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الف) $9x^2 - 6x - 9 = 0 \rightarrow x^2 - 2x - 3 = 0 \rightarrow (x-3)(x+1) = 0 \rightarrow x_0 = \frac{9}{9} \text{ و } \frac{-6}{9}$

ب) $3x^2 - 8x - 9 = 0 \rightarrow x^2 - 8x - 9 = 0 \rightarrow (x-9)(x+1) = 0 \rightarrow x_0 = \frac{9}{3} \text{ و } \frac{-1}{3}$

ج) $5x^2 - 8x - 9 = 0 \rightarrow x^2 - 8x - 12 = 0 \rightarrow (x-6)(x+2) = 0 \rightarrow x_0 = \frac{9}{5} \text{ و } \frac{-2}{5}$

د) $2x^2 - 5x - 12 = 0 \rightarrow x^2 - 5x - 24 = 0 \rightarrow (x-8)(x+3) = 0 \rightarrow x_0 = \frac{1}{2} \text{ و } \frac{-3}{2}$

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الف) $x^2 - 5x - 14 = 0 \rightarrow (x-7)(x+2) = 0 \rightarrow x_0 = 7, -2$

ب) $2x^2 + 5x + 2 = 0 \xrightarrow{a+c=b} x_0 = -1, \frac{-c}{a} \rightarrow x_0 = -1, \frac{-2}{2}$

ج) $x^2 + 2x + 2 = 0 \rightarrow \Delta = b^2 - 4ac = 4 - 8 = -4 \rightarrow \Delta < 0 \rightarrow \text{ریشه ندارد}$

د) $3x^2 + 5x - 2 = 0 \rightarrow \Delta = 9 - 4(-6) = 9 + 24 = 33 \rightarrow x_0 = \frac{-5 \pm \sqrt{33}}{6}$

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$A \times B = \{(1,2), (1,4), (2,3), (2,5), (3,2), (4,4)\}$

$B^2 = \{(2,2), (2,4), (4,2), (4,4)\}$

$\Rightarrow A \times B - B^2 = \{(1,2), (1,4)\}$

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الف) $m^2 = m + 2 \rightarrow m^2 - m - 2 = 0 \rightarrow m \begin{cases} 2 \rightarrow (2,1)(2,4) \times \\ -1 \checkmark \Rightarrow \boxed{m = -1} \end{cases}$

ب) $m^2 = m + 2 \rightarrow m^2 - m - 2 = 0 \rightarrow m \begin{cases} 2 \rightarrow (2,1)(2,4) \times \\ -1 \rightarrow (-1,1)(-1,4) \times \end{cases}$

هیچ مقدار از m

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

$a^2 = 3a - 2 \rightarrow a^2 - 3a + 2 = 0 \rightarrow a \begin{cases} 1 \rightarrow (1,1)(1,0) \times \\ 2 \checkmark \Rightarrow \boxed{a = 2} \end{cases}$

$$f(x) = \begin{cases} x^2 - 1 : x \leq 1 \\ ax + b : 1 \leq x \leq 2 \\ x^2 : x > 2 \end{cases} \begin{cases} x=1 \Rightarrow 1^2 - 1 = a + b \Rightarrow a + b = 0 \\ x=2 \Rightarrow 2^2 = 2a + b \Rightarrow 2a + b = 1 \end{cases} \Rightarrow a = 1, b = -1 \Rightarrow a \times b = (-1)$$

$$f(x) = \begin{cases} 2x - 3 : x \geq K \\ \varepsilon - 2x : x \leq K \end{cases} \xrightarrow{x=K} 2K - 3 = \varepsilon - 2K \Rightarrow 4K = \varepsilon + 3 \Rightarrow K = \frac{\varepsilon + 3}{4}$$

الف) $y^3 - 4y = x^2 - \varepsilon x + 3 \xrightarrow{x=1} y^3 - 4y = 0 \Rightarrow y(y^2 - 4) = 0 \Rightarrow y = 0, \pm 2$ ~~نفس~~

ب) $|x| + |y| = 2 \xrightarrow{x=0} y = \pm 2$ ~~نفس~~

ج) $|y| = \sqrt{1 - \cos x} \xrightarrow[\substack{\cos x = 0 \\ x = 90^\circ}]{} |y| = 1 \Rightarrow y = \pm 1$ ~~نفس~~

د) $y^2 + x^2 + 2x + 1 = 0 \Rightarrow y^2 + (x+1)^2 = 0 \xrightarrow{\text{نقطه}} (-1, 0)$ ~~نفس~~

الف) $\sqrt[3]{y} + x^2 = 2x - 2 \Rightarrow \begin{cases} \sqrt[3]{y_1} = -x^2 + 2x - 2 \\ \sqrt[3]{y_2} = -x^2 + 2x - 2 \end{cases} \Rightarrow \sqrt[3]{y_1} = \sqrt[3]{y_2} \xrightarrow{\text{توان}} y_1 = y_2$ ~~تابع است~~

ب) $y^2 + 2y = 2x \Rightarrow y_1^2 + 2y_1 = y_2^2 + 2y_2 \Rightarrow y_1^2 - y_2^2 + 2y_1 - 2y_2 = 0 \Rightarrow (y_1 - y_2)(y_1 + y_2 + 2) = 0 \Rightarrow y_1 = y_2$ ~~تابع است~~

الف) $x \sin y = y \sin x \xrightarrow[\substack{x=0 \\ \text{شکل نقض}}]{} 0 \times \sin y = y \sin 0 \Rightarrow y = (-\infty, \infty)$ ~~تابع نیست~~

ب) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \xrightarrow{\text{توان}} \frac{x}{y} + \frac{y}{x} + 2 = \varepsilon \Rightarrow \frac{x^2 + y^2}{xy} = \varepsilon \Rightarrow x^2 - 2xy + y^2 = 0 \Rightarrow (x - y)^2 = 0 \Rightarrow x = y$ ~~تابع است~~