m نمی تواند ۲ باشد زیرا آن که در زوج مرتب $(2, 1)$ مولفه اول مساوی مولفه دوم دارد

$$\text{ب) } g(x) = \{(3, m^2), (2, 1), (m, 4), (3, m+2), (-2, m), (-1, 3)\} \rightarrow m^2 = m+2$$

$$\begin{cases} m = -1 \quad \times \\ m = 2 \quad \times \end{cases}$$

برای هیچ مقدار m این مجموعه تابع نمی باشد

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

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

$$\rightarrow a \times b = -4 \quad \checkmark$$

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

$$\rightarrow x=k \rightarrow 2k - 3 = 2 - 3k$$

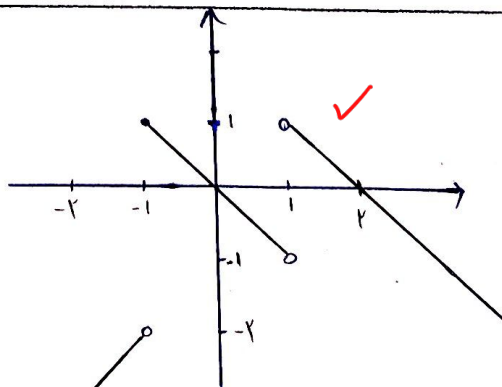
$$5k = 1$$

$$k = \frac{1}{5} \quad \checkmark$$

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

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

$$R_f = (-\infty, 1] \quad \checkmark$$



الف) $2y^2 + x^2 + 1 = 0 \rightarrow \begin{cases} (x_1, y_1) \in f_{(m)} \\ (x_2, y_2) \in f_{(m)} \end{cases} \xrightarrow{x_1 = x_2, y_1 = y_2} \begin{cases} 2y_1^2 = -x_1^2 - 1 \\ 2y_2^2 = -x_2^2 - 1 \end{cases} \rightarrow 2y_1^2 = 2y_2^2 \rightarrow y_1 = y_2 \checkmark$
تابع است

ب) $x^2 - 2x + 1 + \varepsilon y^2 - 12y + 9 = 0 \rightarrow (x-1)^2 + (y-3)^2 = 0$



مک یک نقطه $\frac{1}{\sqrt{2}}$

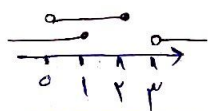
الف) $x \sin y = y \sin x \rightarrow x=0 \rightarrow 0 \times \sin y = y \times 0 \rightarrow$ هر دو اندازه مقدار باشد
مثال نقض $\times$ تابع نیست

ب) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \xrightarrow{\text{تکلیف}} \frac{x}{y} + \frac{y}{x} + 2\sqrt{1} = 2 \rightarrow \frac{x^2 + y^2}{xy} = 2$

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



الف) $y = \sqrt{\frac{x-1}{x-2}} + \sqrt{\frac{2-x}{x}} \rightarrow \frac{x-1}{x-2} \geq 0 \quad \frac{1}{x-2} \geq 0$
 $\frac{2-x}{x} \geq 0 \quad \frac{0}{-2} \geq 0$



$\rightarrow D_f = (0, 1] \checkmark$

ب) $\sqrt{x} + \sqrt{y-1} = \sqrt{3} \rightarrow \begin{cases} x \geq 0 \\ \sqrt{x} - \sqrt{3} = -\sqrt{y-1} \rightarrow \sqrt{x} - \sqrt{3} \leq 0 \rightarrow \sqrt{x} \leq \sqrt{3} \rightarrow x \leq 3 \end{cases}$
 $\rightarrow D_f = [0, 3] \checkmark$

الف) $y = \frac{\sqrt{x^2 - 5x + 4}}{\sqrt{-9x + 14}} \rightarrow x^2 - 5x + 4 \geq 0 \quad \frac{1}{-9x + 14} \geq 0$
 $-9x + 14 > 0 \rightarrow -9x > -14 \rightarrow 9x < 14 \rightarrow x < \frac{14}{9}$
 $\rightarrow D_f = (-\infty, 1] \checkmark$

ب) $y = \sqrt{\frac{x^2 - 5x + 4}{x^2 - 10x + 14}} \rightarrow \frac{x^2 - 5x + 4}{x^2 - 10x + 14} \geq 0 \rightarrow \frac{1}{x^2 - 10x + 14} \geq 0$
 $\rightarrow D_f = (-\infty, 1] \cup (2, 4] \cup (14, +\infty) \checkmark$

الف) $y = \frac{\sqrt{2x^2 - 8x + 3}}{\sqrt{3x^2 - 5x + 2}} \rightarrow 2x^2 - 8x + 3 \geq 0 \rightarrow \frac{1}{3x^2 - 5x + 2} \geq 0$
 $3x^2 - 5x + 2 > 0$
 $\rightarrow D_f = (-\infty, 1) \cup [\frac{2}{3}, +\infty) \checkmark$

ب) $y = \sqrt{\frac{2x^2 - 8x + 3}{3x^2 - 5x + 2}} \rightarrow \frac{2x^2 - 8x + 3}{3x^2 - 5x + 2} \geq 0 \rightarrow \frac{1}{3x^2 - 5x + 2} \geq 0$
 $\rightarrow D_f = \mathbb{R} - \{1\} - \{\frac{2}{3}\} \checkmark$

$\checkmark (-\infty, 1) \cup (1, \frac{2}{3}) \cup [\frac{2}{3}, +\infty)$