

الف) $4x^2 - 4x - 4 = 0 \Rightarrow x^2 - x - 1 = 0 \Rightarrow (x - \frac{1}{2})^2 - \frac{5}{4} = 0 \Rightarrow (x - \frac{1}{2} - \frac{\sqrt{5}}{2})(x - \frac{1}{2} + \frac{\sqrt{5}}{2}) = 0 \Rightarrow x = \begin{cases} \frac{1+\sqrt{5}}{2} \\ \frac{1-\sqrt{5}}{2} \end{cases}$ ب) $3x^2 - 11x - 2 = 0 \Rightarrow x^2 - 11x - 2 = 0 \Rightarrow (x - 11)(x + 2) = 0 \Rightarrow (x - \frac{11}{2})(x + \frac{4}{2}) = 0 \Rightarrow x = \begin{cases} 11 \\ -2 \end{cases}$ ج) $4x^2 - 4x - 12 = 0 \Rightarrow x^2 - x - 3 = 0 \Rightarrow (x - 2)(x + 1) = 0 \Rightarrow (x - \frac{4}{2})(x + \frac{2}{2}) = 0 \Rightarrow (x - 2)(x + 1) = 0 \Rightarrow x = \begin{cases} 2 \\ -1 \end{cases}$ د) $2x^2 - 2x - 12 = 0 \Rightarrow x^2 - x - 6 = 0 \Rightarrow (x - 3)(x + 2) = 0 \Rightarrow (x - \frac{3}{2})(x + \frac{4}{2}) = 0 \Rightarrow x = \begin{cases} 3 \\ -2 \end{cases}$	۱
الف) $x^2 - 2x - 12 = 0 \Rightarrow (x - 6)(x + 2) = 0 \Rightarrow x = \begin{cases} 6 \\ -2 \end{cases}$ ب) $2x^2 + 2x + 3 = 0 \Rightarrow x^2 + x + \frac{3}{2} = 0 \Rightarrow (x + 1)(x + \frac{3}{2}) = 0 \Rightarrow (x + 1)(x + \frac{3}{2}) = 0 \Rightarrow x = \begin{cases} -1 \\ -\frac{3}{2} \end{cases}$ ج) $x^2 + 2x + 3 = 0 \Rightarrow \Delta = b^2 - 4ac \Rightarrow 4 - 12 = -8 \Rightarrow \Delta < 0$ (ج) شبه ندارد. د) $2x^2 + 2x - 2 = 0 \Rightarrow \Delta = 4 + 16 = 20 \Rightarrow x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-2 \pm \sqrt{20}}{4} = \frac{-2 \pm 2\sqrt{5}}{4} = \frac{-1 \pm \sqrt{5}}{2}$	۲
$A \times B = \{(1, 2), (1, 3), (2, 2), (2, 3), (3, 2), (3, 3)\}$ $B^T = B \times B = \{(2, 2), (2, 3), (3, 2), (3, 3)\}$ $A \times B - B^T = \{(1, 2), (1, 3)\}$	۳
الف) $f(x) = \{(x, m^2), (x, 1), (-x, m), (-x, m), (x, m+2), (m, x)\}$ $m^2 = m+2 \Rightarrow m^2 - m - 2 = 0 \Rightarrow (m-2)(m+1) = 0 \Rightarrow m = 2 \text{ یا } m = -1$ $m = 2 \Rightarrow \{(2, 1), (2, 4)\} \times$ $m = -1 \Rightarrow \{(1, 1), (1, 1), (-1, -1), (-1, -1), (1, 1), (-1, 4)\} \Rightarrow \boxed{m = -1}$ ب) $g(x) = \{(x, m^2), (x, 1), (m, x), (x, m+2), (-x, m), (-1, 3)\}$ $m^2 = m+2 \Rightarrow m^2 - m - 2 = 0 \Rightarrow (m-2)(m+1) = 0 \Rightarrow m = 2 \text{ یا } m = -1$ $m = 2 \Rightarrow \{(2, 1), (2, 4)\} \times$ $m = -1 \Rightarrow \{(1, 1), (1, 1), (-1, 4), (1, 1), (-1, -1), (-1, 3)\} \times \Rightarrow m \text{ برای همه مقادیر}$	۴
$f(x) = \{(1, a^2), (1, 3a-2), (a^2, 3a+2)\}$ $a = 1 \Rightarrow \{(1, 1), (1, 1), (1, 5)\} \times$ $a^2 = 3a-2$ $a = 2 \Rightarrow \{(1, 4), (1, 4), (4, 8)\} \Rightarrow \boxed{a = 2}$ $a^2 - 3a + 2 = 0$ $(a-2)(a-1) = 0$	۵

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

نازنین زعفرانی

$$x=1 \Rightarrow 1-1 = a+b \Rightarrow a+b=0 \Rightarrow \underline{a=-b}$$

$$x=2 \Rightarrow 2a+b=1 \Rightarrow -2b+b=1 \Rightarrow \boxed{b=-1} \quad a+b=\boxed{-4}$$

$$f(x) = \begin{cases} 2x-3 & x \geq 4 \\ 4-3x & x < 4 \end{cases}$$

$$x=k \Rightarrow rk-r = k-r/k$$

$$k = \frac{v}{\omega}$$

(الف) $y^3 - 4y = x^2 - 4x + 3 \Rightarrow x=1 \Rightarrow y^3 - 4y = 1 - 4 + 3 \Rightarrow y^3 - 4y = 0 \Rightarrow y(y^2 - 4) = 0$ $y \in \left\{ \frac{2}{\sqrt{2}}, -\frac{2}{\sqrt{2}} \right\}$

ج) $|x| + |y| = 3 \Rightarrow x=0 \Rightarrow |y|=3 \Rightarrow y=\pm 3$ تمام است

ج) $|y| = \sqrt{1 - \cos x} \Rightarrow x = 180^\circ \Rightarrow \cos 180^\circ = -1 \Rightarrow |y| = \sqrt{1 - (-1)} \Rightarrow |y| = \sqrt{2} \Rightarrow y = \pm\sqrt{2}$ بمعنى

د) $y^2 + x^2 + 2x + 1 = 0 \Rightarrow y^2 + (x+1)^2 = 0 \Rightarrow y=0, x=-1 \Rightarrow \begin{vmatrix} -1 \\ 0 \end{vmatrix}$ باز هم هست.
جمع دو عبارت مثبت = صفر $\Rightarrow$ هر عبارت = صفر

(الف) $\sqrt[r]{y} + x^r = rx - r \Rightarrow \sqrt[r]{y_1} = -x^r + rx - r \Rightarrow \sqrt[r]{y_1} = \sqrt[r]{y_r} \Rightarrow y_1 = y_r$ تابع هست.

$$\begin{aligned} \text{ب) } y^r + ry &= ax \Rightarrow y_1^r + ry_1 = ax \Rightarrow y_1^r + ry_1 = y_1^r + ry_1 \Rightarrow y_1^r - y_1^r = r(y_1 - y_1) \\ \Rightarrow (y_1 - y_1)(y_1^r + y_1 y_1 + y_1^r) + r(y_1 - y_1) &= 0 \Rightarrow (y_1 - y_1) \left(\frac{y_1^r + y_1 y_1 + y_1^r}{b} + r \right) = 0 \\ \checkmark y_1 &= y_1 \quad \Delta = y_1^r - r(y_1 + r) \Rightarrow -ry_1 - r \Rightarrow < 0 \end{aligned}$$

الف) $x \sin y = y \sin x \Rightarrow x = \pi \Rightarrow \pi \sin y = y \sin \pi \Rightarrow \sin y = 0 \Rightarrow y = \pi, 2\pi$
 $\sin \pi = 0$

ج) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \xrightarrow{\text{تساوي}}$ $\frac{x}{y} + \frac{y}{x} + 2 = 4 \Rightarrow \frac{x^2 - y^2}{xy} = 2 \Rightarrow x^2 - y^2 = 2xy \Rightarrow x^2 - y^2 - 2xy = 0$ 1.
 $(x - y)^2 = 0$
 . حيث $x = y$