

۱۹

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

سوال (۱) (۲)

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

$$\Rightarrow b = \pm 3 \quad \checkmark$$

سوال (۲)

الف) $f(x) = x^2 + 2x + 10 \quad \Delta = b^2 - 4ac \quad \Delta = (2)^2 - 4(1)(10) = 4 - 40 = -36 < 0 \quad \checkmark$ (۲)

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

سوال (۳)

$\{x^2 - 12x + m = 0 \quad \alpha + 2 = \beta \Rightarrow S = \alpha + \beta = 2\alpha + 2 = \frac{-(-12)}{1} = 14$ (۲)
 $\Rightarrow 2\alpha + 2 = 14 \Rightarrow \alpha = 6 \quad \checkmark, \quad \beta = \alpha + 2 = 8 \quad \checkmark$
 $P = \alpha\beta = \frac{c}{a} = \frac{m}{1} = 48 \quad \checkmark$
 $\Rightarrow m = 48 \quad \checkmark$
 $\alpha = 6, \beta = 8, m = 48$

سوال (۴)

$3x^2 - 6x + m - 1 = 0 \Rightarrow 2\alpha - \beta = 1 \Rightarrow \beta = 2\alpha - 1$ (۲)
 $S = \alpha + \beta = \frac{-b}{a} \Rightarrow 3\alpha - 1 = -\frac{(-6)}{3} \Rightarrow 3\alpha - 1 = 2 \Rightarrow 3\alpha = 3 \Rightarrow \alpha = 1$
 $\beta = 2\alpha - 1 = 2(1) - 1 = 1 \Rightarrow P = \alpha\beta = \frac{c}{a} = 1 \times 1 = 1 \Rightarrow \frac{m-1}{3} = 1 \Rightarrow m = 4 \quad \checkmark$

سوال (۵)

$-mx^2 + 8x + m^2 - 2$ (۲)
 $\alpha = \frac{1}{\beta} \Rightarrow P = \alpha\beta = \frac{1}{\beta} \times \beta = 1$
 $P = \frac{m^2 - 2}{-m} = 1 \Rightarrow m^2 - 2 = -m \quad m^2 + m - 2 = 0 \quad (m+2)(m-1) = 0$
 $\begin{cases} m = 1 \\ m = -2 \end{cases}$

$\Delta > 0 \Rightarrow b^2 - 4ac > 0 \Rightarrow (8)^2 - 4(-m)(m^2 - 2) > 0 \Rightarrow \begin{cases} m = 1 \Rightarrow 64 - 4(-1)(-1) = 64 - 4 = 60 \\ m = -2 \Rightarrow 64 - 4(2)(4 - 2) = 64 - 16 = 48 \end{cases}$
 $\checkmark m = 1$ چون سوال گفته در تمام مقادیر $\Delta > 0$ باشد قبول نیست درنتیجه $m = 1$

$x^2 - mx + 1 = 0$ $\alpha\beta = \varepsilon \Rightarrow \alpha\beta \times \beta = \varepsilon \Rightarrow \rho = \alpha\beta = \frac{c}{a} = \frac{1}{1} = 1$ (سوال ۲)
 $1 \times \beta = \varepsilon \Rightarrow \beta = \frac{\varepsilon}{1} \Rightarrow S = \alpha + \beta = -\frac{b}{a} = -\frac{(-m)}{1} = m = \frac{9}{\varepsilon} + \frac{1}{1} = \frac{17+1}{12} = \frac{18}{12} = \frac{3}{2}$ ✓
 $\alpha \times \frac{1}{\beta} = 1 \Rightarrow \alpha = \frac{9}{\varepsilon}$

$x^2 - \varepsilon x + m = 0$ $\alpha = 1/\beta \Rightarrow S = 1/\beta + \beta = \varepsilon/\beta = -\frac{b}{a} = -\frac{(-\varepsilon)}{1} = \varepsilon$ (سوال ۷)
 $\Rightarrow \beta = 1 \Rightarrow \alpha = 1$ (۲)

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

$x^2 - 7x + 1 = 0$ $\alpha^3 + \frac{1}{\alpha^3} = ?$ $S = -\frac{b}{a} = -\frac{(-7)}{1} = 7$ (سوال ۱)
 $\rho = \alpha\beta = \frac{c}{a} = \frac{1}{1}$ $\Rightarrow \alpha\beta = 1 \Rightarrow \beta = \frac{1}{\alpha} \Rightarrow \beta^3 = \left(\frac{1}{\alpha}\right)^3 = \frac{1}{\alpha^3}$ (۲)
 $\Rightarrow \alpha^3 + \underbrace{\left(\frac{1}{\alpha^3}\right)}_{\beta^3} = \alpha^3 + \beta^3 = S^3 - 3\rho = (7)^3 - 3(1)(1)$
 $= 7(49 - 3) = 7 \times 46 = 322$ ✓

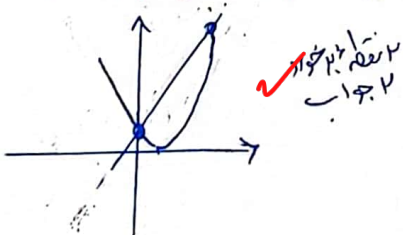
به صورت سوال درج کن!

$h(t) = -10t^2 + 50t$ $\rightarrow h_{max} = -\frac{1}{2a} = -\frac{1}{2(-10)} = \frac{1}{20}$ (سوال ۹)
 $h = 0 \Rightarrow -10t^2 + 50t = 0 \Rightarrow -10t(t - 5) = 0 \Rightarrow t = 0 \rightarrow$ (۲, ۵m)
 $t = \frac{50}{20} = 2.5$ ✓

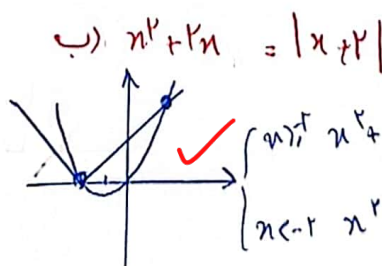
$-10t(t - 5) = 0 \rightarrow \begin{cases} t = 5 \checkmark \\ t = 0 \times \end{cases}$

سوال ۱۰

الف) $(x-1)^2 = 2x+1$ $x^2 - 2x + 1 = 2x + 1$ $x^2 - 4x = 0 \Rightarrow x(x-4) = 0$ (۲)
 $x_1 = 0, x_2 = 4$ ✓



نقطه تقاطع



ب) $x^2 + 2x = |x+2|$
 $\begin{cases} x \geq -2: x^2 + 2x = x+2 \Rightarrow x^2 + x - 2 = 0 \\ \quad (x+2)(x-1) = 0 \Rightarrow x = -2, x = 1 \\ x < -2: x^2 + 2x = -(x+2) \Rightarrow x^2 + 3x + 2 = 0 \\ \quad (x+2)(x+1) = 0 \Rightarrow x = -2, x = -1 \end{cases}$ ✓