تمارین ابراهیمی شماره ۱۴

۱- $y_{max} = \frac{-\Delta}{4a} = 7 \rightarrow -\frac{(b^2+12)}{-4} = 7 \rightarrow b^2+12 = 28$

$\rightarrow b^2 = 16 \rightarrow \boxed{b = \pm 4}$

۲-

الف) $f(x) = x^4 + 2x^2 + 3 \qquad t = x^2$

$t^2 + 2t + 3 \Longrightarrow \Delta = b^2 - 4ac \rightarrow 4 - 12 = -8 < 0$ ریشه حقیقی ندارد

ب) $f(x) = (4-x^2)^2 - 2(4-x^2) - 15$

$t = 4 - x^2 \rightarrow t^2 - 2t - 15 = 0 \rightarrow (t-5)(t+3) = 0$

$t = 5 \rightarrow 4 - x^2 - 5 = 0 \rightarrow x^2 = -1$ ریشه ندارد

$t = -3 \rightarrow 4 - x^2 + 3 = 0 \rightarrow x^2 = 7 \rightarrow \boxed{x = \pm\sqrt{7}}$

۳- $S = \frac{-b}{a} \rightarrow \alpha + \alpha + 2 = \frac{16}{4} \rightarrow 2\alpha + 2 = 4 \rightarrow 2\alpha = 2$

$\boxed{\alpha = 1 \text{ , } \beta = 3}$

$P = \frac{c}{a} \rightarrow \frac{m}{4} = 1 \times 3 \rightarrow \boxed{m = 12}$ $\quad 4x^2 - 16x + 12 = 0$

$\Delta > 0$

۴-

$2\alpha - \beta = 4 \rightarrow 2\alpha + 2\beta - 3\beta = 4$

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

$\alpha + \beta = 2 \rightarrow \alpha = 2$

$P = \frac{c}{a} = \frac{m-1}{3} = 0 \rightarrow m - 1 = 0 \rightarrow \boxed{m = 1} \rightarrow 3x^2 - 6x = 0 \rightarrow$

$\Delta > 0$

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۵- $P = 1 \longrightarrow \frac{c}{a} = 1 \longrightarrow \frac{m^2-2}{-m} = 1 \rightarrow m^2+m-2=0$

$(m+2)(m-1)=0$

$\boxed{m=1} \longrightarrow -x^2+4x-1=0 \longrightarrow \Delta>0 \rightarrow 16-4=12>0$ ✓

$m=-2 \longrightarrow 2x^2+4x+2=0 \longrightarrow \Delta=0 \quad 16-16=0$ غ ق

۶- $P=\alpha\beta=\frac{c}{a}=2$

$\alpha\beta^2=4 \rightarrow \alpha\beta\times\beta=4 \longrightarrow 2\beta=4 \longrightarrow \beta=\frac{4}{2}$ $\quad \alpha+\frac{4}{2}=2 \rightarrow \alpha=\frac{2}{\frac{4}{2}}=\frac{4}{4}$

$S=\alpha+\beta=-\frac{b}{a}$ $\quad \frac{2}{2}+\frac{4}{4}=m \longrightarrow \boxed{m=\frac{42}{12}}$ $\quad x^2-\frac{42}{12}x+2=0$

$\Delta>0$

۷- $\beta=2\alpha \quad S=\alpha+\beta=-\frac{b}{a} \rightarrow 2\alpha=4 \longrightarrow \alpha=1$

$\beta=2\alpha=2$

$P=\frac{c}{a}=\alpha\beta \rightarrow \boxed{m=2}$

$\longrightarrow x^2-4x+2=0 \longrightarrow \Delta>0$

۸- $\alpha^2-7\alpha+1=0 \longrightarrow \alpha^2+1=7\alpha$

$(\alpha)^3+(\frac{1}{\alpha})^3 \Rightarrow (\alpha+\frac{1}{\alpha})(\alpha^2+\frac{1}{\alpha^2}-1) \longrightarrow \alpha+\frac{1}{\alpha}=\frac{\alpha^2+1}{\alpha}=\frac{7\alpha}{\alpha}=7$

$\alpha^2+\frac{1}{\alpha^2}=\frac{\alpha^4+1}{\alpha^2} \longrightarrow \frac{(\alpha^2+1)^2-4\alpha^2}{\alpha^2}=\frac{(\alpha^2+1)^2}{\alpha^2}-\frac{4\alpha^2}{\alpha^2}=49-4=45$

$(\alpha+\frac{1}{\alpha})(\alpha^2+\frac{1}{\alpha^2}-1)=7(\underbrace{45-1}_{44})=308$

۹- $a<0$ سهمی $\max$

$x_S=\frac{-b}{2a}=\frac{-50}{-20}=\frac{5}{2}$

$y_S=-10(\frac{25}{4})+50(\frac{5}{2})=49,2$ ارتفاع $\max$

$-10t^2+50t=0 \longrightarrow t(-10t+50)=0 \rightarrow t=0s$

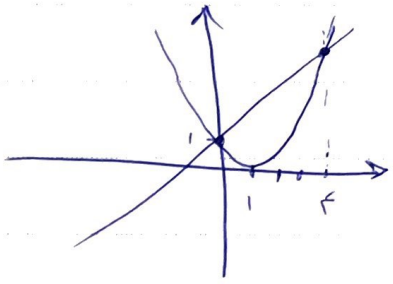
$t=5s$

زمان برخورد با زمین

Elipon

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

$\rightarrow x(x-4)=0 \rightarrow \boxed{x=0 \text{ و } 4}$ ۲ جواب دارد



ب) $x^2+2x = |x+2| \rightarrow x^2+2x-x-2=0 \rightarrow x^2+x-2=0$

$\rightarrow \boxed{x=1 \text{ و } -2}$ ۲ جواب دارد