

$$y = -u^2 + 6u + 3$$

$$-\frac{\Delta}{\varepsilon a} = V \quad \times \quad \frac{b^2 + 12}{\varepsilon} = V \Rightarrow b^2 + 12 \leq 12 \Rightarrow b^2 \leq 0 \Rightarrow \boxed{b = \pm 0}$$

$$\text{ii) } f(u) = u^2 + 2u^2 + 3$$

$$u^2 + 2u^2 + 3 = 0 \Rightarrow t^2 + 2t + 3 = 0$$

$$u^2 = t$$

$$t = \frac{-2 \pm \sqrt{4 - 12}}{2} \rightarrow \Delta < 0 \quad (\text{این تابع منفی است})$$

$$\text{b) } f(u) = (u - u^2)^2 - 2(u - u^2) - 10$$

$$(u - u^2)^2 - 2(u - u^2) - 10 = 0 \Rightarrow t^2 - 2t - 10 = 0$$

$$u - u^2 = t$$

$$(t - 2)(t + 3) = 0 \quad \begin{cases} t = 2 \Rightarrow u - u^2 = 2 \Rightarrow u^2 - u + 2 = 0 \\ t = -3 \Rightarrow u - u^2 = -3 \Rightarrow u^2 - u - 3 = 0 \end{cases}$$

$$u^2 - 14u + m = 0$$

$$\alpha = \beta + 2$$

$$\rho = \frac{m}{\varepsilon} \Rightarrow (3)(1) = \frac{m}{\varepsilon} \Rightarrow \boxed{m = 12}$$

$$\alpha + \beta = \frac{14}{\varepsilon} = 7$$

$$\beta + 2 + \beta = 7 \Rightarrow 2\beta = 5 \Rightarrow \boxed{\beta = 2.5}$$

$$\boxed{\alpha = 4.5}$$

$$u^2 - 4u + m - 1 = 0$$

$$\rho\alpha - \beta = \varepsilon \Rightarrow \frac{1}{\rho}\alpha + \frac{\rho}{\rho}\alpha + \frac{1}{\rho}\beta - \frac{\rho}{\rho}\beta = \varepsilon \Rightarrow \frac{1}{\rho}(\alpha + \beta) + \frac{\rho}{\rho}(\alpha - \beta) = \varepsilon$$

$$\frac{\rho}{\rho}(\alpha - \beta) = \varepsilon \Rightarrow \alpha - \beta = \varepsilon$$

$$\alpha - \beta = \frac{\sqrt{\Delta}}{|\alpha|} \Rightarrow \frac{\sqrt{16 - 12(m-1)}}{1} = 2 \Rightarrow \sqrt{16 - 12(m-1)} = 2 \Rightarrow 16 - 12(m-1) = 4$$

$$m - 1 = 0 \Rightarrow \boxed{m = 1}$$

$$u^2 - 4u + m - 1 = 0 \Rightarrow u^2 - 4u = 0$$

$$-mu^2 + \varepsilon u + m^2 - 2 = 0$$

$$\Delta > 0 \Rightarrow 14 + 6m^2 - 12m > 0$$

$$14 + 6m^2 - 12m > 0$$

$$14 - 12 + 12 = 4$$

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

$$u^2 - mu + 3 = 0$$

$$\alpha\beta \leq 3 \Rightarrow (\alpha)(\beta)(\beta) = 3 \Rightarrow \beta \leq \frac{3}{\alpha}$$

$$m = \frac{9}{\varepsilon} + \frac{\varepsilon}{\rho} = \frac{12 + 14}{12}$$

$$\boxed{\frac{26}{12}}$$

$$u^2 - \frac{13}{12}u + 3 = 0$$

$$\left(\frac{13}{12}\right)^2 - 12 > 0$$

$$u^r - \varepsilon u + m = 0 \quad \alpha + \beta = \varepsilon \quad u^r - \varepsilon u + \varepsilon = 0$$

$$\alpha = \beta \quad \varepsilon \beta = \varepsilon \Rightarrow \beta = 1 \quad u - \varepsilon s, \quad \Delta > 0$$

$$m = \alpha \beta = \beta \times 1 = \boxed{\beta}$$

$$\alpha \leq \beta$$

-V

$$u^r - \varepsilon u + \varepsilon = 0 \quad \alpha + \frac{\varepsilon}{\alpha} = \varepsilon \quad \alpha + \frac{\varepsilon}{\alpha} = \varepsilon \Rightarrow \alpha^2 - \varepsilon \alpha + \varepsilon = 0$$

$$\alpha + \frac{\varepsilon}{\alpha} = \varepsilon \Rightarrow \alpha^2 - \varepsilon \alpha + \varepsilon = 0 \Rightarrow \alpha = \frac{\varepsilon \pm \sqrt{\varepsilon^2 - 4\varepsilon}}{2}$$

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-A

$$h(t) = -10t^r + 20t$$

$$-10t(t-2) \leq 0 \quad t \leq 2 \leq 5$$

-9

$$\left| \frac{-\Delta}{2a} \right| = \left| \frac{20}{-10} \right| = 2$$

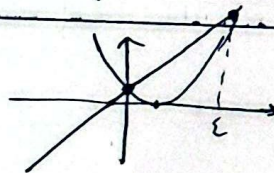
$$-10 \left(\frac{20}{-10} \right) + 20 \cdot \left(\frac{20}{-10} \right) = \frac{-10 \cdot 20 + 20 \cdot 20}{-10} = \frac{0}{-10} = 0$$

$$d) (u-1)^r = \varepsilon u + 1$$

$$u^r - \varepsilon u + 1 = \varepsilon u + 1$$

$$u^r - \varepsilon u + 1 = \varepsilon u + 1$$

$$u^r - \varepsilon u = \varepsilon u$$



$$u = 0$$

$$u \leq \varepsilon$$

$$-10t^2$$

$$u \leq \varepsilon$$

$$u \leq 1$$

$$u^r + \varepsilon u \leq (u+1)^r$$

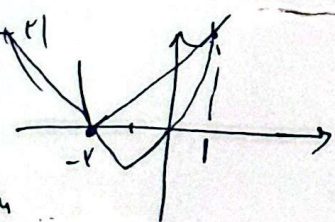
$$u(u+1)$$

$$u + \varepsilon \leq u^r + \varepsilon u$$

$$u + \varepsilon \leq u^r + \varepsilon u$$

$$u^r + \varepsilon u + \varepsilon$$

$$(u+1)(u+1) \leq u^r + \varepsilon u + \varepsilon$$



$$u^r + \varepsilon u \leq (u+1)^r$$