

① شکیف

* کیمان جعفری *

نکات خطا

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

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

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

۲)

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

$$m^2 = m+2 \Rightarrow m^2 - m - 2 = 0 \Rightarrow (m-2)(m+1) \Rightarrow m < 2 \text{ غلط} \oplus$$

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

$$m^2 = m+2 \Rightarrow m^2 - m - 2 = 0 \Rightarrow m < 2 \text{ غلط} \oplus$$

$\Rightarrow$ معنای صحیح مقدار m تابع نمی باشد.

$$۳) f(n) = \begin{cases} n^2 - 1 & ; n \leq 1 \\ an + b & ; 1 < n \leq 2 \\ n^3 & ; n \geq 2 \end{cases}$$

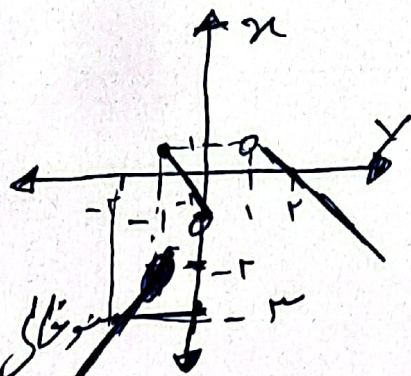
$$\Rightarrow \begin{cases} 1^0 = a + b \Rightarrow a = -b \\ 1 = 2a + b \\ 1 = -b \Rightarrow -1 = b \\ a = 1 \\ \Rightarrow a \cdot b = -1 \times 1 = -1 \end{cases}$$

$$۴) f(n) = \begin{cases} 2n - 3 & ; n \geq k \\ 4 - 3n & ; n < k \end{cases}$$

$$\Rightarrow 2k - 3 = 4 - 3k$$

$$\textcircled{Q} \quad 5k = 7 \Rightarrow k = \frac{7}{5}$$

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



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

$$R_f = (-\infty, -1] \cup \{1\} \cup (-1, 1]$$

4)

الف) $x^2 + y^2 + 1 = 0$ $\Rightarrow \begin{cases} (x, y) \in F(x) \\ (x, y_r) \in f(x) \end{cases} \Rightarrow y_1 = y_r$

$\Rightarrow \begin{cases} x^2 + y^2 + 1 = 0 \\ x^2 + y_r^2 + 1 = 0 \end{cases} \Rightarrow \boxed{y_1 = y_r}$

ب) $x^2 + y^2 - 2x - 12y + 10 = 0$

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

$\Rightarrow \boxed{x=1, y=3}$

5)

الف) $x \sin y = y \sin x \quad x=0 \Rightarrow 0 = y \cdot 0$

ب) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \Rightarrow \frac{x}{y} + \frac{y}{x} + 1 = 2$

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

$\Rightarrow \boxed{x=y}$

6)

الف) $x = \sqrt{\frac{x-1}{x-2}} + \sqrt{\frac{2-x}{x}} \Rightarrow D_x = [0, 1] \cup [2, 2)$

$\frac{x-1}{x-2} \geq 0 \quad \frac{2-x}{x} \geq 0$

$\frac{+}{-} \frac{-}{+} \quad \frac{+}{-} \frac{-}{+}$

~~1)~~ 1)

c.) $\sqrt{x} + \sqrt{y-1} = \sqrt{x} \quad x \geq 0 \Rightarrow D_Y = [0, +\infty)$

9)

a.) $\frac{\sqrt{x^2 - 6x + 7}}{\sqrt{x^2 - 10x + 17}} = \frac{\sqrt{(x-7)(x-1)}}{\sqrt{-9x+17}} \Rightarrow \frac{+}{+} \frac{-}{-} \frac{+}{+}$
 $\Rightarrow -9x+17 \geq 0$
 $\Rightarrow x \leq \frac{17}{9}$
 $\Rightarrow D_f = \left[\frac{17}{9}, +\infty \right) \cup \{1\}$

b.) $\sqrt{\frac{x^2 - 6x + 7}{x^2 - 10x + 17}} \Rightarrow \frac{+}{+} \frac{-}{-} \frac{+}{-} \frac{+}{+}$
 $\Rightarrow D_f = (-\infty, 1] \cup (2, 4] \cup (11, +\infty)$

10) $y = \frac{\sqrt{4x^2 - 2x + 3}}{\sqrt{4x^2 - 6x + 5}}$
 a.) $\Rightarrow \frac{+}{+} \frac{+}{-} \frac{+}{+}$
 $\Rightarrow \frac{+}{+} \frac{+}{-} \frac{+}{+}$

$\Rightarrow D_f = (-\infty, 1] \cup [1.5, +\infty)$

10) b.) $y = \sqrt{\frac{4x^2 - 2x + 3}{4x^2 - 6x + 5}} \Rightarrow \frac{+}{+} \frac{+}{-} \frac{+}{+}$
 $D_Y = (-\infty, \frac{1}{4}) \cup [1.5, +\infty) - \{1\}$