

$$A \times B = \{ (1,2), (2,3), (3,2), (2,4), (3,4), (4,3) \}$$

$$B^r = \{ (2,2), (2,3), (3,2), (4,3) \}$$

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

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

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

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

$$x=1 \rightarrow 0 = a + b \rightarrow b = -a$$

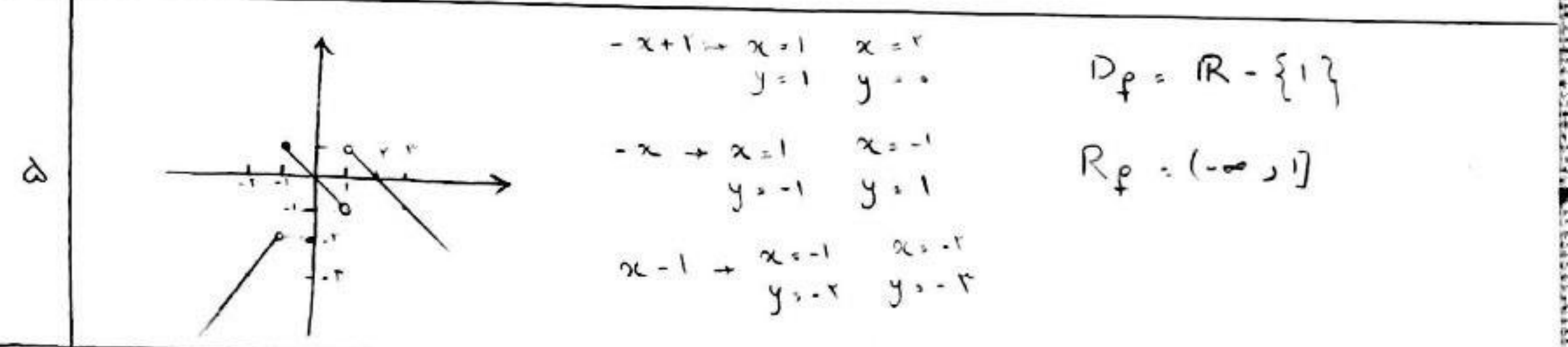
$$x=2 \rightarrow 1 = 4a + b \rightarrow 1 = 3a \rightarrow a = \frac{1}{3}$$

$$b = -a = -\frac{1}{3} \Rightarrow b \times a = -\frac{1}{9}$$

$$f(x) = \begin{cases} 2x - 3 & x \geq K \\ 4 - 3x & x \leq K \end{cases}$$

$$x=K \rightarrow 2K - 3 = 4 - 3K$$

$$5K = 7 \rightarrow K = \frac{7}{5}$$



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

ب) $4y^2 - 12y + 9 + x^2 - 2x + 1 = 0 \rightarrow (2y-3)^2 + (x-1)^2 = 0$

الف) $x \sin y = y \sin x \rightarrow x=0 \rightarrow y \in \mathbb{R} \Rightarrow$ تابع است

$0 = y(0)$
 $\rightarrow \sin 0 = 0$

ب) $x=y \rightarrow$ تابع است

الف) $\begin{cases} \sqrt{\frac{x-1}{x-2}} \rightarrow \frac{1}{+ \quad - \quad +} \Rightarrow D_1 = (-\infty, 2) \cup (3, +\infty) \\ \sqrt{\frac{x-2}{x}} \rightarrow \frac{1}{- \quad + \quad -} \Rightarrow D_2 = (0, 2] \end{cases}$

ب) $D_1 \cap D_2 = (0, 1]$

ج) $\sqrt{y-1} = \sqrt{2} - \sqrt{x} \rightarrow \sqrt{y-1} \geq 0 \Rightarrow \sqrt{2} - \sqrt{x} \geq 0 \rightarrow \sqrt{2} \geq \sqrt{x} \Rightarrow x \leq 2$

$D_f = [0, 2]$

محدودیت در برابری است پس $x \geq 0$

الف) $y = \frac{\sqrt{(x-4)(x-1)}}{\sqrt{(x-2)(x-1)}} \rightarrow \frac{1}{+ \quad - \quad +} \rightarrow D_1 = (-\infty, 2) \cup (4, +\infty)$

$\frac{1}{\sqrt{(x-2)(x-1)}} \rightarrow \frac{1}{+ \quad - \quad +} \rightarrow D_2 = (-\infty, 2) \cup (1, +\infty)$

ب) $D_1 \cap D_2 = (-\infty, 2) \cup (1, +\infty) = D_f$

ج) $y = \sqrt{\frac{(x-4)(x-1)}{(x-2)(x-1)}} \rightarrow \frac{1}{+ \quad - \quad +} \rightarrow D_f = (-\infty, 2) \cup (2, 4] \cup (1, +\infty)$

الف) عبارت صورت: $a+b+c \geq 0 \rightarrow 1 \geq \frac{r}{r} \rightarrow \frac{1}{+ \quad - \quad +} \rightarrow D_1 = (-\infty, 0] \cup [\frac{r}{r}, +\infty)$

عبارت مخرج: $a+b+c \geq 0 \rightarrow 1 \geq \frac{r}{r} \rightarrow \frac{1}{+ \quad - \quad +} \rightarrow D_2 = (-\infty, 0] \cup [\frac{r}{r}, +\infty)$

ب) $D_f = D_1 \cap D_2 = (-\infty, 0] \cup [\frac{r}{r}, +\infty)$

الف) عبارت صورت: $a+b+c \geq 0 \rightarrow 1 \geq \frac{r}{r} \rightarrow \frac{1}{+ \quad - \quad +} \rightarrow D_1 = (-\infty, 0] \cup [\frac{r}{r}, +\infty)$

عبارت مخرج: $a+b+c \geq 0 \rightarrow 1 \geq \frac{r}{r} \rightarrow \frac{1}{+ \quad - \quad +} \rightarrow D_2 = (-\infty, 0] \cup [\frac{r}{r}, +\infty)$

ب) $\Rightarrow D_f = (-\infty, 0] \cup [\frac{r}{r}, +\infty) - \{1\}$