

$$3n^2 + an + c = 0$$

سوال ۱:

$$\alpha = 3\beta \rightarrow \beta = \frac{\alpha}{3}$$

$$3\beta \times \beta = 3\beta^2 \quad 3\beta^2 = \frac{c}{3} \rightarrow \beta^2 = \frac{c}{9} = \frac{4}{9} \rightarrow \beta = \pm \frac{2}{3} \quad \alpha = 3 \times \frac{2}{3} = \boxed{\alpha = 2}$$

$$\frac{2}{3} + \frac{2}{3} = \frac{a}{3} \rightarrow \frac{4}{3} = \frac{a}{3} \rightarrow \underline{a = 4}$$

$$a_1 - a_2 = 4 - (-4) = 8$$

$$\beta = -\frac{2}{3} \rightarrow \alpha = -2 \quad -2 - \frac{2}{3} = \frac{a}{3} \rightarrow \underline{a_2 = -8}$$

$$34m^2 - (m+14)n + 1 = 0$$

سوال ۲:

$$\sqrt{\frac{1}{\alpha}} + \sqrt{\frac{1}{\beta}} = \omega \rightarrow \frac{1}{\sqrt{\alpha}} + \frac{1}{\sqrt{\beta}} = \omega \rightarrow \frac{\sqrt{\beta} + \sqrt{\alpha}}{\sqrt{\alpha\beta}} = \omega$$

$$\alpha\beta = \frac{1}{34} \quad \alpha + \beta = \frac{m+14}{34} \quad \frac{\sqrt{\beta} + \sqrt{\alpha}}{\sqrt{\alpha\beta}} = \omega \rightarrow \sqrt{\beta} + \sqrt{\alpha} = \frac{\omega}{\sqrt{\alpha\beta}}$$

$$\beta, \alpha \text{ roots of } \sqrt{\frac{1}{\alpha\beta}} = \frac{\omega}{\sqrt{\alpha\beta}} \rightarrow \frac{m+14}{34} = \frac{\omega}{\sqrt{\alpha\beta}} = \frac{12}{34} = \frac{12}{34}$$

$$m+14 = 12 \rightarrow \underline{m = -2}$$

$$m^2 + 3m + 2 = 0$$

$$\rightarrow -m^2 + 3m + 2 = 0 \rightarrow \underline{\frac{c}{a} = -2}$$

سوال ۳:

$$En^3 + kn^2 - 9m - 2 = 0 \quad \alpha\beta = -2 \quad \alpha + \beta = 1 \quad \left. \begin{array}{l} \alpha = 2 \\ \beta = -1 \end{array} \right\}$$

$$(\alpha + \beta)^2 = 1 \rightarrow \alpha^2 + \beta^2 + 2\alpha\beta = 1 \rightarrow \alpha^2 + \beta^2 = 5 \rightarrow \alpha^2 + \beta^2 = 5$$

$$6 \times (-1)^3 + k + 9 - 2 = 0 \rightarrow \boxed{k = -3} \checkmark$$

$$6 \times 1 + k - 11 - 2 = 0 \rightarrow \underline{k = 3} \checkmark$$

$$x^2 + 4x + a = 0 \quad \alpha, \beta < 0 \quad \alpha + \beta = -4$$

$$\alpha\beta = a$$

سوال ۴

$$x^2 + 4x + a = 0 \quad \alpha, \beta < 0 \quad \alpha + \beta = -4$$

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

$$x^2 + 4x + a = 0 \quad \alpha, \beta < 0 \quad \alpha + \beta = -4$$

$$x^2 + 4x + a = 0 \quad \alpha, \beta < 0 \quad \alpha + \beta = -4$$

$$4a - 4a + 4\sqrt{4-a} = 16 + 16\sqrt{4-a} \rightarrow -4a + 4\sqrt{4-a} = -16 + 16\sqrt{4-a}$$

$$a = 1 \quad a - a = 0$$

$$a - a = 0 \rightarrow a = 1$$

$$x^2 - vx + c = 0$$

سوال ۵

$$x^2 - vx + c = 0$$

$$\Delta = v^2 - 4c = 49$$

$$\frac{v \pm \sqrt{49}}{2} = x_1, x_2$$

$$x_1 = \frac{v + \sqrt{49}}{2}, x_2 = \frac{v - \sqrt{49}}{2}$$

$$x^2 - vx + c = 0$$

$$S = 0 \quad P = \frac{-v - \sqrt{49}}{2}$$

$$x^2 - vx + c = 0$$

$$x^2 - ax + b = 0$$

$$x^2 - ax + b = 0$$

سوال ۶

$$\alpha + \frac{1}{\alpha} + \beta + \frac{1}{\beta} = \frac{a}{r}$$

$$\alpha\beta = \frac{b}{r}$$

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

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

$$\frac{1}{r} + \frac{1}{r} - \frac{1}{r} = \frac{b}{r} \rightarrow b = -4$$

$$\left[\frac{ab}{r}\right] = \left[\frac{1 \times -4}{r}\right] = \left[-\frac{4}{r}\right] = -4$$

Arman

سوال ۷: $am^2 - an - b = 0 \rightarrow \alpha, \beta$ $\gamma_0 \beta^2 + \gamma_0 \alpha^2 - \gamma_0 \beta = 1 \vee$

$\alpha + \beta = 1 \quad \alpha \beta = -\frac{b}{a} \quad \gamma_0 \beta^2 + \gamma_0 \beta^2 + \gamma_0 \alpha^2 - \gamma_0 \beta = 1 \vee$

$m^2 - n - \frac{b}{a} = 0 \rightarrow m^2 - n = \frac{b}{a} \quad \gamma_0 (\beta^2 - \beta) + \gamma_0 (\beta^2 + \alpha^2) = 1 \vee$

$\beta^2 - \beta = \frac{b}{a} \quad \gamma_0 \left(\frac{b}{a}\right) + \gamma_0 \left(1 + \frac{b}{a}\right) = 1 \vee$

$\alpha + \beta + \gamma_0 \alpha \beta = 1 \rightarrow \alpha + \beta = 1 + \frac{\gamma_0 b}{a} \quad \gamma_0 + \gamma_0 \frac{b}{a} = 1 \vee \rightarrow \gamma_0 \frac{b}{a} = -3 \rightarrow \frac{b}{a} = -\frac{3}{\gamma_0}$

$\alpha - \beta = \frac{\sqrt{\Delta}}{|a|} = \sqrt{1 - \frac{4b}{a}} = \sqrt{1 - \frac{4}{\gamma_0 a}} = \sqrt{\frac{4}{\gamma_0 a}} = \frac{2}{\sqrt{\gamma_0 a}}$

سوال ۸: $m^2 - (a+1)m + a = 0 \rightarrow$ $\gamma_0 k, \gamma_0 k-1$

$m^2 - (\gamma_0 a + 1)m + b = 0 \rightarrow$ $\gamma_0 k, \gamma_0 k + \gamma_0$

$a = \gamma_0 k + 1 \times \gamma_0 k - 1 = \gamma_0 k^2 - 1 \quad \gamma_0 k^2 - \gamma_0 k = 0$
 $a + 1 = \gamma_0 k \rightarrow a = \gamma_0 k - 1 \quad \gamma_0 k(k-1) = 0$
 $k \geq 1 \quad k = 0$
 $a = 3$

$b = \gamma_0 k^2 + \gamma_0 k \quad a + 1 = \gamma_0 k + 1$
 $10 = \gamma_0 k + 1 \rightarrow k = 2 \rightarrow b = 12$

$|a - b| = |3 - 12| = 9$

سوال ۹: $m^2 - (1+m^2)m + 1 = 0 \quad \alpha^2 + \beta^2 = \min$

$\alpha + \beta = -1 \rightarrow \alpha^2 + \beta^2 + 2\alpha\beta = 1$

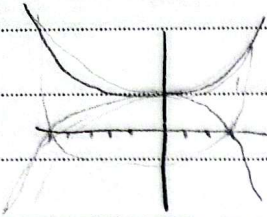
$\alpha\beta = -(1+m^2) \quad \alpha^2 + \beta^2 + 2(1+m^2) = 1$

$\alpha^2 + \beta^2 - 2m^2 = 3$

$\alpha^2 + \beta^2 = 3$

$$B = (-\omega, \omega) \quad A(1, \omega)$$

سوال 10:



$$\frac{\omega - \omega}{\omega} = -1 \rightarrow \text{correct}$$

$$\alpha' = 1$$

$$\alpha' + \beta' = \omega$$

$$y = a(n+1)^r + 1$$

$$0 = a(n^r + 1 + r n) + 1$$

$$0 = n^r a + a + r a n + 1$$

$$0 = a n^r + r a n + a + 1$$

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

$$\alpha \beta = \frac{a+1}{a}$$

$$r \alpha \beta = -1 \rightarrow \alpha \beta = -\frac{1}{r}$$

$$y = -\frac{r}{r} (n+1)^r + 1$$

$$-\frac{1}{r} = 1 + \frac{1}{a}$$

$$-\frac{r}{r} = \frac{1}{a} \rightarrow a = -\frac{r}{r}$$

$$y = -\frac{r}{r} + 1 \Rightarrow y = \frac{1}{r} \quad n=0$$