

الف) $x^2 - 5x - 14 = 0 \xrightarrow{(x-7)(x+2)} 4x = 9 \text{ و } 4x = -4 \Rightarrow x = \frac{9}{4} \text{ و } -\frac{1}{4} \checkmark$

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

ج) $x^2 - 4x - 12 = 0 \xrightarrow{(x-6)(x+2)} 4x = 4 \text{ و } -2 \rightarrow x = \frac{1}{4} \text{ و } -\frac{1}{2} \checkmark$

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

الف) $(x-7)(x+2) = 0 \rightarrow x = 7 \text{ و } -2 \checkmark$

ب) $(x+3)(x+2) = 0 \rightarrow 2x = -2 \text{ و } -3 \rightarrow x = -1 \text{ و } -\frac{3}{2} \checkmark$

ج) $\Delta < 0 \rightarrow$ ریشه حقیقی ندارد $\checkmark$

د) $x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-3 \pm \sqrt{9+24}}{4} \rightarrow x = \frac{-3 + \sqrt{33}}{4} \text{ و } x = \frac{-3 - \sqrt{33}}{4}$

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

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

$(3, m^2) = (3, m+2) \Rightarrow m^2 - m - 2 = 0 \rightarrow \boxed{m = -1 \text{ و } m = 2} \leftarrow \text{الف}$

$(3, m^2) = (3, m+2) \Rightarrow m^2 - m - 2 = 0 \rightarrow \boxed{m = -1 \text{ و } m = 2} \leftarrow \text{ب}$
 غلط $\checkmark$
 به ازای هیچ مقدار m

$(1, a^2) = (1, 3a-2) \Rightarrow a^2 - 3a + 2 = 0 \rightarrow a = 1 \text{ و } a = 2 \checkmark \checkmark$
 غلط $\checkmark$

$$\left. \begin{array}{l} \text{if } x=1 \Rightarrow x^2-1=ax+b \Rightarrow a+b=0 \\ \text{if } x=2 \Rightarrow x^3=ax+b \Rightarrow 1=2a+b \end{array} \right\} \Rightarrow a=1, b=-1$$

$$a \times b = -1$$

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$$\text{if } x=k \Rightarrow 2x-3=4-3x \Rightarrow 5k=7 \Rightarrow k=\frac{7}{5}$$

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$$\text{الف) } y(y^2-y) = (x-3)(x-1) \xrightarrow[\text{if } x=1]{\text{if } x=3} y=0, y=-\sqrt{4}, y=\sqrt{4} \rightarrow \text{تابع نیست}$$

$$\text{ب) } \text{if } x=0 \rightarrow y=\pm 3 \Rightarrow \text{تابع نیست}$$

$$\text{ج) } \text{if } x=\frac{\pi}{2} \rightarrow y=\pm 1 \Rightarrow \text{تابع نیست}$$

$$\text{د) } y^2 + (x+1)^2 = 0 \rightarrow \left. \begin{array}{l} (x+1)^2 = 0 \rightarrow x=-1 \\ y^2 = 0 \rightarrow y=0 \end{array} \right\} \rightarrow \text{تابع است}$$

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$$\text{الف) } \text{if } x_1=x_2 \rightarrow \sqrt[3]{y_1} = \sqrt[3]{y_2} \Rightarrow y_1=y_2 \rightarrow \text{تابع است}$$

$$\text{ب) } \text{if } x_1=x_2 \rightarrow y_1^3 + 2y_1 = y_2^3 + 2y_2 \Rightarrow (y_1-y_2)(y_1^2 + y_1y_2 + y_2^2 + 2(y_1-y_2)) = 0$$

$$(y_1-y_2)(y_1^2 + y_1y_2 + y_2^2 + 2) = 0 \rightarrow \left. \begin{array}{l} y_1^2 + y_1y_2 + y_2^2 + 2 = 0 \rightarrow \Delta < 0 \rightarrow \text{ریشه ندارد} \\ y_1-y_2=0 \rightarrow y_1=y_2 \Rightarrow \text{تابع است} \end{array} \right\}$$

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$$\text{الف) } \text{if } x=0 \rightarrow 0=y(0) \Rightarrow y=\mathbb{R} \Rightarrow \text{تابع نیست}$$

$$\text{ب) } \xrightarrow{\text{ببینیم}} \frac{x}{y} + \frac{y}{x} + 2\sqrt{\frac{x}{y} \cdot \frac{y}{x}} = 4 \Rightarrow \frac{x^2+y^2}{xy} = 4 \Rightarrow (x-y)^2 = 0$$

$$x=y \rightarrow \text{تابع است}$$

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$$(10-ج) \sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2$$

اسی عبارت تنہا زمانی ہو سکتا ہے کہ $\sqrt{\frac{x}{y}} = 1$ یا $\sqrt{\frac{y}{x}} = 1$ ہے

$$\sqrt{\frac{x}{y}} = 1 \Rightarrow \frac{x}{y} = 1 \Rightarrow x = y \quad (x, y \neq 0)$$

