

1A, 2A

لأنه أكبر

أكثر من 11

المسألة

Year: Month: Date: ()

$$y = -x^2 + bx + c \xrightarrow{\text{max} = y} \frac{-\Delta}{2a} = \frac{4ac - b^2}{4a} = \frac{4(-1)(c) - b^2}{-4} = \frac{12 + b^2}{4} = y \quad (1)$$

$$\rightarrow 12 = 12 + b^2 \rightarrow b^2 = 14 \rightarrow b = \pm \sqrt{14} \quad \checkmark$$

$$\text{ii) } f(m) = x^2 + 2mx + c \xrightarrow{m^2 = t} t^2 + 2t + c \rightarrow \Delta < 0 \quad \checkmark \quad (2) \quad (3)$$

$$\text{iii) } f(m) = (x - m)^2 - 2(x - m) - 15 \xrightarrow{x - m^2 = t} t^2 - 2t - 15 = 0 \rightarrow (t - 5)(t + 3) = 0$$

$$\rightarrow \begin{cases} t - m^2 = 5 \rightarrow -1 = m^2 \text{ غير ممكن} \\ t - m^2 = -3 \rightarrow 7 = m^2 \rightarrow m = \pm \sqrt{7} \quad \checkmark \end{cases}$$

$$x_1 + x_2 = 2, x_1 x_2 = x + 2 \rightarrow \text{مقابلين} = 2 = \sqrt{5x^2 - 4p} \quad 5m^2 - 14m + m = 0 \quad (4)$$

$$\begin{cases} S = \frac{-b}{a} = \frac{14}{5} = \textcircled{5} \\ P = \frac{c}{a} = \frac{m}{5} \end{cases} \rightarrow \sqrt{14 - m} = 2 \rightarrow 14 - m = 4 \rightarrow 14 = m \quad \checkmark$$

$$\text{نلاحظ} \rightarrow 5m^2 - 14m + 12 = 0 \xrightarrow{\div 5} m^2 - 2.8m + 2.4 = 0 \rightarrow (m - 1)(m - 3) = 0 \rightarrow m_1 = 1, m_2 = 3 \quad \checkmark$$

$$5x^2 - 4m + m - 1 = 0 \rightarrow 5x^2 - 3 = 0 \rightarrow 5x^2 = 3 + 0 \quad (5)$$

$$S = \frac{-b}{a} = \frac{4}{5} = \textcircled{4} \rightarrow \alpha + \beta = 2$$

نلاحظ

$$5\alpha = \beta + 2 \rightarrow \alpha = \frac{\beta + 2}{5} \xrightarrow{S} \alpha + \beta = 2 \rightarrow \frac{\beta + 2}{5} + \beta = 2 \rightarrow \frac{\beta + 2 + 5\beta}{5} = 2 \rightarrow \frac{6\beta + 2}{5} = 2 \rightarrow 6\beta + 2 = 10 \rightarrow 6\beta = 8 \rightarrow \beta = \frac{4}{3} \rightarrow \alpha = \frac{2}{3} \rightarrow m(m - 2) = m^2 - 2m \rightarrow 3m^2 - 4m + 0 = 0 \rightarrow m - 1 = 0 \rightarrow m = 1 \quad \checkmark$$

$$-m^2 + 5m + m^2 - 2 = 0 \rightarrow \alpha = \frac{1}{3} \rightarrow \alpha/\beta = 1 \quad (6) \quad (7) \quad (8)$$

$$\rightarrow P = \frac{c}{a} = \frac{m^2 - 2}{-m} = 1 \rightarrow m^2 - 2 = -m \rightarrow m^2 + m - 2 = 0 \rightarrow (m + 2)(m - 1) = 0 \rightarrow m = -2 \text{ or } m = 1 \quad \checkmark$$

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

$$\begin{cases} P = \frac{c}{a} = 2 \\ S = \frac{-b}{a} = m \end{cases} \rightarrow \frac{\alpha\beta}{\alpha\beta} = \frac{2}{m} \rightarrow \beta = \frac{2}{m} \rightarrow \alpha = \frac{4}{m} \rightarrow \begin{cases} S = m = \frac{4}{m} + \frac{4}{m} = \frac{8}{m} \\ P = 2 \end{cases} \rightarrow \frac{8}{m} = 2 \rightarrow m = 4 \quad \checkmark$$

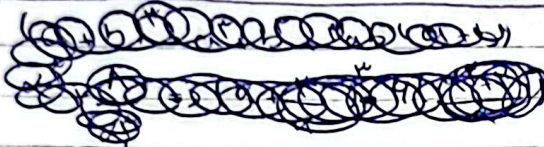
$$x^2 - 4x + m = 0 \rightarrow m_1 = \alpha \quad m_2 = 3\alpha$$

(2)

$$\rightarrow S = \frac{-b}{a} = 4 \rightarrow \alpha + 3\alpha = 4\alpha = 4 \rightarrow \alpha = 1 \rightarrow \beta = 3 \rightarrow m^2 - 5m + 6 = 0$$

$$\boxed{m=3}$$

$$\leftarrow x^2 - 4x + 3 = 0 \rightarrow (x-1)(x-3)$$



$$x^2 - vx + r = 0 \quad (3)$$

(2)

$$\alpha^2 - vx + r = 0 \rightarrow \alpha^2 = vx - r \rightarrow \alpha^3 = \alpha^2 \cdot \alpha$$

$$\rightarrow \alpha^3 = (vx - r)\alpha = vx\alpha - r\alpha \xrightarrow{vx\alpha = \alpha^3} \alpha^3 = v(vx - r) = vx^2 - r\alpha = 4vx - 16$$

$$\rightarrow \alpha^3 = 4vx - 16 \xrightarrow{\alpha^2 = vx - r} \alpha^2 - vx + r = 0 \xrightarrow{\div \alpha} \alpha - v + \frac{r}{\alpha} = 0$$

$$\Rightarrow \alpha + \frac{r}{\alpha} = v$$

$$\rightarrow \alpha^3 + \frac{1}{\alpha^3} = \alpha^3 + \left(\frac{r}{\alpha}\right)^3 \rightarrow \left(\frac{r}{\alpha}\right)^3 = \left(\alpha + \frac{r}{\alpha}\right)^3 - 3\alpha \times \frac{r}{\alpha} \times \frac{r}{\alpha} = \left(\alpha + \frac{r}{\alpha}\right)^3 - 3r$$

$$v^3 - 3 \times r \times v = \boxed{301} \quad \checkmark$$

$$h(t) = -10t^2 + 50t \rightarrow t = \frac{-b}{2a} = \frac{-50}{2 \times (-10)} = \frac{50}{20} = 2.5$$

(2) (4)

$$\rightarrow h(2.5) = -10(2.5)^2 + 50(2.5) = -10(6.25) + 125 = 37.5$$

$$\text{درگاه توپ به زمین می‌رسد} \rightarrow h(t) = 0 \rightarrow -10t^2 + 50t = 0 \rightarrow t(-10t + 50) = 0 \quad \left\{ \begin{array}{l} t=0 \\ t=5 \end{array} \right.$$

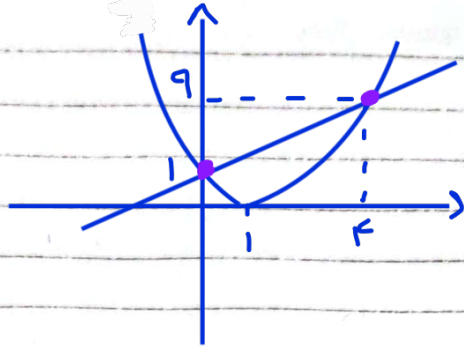
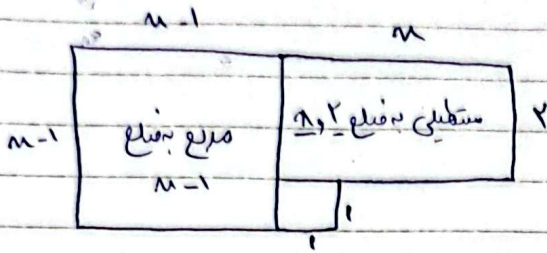
$$\rightarrow t = 0 \text{ یا } t = 5 \rightarrow \text{اما در } t=0 \text{ توپ از زمین بلند می‌شود}$$

$$\text{است پس } \boxed{t=5} \text{ زمان برخورد توپ به زمین است}$$

$$\text{حاصل می‌شود} \rightarrow \boxed{\text{max ارتفاع} = 37.5 \text{ متر در } t=2.5}$$

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(الف) $(m-1)^2 = 2m+1$



(10)

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$m^2 - 2m + 1 = 2m + 1 \rightarrow (m-1)^2 = 2m + 1 \rightarrow m^2 - 2m + 1 = 2m + 1 \rightarrow m^2 - 4m = 0$

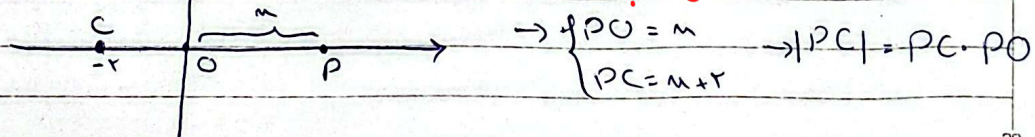
$m^2 - 4m = 0 \rightarrow m(m-4) = 0 \rightarrow \boxed{m=0} \text{ یا } \boxed{m=4}$

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یا به روش دیگر $m^2 - 4m = m^2 - 4m + 4 - 4 \Rightarrow 0 \rightarrow (m-2)^2 = 4 \rightarrow \begin{cases} m-2=2 \rightarrow \boxed{m=4} \\ m-2=-2 \rightarrow \boxed{m=0} \end{cases}$ ✓

روش هندسی یعنی باید نمودارش رو بکش!

(ب)



$\begin{cases} PO = m \\ PC = m + 2 \end{cases} \rightarrow |PC| = PC \cdot PO$

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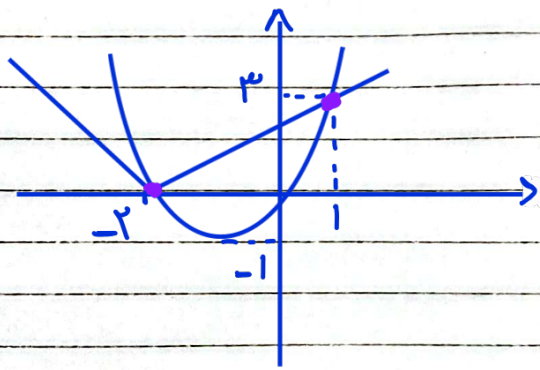
(i) if $PC = 0 \rightarrow \begin{cases} m + 2 = 0 \rightarrow m = -2 \\ PO \cdot PC = 0 \end{cases} \rightarrow \boxed{m = -2}$

(ii) if $PC \neq 0 \rightarrow \begin{cases} |PC| = PC \cdot PO \\ \Rightarrow \frac{|PC|}{PC} = PO \end{cases} \rightarrow \begin{cases} PC > 0 \rightarrow \boxed{PO = 1} \\ PC < 0 \rightarrow \boxed{PO = -1} \end{cases}$

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← اگر $PC < 0$ پس $PO = -1$ و از این هم $PO = 0$ و $-2 > m$ و اینها را نمی‌توانیم داشته باشیم. پس $m < -2$ نتوانیم داشته باشیم.

$\boxed{m = -2}$ و $\boxed{m = +1}$ ✓



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