

$$A \times B - (B \times B) = ?$$

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

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

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

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الف) $m^2 = m + 2 \rightarrow m^2 - m - 2 = 0$ $\begin{cases} m = -1 \\ m = 2 \end{cases}$
 $m = 2 \rightarrow (2,4), (2,1) \rightarrow$ غنّ قنّ

ب) $m^2 = m + 2 \rightarrow m^2 - m - 2 = 0$ $\begin{cases} m = -1 \rightarrow (-1,4), (-1,3) \rightarrow$ غنّ قنّ
 $m = 2 \rightarrow (2,4), (2,1) \rightarrow$ غنّ قنّ

به ازای هیچ مقدار حقیقی m تابع نیست!

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

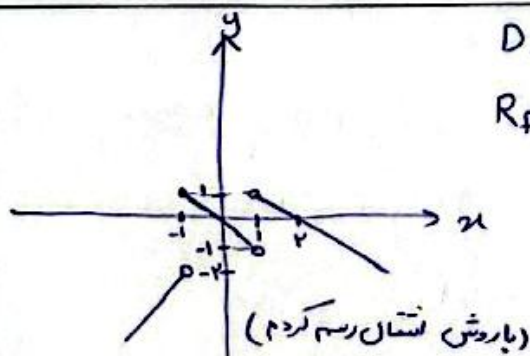
$\begin{cases} a + b = 0 \\ 2a + b = 1 \end{cases} \rightarrow \begin{cases} a = 1 \\ b = -1 \end{cases}$

$a \times b = 1 \times (-1) = -1$

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$$x = k \rightarrow 2k - 3 = 4 - 3k \rightarrow 5k = 7 \rightarrow k = \frac{7}{5}$$

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الف) $2y^3 + x^2 + 1 = 0$ $\left\{ \begin{array}{l} 2y_1^3 + x_1^2 + 1 \\ 2y_2^3 + x_2^2 + 1 \end{array} \right\} \xrightarrow{x_1 = x_2} 2y_1^3 + 1 = 2y_2^3 + 1 \rightarrow 2y_1^3 = 2y_2^3 \rightarrow y_1^3 = y_2^3 \rightarrow y_1 = y_2$ تابع است ✓ ب) $x^2 + 4y^2 - 2x - 12y + 1 = 0 \rightarrow x^2 - 2x + 1 + 4y^2 - 12y + 9 = 0 \rightarrow (x-1)^2 + (2y-3)^2 = 0$ $\left\{ \begin{array}{l} x-1=0 \rightarrow x=1 \\ 2y-3=0 \rightarrow y=\frac{3}{2} \end{array} \right\}$ $\left \begin{array}{l} 1 \\ \frac{3}{2} \end{array} \right$ تابع است ✓ جمع عبارت مثبت برابر صفاست پس هر دو برابر صفر هستند	۶
الف) $x \sin y = y \sin x$ $x=0$ $\rightarrow y \sin(0) = 0 \rightarrow y \in \mathbb{R}$ تابع نیست X ب) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2$ $\xrightarrow{\text{مربع کردن}} 1 + \frac{x}{y} + \frac{y}{x} = 2 \rightarrow \frac{x^2 + y^2}{xy} = 2 \rightarrow x^2 + y^2 = 2xy \rightarrow x^2 + y^2 - 2xy = 0 \rightarrow (x-y)^2 = 0 \rightarrow x-y=0 \rightarrow x=y$ پس تابع است ✓ $(\sqrt{\frac{x}{y}})^2 + (\sqrt{\frac{y}{x}})^2 + 2\sqrt{\frac{xy}{yx}}$ $\rightarrow \frac{x}{y} + \frac{y}{x} + 2$	۷
الف) $\sqrt{\frac{x-1}{x-3}} + \sqrt{\frac{2-x}{x}}$ $\frac{x-1}{x-3} \geq 0 \rightarrow \frac{1}{+} \frac{-}{-} \frac{+}{+} \rightarrow (-\infty, 1] \cup (3, +\infty)$ ① $\frac{2-x}{x} \geq 0 \rightarrow \frac{+}{-} \frac{-}{+} \frac{+}{+} \rightarrow (0, 2]$ ② $① \cap ② \rightarrow D_f = (0, 1]$ ب) $\sqrt{x} + \sqrt{y-1} = \sqrt{3}$ $\sqrt{y-1} = \sqrt{3} - \sqrt{x}$ $\sqrt{3} - \sqrt{x} \geq 0 \rightarrow \sqrt{3} \geq \sqrt{x} \rightarrow 3 \geq x$ ③ $x \geq 0$ ④ $① \cap ③ \rightarrow D_f = (-\infty, 3]$	۸
الف) $y = \frac{\sqrt{x^2 - 7x + 4}}{\sqrt{x^2 - 10x + 14}}$ $x^2 - 7x + 4 \geq 0$ $x_1 = 1$ $x_2 = 4$ $\frac{1}{+} \frac{-}{-} \frac{+}{+} \rightarrow (-\infty, 1] \cup (4, +\infty)$ ① $x^2 - 10x + 14 > 0$ $x_1 = 2$ $x_2 = 8$ $\frac{1}{+} \frac{-}{-} \frac{+}{+} \rightarrow (-\infty, 2) \cup (8, +\infty)$ ② $D_f = ① \cap ② = (-\infty, 2) \cup (4, +\infty)$ ب) $\sqrt{\frac{x^2 - 7x + 4}{x^2 - 10x + 14}}$ $\xrightarrow{x_1=1, x_2=4} \frac{x^2 - 7x + 4}{x^2 - 10x + 14} \geq 0$ $\frac{1}{+} \frac{-}{-} \frac{+}{+} \frac{1}{+} \frac{-}{-} \frac{+}{+} \rightarrow (-\infty, 2) \cup (4, 8) \cup (8, +\infty)$ $D_f = (-\infty, 2) \cup (4, 8) \cup (8, +\infty)$	۹
الف) $\frac{\sqrt{2x^2 - 5x + 3}}{\sqrt{3x^2 - 7x + 4}}$ $2x^2 - 5x + 3 \geq 0$ $x_1 = 1$ $x_2 = \frac{3}{2}$ $\frac{1}{+} \frac{-}{-} \frac{+}{+} \rightarrow (-\infty, 1] \cup [\frac{3}{2}, +\infty)$ ① $3x^2 - 7x + 4 > 0$ $x_1 = 1$ $x_2 = \frac{4}{3}$ $\frac{1}{+} \frac{-}{-} \frac{+}{+} \rightarrow (-\infty, 1) \cup (\frac{4}{3}, +\infty)$ ② $D_f = ① \cap ② = (-\infty, 1) \cup [\frac{3}{2}, +\infty)$ ب) $\sqrt{\frac{2x^2 - 5x + 3}{3x^2 - 7x + 4}}$ $\xrightarrow{x_1=1, x_2=\frac{3}{2}} \frac{2x^2 - 5x + 3}{3x^2 - 7x + 4} \geq 0$ $\frac{1}{+} \frac{-}{-} \frac{+}{+} \frac{1}{+} \frac{-}{-} \frac{+}{+} \rightarrow (-\infty, 1) \cup (1, \frac{4}{3}) \cup [\frac{3}{2}, +\infty)$ $D_f = (-\infty, 1) \cup (1, \frac{4}{3}) \cup [\frac{3}{2}, +\infty)$	۱۰