یازدهم (فیزیک)

زهرا آقایی

۲۰

Subject: Date:

سوال ۱

$۳x^۲ - ax + ۶ = ۰$

$\alpha = ۳\beta \rightarrow ۶\beta = \frac{a}{۳}$

$۳\beta \times \beta = ۳\beta^۲ = \frac{۶}{۳} \rightarrow \beta^۲ = \frac{۶}{۹} \rightarrow \beta = \pm\frac{۲}{۳}$ $\alpha = ۳\times\frac{۲}{۳} = ۲$

$۳ + \frac{۲}{۳} = \frac{\alpha}{۳} \rightarrow \frac{۸}{۳} = \frac{a}{۳} \rightarrow a_۱ = ۸$ ۵

$a_۱ - a_۲ = ۸ - (-۸) = ۱۶$ ، $\beta = -\frac{۲}{۳}$ ، $\alpha = ۲$

$-۲ - \frac{۲}{۳} = -۸ = a_۲$ ← جواب

سوال ۲

$۳۶x^۲ - (m+۱۶)x + ۱ = ۰$ $\alpha\beta = \frac{۱}{۳۶}$ $\alpha+\beta = \frac{m+۱۶}{۳۶}$

حاصل ضرب ریشه های $mx^۲ + ۳x + ۲ = ۰$

$\sqrt{\frac{۱}{\alpha}} + \sqrt{\frac{۱}{\beta}} = ۵ \rightarrow \frac{\sqrt{\beta}+\sqrt{\alpha}}{\sqrt{\alpha\beta}} = ۵$

$\sqrt{\alpha\beta} = \frac{۱}{۶}$

$\sqrt{\beta}+\sqrt{\alpha} = \frac{۵}{۶}$

$\beta + \alpha + ۲\sqrt{\frac{۱}{۳۶}} = \frac{۲۵}{۳۶} \rightarrow \frac{m+۱۶}{۳۶} = \frac{۲۵}{۳۶} - \frac{۱۲}{۳۶} = \frac{۱۳}{۳۶}$

$m+۱۶ = ۱۳ \rightarrow m = -۳$ ، $-۳x^۲ + ۳x + ۲ = ۰$ $-\frac{b}{a} = ۱$

سوال ۳

$۶x^۳ + kx^۲ - ۹x - ۲ \rightarrow \alpha\beta = -۲$ ، $(\alpha\beta = ۱)$

$(\alpha+\beta)^۲ = ۱ \rightarrow \alpha^۲ + \beta^۲ - ۲\alpha\beta = ۱ \rightarrow \alpha^۲ + \beta^۲ = ۵$

$۶\times(-۱)^۳ + k + ۹ - ۲ = ۰$ $k = -۳$ ✓

$۶\times۸ + ۶k - ۱۸ - ۲ = ۰$ $k = -۳$

$\alpha = ۲$

$\beta = -۱$

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سوال ۴) α, β ریشه‌های $x^2+4x+a=0$

$\alpha<\beta<0$ ← منفی هستند

$\alpha-\beta=\sqrt{16-4a}=-2\sqrt{4-a}$

$\alpha+\beta=-4$ $\quad \alpha\times\beta=a$

$3\alpha^2+2\beta^2=12\sqrt{2}+18$

$\hookrightarrow 3/5\alpha^2+2/5\beta^2=(1/5\alpha^2-1/5\beta^2)=3/5(\alpha^2+\beta^2)+1/5(\alpha^2-\beta^2)$

$\alpha^2+\beta^2+14\alpha\beta=49 \rightarrow \alpha^2+\beta^2=49-14a$

$\downarrow$

$3/5(49-14a)+1/5((\alpha+\beta)(\alpha-\beta))$

$90-5a+4\sqrt{4-a}=18a+12\sqrt{2}$ ←

$\hookrightarrow -5a+4\sqrt{4-a}=-5a+12\sqrt{2} \rightarrow 4\sqrt{4}$

$\boxed{a=1}$

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سوال ۵) $x^4+7x^2-8=0$ $\quad \Delta=49+32=81$

$t=x^2 \rightarrow t^2-7t-8=0$ $\quad \frac{7\pm\sqrt{81}}{2}=t_1,t_2$

$\sqrt{\frac{7\pm\sqrt{81}}{2}}$ ← عددی

$2p^2-3p+2=0$ $\quad p=\frac{-7-\sqrt{81}}{2}$

$2p^2=\frac{49+81+14\sqrt{81}}{4}\times 2 \rightarrow \boxed{59+7\sqrt{81}}$ $\quad s=0,5$

سوال ۶) $3x^2-ax+b=0$ $\quad \alpha+\frac{1}{\beta}+\beta+\frac{1}{\alpha}=\frac{9}{4}$

$2ax^2+ax-4=0$ $\quad \alpha+\beta=-\frac{1}{4}$

ادامه صفحه بعد

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$2x^2 - ax + b = 0$ $\quad 2ax^2 + ax - 9 = 0$

$\alpha + \frac{1}{2} + \beta \cdot \frac{1}{2} = \frac{\alpha}{2}$ $\quad \alpha + \beta = -\frac{1}{2}$

$\alpha\beta = -\frac{9}{a}$ (۶)

$\alpha + \beta + 1 = \frac{a}{2} \rightarrow -\frac{1}{2} + 1 = \frac{a}{2} \rightarrow a = 1$

$\left(\frac{1}{2} + \alpha\right)\left(\frac{1}{2} + \beta\right) = \frac{1}{4} + (\alpha + \beta)\frac{1}{2} + \alpha\beta = \frac{b}{4}$

$\frac{1}{4} - \frac{1}{2} - 9 = \frac{b}{4} \hookrightarrow \boxed{b = -4}$ $\quad \left[\frac{ab}{4}\right] = \left[\frac{-4}{4}\right] = [-1]$

$ax^2 + ax - b$; $\beta^2 + 2\alpha - 2\beta = 17$

$2\beta^2 + 4\beta^2 + 2\alpha^2 - 4\beta = 17$

$\alpha + \beta = 1$ $\quad \alpha\beta = -\frac{b}{a}$

$x^2 - x - \frac{b}{a} = 0 \rightarrow x^2 = x + \frac{b}{a}$

$\beta^2 = \beta + \frac{b}{a}$

سوال ۷

$6(\beta + \beta) + 2(\beta^2 + \alpha^2) = 17$ (۶)

$12\left(\frac{b}{a}\right) + 2\left(1 + \frac{2b}{a}\right) = 17$

$12 + 16\frac{b}{a} = 17$

$16\frac{b}{a} = 5 \rightarrow \boxed{\frac{b}{a} = \frac{5}{16}}$

$\alpha^2 + \beta^2 = 1 - 2\frac{b}{a}$

$\alpha - \beta = \sqrt{\frac{9}{25}} = \boxed{\frac{3}{\sqrt{25}}} \longrightarrow$ حذف

سوال (۸)

$x^2 - (a+1)x + a = 0 \rightarrow 2K+1,\ 2K-1$

$x^2 - (2a+1)x + b \rightarrow 2K',\ 2K'+2$

$a = (2K+1)(2K-1) = 4K^2 - 1$

$a + 1 = 4K \rightarrow a = 4K - 1$

$4K^2 - 4K = 0$

$4K(K-1) = 0 \rightarrow K = 1, 0$ (۶)

$a \neq 0$

(۱۱)

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$b = \{k^2 + k \mid k \in \mathbb{Z}\}$ $\quad a = \{4k' + 2 \mid k' \in \mathbb{Z}\}$ $\rightarrow 10 \in (b) \cdot 4$

$b = 4\mathbb{Z}$

$|a - b| = |2 - 4\mathbb{Z}| = 2\mathbb{Z}_1$

سوال ۹)

$x^2 + x - 1 - m^2 = 0$ $\quad \alpha^2 + \beta^2 = \min$ (۵)

$\alpha + \beta = -1 \rightarrow \alpha^2 + \beta^2 + 2\alpha\beta = 1$ $\quad \alpha^2 + \beta^2 - 2(m^2 + 1) = 1$

$\alpha\beta = \frac{c}{a} = -(1 + m^2)$ $\quad \alpha^2 + \beta^2 - 2m^2 - 2 = 1$

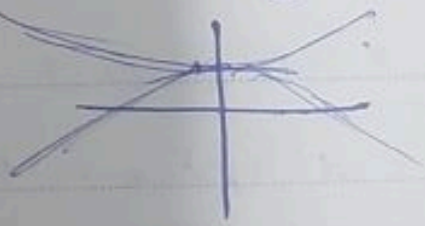
$m = 0$ $\quad \alpha^2 + \beta^2 = 3$

سوال ۱۰)

$B = (-5, 9)$ $\quad A(3, y)$

طول وسط $\frac{3 - 5}{2} = (-1)$

$\text{شیب} = \left|\frac{-1}{1}\right|$



$\alpha^2 + \beta^2 = 0$

$y = a(x + 1)^2 + 4 \rightarrow 0 = a(x^2 + 4 + 4x) + 1$ (۵)

$0 = ax^2 + 4ax + 4a + 1$

$\alpha + \beta = \frac{-4a}{a} = -4 \rightarrow \alpha^2 + \beta^2 + 2\alpha\beta = 4$ $\quad \Delta$

$\alpha\beta = \frac{4a + 1}{a}$ $\quad \frac{-1}{2}$

$y = -\frac{2}{3}(x + 1)^2 + 1$

$y = -\frac{2}{3} + 1 \rightarrow y = \frac{1}{3}, x = 0$ $\quad \downarrow$ $\quad -4 = 1 + \frac{1}{a} \rightarrow -\frac{2}{3}$

Puzzle