(۲)

ریاضیاتی زاده - یازدهم رشته A

سوال ۱)

$3x^2 - ax + 4 = 0 \qquad \beta = 3\alpha$

$P = \frac{4}{3} = 3\alpha^2 \Rightarrow \alpha = \pm\frac{2}{3} \qquad 4\alpha = \frac{a}{3} \Rightarrow 12\alpha = a$

$\frac{2}{3} \Rightarrow a = 8$

$-\frac{2}{3} \Rightarrow a = -8$

$8 - (-8) = 16$

سوال ۲)

$P = \frac{1}{36} \qquad S = \frac{m+14}{36}$

$36x^2 - (m+14)x + 1 = 0 \qquad \frac{1}{\sqrt{\alpha}} + \frac{1}{\sqrt{\beta}} = 5$

$\frac{\sqrt{\alpha}+\sqrt{\beta}}{\sqrt{\alpha\beta}} = 5 \Rightarrow 5\sqrt{\alpha\beta} = \sqrt{\alpha}+\sqrt{\beta} \xrightarrow{\text{توان ۲}} 25\alpha\beta = \alpha + \beta + 2\sqrt{\alpha\beta}$

$\rightarrow \frac{25}{36} = \frac{m+14}{36} + \frac{1}{3} \rightarrow \frac{m+14+12}{36} = \frac{25}{36}$

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

سوال ۳)

$4x^3 + kx^2 - 9x - 2 = 0 \qquad \alpha + \beta = 1 \quad \alpha\beta = -2$

$\Rightarrow x^2 - x - 2$

$(x^2 - x - 2)(4x + m) = 4x^3 + kx^2 - 9x - 2$

$\rightarrow 4x^3 - 4x^2 - 8x + mx^2 - mx - 2m$

$\rightarrow 4x^3 + (m-4)x^2 - (8+m)x - 2m = 4x^3 + kx^2 - 9x - 2$

$\xrightarrow{\text{مقایسه ضرایب}} k = m - 4 \qquad -8 - m = -9 \rightarrow m = 1$

$\Rightarrow k = -3$

سوال ۴)

$x^2 + 6x + a = 0 \qquad \alpha < \beta < 0 \qquad 3\alpha^2 + 2\beta^2 - 12\sqrt{2} = 85$

$\Delta = 36 - 4a$

$\frac{-6 \pm \sqrt{36-4a}}{2} \rightarrow -3 + \sqrt{9-a}$, $\; -3 - \sqrt{9-a}$ $\;\; \alpha<\beta \Rightarrow \alpha = -3 - \sqrt{9-\alpha}$, $\; \beta = -3 + \sqrt{9-\alpha}$

$3\alpha^2 = 54 - 3a + 18\sqrt{9-\alpha}$

$2\beta^2 = 36 - 2a - 12\sqrt{9-a} \qquad 90 + 6\sqrt{9-a} - 5a = 12\sqrt{2} + 85$

$5 - 12\sqrt{2} = 5a - 6\sqrt{9-a}$

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$\Rightarrow a = 11$

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سوال ۵)

$x^4 - 7x^2 - 2 = 0$ $\quad 2p^2 - 3sp + 2s$

$t^2 - 7t - 2 = 0 \rightarrow \Delta = 49$

$\frac{7+\sqrt{49}}{2}$ $\quad \frac{7-\sqrt{49}}{2} \rightarrow$ ریشه

$x_1 = \sqrt{\frac{7+\sqrt{49}}{2}}$ $\quad x_2 = -\sqrt{\frac{7+\sqrt{49}}{2}}$

$p_1 = -\left(\frac{7+\sqrt{49}}{2}\right)^2 = -\frac{7+\sqrt{49}}{2}$

$s = 0$ $\quad 2p^2 = 2\left(-\frac{7+\sqrt{49}}{2}\right)^2 = 2\left(\frac{49+49+14\sqrt{49}}{4}\right)$

$= 49 + 7\sqrt{49}$

سوال ۶)

$2x^2 - ax + b = 0$ $\quad 2ax^2 + ax - 4 = 0$ $\quad \left\{\frac{ab}{4}\right\}$

α, β $\quad s = \frac{a}{2}$ $\quad p = \frac{b}{2}$ $\quad \alpha + \frac{1}{2}, \beta + \frac{1}{2}$ $\quad s' = -\frac{1}{2}$ $\quad p' = -\frac{3}{a}$

$s' = \frac{\alpha + \beta + 1}{\frac{a}{2}} = -\frac{1}{2} \rightarrow \alpha = -3$

$p' = \alpha\beta + \frac{1}{2}(\alpha + \beta) + \frac{1}{4} = \frac{b}{2} - \frac{3}{4} + \frac{1}{4} = 1 \rightarrow b = 3$

$\left\{\frac{3(-3)}{4}\right\} = -\frac{3}{4}$

سوال ۷)

$ax^2 - ax - b = 0$ $\quad 40\beta^2 + 20\alpha^2 - 20\beta = 17$

$x^2 - ax + b = 0 \rightarrow \alpha^2 = a\alpha + b$

$\ldots -\frac{1}{2}(\alpha+\beta)+\frac{1}{4} = \frac{\beta}{2}-\frac{1}{4}+\frac{1}{4}=1 \rightarrow b=3$

$\left[\frac{3(-3)}{4}\right] = -3$

سوال (۷) $40\beta^2+20\alpha^2-20\beta=17$ $\quad ax^2-ax-b=0$

$\hookrightarrow a\alpha^2-a\alpha-b=0 \Rightarrow \alpha^2=\frac{a\alpha+b}{a}$

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

$\rightarrow 40\left(\frac{a\beta+b}{a}\right)+20\left(\frac{a\alpha+b}{a}\right)-20\beta=17 \xrightarrow{\times a} 40a\beta+40b+20\alpha a+20b-20\beta a=17a \Rightarrow 20a\beta+20a+40b-20\beta a=17a$

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$\Rightarrow b=-\frac{3}{40}a \qquad \frac{\sqrt{\Delta}}{|a|}=\frac{\sqrt{b^2-4ac}}{|a|}=\frac{\sqrt{\frac{7}{20}a^2}}{|a|}=\sqrt{\frac{7}{10}}$

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سوال ۸) $x^2-(a+1)x+a=0 \to \alpha,\ \alpha+2 \to S=a+1=2\alpha+2$

$x^2-(3a+1)x+b=0 \to \beta,\ \beta+2$

$\alpha^2+2\alpha+1=2\alpha+2 \Rightarrow \alpha^2=1 \Rightarrow \alpha=\pm 1 \xrightarrow[\text{قبول}]{\text{فرد}} \alpha=1$

$\Rightarrow a=3$

$\hookrightarrow x^2-10x+b=0 \to S: 10=2\beta+2 \Rightarrow \beta=4$

$b=4\times 6=24$

21 و -24 ، اختلاف حاصلضرب

سوال ۹) $x^2+x-1-m^2=0$

$\hookrightarrow S=-1$

$P=-1-m^2$

$\alpha^2+\beta^2=S^2-2P=(-1)^2-2(-1-m^2)$

$1+2+2m^2 \Rightarrow 2m^2+3=$

$-\frac{b}{2a}=0 \Rightarrow \min=3$

سوال ۱۰) $A(3,y)\ B(-5,y) \xrightarrow{\text{عرض}} x_S=\frac{-5+3}{2}=-1 \quad y=1$

$\to (-1,1)$

$\xrightarrow{\text{سهمی}} y=a(x+1)^2+1 \to \Delta=\sqrt{-4a}=2\sqrt{-a}$

$ax^2+2ax+a+1$

$\to \frac{-2a\pm 2\sqrt{-a}}{2a} \xrightarrow{\div 2} -\frac{a\pm\sqrt{-a}}{a} \to -1+\sqrt{\frac{-1}{a}}$

$\hookrightarrow -1-\sqrt{\frac{-1}{a}}$

$\alpha^2+\beta^2=S^2-2P=2\left(1-\frac{1}{a}\right)=5$

$\Rightarrow a=-\frac{2}{3}$

$y=-\frac{2}{3}x^2-\frac{4}{3}x+\frac{1}{3}$

$x=0 \longrightarrow y=\frac{1}{3}$

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