نام و نام خانوادگی ...... محسن صالحی کرانی ...... پاسخنامه تشریحی تکلیف شماره .... کلاس ....

۱	$\alpha \times 3\alpha = 3\alpha^2 = 4 \to \alpha^2 = \frac{4}{3} \to \alpha = \pm \frac{2}{\sqrt{3}}$ $\cancel{-\frac{b}{a} = \alpha + 3\alpha = 4\alpha \left(\frac{2}{\sqrt{3}} \to \frac{8}{\sqrt{3}} \to -\frac{a}{3} = \frac{8}{\sqrt{3}} \to a = 8\sqrt{3} \quad ; \quad -\frac{2}{\sqrt{3}} \to -\frac{8}{\sqrt{3}} \to -\frac{a}{3} = -\frac{8}{\sqrt{3}} \to a = -8\sqrt{3} \right.}$ $8\sqrt{3} - -8\sqrt{3} = +16\sqrt{3}$
۲	$\frac{1}{\sqrt{\alpha}} + \frac{1}{\sqrt{\beta}} = 5 \to \frac{1}{\alpha} + \frac{1}{\beta} + \frac{2}{\sqrt{\alpha\beta}} = 25 \qquad \alpha+\beta = \frac{m+14}{36} \quad \alpha\beta = \frac{1}{36}$ $\frac{\alpha+\beta}{\alpha\beta} + \frac{2}{\sqrt{\alpha\beta}} = 25 \to \frac{\frac{m+14}{36}}{\frac{1}{36}} + \frac{2}{\frac{1}{6}} = 25 \qquad m+14+12 = 25 \to m = -1$ $\frac{2}{m} = \frac{2}{-1} = -2$
۳	$(x-\alpha)^2 \times (x-\beta) \to (x^2+\alpha^2-2\alpha x)(x-\beta)$ $x^3 + \alpha^2 x - 2\alpha x^2 - \beta x^2 - \beta\alpha^2 - 2\alpha\beta x = \underbrace{1}_{1}x^3 - \underbrace{(2\alpha+\beta)}_{k}x^2 + \underbrace{(\alpha^2 + 2\alpha\beta)}_{-9}x - \underbrace{\beta\alpha^2}_{-2}$ $-\beta\alpha^2 = -\frac{2}{4} \to \beta\alpha^2 = \frac{1}{2} \qquad \frac{\beta\alpha^2}{\alpha\beta} = \alpha = \frac{\frac{1}{2}}{-2} = -\frac{1}{4}$ $2\alpha+\beta = \alpha+\beta+\alpha = 1 - \frac{1}{4} = \frac{3}{4} \qquad k = -(2\alpha+\beta) \times 4 = -\frac{3}{4} \times 4 = -3$
۴	$\alpha+\beta = -6 \to \beta = -6-\alpha \to \beta^2 = 36+\alpha^2+12\alpha \to 2\beta^2 = 72+2\alpha^2+24\alpha$ $3\alpha^2 + 72 + 2\alpha^2 + 24\alpha = 12\sqrt{2} + 85 \qquad 5\alpha^2 + 24\alpha - 13 + 12\sqrt{2} = 0$ $\alpha = \frac{-24 \pm \sqrt{6+240\sqrt{2}}}{10}$ ($\frac{-9+10\sqrt{5}}{5}$ مثبت است × ; $-3-2\sqrt{2}$) $-3-2\sqrt{2}-6 = \beta \to -3+2\sqrt{2}$ $-\alpha - 6 = \beta$ $(-3+2\sqrt{2})(-3-2\sqrt{2}) = 9-8 = 1$
۵	$x^4 - 7x^2 - 5 = 0 \to t^2 - 7t - 5 = 0 \to t = \frac{7 \pm \sqrt{(-7)^2 - 4(1)(-5)}}{2} = \frac{7 \pm \sqrt{49+20}}{2} = \frac{7 \pm \sqrt{69}}{2}$ $t>0 \to \frac{7-\sqrt{69}}{2} \times \to \frac{7+\sqrt{69}}{2} \checkmark \qquad x_1 = \sqrt{\frac{7+\sqrt{69}}{2}} \text{ و } x_2 = -\sqrt{\frac{7+\sqrt{69}}{2}}$ $S \to \sqrt{\frac{7+\sqrt{69}}{2}} - \sqrt{\frac{7+\sqrt{69}}{2}} = 0 \qquad P = x_1 \times x_2 = -\left(\frac{7+\sqrt{69}}{2}\right)$ $2P^3 - 3SP + 2S \xrightarrow{S=0} 2P^3 \to P^2 = \left(\frac{7+\sqrt{69}}{2}\right)^2 = \frac{(7+\sqrt{69})^2}{4} = \frac{49+14\sqrt{69}+69}{4} = \frac{118+14\sqrt{69}}{4}$

$2P^2 = 2 \times \frac{118+14\sqrt{69}}{4} = \frac{118+14\sqrt{69}}{2} = 59 + 7\sqrt{69}$

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

$a^2+2a=-a \Rightarrow a^2+3a=0 \begin{cases} a=0 \\ a=-3 \end{cases}$ $\left[\frac{(-a)(3)}{4}\right]\cdot\left[\frac{?}{?}\right]=[-2,0]$ 6

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

$\frac{1}{4}+\frac{a}{4}+\frac{b}{2}=-\frac{3}{a} \begin{cases} a=0 \Rightarrow \frac{1}{4}+0+\frac{b}{2}=\frac{?}{0} \\ a=-3 \Rightarrow \frac{1}{4}-\frac{3}{4}+\frac{b}{2}=1 \Rightarrow -\frac{1}{2}+\frac{b}{2}=1 \Rightarrow \frac{b}{2}=\frac{3}{2} \Rightarrow b=3 \end{cases}$

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

$2\beta^2+1+\beta^2-2\beta-\beta=\frac{17}{20} \Rightarrow 3\beta^2-3\beta-\frac{3}{20}=0 \Rightarrow \beta^2-\beta-\frac{1}{20}=0$ 7

$\Delta=1-4(1)(-\frac{1}{20})=1+\frac{1}{5}=\frac{6}{5}$ $\beta=\frac{1\pm\sqrt{\frac{6}{5}}}{2}$ $\alpha=1-\frac{1\pm\sqrt{\frac{6}{5}}}{2}$

$|\alpha-\beta|=\left|\frac{1-1\pm\sqrt{\frac{6}{5}}}{2}-\frac{1\pm\sqrt{\frac{6}{5}}}{2}\right|=\left|1-1\mp\sqrt{\frac{6}{5}}\right|=\left|\mp\sqrt{\frac{6}{5}}\right|=\sqrt{\frac{6}{5}}$

$\alpha+\alpha+2=2\alpha+2=a+1 \Rightarrow 2\alpha+1=a$ $\alpha(\alpha+2)=\alpha^2+2\alpha=a$

$2\alpha+1=\alpha^2+2\alpha \Rightarrow 1=\alpha^2 \Rightarrow \alpha=\pm1 \Rightarrow \alpha=1$ طبیعی $\Rightarrow 2(1)+1=3=a$

$\beta+\beta+2=2\beta+2=3a+1 \Rightarrow 3(3)+1=10 \Rightarrow 2\beta=8 \Rightarrow \beta=4$ $\beta+2=6$ 8

$(\beta)(\beta+2)=4(6)=24$ $\alpha\times(\alpha+2)=1.(3)=3$ $24-3=21$

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

$\Delta=b^2-4ac \Rightarrow 1^2-4(1)(-1-m^2)\geq0$ $5+4m^2\geq0 \Rightarrow +4m^2\geq-5 \Rightarrow m^2\geq-\frac{4}{5} \Rightarrow m^2\geq0$ 9

$-1^2-2(-1-m^2)=1+2+2m^2=3+2m^2 \Rightarrow 3+2(0)=3$ $m^2_{min}=0$

$\frac{3+(-5)}{2}=-1=x_S$ $S\left|\begin{smallmatrix}-1\\1\end{smallmatrix}\right.$ $ax^2+bx+c \Rightarrow ax^2+2ax+c$

$\frac{-b}{2a}=-1 \Rightarrow b=2a$ $-1 \Rightarrow a-2a+c=1 \Rightarrow -a+c=1 \Rightarrow c=1+a$ 10

$\alpha^2+\beta^2=(\alpha+\beta)^2-2\alpha\beta=5=2^2-2(1+a)=4-2-2a=5$ $-2a=3$ $a=-\frac{3}{2}$

$c=1-\frac{3}{2}=-\frac{1}{2}$

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سوال ۱

$$\alpha , 3\alpha = 3\alpha^2 = \frac{4}{3} \rightarrow \alpha^2 = \frac{4}{9} \rightarrow \alpha = \pm\frac{2}{3}$$

$$-\frac{b}{a} = \alpha + 3\alpha = 4\alpha \begin{cases} \frac{2}{3} \rightarrow 4\left(\frac{2}{3}\right) = \frac{8}{3} = \frac{a}{3} \rightarrow a = 8 \\ -\frac{2}{3} \rightarrow 4\left(-\frac{2}{3}\right) = -\frac{8}{3} = \frac{a}{3} \rightarrow a = -8 \end{cases}$$

$$8 - -8 = 16$$