

$$\max Y = \frac{-\Delta}{\varepsilon a} = \frac{-(b^2 + 12)}{-\varepsilon} = \frac{b^2 + 12}{\varepsilon} = V \Rightarrow b^2 + 12 = 28 \Rightarrow b^2 = 16 \Rightarrow b = \pm 4 \quad -1$$

$$b = 4 \Rightarrow -x^2 + 4x + 3 = 0 \Rightarrow \frac{-b}{2a} = x_{\max} \Rightarrow \frac{-4}{-2} = 2 \xrightarrow{x=2} -(2)^2 + 4(2) + 3 = -4 + 8 + 3 = 7 \quad \checkmark \text{ قابل قبول}$$

$$b = -4 \Rightarrow -x^2 - 4x + 3 = 0 \Rightarrow \frac{-b}{2a} = x_{\max} \Rightarrow \frac{4}{-2} = -2 \xrightarrow{x=-2} -(-2)^2 - 4(-2) + 3 = -4 + 8 + 3 = 7 \quad \checkmark \text{ قابل قبول}$$

به ازای هر مقدار از x عبارت $\Delta < 0 \Rightarrow$ برابر صفر نمی شود.

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

ب) $f(x) = (4-x^2)^2 - 2(4-x^2) - 10 \xrightarrow{4-x^2=t} t^2 - 2t - 10 = 0 \Rightarrow (t-5)(t+3) = 0 \Rightarrow \begin{matrix} t=5 \\ t=-3 \end{matrix}$

$t = 5 \Rightarrow -x^2 + 4 = 5 \Rightarrow x^2 = -1 \Rightarrow$ هیچ جوابی ندارد

$t = -3 \Rightarrow 4 - x^2 = -3 \Rightarrow x^2 = 7 \Rightarrow x = \pm\sqrt{7} \Rightarrow$ دو جواب قرینه دارد

$$x^2 - 16x + m = 0 \rightarrow x_1 = \alpha = 1, x_2 = \alpha + 2 \rightarrow 1 + 2 = 3$$

$$S = \frac{-b}{a} = x_1 + x_2 = 2\alpha + 2 \Rightarrow \frac{16}{1} = 2\alpha + 2 \Rightarrow \alpha = 1$$

$$P = \frac{c}{a} = x_1 \cdot x_2 = \frac{m}{1} = 1 \times 3 \Rightarrow \frac{m}{1} = 3 \Rightarrow m = 12$$

عبارت $x^2 - 16x + 12$ است مساوی صفر $\rightarrow x^2 - 16x + 12 = 0 \Rightarrow x^2 - 4x + 3 = 0 \Rightarrow (x-3)(x-1) = 0$

$x=3 \quad x=1$

$$3x^2 - 4x + m - 1 = 0 \Rightarrow S = \frac{-b}{a} = \frac{4}{3} = 2 = \alpha + \beta$$

$$2\alpha - \beta = 4 \Rightarrow 2\alpha - \beta = 2(\alpha + \beta) \Rightarrow 2\alpha - \beta = 2\alpha + 2\beta \Rightarrow 3\beta = 0 \Rightarrow \beta = 0$$

$$\Rightarrow \alpha = 2$$

$$\frac{\beta=0}{\alpha=2} \rightarrow \alpha\beta = 0 \Rightarrow \frac{m-1}{3} = 0 \Rightarrow m-1 = 0 \Rightarrow m = 1$$

$$-mx^2 + \{x + m^2 - 2 = 0 \quad \xrightarrow{\text{ریشه ها}} \alpha \text{ و } \frac{1}{\alpha} \xrightarrow{\text{ریشه ها}} \alpha \times \frac{1}{\alpha} = 1$$

$$P = \frac{m^2 - 2}{-m} = 1 \Rightarrow m^2 - 2 = -m \Rightarrow m^2 + m - 2 = 0 \Rightarrow (m+2)(m-1) = 0 \Rightarrow \begin{matrix} m=1 \\ m=-2 \end{matrix}$$

$m=1 \Rightarrow -x^2 + x - 1 = 0 \Rightarrow \Delta = b^2 - 4ac = 1 - 4 = -3 < 0 \Rightarrow m=1 \quad \checkmark$ قابل قبول

$m=-2 \Rightarrow x^2 + x + 2 = 0 \Rightarrow \Delta = b^2 - 4ac = 1 - 8 = -7 < 0 \Rightarrow m=-2 \quad \times$ غیر قابل قبول

چون در صورت سوال می گویند این معادله در ریشه متناهی داشته باشد ولی به ازای $\Delta = 0$ ریشه مضاعف دارد

$$x^2 - mx + 3 = 0 \rightarrow P = \frac{c}{a} = 3 \Rightarrow \alpha\beta = 3 \quad \alpha\beta^2 = 3 \Rightarrow 3\beta = 3 \Rightarrow \beta = \frac{1}{3}$$

$$\alpha\beta = 3 \Rightarrow \alpha \times \frac{1}{3} = 3 \Rightarrow \alpha = 9 \quad S = \alpha + \beta = \frac{-b}{a} \Rightarrow \frac{1}{3} + 9 = m \Rightarrow m = \frac{16 + 27}{12} = \frac{43}{12}$$

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$$x^2 - \varepsilon x + m = 0 \rightarrow x_1 = \alpha \quad x_2 = 3\alpha \rightarrow x_1 = 1 \quad x_2 = 3$$

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

$$P = \frac{c}{a} = m = x_1 \cdot x_2 \Rightarrow m = 3$$

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$$x^2 - Vx + \gamma = 0 \Rightarrow \alpha^2 - V\alpha + \gamma = 0 \Rightarrow \alpha^2 = V\alpha - \gamma$$

$$\alpha^3 + \frac{\Delta}{\alpha^2} = \left(\alpha + \frac{\gamma}{\alpha}\right) \left(\alpha^2 - \gamma + \frac{\varepsilon}{\alpha^2}\right) = V \times \varepsilon^3 = 301$$

$$\begin{aligned} \rightarrow \frac{\alpha^2 + \gamma}{\alpha} = \frac{V\alpha - \gamma + \gamma}{\alpha} = V & \rightarrow \alpha^2 - \gamma + \frac{\varepsilon}{\alpha^2} = V\alpha - \varepsilon + \frac{\varepsilon}{V\alpha - \gamma} = \frac{\varepsilon 9\alpha^2 - 21\alpha - 1\varepsilon\alpha + 1 + \varepsilon}{V\alpha - \gamma} \\ & = \frac{\varepsilon 9\alpha^2 - \varepsilon 2\alpha + 1\varepsilon}{V\alpha - \gamma} = \frac{\varepsilon 9(V\alpha - \gamma) - 6(V\alpha - \gamma)}{V\alpha - \gamma} = \frac{(\varepsilon 9 - 6)(V\alpha - \gamma)}{V\alpha - \gamma} \\ & = \varepsilon 9 - 6 = \varepsilon 3 \end{aligned}$$

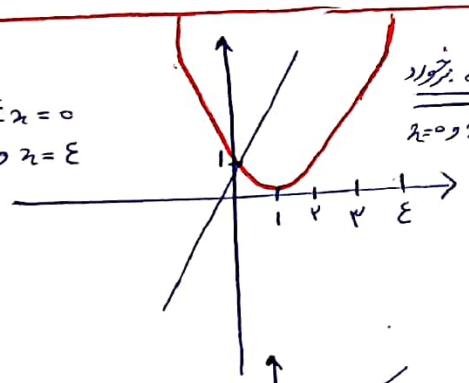
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$$h(t) = -10t^2 + \omega t = 0 \Rightarrow -10t^2 + \omega t = 0 \Rightarrow -10t(t - \omega) = 0 \Rightarrow \begin{matrix} t=0 \\ t=\omega \end{matrix} \leftarrow \begin{matrix} \text{زمان بازگشت توپ به زمین} \\ \text{پس از پرتاب} \end{matrix}$$

$$\text{ex} \left\{ \begin{aligned} \frac{-b}{2a} &= \frac{-\omega}{-20} = \gamma, \omega \\ \frac{-\Delta}{\varepsilon a} &= \frac{-(\omega^2 - 400)}{\varepsilon a} = \frac{-(\omega^2 - 400)}{-\varepsilon_0} = \frac{\omega^2 - 400}{\varepsilon_0} = 62, \omega \end{aligned} \right. \leftarrow \begin{matrix} \text{ماتریم ارتفاعی که توپ از سطح زمین} \\ \text{می‌گیرد} \end{matrix}$$

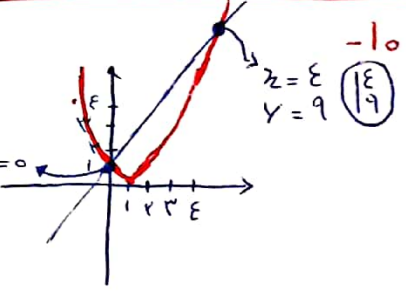
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الف) $(x-1)^2 = 2x+1$
 $\Delta = x^2 - 2x + 1 = 2x + 1 = x^2 - \varepsilon x = 0$
 $\Rightarrow x(x - \varepsilon) = 0 \Rightarrow x = 0 \text{ و } x = \varepsilon$

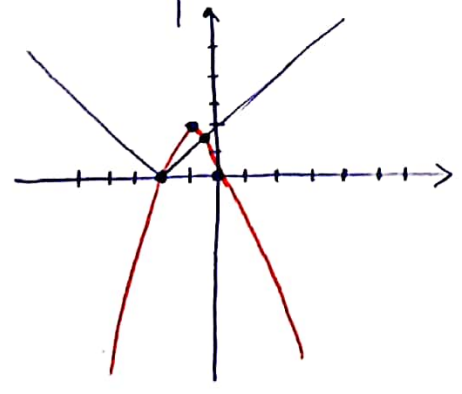


دو نقطه برخورد
 $x=0$ و $x=\varepsilon$

نرم کمتر
 $y=1 \quad x=0$
 (۱۱)



ب) $x^2 + 2x = |x+2|$
 $x(x+2)$



دو نقطه برخورد دارد

نرم بیشتر
 $x = -2$
 $y = 0$
 (۱-۲)

