

$$\rightarrow \begin{cases} x = \frac{-b}{2a} \\ y = v \end{cases} \Rightarrow x = \frac{-b}{2(-1)} = \frac{b}{2} \quad (1)$$

$$(1) \rightarrow v = -\left(\frac{b}{2}\right)^2 + b\left(\frac{b}{2}\right) + 3 \Rightarrow \frac{b^2}{4} + 3 = v \Rightarrow b^2 = 14 \Rightarrow b = \pm\sqrt{14}$$

الف) $t = x^2 \rightarrow t^2 + 2t + 3 = 0 \rightarrow \Delta = 4 - 12 = -8 \rightarrow$ ریشه حقیقی ندارد

$$t = x^2 \rightarrow t^2 - 2t - 15 = 0 \rightarrow t = \frac{2 \pm \sqrt{4 + 60}}{2} = \frac{2 \pm 8}{2} \Rightarrow t = 5 \text{ یا } t = -3 \quad (2)$$

$$(2) \rightarrow 5 - x^2 = -3 \Rightarrow x^2 = 8 \Rightarrow x = \pm\sqrt{8} \quad \checkmark$$

$$(2) \rightarrow -3 - x^2 = 0 \Rightarrow x^2 = -3 \Rightarrow x \text{ ندارد}$$

ریشه x_1 و $x_2 = x_1 + 2$

$$\begin{cases} x_1 + x_2 = \frac{14}{4} = 3.5 \\ x_1 x_2 = \frac{m}{4} \end{cases} \Rightarrow 2x_1 + 2 = 3.5 \Rightarrow x_1 = 0.75, x_2 = 0.75 + 2 = 2.75 \quad (3)$$

$$x_1 x_2 = \frac{m}{4} \xrightarrow{(3)} 0.75 \times 2.75 = \frac{m}{4} \Rightarrow m = 8.25$$

$$\begin{cases} \alpha + \beta = \frac{-b}{a} = \frac{4}{2} = 2 \\ \alpha \beta = \frac{m-1}{3} = \frac{c}{a} \end{cases} \Rightarrow \begin{cases} 2\alpha + (-\beta) = 4 \\ \alpha + \beta = 2 \end{cases} \xrightarrow{+} 3\alpha = 6 \Rightarrow \alpha = 2, \beta = 0 \quad (4)$$

$$\alpha \beta = (2)(0) = \frac{m-1}{3} \Rightarrow m-1 = 0 \Rightarrow m = 1 \xrightarrow{(4)} \alpha = 2, \beta = 0, m = 1$$

ریشه $\frac{c}{a} = 1 \Rightarrow \frac{m^2 - 2}{-m} = 1 \rightarrow m^2 + m - 2 = 0 \Rightarrow (m+2)(m-1) = 0$

$$m = 1 \rightarrow \Delta = 14 - 4 = 10 \checkmark \Rightarrow \checkmark \quad (5)$$

$$m = -2 \rightarrow 14 - 16 = -2 \times \text{درجه 2 ندارد} \Rightarrow \times \quad (6)$$

$$\begin{cases} \alpha + \beta = m \\ \alpha \beta = r \Rightarrow \alpha = \frac{r}{\beta} \text{ ①} \end{cases}$$

$$\alpha \beta^r = r \xrightarrow{\text{①}} \frac{r}{\beta} (\beta^r) = r \Rightarrow r \beta = r \rightarrow \beta = \frac{r}{r} \Rightarrow \alpha = \frac{r}{\frac{r}{r}} = \frac{r}{r}$$

$$m = \alpha + \beta = \frac{r}{r} + \frac{r}{r} = \boxed{\frac{r+r}{1r}}$$

$$\Rightarrow \alpha = r\beta \rightarrow \begin{cases} \alpha + \beta = r \rightarrow r\beta = r \Rightarrow \beta = 1, \alpha = r \\ \alpha \beta = m \rightarrow (1)(r) = r \Rightarrow \boxed{m = r} \end{cases}$$

$$\rightarrow \alpha^r - v\alpha + r = 0 \xrightarrow{\div \alpha} \alpha + \frac{r}{\alpha} - v = 0 \Rightarrow \alpha + \frac{r}{\alpha} = v$$

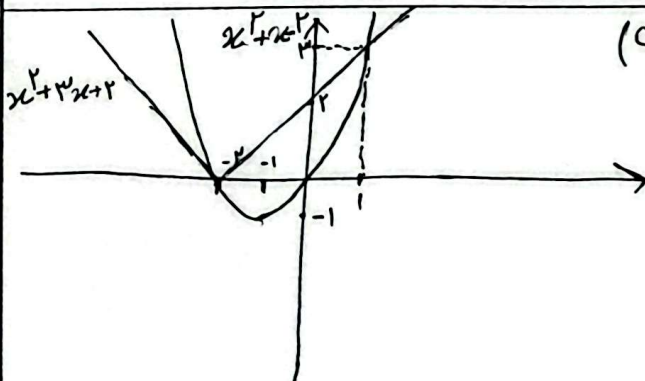
$$\left(\alpha + \frac{r}{\alpha}\right)^r = \alpha^r + \frac{1}{\alpha^r} + r\alpha \times \frac{r}{\alpha} \left(\alpha + \frac{r}{\alpha}\right) = \alpha^r + \frac{1}{\alpha^r} + 4\left(\alpha + \frac{r}{\alpha}\right)$$

$$\Rightarrow v^r = \alpha^r + \frac{1}{\alpha^r} + 4(v) \Rightarrow \alpha^r + \frac{1}{\alpha^r} = r^r r - r r = \boxed{r^r - r}$$

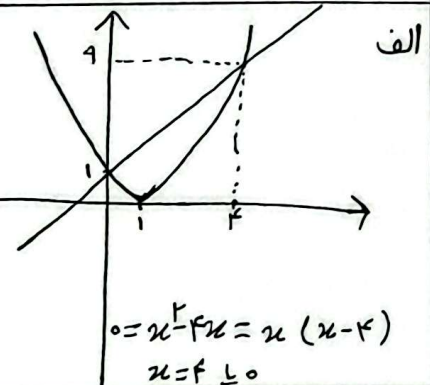
$$\rightarrow t_{max} = \frac{-\Delta_0}{r(-10)} = r, \Delta_0 \approx 10$$

$$\rightarrow h_{max} = -10(r, \Delta) + \Delta_0(r, \Delta) = \boxed{4r, \Delta}$$

$$\xrightarrow{\text{بجاء}} h=0 \Rightarrow -10t^r + \Delta_0 t = 0 \Rightarrow -10t(t-\Delta) = 0 \rightarrow t=0 \times \underline{t=\Delta \approx 10}$$



(ب)



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