

الف) $xy^3 + x^2 + 1 = 0 \Rightarrow xy^3 = -x^2 - 1$

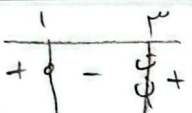
$xy_1^3 = -x_1^2 - 1 \Rightarrow xy_1^3 = xy_2^3 \Rightarrow y_1^3 = y_2^3 \Rightarrow$ تابع است

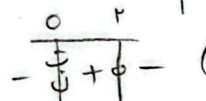
ب) $x^2 + 4y^2 - 2x - 12y + 10 = 0 \Rightarrow (x-1)^2 + (2y-3)^2 = 0$

$x-1=0 \Rightarrow x=1$
 $2y-3=0 \Rightarrow y=\frac{3}{2}$
 به ازای این مقدارها تابع است

الف) $x \sin y = y \sin x \quad \sin 90 = \sin 180 = 0$
 به ازای 90 و 180 برقرار است
 تابع است

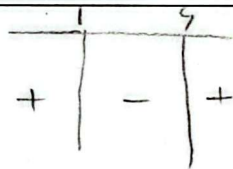
ب) به ازای $x=y$ برقرار است
 تابع است

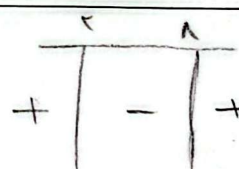
الف) $\frac{x-1}{x-2} \geq 0 \Rightarrow$  $(-\infty, 1) \cup (2, +\infty)$

$\frac{2-x}{x} \geq 0 \Rightarrow$  $(0, 2]$
 $\Rightarrow ((-\infty, 1) \cup (2, +\infty)) \cap (0, 2] = \underline{\underline{[1, 2]}}$

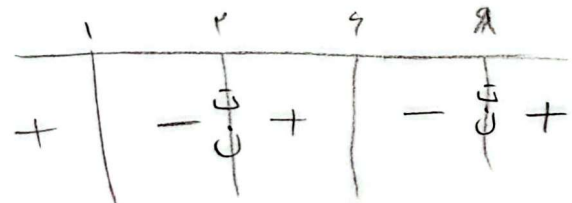
ب) $\sqrt{x} + \sqrt{y-1} = \sqrt{3} \quad x \geq 0 \Rightarrow D_f = \mathbb{R}^+ \cup \{0\}$

الف) $\frac{x-1}{x-2} \leq \frac{x-3}{x-4}$
 مخرج $x=1$
 مخرج $x=3$

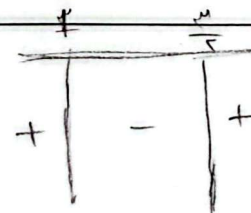


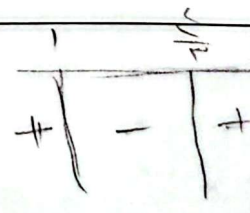


$(-\infty, 1) \cap (-\infty, 3) \cup [4, +\infty) \cap (3, +\infty)$
 $(-\infty, 1) \cup (4, +\infty)$

ب)  $(-\infty, 1) \cup (2, 3] \cup (4, +\infty)$

الف) $\frac{x-1}{x-2} \leq \frac{x-5}{x-6}$
 مخرج $x=\frac{5}{2}$
 مخرج $x=1$
 مخرج $x=\frac{6}{2}$
 مخرج $x=1$





$[1, \frac{5}{2}] \cup (-\infty, 1) \cup (\frac{6}{2}, +\infty)$

ب)  $(-\infty, \frac{5}{2}) \cup [\frac{6}{2}, +\infty)$

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

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

$$\Rightarrow \{(1, 2), (1, 3)\}$$

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عق ۱ $m^2 = m + 2 \Rightarrow m = \frac{2}{-1} = -2$ if $m = 2 \rightarrow (2, 1), (2, 4) \times$
 $\Rightarrow m = -1$

عق ۲ $m^2 = m + 2 \Rightarrow m = \frac{2}{-1} = -2$ if $m = -1 \rightarrow (-1, 4), (-1, 3) \times$
 $\Rightarrow m = 2$

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$$x = 1 \Rightarrow (1)^2 - 1 = a + b \Rightarrow a + b = 0$$

$$x = 2 \Rightarrow 2a + b = 1$$

$$\begin{aligned} 2a + b &= 1 \\ a + b &= 0 \end{aligned} \rightarrow \begin{aligned} 2a + b &= 1 \\ -a - b &= 0 \\ \hline a &= 1 \\ b &= -1 \end{aligned} \Rightarrow a \times b = 1(-1) = \underline{-1}$$

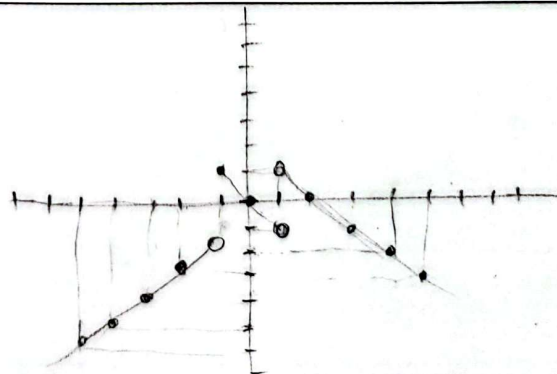
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$$\begin{aligned} x &= k \\ 2k - 3 &= 4 - 3k \\ 5k &= 7 \\ k &= \frac{7}{5} \end{aligned}$$

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$$D_f = (-\infty, 1) \cup (1, +\infty)$$

$$R_f = (-\infty, 1)$$



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