

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

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

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

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

$$\rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0$$

$$\rightarrow m = 2, -1$$

$$\xrightarrow{m=2} f(x) = \{(2,1), (2,4)\} \times$$

$$\Rightarrow m = -1$$

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

$$\rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0$$

$$\rightarrow m = 2, -1$$

$$\xrightarrow{m=2} g(x) = \{(2,1), (2,4)\} \times$$

$$\xrightarrow{m=-1} g(x) = \{(-1,2), (-1,1)\} \times \quad m \in \emptyset$$

$$\left. \begin{array}{l} x=1 \rightarrow x^2 - 1 = ax + b \rightarrow a + b = 0 \\ x=2 \rightarrow x^2 = ax + b \rightarrow 2a + b = 1 \end{array} \right\} a = 1, b = -1$$

$$ax + b = 1x - 1 = -4x$$

$$x = k \rightarrow 2x - 3 = 5 - 3x \Rightarrow x = \frac{8}{5}$$

$$k = \frac{8}{5}$$

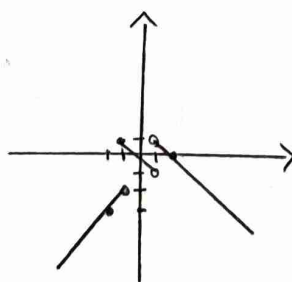
$$D_f \in \mathbb{R} - \{1\} \quad R_f \in (-\infty, -1]$$

$$-x + 2 \Rightarrow x = 1, y = +1$$

$$x = 2, y = 0$$

$$-x \Rightarrow x = 1, y = -1$$

$$x = -1, y = 1$$



$$x - 1 \Rightarrow x = -1, y = -2$$

$$x = -2, y = -3$$

الف) $\begin{cases} 2y_1^2 = -x_1^2 - 1 \\ 2y_2^2 = -x_2^2 - 1 \end{cases} \xrightarrow{x_1=x_2} 2y_1^2 = 2y_2^2$ $y_1^2 = y_2^2$ $y_1 = y_2 \rightarrow \text{تابع است}$	ب) $x^2 + 4y^2 - 2x - 12y + 10 = 0$ $(x-1)^2 + (2y-3)^2 = 0$ $\hookrightarrow x=1, y=\frac{3}{2} \Rightarrow \text{تابع است}$	۶
الف) $x \sin y = x \sin x$ $x=0 \rightarrow y \in \mathbb{R} \Rightarrow \text{تابع نیست}$	ب) جمع دو عدد مثبت برابر ۲ شده است $\left. \begin{matrix} 0+2=2 \\ 2+0=2 \\ 1+1=2 \end{matrix} \right\} x, y \neq 0 \Rightarrow \text{تابع نیست}$ $\hookrightarrow x=y \Rightarrow \text{تابع است}$	۷
الف) $\frac{x-1}{x-3} > 0 \quad \begin{array}{c ccc} x & 1 & 3 & \end{array}$ $x \in (-\infty, 1] \cup (3, +\infty) \quad ①$ $\frac{2-x}{x} > 0 \quad \begin{array}{c ccc} x & 0 & 2 & \end{array}$ $x \in (0, 2] \quad ② \quad ① \cap ② \rightarrow x \in (0, 1]$	ب) $\sqrt{y-1} = \sqrt{3} - \sqrt{x} \rightarrow x > 0 \quad ①$ $\sqrt{y-1} > 0 \rightarrow x \leq 3 \quad ②$ $① \cap ② \rightarrow x \in [0, 3]$	۸
الف) $x^2 - 7x + 4 > 0 \rightarrow (x-1)(x-4) > 0$ $\begin{array}{c ccc} x & 1 & 4 & \end{array} \quad x \in (-\infty, 1] \cup [4, +\infty) \quad ②$ $14 - 9x > 0 \rightarrow x \in (-\infty, \frac{14}{9}) \quad ①$ $① \cap ② \rightarrow x \in (-\infty, 1]$	ب) $\frac{x^2 - 7x + 4}{x^2 - 10x + 14} > 0 \Rightarrow \frac{(x-1)(x-4)}{(x-2)(x-8)} > 0$ $\begin{array}{c ccccc} x & 1 & 2 & 4 & 8 & \end{array}$ $x \in (-\infty, 1] \cup (2, 4] \cup (8, +\infty)$	۹
الف) $2x^2 - 5x + 3 > 0 \rightarrow a+b+c=0$ $x = 1, \frac{5}{2} \quad \begin{array}{c ccc} x & 1 & \frac{5}{2} & \end{array}$ $x \in (-\infty, 1] \cup [\frac{5}{2}, +\infty) \quad ①$ $3x^2 - 7x + 4 > 0 \rightarrow a+b+c=0$ $x = 1, \frac{4}{3} \quad \begin{array}{c ccc} x & 1 & \frac{4}{3} & \end{array} \quad ① \cap ②$ $x \in (-\infty, 1] \cup (\frac{4}{3}, +\infty) \quad ② \quad \hookrightarrow x \in (-\infty, 1] \cup [\frac{4}{3}, +\infty)$	ب) $\frac{2x^2 - 5x + 3}{3x^2 - 7x + 4} > 0$ $\begin{array}{c ccc} x & 1 & \frac{4}{3} & \frac{5}{2} & \end{array}$ $x \in (-\infty, 1] \cup (1, \frac{4}{3}) \cup [\frac{5}{2}, +\infty)$	۱۰