

الف) $6x^2 - 5x - 6 = 0 \Rightarrow x^2 - 5x - 36 = 0 \rightarrow (x-9)(x+4) \rightarrow \begin{matrix} 9 & -4 \\ 6 & 6 \end{matrix}$
 ب) $3x^2 - 8x - 3 = 0 \Rightarrow x^2 - 8x - 9 = 0 \rightarrow (x-9)(x+1) \rightarrow \begin{matrix} 9 & -1 \\ 3 & 3 \end{matrix}$
 ج) $4x^2 - 4x - 3 = 0 \Rightarrow x^2 - 4x - 12 = 0 \rightarrow (x-6)(x+2) \rightarrow \begin{matrix} 6 & -2 \\ 4 & 4 \end{matrix}$
 د) $2x^2 - 5x - 12 = 0 \Rightarrow x^2 - 5x - 24 = 0 \rightarrow (x-8)(x+3) \rightarrow \begin{matrix} 8 & -3 \\ 2 & 2 \end{matrix}$

الف) $x^2 - 5x - 14 = 0 \rightarrow (x-7)(x+2) < 2$
 ب) $2x^2 + 5x - 3 = 0 \rightarrow \frac{-5 \pm \sqrt{1}}{4} < \frac{-5-1}{4} = -\frac{3}{2}$
 $\frac{-5+1}{4} = -1$
 ج) $x^2 + 2x + 3 = 0 \rightarrow \Delta = 4 - 4(2 \times 3) = -20 < 0 \rightarrow$ ریشه ندارد
 د) $3x^2 + 3x - 2 = 0 \rightarrow \frac{-3 \pm \sqrt{33}}{6} < \frac{-3+\sqrt{33}}{6}$

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

الف) $f(x) = \{(3, m^2)(2, 1)(-3, m)(-2, m)(3, m+2)(m, 4)\}$
 $m^2 = m + 2 \Rightarrow m^2 - m = 2 \Rightarrow m < -1$ تابع است ✓
 ب) $f(x) = \{(3, m^2)(2, 1)(m, 4)(3, m+2)(-2, m)(-1, 3)\}$
 $m^2 = m + 2 \Rightarrow m^2 - m = 2 \Rightarrow m < -1$ تابع نیست ✗

$f(x) = \{(1, a^2)(1, 3a-2)(a^2, 3a+2)\}$
 $\Rightarrow a^2 = 3a - 2 \Rightarrow a^2 - 3a + 2 = 0 \Rightarrow (a-2)(a-1) < a=2 \checkmark$
 $a=1 \times$

$$f(x) = \begin{cases} x^2 - 1 & x \leq 1 \\ ax + b & 1 < x \leq 2 \\ x^3 & x > 2 \end{cases} \quad \left. \begin{array}{l} f(1) = 1^2 - 1 = 0 \\ f(1) = a + b = 0 \\ f(2) = 8 \\ f(2) = 2a + b = 8 \\ a = -b \end{array} \right\} \begin{array}{l} 2a + b = 8 \\ -a + b = 0 \\ \hline a = 8 \\ b = -8 \end{array} \quad \left. \begin{array}{l} a = 8 \\ b = -8 \end{array} \right\} a \cdot b = 8 \cdot (-8) = -64$$

$$f(x) = \begin{cases} 2x - 3 & x \geq k \\ 4 - 3x & x \leq k \end{cases} \quad \begin{array}{l} \Rightarrow x = k \Rightarrow 2k - 3 = 4 - 3k \\ \Rightarrow 5k = 7 \Rightarrow k = \frac{7}{5} \end{array}$$

$$a) y^3 - 6y = x^2 - 4x + 3 \Rightarrow x = 1 \Rightarrow y^3 - 6y = 0 \Rightarrow y^3 = 6y \Rightarrow y^2 = 6 \Rightarrow y = \pm \sqrt{6}$$

$$b) |x| + |y| = 3 \Rightarrow x = 0 \Rightarrow |y| = 3 \Rightarrow y = \pm 3$$

$$c) |y| = \sqrt{1 - 65x} \Rightarrow x = 0 \Rightarrow |y| = \sqrt{1} \Rightarrow y = \pm 1$$

$$d) y^2 + x^2 + 2x + 1 = 0 \Rightarrow y^2 + (x+1)^2 = 0 \Rightarrow y^2 = 0 \Rightarrow y = 0 \\ (x+1)^2 = 0 \Rightarrow x = -1$$

$$e) \sqrt[3]{y + x^2} = 2x - 2 \\ \Rightarrow \begin{cases} \sqrt[3]{y_1} = -x_1^2 + 2x_1 - 2 \\ \sqrt[3]{y_2} = -x_2^2 + 2x_2 - 2 \end{cases} \quad (x_1 = x_2) \\ \Rightarrow \sqrt[3]{y_1} = \sqrt[3]{y_2} \Rightarrow y_1 = y_2$$

$$f) y^3 + 2y = 5x \\ \Rightarrow \begin{cases} y_1^3 + 2y_1 = 5x_1 \\ y_2^3 + 2y_2 = 5x_2 \end{cases} \quad (x_1 = x_2) \\ \Rightarrow y_1^3 - y_2^3 + 2(y_1 - y_2) = 0 \\ (y_1 - y_2)(y_1^2 + y_1y_2 + y_2^2) + 2(y_1 - y_2) = 0 \\ (y_1 - y_2)(y_1^2 + y_1y_2 + y_2^2 + 2) = 0 \\ \Rightarrow y_1 = y_2$$

$$g) x \sin y = y \sin x \rightarrow x = \pi \rightarrow \pi \sin y = 0 \Rightarrow \sin y = 0 \Rightarrow y = 0, \pi, 2\pi, \dots$$

$$h) \sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \rightarrow \sqrt{\frac{x}{y}} = \sqrt{\frac{y}{x}} \rightarrow x = y$$