

الف) $2x^2 - 5x - 6 = 0 \rightarrow 2x^2 - 5x - 12 = 0 \rightarrow (x+4)(x-9) = 0 \rightarrow x_1 = \frac{9}{2}, x_2 = -\frac{4}{2}$

ب) $3x^2 - 11x - 4 = 0 \rightarrow y^2 - 11y - 4 = 0 \rightarrow (y-9)(y+1) = 0 \rightarrow x_1 = \frac{9}{3}, x_2 = -\frac{1}{3}$

ج) $4x^2 - 4x - 3 = 0 \rightarrow y^2 - 4y - 12 = 0 \rightarrow (y-6)(y+2) = 0 \rightarrow x_1 = \frac{6}{4}, x_2 = -\frac{2}{4}$

د) $5x^2 - 5x - 12 = 0 \rightarrow y^2 - 5y - 12 = 0 \rightarrow (y-9)(y+3) = 0 \rightarrow x_1 = \frac{9}{5}, x_2 = -\frac{3}{5}$

$x^2 - 5x - 12 = 0 \rightarrow (x-7)(x+2) = 0 \rightarrow x_1 = 7, x_2 = -2$

$2x^2 + 5x + 3 = 0 \rightarrow a+c=b \rightarrow x_1 = -1, x_2 = -\frac{3}{2}$

$x^2 + 2x + 3 = 0 \rightarrow \Delta = b^2 - 4ac = 4 - 12 = -8 \rightarrow$ دو ریشه مجزا

$3x^2 + 2x - 2 = 0 \rightarrow \Delta = b^2 - 4ac = 4 - 4(3)(-2) = 4 + 24 = 28$

$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-2 \pm \sqrt{28}}{6}$

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

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

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

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

$m^2 = m+2 \rightarrow m^2 - m - 2 = 0 \rightarrow m = 2, -1 \rightarrow$ ~~خارج از دامنه~~

ب) $f(x) = \{(3, m^2), (1, 1), (m, 4), (3m+2), (2, m), (-1, 3)\}$

$m^2 = m+2 \rightarrow m = 2, -1 \rightarrow$ در هیچ صورت تابع نیست

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

$a^2 = 3a-2 \rightarrow a^2 - 3a + 2 = 0 \rightarrow (a-1)(a-2) = 0 \rightarrow a = 1, 2$

پس $a=2$ تنها جواب تابع نیست

$$f(x) = \begin{cases} x^2 - 1 & x \leq 1 \\ ax + b & 1 \leq x \leq 2 \\ x^2 & x \geq 2 \end{cases} \rightarrow \begin{aligned} x=1 &\rightarrow 1^2 - 1 = 0 = a + b \\ x=2 &\rightarrow 2a + b = 1 \end{aligned}$$

$$\begin{aligned} a + b &= 0 \\ 2a + b &= 1 \end{aligned} \rightarrow a = 1, b = -1$$

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

$$f(x) = \begin{cases} x^2 - 1 & x > 2 \\ x^2 - 1 & x \leq 2 \end{cases} \xrightarrow{x=2} 2^2 - 1 = 3 = a + b \rightarrow a = 1, b = 2$$

$$الف) y^2 - 4y = x^2 - 4x + 4 \rightarrow x=0 \rightarrow y^2 - 4y = 4 \rightarrow y(y-4) = 4 \quad \times$$

$$ب) |x| + |y| = 2 \xrightarrow{x=0} |y| = 2 \rightarrow y = -2, 2 \quad \times$$

$$ج) |y| = \sqrt{1 - \cos x} \xrightarrow{x=\pi} |y| = \sqrt{1 - (-1)} = \sqrt{2} \rightarrow y = \pm \sqrt{2} \quad \times$$

$$د) y^2 + x^2 + 2x + 1 = 0 \rightarrow y^2 + (x^2 + 2x + 1) = y^2 + (x+1)^2 = 0 \rightarrow \begin{aligned} y^2 &= 0 \rightarrow y = 0 \\ (x+1)^2 &= 0 \rightarrow x = -1 \end{aligned} \quad \checkmark$$

$$ه) y^2 + x^2 = 2x - 2 \rightarrow y^2 = -x^2 + 2x - 2 \rightarrow y = (-x^2 + 2x - 2) \rightarrow \text{باهر محاوره نگرین}$$

$$y^2 + 2y = 0 \quad \checkmark \quad \begin{aligned} y_1^2 + 2y_1 &= 0 \quad x_1 = x_2 \\ y_2^2 + 2y_2 &= 0 \end{aligned} \quad \begin{aligned} y_1^2 + 2y_1 &= y_2^2 + 2y_2 \Rightarrow y_1^2 - y_2^2 + 2y_1 - 2y_2 = 0 \\ (y_1 - y_2)(y_1 + y_2 + 2) &= 0 \end{aligned}$$

$$\begin{aligned} y_1^2 + y_1 + y_2^2 + y_2 + 2 &= 0 \quad (y_1 = y_2) \\ (y_1 - y_2)(y_1^2 + y_1 + y_2^2 + y_2 + 2) &= 0 \end{aligned}$$

$$x \sin y = y \sin x \xrightarrow{x=0} y \sin 0 = 0 \rightarrow x \sin y \rightarrow \text{ازای هر عددی تواند}$$

$$\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = 2 \rightarrow t + \frac{1}{t} = 2 \Rightarrow t^2 - 2t + 1 = 0 \rightarrow (t-1)^2 = 0 \rightarrow t = 1$$

$$\sqrt{\frac{x}{y}} = 1 \quad \frac{x}{y} = 1 \rightarrow y = x \quad \checkmark$$