

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

$$B^T = B \times B \Rightarrow \{(2, 2), (2, 3), (3, 2), (3, 3)\} \xrightarrow{\text{از هر یک یک شیب}} \rightarrow$$

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

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الف) $F(x) = \{(3, m^2), (2, 1), (-3, m), (3, m+2), (m, 3)\}$

$$m^2 = m + 2$$

$$m^2 - m = 2 \rightarrow m(m-1) = 2 \rightarrow m \begin{matrix} \xrightarrow{\text{عقل}} 2 \\ \xrightarrow{\text{عقل}} -1 \end{matrix}$$

$\Rightarrow g(x) = \{(3, m^2), (2, 1), (m, 3), (3, m+2), (-2, m), (-1, 3)\}$

$m^2 = m + 2 \Rightarrow m \begin{matrix} \xrightarrow{\text{عقل}} 2 \\ \xrightarrow{\text{عقل}} -1 \end{matrix}$ (به ازای هیچ مقدار x کلاً تابع نیست)

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$$f(x) = \begin{cases} x^2 - 1 & x \leq 1 \\ ax + b & 1 \leq x \leq 2 \\ x^3 & x > 2 \end{cases} \quad a \times b = ?$$

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$$F(x) = \begin{cases} 2x - 3 & x > k \\ 5 - 3x & x \leq k \end{cases} \quad \text{استمرار این دو ک است} \Rightarrow k = -\frac{1}{5}$$

$$2x - 3 = 5 - 3x$$

$$5x = 8$$

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

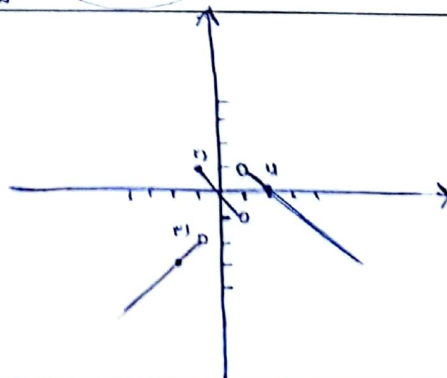
$$\Rightarrow \begin{cases} \frac{14}{5} > \frac{14}{5} \\ \frac{20}{5} > \frac{20}{5} \end{cases} \quad \begin{matrix} \uparrow \\ x > k \\ x \leq k \end{matrix}$$

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$$f(x) = \begin{cases} -x + 2 & x > 1 \\ -x & -1 \leq x \leq 1 \\ x - 1 & x < -1 \end{cases}$$

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

$$R_f = \mathbb{R}$$



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الف) $xy^3 + x^2 + 1 = 0 \Rightarrow \frac{xy^3}{y^3} = \frac{-x^2-1}{y^3} \Rightarrow y_1^3 = \frac{-x^2-1}{y^3} \Rightarrow y_1^3 = y_1^3$
 $\frac{xy^3}{y^3} = \frac{-x^2-1}{y^3} \Rightarrow y_1^3 = \frac{-x^2-1}{y^3} \Rightarrow y_1^3 = y_1^3$
 $\checkmark$ تابع است $y_1 = y_2$

ب) $x^2 + 6x^2 - 2x - 12y + 10 = 0$

$x^2 - 2x + 2 = (-6x^2 + 12y) - 10$ (تابع نیست) X تابع نیست

$(x-1)^2 = (y+1)(y+5) \Rightarrow (x-1)^2 - (-6y+1)(y-1) = 0$
 $\downarrow x=1$ $\downarrow y=2$ $\downarrow y=1$

الف) $x \sinh y = y \sinh x$

$x=0 \Rightarrow 0 \times \sinh y = y \times \sinh 0 \Rightarrow 0 \times \sinh y = y \Rightarrow y=0 \Rightarrow X$ تابع نیست
 $\Rightarrow y=0$

ب) $\left(\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2\right)^2$

$(x-y)^2 = 0 \Rightarrow x=y$

$\frac{x}{y} + \frac{y}{x} + 2 = 4 \Rightarrow \frac{x}{y} + \frac{y}{x} = 2 \Rightarrow \frac{x^2+y^2}{xy} = 2 \Rightarrow x^2+y^2-2xy=0$

الف) $y = \sqrt{\frac{x-1}{x-3}} + \sqrt{\frac{y-1}{y-3}}$ ب) $\sqrt{x} + \sqrt{y-1} = \sqrt{3}$

$\frac{x-1}{x-3} \geq 0$ $\frac{y-1}{y-3} \geq 0$
 $\frac{1}{+} - \frac{3}{+}$ $\frac{1}{+} - \frac{3}{+}$
 $x=3$ $y=3$
 $x \neq 0$

$D_f = \{0, 2\}$

$(-\infty, 1] \cup (3, +\infty) \cup [1, 2] = D_f$

الف) $\frac{\sqrt{x^2-7x+6}}{\sqrt{x-10x+14}} = \frac{1}{+} - \frac{1}{+} +$

$x^2-7x+6 \geq 0 \Rightarrow (x-6)(x-1) \geq 0$

$x-10x+14 \geq 0 \Rightarrow x > \frac{14}{9} - 1 \frac{5}{9}$

$D_f = (-\infty, 1] \cup (3, +\infty)$

ب) $\frac{\sqrt{x^2-7x+6}}{\sqrt{x-10x+14}} = \frac{1}{+} - \frac{1}{+} +$
 $\frac{x^2-7x+6}{x^2-10x+14} \geq 0$
 $(x-6)(x-1)$
 $(x-1)(x-1)$

$D_f = (-\infty, 1] \cup (3, 4] \cup (1, +\infty)$

الف) $\frac{\sqrt{2x^2-5x+3}}{\sqrt{3x^2-7x+4}} = \frac{1}{+} - \frac{1}{+} +$

$2x^2-5x+3 \geq 0$ $(x-1)(2x-3) \geq 0$

$3x^2-7x+4 \geq 0$ $(3x-4)(x-1) \geq 0$

$D_f = (-\infty, 1) \cup (\frac{4}{3}, +\infty)$

ب) $\frac{\sqrt{2x^2-5x+3}}{\sqrt{3x^2-7x+4}} = \frac{1}{+} - \frac{1}{+} +$
 $\frac{2x^2-5x+3}{3x^2-7x+4} \geq 0$
 $(2x-3)(x-1)$
 $(3x-4)(x-1)$

$D_f = (-\infty, 1) \cup (1, \frac{4}{3}) \cup (\frac{4}{3}, +\infty)$