

سوال ۱) $\frac{cx^2}{x^2 - 2x - 3} = 0$ $(x-3)(x+1) = 0$ $\left\{ \begin{array}{l} \frac{9}{4} = \frac{9}{4} \\ -\frac{6}{4} = -\frac{3}{2} \end{array} \right.$ $\frac{9}{4} = \frac{9}{4}$ $-\frac{6}{4} = -\frac{3}{2}$

ب) $\frac{cx^2}{x^2 - 8x - 9} = 0$ $(x-9)(x+1) = 0$ $\left\{ \begin{array}{l} \frac{9}{4} = \frac{9}{4} \\ -\frac{6}{4} = -\frac{3}{2} \end{array} \right.$ $\frac{9}{4} = \frac{9}{4}$ $-\frac{6}{4} = -\frac{3}{2}$

ج) $\frac{cx^2}{x^2 - 4x - 12} = 0$ $(x-6)(x+2) = 0$ $\left\{ \begin{array}{l} \frac{9}{4} = \frac{9}{4} \\ -\frac{6}{4} = -\frac{3}{2} \end{array} \right.$ $\frac{9}{4} = \frac{9}{4}$ $-\frac{6}{4} = -\frac{3}{2}$

د) $\frac{cx^2}{x^2 - 2x - 3} = 0$ $(x-3)(x+1) = 0$ $\left\{ \begin{array}{l} \frac{9}{4} = \frac{9}{4} \\ -\frac{6}{4} = -\frac{3}{2} \end{array} \right.$ $\frac{9}{4} = \frac{9}{4}$ $-\frac{6}{4} = -\frac{3}{2}$

الف) $(x-3)(x+1) = 0$ $\left\{ \begin{array}{l} x = -1 \\ x = 3 \end{array} \right.$

ب) $a + c = b$ $\left\{ \begin{array}{l} x = -1 \\ x = -\frac{c}{a} = -\frac{3}{2} \end{array} \right.$

ج) $\Delta = b^2 - 4ac = 3^2 - 4(1)(3) = -3$ $\Delta = -3$ $\Delta < 0$ Δ منفی

د) $\Delta = b^2 - 4ac = 3^2 - 4(3)(-2) = 33$ $x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-3 \pm \sqrt{33}}{2}$

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

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

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

الف) $m^2 = m + 2 \rightarrow m^2 - m - 2 = 0$ $\left\{ \begin{array}{l} m = -1 \\ m = -\frac{c}{a} = 2 \end{array} \right.$ $\rightarrow (2,1)(2,4)$ $\Rightarrow m = -1$

ب) $m^2 = m + 2$ $\left\{ \begin{array}{l} m = -1 \rightarrow (-1,4)(-1,3) \\ m = 2 \rightarrow (2,1)(2,4) \end{array} \right.$ $\Rightarrow$ هیچ شای از m تابع نمی شود

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

$a^2 = 3a - 2 \rightarrow a^2 - 3a + 2 = 0$ $\left\{ \begin{array}{l} a = 1 \rightarrow (1,1)(1,4) \\ a = \frac{c}{a} = 2 \end{array} \right.$ $\Rightarrow a = 2$

$x = 1 \rightarrow x^2 - 1 = ax + b \rightarrow 0 = a + b$

$x = 2 \rightarrow ax + b = x^2 \rightarrow 2a + b = 1 \Rightarrow a + \frac{a+b}{2} = 1 \rightarrow a = 1, b = -1$ $a \times b = -1$

$x = k \rightarrow 2x - 3 = 4 - 3x$

$2k - 3 = 4 - 3k$ $5k = 7 \rightarrow k = \frac{7}{5} = 1.4$

سوال ۸) الف) $y^3 - 4y = x^2 - 4x + 3 \xrightarrow{\text{ضرب ناقص}} x=1 \quad y(y-4)(y+5)=0 \quad \begin{cases} y=0 \\ y=5 \\ y=-5 \end{cases} \quad \text{تابع نیست} \quad X$

ب) $\text{ضرب ناقص} \rightarrow x=0 \quad \begin{cases} y=+3 \\ y=-3 \end{cases} \quad \text{تابع نیست} \quad X$

ج) $\text{ضرب ناقص} \rightarrow x=\pi \quad |y|=\sqrt{2} \rightarrow \begin{cases} y=\sqrt{2} \\ y=-\sqrt{2} \end{cases} \quad \text{تابع نیست} \quad X$

د) $y^2 + (x+1)^2 = 0 \xrightarrow{\text{نقطه}} (-1, 0) \quad \text{تابع است} \quad \checkmark$

سوال ۹) الف) $\begin{cases} \sqrt[3]{y_1} + x_1^2 = 2x_1 - 2 \\ \sqrt[3]{y_2} + x_2^2 = 2x_2 - 2 \end{cases} \xrightarrow{x_1=x_2} \sqrt[3]{y_1} = \sqrt[3]{y_2} \rightarrow y_1 = y_2 \quad \text{تابع است} \quad \checkmark$

ب) $\begin{cases} y_1^3 + 2y_1 = \omega x_1 \\ y_2^3 + 2y_2 = \omega x_2 \end{cases} \xrightarrow{x_1=x_2} y_1^3 + 2y_1 = y_2^3 + 2y_2 \rightarrow y_1^3 - y_2^3 + 2y_1 - 2y_2 = 0$
 $(y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2) + 2(y_1 - y_2) = 0$
 $(y_1 - y_2)(y_1^2 + y_1 y_2 + y_2^2 + 2) = 0$
 $\text{تابع است} \quad \text{① } y_1 = y_2 \quad \text{② } y_1^2 + y_1 y_2 + y_2^2 + 2 = 0$
 $\Delta = y_2^2 - 4(1)(y_2^2 + 2) = -3y_2^2 - 8 < 0$ ریشه ندارد

سوال ۱۰) الف) $\text{ضرب ناقص} \rightarrow x=0 \quad 0 = yx \rightarrow \text{از } x=0 \text{ می‌تواند حالت برای } y \text{ داریم} \quad \text{تابع نیست} \quad X$

ب) $a + \frac{1}{a} \geq 2$
 $a = \frac{1}{a} = 1 \rightarrow a + \frac{1}{a} = 2 \quad \left\{ \rightarrow \frac{x}{y} = \frac{y}{x} = 1 \rightarrow x=y \quad \text{تابع است} \quad \checkmark \right.$
 $(x, y \neq 0) \text{ یادت نره!}$

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

این عبارت تنها زمانی برقرار است که $\sqrt{\frac{x}{y}} = 1$ باشد پس

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

