

الف) $x^2 - 9x - 9 = 0$ $x^2 - 9x - 36 = 0$ $(x-9)(x+4) = 0$

ب) $x^2 - 11x - 3 = 0 \rightarrow x^2 - 11x - 9 = 0$
 $(x-9)(x+1) = 0$ $x = \frac{9}{3} = 3$ $x = -\frac{1}{3}$

ج) $x^2 - 4x - 3 = 0$ $x^2 - 4x - 12 = 0$ $(x-6)(x+2) = 0$ $x = \frac{4}{2} = 2$ $x = -\frac{2}{2} = -1$

د) $x^2 - 5x - 12 = 0$ $x^2 - 5x - 24 = 0$ $(x-8)(x+3) = 0$ $x = \frac{5}{2} = 2.5$ $x = -\frac{3}{2} = -1.5$

الف) $x^2 - 6x - 14 = 0$ $(x-7)(x+2) = 0$ $x = 7$ $x = -2$

ب) $x^2 + 5x + 3 = 0$ $b^2 - 4ac$ $25 - 12 = 13$ $\frac{-5 \pm \sqrt{13}}{2}$

ج) $x^2 + 2x + 3 = 0$ $b^2 - 4ac$ $4 - 12 = -8$ $\Delta < 0$ $x = -1$ $x = -\frac{2}{2} = -1$

د) $3x^2 + 3x - 2 = 0$ $b^2 - 4ac$ $9 + 24 = 33$ $\frac{-3 \pm \sqrt{33}}{6}$

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

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

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

الف) $f(x) = (3, m^2)(2, 1)(-2, m)(-2, m)(3, m+2)(m, 4)$

$m^2 = m+2$ $m^2 - m - 2 = 0$ $(m-2)(m+1) = 0$
 $m = 2$ یا $m = -1$ $m = 1$

ب) $(3, m^2)(2, 1)(m, 4)(-2, m)(-1, 3)$ $m^2 = m+2$ $m^2 - m - 2 = 0$

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

$a^2 = 3a-2$ $(a-1)(a-2) = 0$ $a = 1$ $a = 2$

$a = 1$ در این جواب نمی دهد چون مؤلفه اول این شود اما مؤلفه دوم مانند بقیه نیست

$$f(n) = \begin{cases} n^{n-1} & n \leq 1 \\ an + b & 1 \leq n \leq r \\ n^r & n \geq r \end{cases}$$

$$n=1 \Rightarrow a \times 1 + b = 1-1 \Rightarrow a+b=0$$

$$n \leq r \quad (r \times a) + b = r^r \quad ra + b = 1$$

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

$$f(n) \begin{cases} 2n-3 & n \geq k \\ 4-3n & n \leq k \end{cases}$$

عدد درستی هم دارند
 $2n-3 = 4-3n$

$$5n = 7$$

$$n = \frac{7}{5} \Rightarrow k = \frac{7}{5}$$

الف) $y^2 - 4y = 0 \quad y=0 \quad y=\sqrt{4} \quad y=-\sqrt{4} \quad n=1$ مثال نقض ☒

ب) $|y|=3 \quad y=\pm 3 \quad n=0$ مثال نقض ☒

ج) $y = \left[\pm \frac{1}{r}\right]^{1-\frac{1}{r}} = \frac{1}{r} \quad (\cos \theta = \frac{1}{r})$ مثال نقض ☒

د) $y^2 + n^2 + 2n + 1 = 0 \quad y^2 + (n+1)^2 = 0 \quad y=0 \quad (n+1)=0$ ☒

ه) $y + n^2 = 2n - 3 \Rightarrow y + n^2 = (2n-3)^2$
 $y = (2n-3)^2 - n^2$ تابع هست ☒

و) $\begin{cases} y_1^2 + 2y_1 = 0 \quad n_1 = n_2 \\ y_2^2 + 2y_2 = 0 \quad n_2 = n_1 \end{cases} \Rightarrow y_1^2 + 2y_1 = y_2^2 + 2y_2 \Rightarrow y_1^2 - y_2^2 + 2y_1 - 2y_2 = 0$
 $(y_1 - y_2)(y_1 + y_2 + 2) = 0 \Rightarrow y_1 - y_2 = 0 \quad y_1 = y_2$ تابع هست ☒

ز) $x \sin y = y \sin x \quad x, y \in \mathbb{R} \Rightarrow x=y$ مثال نقض ☒

ح) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \Rightarrow \frac{x}{y} + \frac{y}{x} + 2\sqrt{\frac{xy}{xy}} = 4$

$x^2 + y^2 + 2xy = 4xy \Rightarrow x^2 - 2xy + y^2 = 0 \Rightarrow (x-y)^2 = 0 \Rightarrow x=y$ تابع هست ☒

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

ہیں عبارت تنہا زمانی بہ قدر است کہ $\sqrt{\frac{x}{y}} = 1$ باشد پس

$$\sqrt{\frac{x}{y}} = 1 \leadsto \frac{x}{y} = 1 \leadsto x = y \text{ و } (x, y \neq 0)$$

