

سوال (۱)

$$y = -x^2 + bx + 10$$

$$y_{ext} = V \Rightarrow -\frac{\Delta}{\epsilon a}, V - \frac{b^2 - \epsilon(-1)(10)}{\epsilon(-1)} = V \quad b^2 + 12 = 21 \Rightarrow b^2 = 9$$

$$\Rightarrow b = \pm 3$$

سوال (۲)

الف) $f(x) = x^2 + 2x + 10 \quad \Delta = b^2 - 4ac \quad \Delta = (2)^2 - 4(1)(10) = 4 - 40 = -36 < 0$

ب) $f(x) = (x - 2)^2 - 2(4 - x^2) - 10 \quad 4 - x^2 = t$

$$t^2 - 2t - 10 = (t + 3)(t - 5) = 0 \Rightarrow \begin{cases} 4 - x^2 + 3 = 0 \Rightarrow x^2 = 7 & x = \pm\sqrt{7} \\ 4 - x^2 - 5 = 0 \Rightarrow x^2 = -1 & \text{غیر ممکن} \end{cases}$$

سوال (۳)

$$\{x^2 - 12x + m = 0 \quad \alpha + 2 = \beta \Rightarrow S = \alpha + \beta = 12 \Rightarrow \alpha + 2 = 12 \Rightarrow \alpha = 10 \Rightarrow \beta = 12$$

$$\Rightarrow 2\alpha + 2 = 12 \Rightarrow \alpha = 5, \beta = 12 \Rightarrow \rho = \alpha/\beta = \frac{5}{12} = \frac{m}{\epsilon} = 12 \times 1 \Rightarrow m = 12$$

$$\alpha = 1, \beta = 3, m = 12$$

سوال (۴)

$$3x^2 - 6x + m - 1 = 0 \Rightarrow 2\alpha - \beta = 1 \Rightarrow \beta = 2\alpha - 1$$

$$S = \alpha + \beta = \frac{b}{a} \Rightarrow 3\alpha - 1 = -\frac{(-6)}{3} \Rightarrow 3\alpha - 1 = 2 \Rightarrow 3\alpha = 3 \Rightarrow \alpha = 1$$

$$\beta = 2\alpha - 1 = 2(1) - 1 = 1 \Rightarrow \rho = \alpha/\beta = \frac{1}{1} = 1 \times 1 = 1 \Rightarrow \frac{m-1}{\mu} = 1 \Rightarrow m = 2$$

سوال (۵)

$$-mx^2 + 8x + m^2 - 2$$

$$\alpha = \frac{1}{\beta} \Rightarrow \rho = \alpha/\beta = \frac{1}{\beta} \times \beta = 1$$

$$\rho = \frac{m^2 - 2}{-m} = 1 \Rightarrow m^2 - 2 = -m \quad m^2 + m - 2 = 0 \quad (m+2)(m-1) = 0$$

$$\begin{cases} m = 1 \\ m = -2 \end{cases}$$

$\Delta > 0 \Rightarrow b^2 - 4ac > 0 \Rightarrow (8)^2 - 4(-m)(m^2 - 2) > 0 \Rightarrow \begin{cases} m = 1 \Rightarrow 64 - 4(-1)(-1) = 64 - 4 = 60 > 0 \\ m = -2 \Rightarrow 64 - 4(2)(4 - 2) = 64 - 16 = 48 > 0 \end{cases}$

چون سوال گفتہ ہے کہ $\Delta = 0$ کا جواب نہیں دینے ہوتے ہیں $m = 1$

سوال ٤

$$x^2 - mx + 1 = 0 \quad \alpha\beta = \varepsilon \Rightarrow \alpha\beta \times \beta = \varepsilon \Rightarrow \rho = \alpha\beta = \frac{c}{a} = \frac{1}{1} = 1$$

$$1 \times \beta = \varepsilon \Rightarrow \beta = \frac{\varepsilon}{1} \Rightarrow S = \alpha + \beta = -\frac{b}{a} = -\frac{(-m)}{1} = m = \frac{9}{\varepsilon} + \frac{1}{1} = \frac{17+1}{12} = \frac{18}{12}$$

$$\alpha \times \frac{1}{1} = 1 \Rightarrow \alpha = \frac{9}{\varepsilon}$$

سوال ٧

$$x^2 - (x+m) = 0 \quad \alpha = 1/\beta \Rightarrow S = 1/\beta + \beta = \varepsilon/\beta = \frac{-b}{a} = \frac{-(-\varepsilon)}{1} = \varepsilon$$

$$\Rightarrow \beta = 1 \Rightarrow \alpha = 1$$

$$\rho = \alpha\beta = \frac{c}{a} = \frac{m}{1} = m \Rightarrow m = 1 \times 1 = 1$$

سوال ١

$$x^2 - vx + 1 = 0 \quad \alpha^2 + \frac{1}{\alpha^2} = ? \quad S = \frac{-b}{a} = -\frac{(-v)}{1} = v$$

$$\rho = \alpha\beta = \frac{c}{a} = \frac{1}{1} \Rightarrow \alpha\beta = 1 \Rightarrow \beta = \frac{1}{\alpha} \Rightarrow \beta^2 = \left(\frac{1}{\alpha}\right)^2 = \frac{1}{\alpha^2}$$

$$\Rightarrow \alpha^2 + \underbrace{\left(\frac{1}{\alpha^2}\right)}_{\beta^2} = \alpha^2 + \beta^2 = S^2 - 2\rho = (v)^2 - 2(1)(1)$$

$$= v(49 - 6) = v \times 43 = 131$$

سوال ٩

$$h(t) = -10t^2 + at \rightarrow h_{max} = -\frac{a}{2\varepsilon} = -\frac{(a)^2 - \varepsilon(-1)(0)}{\varepsilon(-1)} = -\frac{a^2}{-\varepsilon} = \frac{a^2}{1}$$

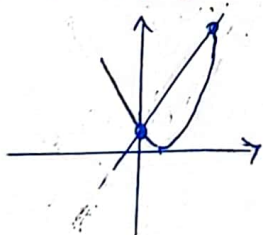
$$h=0 \Rightarrow -10t^2 + at = 0 \quad -at(t-1) = 0 \Rightarrow t=0 \rightarrow \text{وقت شروع}$$

$$t = \frac{1}{1} \checkmark \quad \text{وقت ختم}$$

سوال ١٠

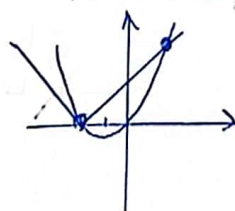
$$\text{الف) } (x-1)^2 = 2x+1 \quad x^2 - 2x + 1 = 2x + 1 \quad x^2 - 4x = 0 \Rightarrow x(x-4) = 0$$

$$x=0, x=4$$



نقطه تقاطع
با محور x

ب) $x^2 + 2x = |x+2|$



$$\begin{cases} \text{اگر } x+2 \geq 0 \Rightarrow x \geq -2 \Rightarrow x^2 + 2x = x+2 \Rightarrow x^2 + x - 2 = 0 \\ (x+2)(x-1) = 0 \Rightarrow x = -2 \text{ یا } x = 1 \end{cases}$$

$$\begin{cases} \text{اگر } x+2 < 0 \Rightarrow x < -2 \Rightarrow x^2 + 2x = -(x+2) \Rightarrow x^2 + 3x + 2 = 0 \\ (x+2)(x+1) = 0 \Rightarrow x = -2 \text{ یا } x = -1 \end{cases}$$