

$$y = -x^2 + bx + 3 \rightarrow y_{\max} = \frac{-\Delta}{2a} = v \rightarrow \frac{-(b^2 - 4(-1)(3))}{-4} = v$$

$$\rightarrow b^2 + 12 = 28 \rightarrow b^2 = 16 \rightarrow b = \pm 4$$

$$\rightarrow \begin{cases} -x^2 - 4x + 3 \rightarrow \text{ext} \mid \begin{matrix} -4 \\ v \end{matrix} \\ -x^2 + 4x + 3 \rightarrow \text{ext} \mid \begin{matrix} 4 \\ v \end{matrix} \end{cases}$$

$$f(x) = x^2 + 2x^2 + 3 \xrightarrow{t=x^2} t^2 + 2t + 3 \Rightarrow \Delta < 0 \rightarrow \text{همیشه مثبت}$$

$$b) f(x) = (5-x)^2 - 2(5-x) - 10 \xrightarrow{5-x=t} t^2 - 2t - 10 = (t-1)(t+3)$$

$$\rightarrow \begin{cases} -x^2 + 5 = -3 \rightarrow -x^2 + 8 = 0 \rightarrow x^2 = 8 \rightarrow x = \pm\sqrt{8} \\ -x^2 + 5 = 0 \rightarrow -x^2 - 1 = 0 \rightarrow -x^2 = 1 \text{ غلط } \times \end{cases} \rightarrow x \in \{\sqrt{8}, -\sqrt{8}\}$$

$$y = 5x^2 - 14x + m \xrightarrow[\beta = \alpha + 2]{\alpha} \begin{cases} S = \frac{14}{2} = 7 = 2\alpha + 2 \rightarrow \alpha = 1 \\ P = \frac{m}{2} = \alpha^2 + 2\alpha \xrightarrow{\alpha=1} 1 + 2 = 3 = \frac{m}{2} \rightarrow m = 6 \end{cases}$$

$$\rightarrow \begin{cases} \alpha = 1 \\ \beta = \alpha + 2 = 3 \end{cases} \rightarrow \text{Algo: } 5x^2 - 14x + 12$$

$$3x^2 - 4x + m - 1 = 0$$

$$2\alpha = \beta + 2 \rightarrow \alpha = \frac{\beta}{2} + 1 \rightarrow \begin{cases} S = \frac{-b}{a} = \frac{4}{3} = 2 \rightarrow 1.5\beta + 2 = 2 \rightarrow \beta = 0 \\ \rightarrow P = \frac{c}{a} = \frac{m-1}{3} = \alpha\beta = 0 \rightarrow m = 1 \end{cases}$$

$$-mx^2 + 5x + m^2 - 2 = 0 \rightarrow P = 1 \rightarrow \frac{m^2 - 2}{-m} = 1 \rightarrow m^2 - 2 = -m$$

$$\rightarrow m^2 + m - 2 = 0 \rightarrow (m+2)(m-1) = 0 \rightarrow \begin{cases} m = 1 \\ m = -2 \text{ غلط } \times \end{cases} \rightarrow \Delta = 0 \rightarrow \text{یک ریشه دارد}$$

$$x^2 - mx + 2 = 0$$

$$\alpha\beta = 2 \rightarrow P(\beta) = 2 \rightarrow \frac{C}{\alpha}(\beta) = 2 \rightarrow V(\beta) = 2 \rightarrow \beta = \frac{2}{\alpha}$$

جایگزینی $\rightarrow (\frac{2}{\alpha})^2 - \frac{2}{\alpha}m + 2 = \frac{14}{9} - \frac{2}{9}m + 2 = \frac{14 - 2m + 18}{9} = 0 \rightarrow 12m = 42$

$\rightarrow m = \frac{42}{12}$

$$x^2 - 5x + m = 0 \quad \xrightarrow{\beta = 3\alpha} \begin{cases} S = \frac{-b}{a} = 5\alpha = 5 \rightarrow \alpha = 1 \\ P = \frac{C}{a} = 3\alpha^2 = m = 3(1)^2 = 3 \rightarrow \boxed{m = 3} \end{cases}$$

$$x^2 - vx + 2 = 0$$

$$\alpha^2 + \frac{1}{\alpha^2} = (\alpha + \frac{1}{\alpha})^2 = (\alpha + \frac{1}{\alpha})(\alpha + \frac{1}{\alpha} - 1) = (\alpha + \frac{1}{\alpha})((\alpha + \frac{1}{\alpha})^2 - 1)$$

$$\Rightarrow \alpha + \frac{1}{\alpha} = \frac{\alpha^2 + 1}{\alpha} \xrightarrow{\alpha^2 + 1 = vx} (\frac{vx}{\alpha})((\frac{vx}{\alpha})^2 - 1) = v(49 - 4) = v \times 45 = 45.1$$

$$h_{max} = \frac{-\Delta}{2a} = \frac{-((80)^2 - 4(-10)(0))}{2(-10)} = \frac{-2800}{-20} = \frac{280}{2} = 140$$

$$y = -10t^2 + 80t \xrightarrow{y=0} -10t^2 + 80t = 0 \rightarrow t^2 - 8t = 0 \rightarrow t(t-8) = 0 \rightarrow \begin{cases} t=0 & S \\ t=8 & 9 \end{cases}$$

