

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

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

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

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الف) $(3, m^2) = (3, m+2) \Rightarrow m^2 = m+2 \Rightarrow m^2 - m - 2 = 0 \begin{matrix} S=1 \\ P=-2 \end{matrix}$
 $\Rightarrow m = \begin{matrix} -1 \\ 2 \end{matrix} \Rightarrow \begin{matrix} \text{تابع نیست} \\ \text{تابع نیست} \end{matrix} \Rightarrow \boxed{m = -1}$
 $2 \rightarrow (2, 1)(2, 4) \Rightarrow \text{تابع نیست}$

ب) $(3, m^2) = (3, m+2) \Rightarrow m^2 = m+2 \Rightarrow m^2 - m - 2 = 0$
 $\Rightarrow m = \begin{matrix} -1 \\ 2 \end{matrix} \rightarrow \begin{matrix} (-1, 4)(-1, 3) \\ (2, 4)(2, 1) \end{matrix} \Rightarrow \begin{matrix} \text{تابع نیست} \\ \text{تابع نیست} \end{matrix} \Rightarrow \text{بازای هیچ مقدار از } m \text{ تابع نیست}$

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$$x=1 \Rightarrow x^2 - 1 = ax + b \rightarrow 1 - 1 = a + b \Rightarrow a + b = 0$$

$$x=2 \Rightarrow ax + b = x^2 \rightarrow 2a + b = 2^2 = 4$$

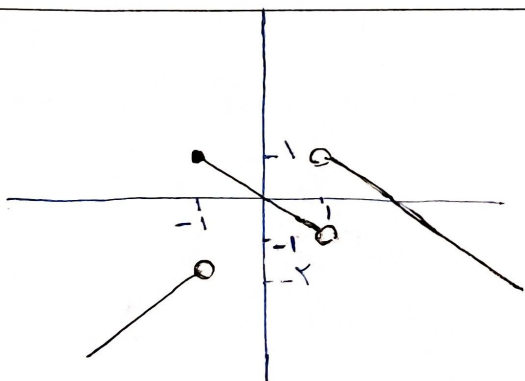
$$\left. \begin{matrix} a + b = 0 \\ 2a + b = 4 \end{matrix} \right\} a = 4 \Rightarrow b = -4 \Rightarrow a \times b = 4 \times (-4) = \boxed{-16}$$

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$$x=k \Rightarrow 2x - 3 = 4 - 3k \rightarrow 2k - 3 = 4 - 3k \Rightarrow 5k = 7$$

$$\Rightarrow \boxed{k = \frac{7}{5}}$$

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

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

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الف) $\begin{cases} 2y^3 = -x^2 - 1 \\ 2y^3 = -x^2 - 1 \end{cases} \Rightarrow y_1^3 = y_2^3 \Rightarrow y_1 = y_2$ تابع است

ب) $x^2 - 2x + 4y^2 - 12y + 10 = 0 \Rightarrow (x-1)^2 - 1 + (2y-3)^2 - 9 + 10 = 0$
 $\Rightarrow (x-1)^2 + (2y-3)^2 = 0 \Rightarrow x=1, y=\frac{3}{2} \rightarrow (1, \frac{3}{2})$ فقط نقطه در آن صدق کند و تابع است

الف) $x = 90 \Rightarrow 90 \sin y = y \times \sin 90 \Rightarrow 90 \sin y = y \Rightarrow y < 90$ تابع نیست

ب) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2$ طریقی که می توانیم $\frac{x}{y} + \frac{y}{x} + 2\sqrt{\frac{x}{y} \cdot \frac{y}{x}} = 4$

$\Rightarrow \frac{x}{y} + \frac{y}{x} = 2 \Rightarrow \frac{x^2 + y^2 - 2xy}{xy} = 0 \Rightarrow \frac{(x-y)^2}{xy} = 0 \Rightarrow x=y \in \mathbb{R} - \{0\}$ تابع است

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

$\frac{2-x}{x} \geq 0 \rightarrow \frac{2}{-\frac{1}{2} + \frac{1}{x}} \Rightarrow x = (0, 2] \rightarrow B$ $A \cap B = (0, 1]$

ب) $x \geq 0 \Rightarrow Df = [0, +\infty)$

الف) $x^2 - 7x + 4 \geq 0 \xrightarrow{a+b+c=0} \frac{1}{+\infty - \frac{7}{2} + \frac{4}{1}} \Rightarrow x = (-\infty, 1] \cup [4, +\infty) \rightarrow A$

$x - 10x + 14 > 0 \Rightarrow -9x + 14 > 0 \Rightarrow \frac{14}{9} > x \Rightarrow \frac{14}{9} > x \rightarrow B$

$A \cap B = (-\infty, 1]$

ب) $\frac{x^2 - 7x + 4}{x^2 - 10x + 14} \geq 0$

$\frac{1}{+\infty - \frac{7}{2} + \frac{4}{1}} \wedge \frac{1}{+\infty - \frac{10}{2} + \frac{14}{1}}$

$\Delta = 34 \Rightarrow \frac{10 \pm \sqrt{34}}{2} = \frac{10 \pm 5.83}{2} = \frac{15.83}{2} = 7.915$
 $Df = (-\infty, 1] \cup (2, 4] \cup (7.915, +\infty)$

الف) $2x^2 - 8x + 3 \geq 0$
 $\Delta = 1 \Rightarrow x = \frac{8 \pm 1}{4} = \frac{9}{4} = 2.25$

$\frac{1}{+\infty - \frac{8}{2} + \frac{3}{1}} \Rightarrow x = (-\infty, 1] \cup [\frac{9}{4}, +\infty) \rightarrow A$

$3x^2 - 7x + 4 > 0$
 $\Delta = 1 \Rightarrow x = \frac{7 \pm 1}{6} = \frac{8}{6} = \frac{4}{3} = 1.33$

$\frac{1}{+\infty - \frac{7}{2} + \frac{4}{1}} \Rightarrow x = (-\infty, 1] \cup (\frac{4}{3}, +\infty) \rightarrow B$

$A \cap B = (-\infty, 1] \cup (\frac{4}{3}, \frac{9}{4}]$

ب) $\frac{2x^2 - 8x + 3}{3x^2 - 7x + 4} \geq 0$

$\frac{1}{+\infty - \frac{8}{2} + \frac{3}{1}} \wedge \frac{1}{+\infty - \frac{7}{2} + \frac{4}{1}}$

$Df = (-\infty, 1] \cup (1, \frac{4}{3}) \cup [\frac{9}{4}, +\infty)$