

الف) $x^2 - 5x - 12 = 0 \Rightarrow x^2 - 5x - 36 = 0 \Rightarrow (x-9)(x+4) = 0 \Rightarrow x \begin{cases} = \frac{9}{1} = 9 \\ = -\frac{4}{1} = -4 \end{cases} - 1$

ب) $3x^2 - 11x - 4 = 0 \Rightarrow x^2 - 11x - 4 = 0 \Rightarrow (x-9)(x+1) = 0 \Rightarrow x \begin{cases} = \frac{9}{1} = 9 \\ = -\frac{1}{1} = -1 \end{cases}$

ج) $x^2 - 2x - 3 = 0 \Rightarrow x^2 - 2x - 12 = 0 \Rightarrow (x-4)(x+3) = 0 \Rightarrow x \begin{cases} = \frac{4}{1} = 4 \\ = -\frac{3}{1} = -3 \end{cases}$

د) $2x^2 - 5x - 12 = 0 \Rightarrow x^2 - 5x - 24 = 0 \Rightarrow (x-8)(x+3) = 0 \Rightarrow x \begin{cases} = \frac{8}{1} = 8 \\ = -\frac{3}{1} = -3 \end{cases}$

الف) $x^2 - 5x - 12 = 0 \Rightarrow (x-7)(x+2) = 0 \Rightarrow x \begin{cases} = \frac{7}{1} \\ = -\frac{2}{1} \end{cases} - 2$

ب) $2x^2 + 5x + 3 = 0 \Rightarrow a+c=b \Rightarrow x \begin{cases} = -1 \\ = -\frac{3}{2} \end{cases}$

ج) $x^2 + 2x + 3 = 0 \Rightarrow \Delta = b^2 - 4ac \Rightarrow 4 - 12 = -8$ ریشه های حقیقی ندارد

د) $3x^2 + 3x - 2 = 0 \Rightarrow \Delta = 9 + 24 = 33$
 $x = \frac{-3 \pm \sqrt{33}}{6}$

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

الف) $m^2 = m + 2 \Rightarrow m^2 - m - 2 = 0 \Rightarrow (m-2)(m+1) = 0 \Rightarrow m \begin{cases} = \frac{2}{1} \\ = -\frac{1}{1} \end{cases} \Rightarrow m = -1$

ب) $m^2 = m + 2 \Rightarrow m \begin{cases} = 2 \\ = -1 \end{cases}$ صحیح مقدار $\Rightarrow$ هر دو صحیح

$a^2 = 3a - 2 \Rightarrow a^2 - 3a + 2 = 0 \Rightarrow a \begin{cases} = \frac{1}{1} \Rightarrow (1, 5) \times \\ = \frac{2}{1} \Rightarrow (2, 1) \checkmark \end{cases} a = 2$

$$\left. \begin{aligned} \text{از } n=1 &\Rightarrow n^2-1=an+b \Rightarrow a+b=0 \\ \text{از } n=2 &\Rightarrow n^2=an+b \Rightarrow 1=2a+b \end{aligned} \right\} \Rightarrow a=1 \text{ و } b=-1 \Rightarrow ab=-1$$

$$\text{از } n=k \Rightarrow 2n-3=4-3n \Rightarrow 2k-3=4-3k \Rightarrow 5k=7 \Rightarrow k=\frac{7}{5}$$

$$\begin{aligned} \text{الف) } y^3-4y &= n^2-4n+3 \Rightarrow \left. \begin{aligned} y_1^3-4y_1 &= n_1^2-4n_1+3 \\ y_2^3-4y_2 &= n_2^2-4n_2+3 \end{aligned} \right\} \xrightarrow{n_1=n_2} y_1^3-4y_1 = y_2^3-4y_2 \\ \Rightarrow (y_1-y_2)(y_1^2+2y_1y_2+y_2^2)-4(y_1-y_2) &= (y_1-y_2)(y_1^2+2y_1y_2+y_2^2-4) = 0 \end{aligned}$$

$$\text{ب) } |n|+|y|=3 \xrightarrow{n=0} y=\pm 3 \text{ تابع نیست} \quad \Delta > 0 \Rightarrow \text{چند جواب دارد}$$

$$\text{ج) } |y|=\sqrt{1-\cos n} \Rightarrow -1 \leq \cos n \leq 1 \Rightarrow |y|=+y \Rightarrow \text{تابع نیست} \xrightarrow{n=180} |y|=\sqrt{2} \Rightarrow y=\pm\sqrt{2} \quad X$$

$$\text{د) } y^2+n^2+2n+1=0 \Rightarrow y^2+(n+1)^2=0 \Rightarrow n=-1, y=0 \text{ تابع نیست}$$

$$\begin{aligned} \text{الف) } \sqrt[3]{y}+n^2=2n-2 \Rightarrow \sqrt[3]{y}=-n^2+2n-2 \Rightarrow \left. \begin{aligned} \sqrt[3]{y_1} &= -n_1^2+2n_1-2 \\ \sqrt[3]{y_2} &= -n_2^2+2n_2-2 \end{aligned} \right\} \xrightarrow{n_1=n_2} \sqrt[3]{y_1}=\sqrt[3]{y_2} \\ \Rightarrow \sqrt[3]{y_1}=\sqrt[3]{y_2} \Rightarrow y_1=y_2 \text{ تابع نیست} \end{aligned}$$

$$\begin{aligned} \text{ب) } y^3+2y=an \Rightarrow \left. \begin{aligned} y_1^3+2y_1 &= an_1 \\ y_2^3+2y_2 &= an_2 \end{aligned} \right\} \xrightarrow{n_1=n_2} y_1^3+2y_1 = y_2^3+2y_2 \Rightarrow y_1^3+2y_1-y_2^3-2y_2=0 \\ \Rightarrow (y_1-y_2)(y_1^2+2y_1y_2+y_2^2)+2(y_1-y_2)=0 \Rightarrow (y_1-y_2)(y_1^2+2y_1y_2+y_2^2+2)=0 \\ \Rightarrow y_1=y_2 \text{ تابع است} \quad \text{همواره} \end{aligned}$$

$$\text{الف) } n \sin y = y \sin n \xrightarrow{n=0} 0 \times \sin y = y \times 0 \Rightarrow y = \mathbb{R} \text{ تابع نیست} \quad -10$$

$$\begin{aligned} \text{ب) } \sqrt{\frac{n}{y}} + \sqrt{\frac{y}{n}} = 2 \xrightarrow{\text{مربع کن}} \frac{n}{y} + 2 + \frac{y}{n} = 4 \Rightarrow \frac{n^2+y^2}{ny} - 2 = 0 \Rightarrow n^2+y^2-2ny=0 \\ \Rightarrow (n-y)^2=0 \Rightarrow n=y \text{ تابع است} \end{aligned}$$