

(1)

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

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

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

$$f(n) = \{(3, m^2), (2, 1), (-3, m), (-2, m), (m, 4)\}$$

(2)

الف) $m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0 \rightarrow m = 2 \text{ or } m = -1$

$$g(m) = \{(3, m^2), (2, 1), (m, 4), (3, m+2), (-2, m), (-1, 3)\}$$

$m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow (m-2)(m+1) = 0 \rightarrow m = 2 \text{ or } m = -1$

و اما هیچ شماره m تابع نمی باشد

$$f(n) = \begin{cases} n^2 - 1 & n \leq 1 \\ an + b & 1 \leq n \leq 2 \\ n^2 & n \geq 2 \end{cases} \begin{cases} n \leq 1, n^2 - 1 = an + b \rightarrow a + b = 0 \\ n \geq 2, an + b = n^2 \rightarrow 2a + b = 4 \end{cases}$$

(3)

$$\begin{cases} 2a + b = 4 \\ a + b = 0 \end{cases}$$

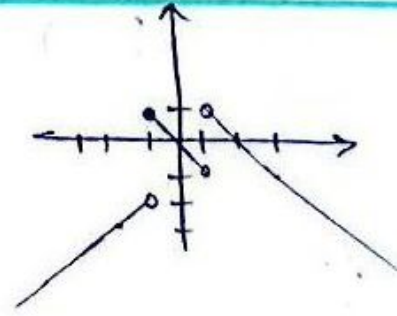
$$a \times b \leq 1 \text{ or } (-1) \leq -4$$

$$a = 1, b = -1$$

$$f(n) = \begin{cases} 2n - 3 & n \geq k \\ 3 - 2n & n \leq k \end{cases} \begin{cases} 2k - 3 = k - 3k \\ 3 - 2k = k \end{cases} \rightarrow k = \frac{3}{3} = 1$$

(4)

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



(5)

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

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

الف) $xy^3 + n^2 + 1 = 0 \xrightarrow{n_1 = n_2} \begin{cases} y_1^3 = \frac{-n^2-1}{x} \\ y_2^3 = \frac{-n^2-1}{x} \end{cases} \Rightarrow y_1^3 = y_2^3 \rightarrow y_1 = y_2$ (6)
تابع مت

ب) $x^2 + ky^2 - 2n + 1 = 0 \xrightarrow{1, 2} (n-1)^2 + (2y-3)^2 = 0 \rightarrow n=1 \rightarrow n_1 \rightarrow (1, 3) \rightarrow$ تابع مت ✓
 $2y-3=0 \rightarrow y = \frac{3}{2}$

الف) $x \sin y = y \sin x \xrightarrow{\text{if } n=0} y \in \mathbb{R} \rightarrow$ تابع مت (7)

ب) $\sqrt{\frac{n}{y}} + \sqrt{\frac{y}{n}} = 2 \xrightarrow{\sqrt{\frac{n}{y}} = \frac{2}{\sqrt{\frac{y}{n}}}} (\sqrt{\frac{n}{y}} + \sqrt{\frac{y}{n}})^2 = 4 \rightarrow \frac{n}{y} + \frac{y}{n} + 2 = 4$
 $\rightarrow \frac{n}{y} + \frac{y}{n} = 2 \rightarrow \frac{n^2 + y^2}{ny} = 2 \xrightarrow{ny \neq 0} n^2 + y^2 = 2ny \rightarrow n^2 + y^2 - 2ny = 0 \rightarrow (n-y)^2 = 0$
تابع $n=y$

الف) $y = \sqrt{\frac{n-1}{n^2-1}} + \sqrt{\frac{2-n}{n}}$ (8)
ب) $\sqrt{n} + \sqrt{y-1} = \sqrt{3}$
 $\sqrt{y-1} = \sqrt{3} - \sqrt{n} \rightarrow n \geq 0$
 $\sqrt{y-1} \geq 0 \rightarrow \sqrt{3} - \sqrt{n} \geq 0$
 $\sqrt{3} \geq \sqrt{n} \rightarrow n \leq 3$
 $D_f = [0, 3]$

الف) $y = \frac{\sqrt{n^2 - 4n + 4}}{\sqrt{n - 1 + n + 1}} \geq 0 \rightarrow (n-2)/(n-1) \geq 0$ (9)
ب) $\sqrt{\frac{n^2 - 4n + 4}{n^2 - 1 + n + 1}} \geq 0 \rightarrow \frac{(n-2)(n-1)}{(n-1)(n-1)} \geq 0$
 $-4n + 4 \geq 0 \rightarrow n \geq \frac{-4}{-4} \rightarrow n \geq 1$
 $D_f = [1, +\infty)$
 $D_f = (-\infty, 1] \cup [2, +\infty)$

الف) $y = \frac{\sqrt{n^2 - 4n + 4}}{\sqrt{n^2 - 4n + 4}} \geq 0 \rightarrow \frac{1}{n} < \frac{1}{n}$
ب) $y = \sqrt{\frac{n^2 - 4n + 4}{n^2 - 4n + 4}} \rightarrow n < \frac{1}{n}$ (10)
 $D_f = (-\infty, 1) \cup [\frac{1}{n}, +\infty)$
 $D_f = (-\infty, 1) \cup (1, \frac{1}{n}) \cup [\frac{1}{n}, +\infty)$