

الف)  $q^2 - 4q - 2 = 0 \rightarrow q^2 - 4q - 3 = 0 \Rightarrow (q - \frac{1}{2})(q + 2) \rightarrow q_1 = \frac{1}{2}$   
 $q^2 - 4q - 2 = 0 \rightarrow q^2 - 4q - 2 = 0 \Rightarrow (q - \frac{1}{2})(q + 2) \rightarrow q_1 = \frac{1}{2}$   
 ب)  $q^2 - 4q - 2 = 0 \rightarrow q^2 - 4q - 2 = 0 \Rightarrow (q - \frac{1}{2})(q + 2) \rightarrow q_1 = \frac{1}{2}$   
 ج)  $q^2 - 4q - 2 = 0 \rightarrow q^2 - 4q - 2 = 0 \Rightarrow (q - \frac{1}{2})(q + 2) \rightarrow q_1 = \frac{1}{2}$   
 د)  $q^2 - 4q - 2 = 0 \rightarrow q^2 - 4q - 2 = 0 \Rightarrow (q - \frac{1}{2})(q + 2) \rightarrow q_1 = \frac{1}{2}$

الف)  $q^2 - 4q - 2 = 0 \rightarrow (q - 7)(q + 2) \rightarrow q_1 = -2$   
 $q^2 - 4q - 2 = 0 \rightarrow q^2 - 4q - 2 = 0 \Rightarrow (q - 7)(q + 2) \rightarrow q_1 = -2$   
 ب)  $\Delta = b^2 - 4ac \rightarrow 4 - 4(1)(-2) = -8 < 0$   
 ج)  $\frac{a}{3}q^2 + \frac{b}{4}q - \frac{c}{2} = 0 \rightarrow \Delta = b^2 - 4ac \rightarrow 4 - 4(1)(-2) = 33 \rightarrow q = \frac{-3 \pm \sqrt{33}}{4}$

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

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

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

الف)  $\{(m, 2), (2, 1), (-2, m), (-2, m), (m, 2), (m, 2)\}$

$m^2 = m + 2 \rightarrow m^2 - m - 2 = 0 \Rightarrow (m - 2)(m + 1) \rightarrow m = -1$   
 $m = 2$

ب)  $\{(m, 2), (2, 1), (m, 2), (m, 2), (-2, m), (-2, m)\}$   
 $m^2 = m + 2 \rightarrow m^2 - m - 2 = 0 \Rightarrow (m - 2)(m + 1) \rightarrow m = -1$   
 $m = 2$

$f(a) = \{(1, a^2), (3a - 2, a^2), (a^2, 3a + 2)\}$

$a^2 = 3a - 2 \rightarrow a^2 - 3a + 2 = 0 \Rightarrow (a - 1)(a - 2) \rightarrow a = 1$   
 $a = 2$

$$f(a) = \begin{cases} a^2 - 1 & a < 1 \\ a^2 + b & 1 \leq a \leq 2 \\ a^3 & a > 2 \end{cases} \quad \begin{cases} a=1 \rightarrow 1^2 = a+b \rightarrow a+b=0 \\ a=2 \rightarrow 2^2 + b = 1 \rightarrow 2a+b=1 \end{cases}$$

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

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

$$f(a) = \begin{cases} 2a - 3 & a > k \\ 5 - 2a & a \leq k \end{cases} \quad \begin{cases} a=k \rightarrow 2k - 3 = 5 - 2k \\ \Delta k = 8 \\ k = \frac{8}{4} = 2 \end{cases}$$

الف)  $y^2 - 4y = a^2 - 4a + 3$   
 $y^2 - y$  براسای کلمه داخل  
 $X$  تابع نیست

ب)  $|y| = \sqrt{1 - \cos a}$  if  $a=90$   $|y|=1$   
 $X$  تابع نیست

ج)  $|x+1| + |y| = 3 \rightarrow |y| = 3$   
 $(x=0)$   $X$  تابع نیست

د)  $y^2 + a^2 + 2a + 1 = 0$   
 $y^2 + (a+1)^2 = 0$   
 $(y=0)$   $\checkmark$  تابع نیست

الف)  $\sqrt[3]{y} + a^2 = 2a - 2 \rightarrow a_1 = a_2$   
 $\sqrt[3]{y_1} = -a_1^2 + 2a_1 - 2$   
 $\sqrt[3]{y_2} = -a_2^2 + 2a_2 - 2$   
 $\sqrt[3]{y_1} = \sqrt[3]{y_2}$   
 $|y_1 = y_2| \checkmark$

ب)  $y^3 + 2y = \Delta a$   
 $\begin{cases} y_1^3 + 2y_1 = \Delta a_1 \\ y_2^3 + 2y_2 = \Delta a_2 \end{cases} \rightarrow y_1^3 + 2y_1 = y_2^3 + 2y_2$   
 $y_1^3 - y_2^3 = 2y_2 - 2y_1 \rightarrow (y_1 - y_2)(y_1^2 + y_1y_2 + y_2^2) = 2(y_2 - y_1)$   
 $\rightarrow (y_1 - y_2)(y_1^2 + y_1y_2 + y_2^2 + 2) = 0$   
 $(y_1 = y_2) \checkmark$

الف)  $a \sin y = y \sin a$  if  $a=0 \Rightarrow$   $X$  تابع نیست

ب)  $\sqrt{a/y} + \sqrt{y/a} = 2 \rightarrow a + 1/a = 2 \Rightarrow a^2 + 1 = 2a$   
 $\sqrt{a/y} = a$   
 $a^2 - 2a + 1 = 0 \rightarrow (a-1)^2 = 0 \checkmark$   
 $(a=1)$   $\checkmark$  تابع نیست