ماهان امیرمقدم لیلی ←

۱ ←

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

$\alpha \times 3\alpha = 3\alpha^2 = \frac{4}{3} \longrightarrow \alpha^2 = \frac{4}{9} \longrightarrow a = \pm \frac{2}{3}$

$$\left.\begin{aligned} 4 \times \frac{2}{3} = \frac{a}{3} \Rightarrow a = 8 \\ 4 \times -\frac{2}{3} = \frac{a}{3} \Rightarrow a = -8 \end{aligned}\right\} \longrightarrow 8 - (-8) = \boxed{16}$$

۲ ←

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

$mx^2 + 3x + 2 = 0 \longrightarrow \frac{2}{m} = ?$

$$\frac{1}{\sqrt{\alpha}} + \frac{1}{\sqrt{\beta}} = \frac{\sqrt{\alpha} + \sqrt{\beta}}{\underbrace{\sqrt{\alpha\beta}}_{1/6}} = 5 \longrightarrow \sqrt{\alpha} + \sqrt{\beta} = \frac{5}{6} \xrightarrow{\text{توان ۲}}$$

$$\alpha + \beta + 2\sqrt{\alpha\beta} = \frac{25}{36} \longrightarrow \frac{m+14}{36} + \frac{2}{6} = \frac{25}{36} \longrightarrow$$

$\alpha\beta = \frac{c}{a} = \frac{1}{36}$

$\alpha + \beta = \frac{-b}{a} = \frac{m+14}{36}$

$m + 14 + 12 = 25 \longrightarrow m = -1$

$\frac{2}{m} = \frac{2}{-1} = \boxed{-2}$

۳ ←

$4x^3 + kx^2 - 9x - 2 = 0$

$$\left.\begin{aligned} \alpha + \beta = 1 \\ \alpha\beta = -2 \Rightarrow \beta = \frac{-2}{\alpha} \end{aligned}\right\} \Rightarrow \alpha + \frac{-2}{\alpha} = 1 \Rightarrow \frac{\alpha^2 - 2}{\alpha} = 1 \Rightarrow \alpha^2 - \alpha - 2 = 0$$

$$(\alpha-2)(\alpha+1)=0 \longrightarrow \alpha=2,\ \beta=-1$$

$$\xrightarrow{m=2} 32+4k-18-2=0 \Rightarrow 4k=12 \Rightarrow \boxed{k=-3}$$

$$\alpha+\beta=-6,\ \alpha\beta=a \qquad \leftarrow 4$$

$$a<\beta<0$$

$$3\alpha^2+2\beta^2=12\sqrt{2}+85 \rightarrow$$

$$\frac{5}{2}(\alpha^2+\beta^2)+\frac{1}{2}(\alpha^2-\beta^2)$$

$$\alpha^2+\beta^2=(\alpha+\beta)^2-2\alpha\beta \longrightarrow 36-2\alpha\beta \qquad 5$$

$$\alpha^2-\beta^2=(\alpha+\beta)(\alpha-\beta) \rightarrow -6(\sqrt{\Delta})$$

$$12\sqrt{2}+85=\frac{5}{2}(36-2\alpha\beta)+\frac{1}{2}(-6\sqrt{\Delta})$$

$$24\sqrt{2}+170=5(36-2\alpha\beta)-6\sqrt{\Delta}$$

$$\rightarrow 24\sqrt{2}=-6\sqrt{\Delta} \longrightarrow \sqrt{\Delta}=-4\sqrt{2}$$

$$\frac{170}{5}=36-2\alpha\beta \longrightarrow 34-36=-2\alpha\beta \Rightarrow$$

$$2\alpha\beta=2 \longrightarrow \alpha\beta=1 \Rightarrow \frac{c}{a}=\frac{a}{1}=1 \Rightarrow$$

$$\boxed{a=1}$$

$$x^4-7x^2-5=0 \xrightarrow{x^2=t} t^2-7t+5=0$$ $\leftarrow 5$

$$t=\frac{7\pm\sqrt{49+20}}{2} \xrightarrow{t>0} t=\frac{7+\sqrt{69}}{2}$$

$$\Rightarrow x^2=\frac{7+\sqrt{69}}{2} \Rightarrow x=\pm\sqrt{\frac{7+\sqrt{69}}{2}}$$

$$S=\sqrt{\frac{7+\sqrt{69}}{2}}-\sqrt{\frac{7+\sqrt{69}}{2}}=0$$

5

$$P=\frac{-7-\sqrt{69}}{2}$$

$$2P^2-\cancel{4SP}+\cancel{4S}=2P^2=2\times\left(\frac{-7-\sqrt{69}}{2}\right)^2=$$

$$\frac{118+14\sqrt{69}}{2}=\boxed{59+7\sqrt{69}}$$

$$2x^2-ax+b=0 \quad \alpha,\beta \rightarrow S=a/2$$
$$P=b/2$$ $\leftarrow 6$

0/5

$$2ax^2+ax-6=0 \quad \alpha+\frac{1}{2},\ \beta+\frac{1}{2} \rightarrow S'=\frac{-a}{2a}=-\frac{1}{2}$$

$$P'=\frac{-6}{2a}=\frac{-3}{a}$$

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

$$p' = (\alpha + \tfrac{1}{2})(\beta + \tfrac{1}{2}) = \alpha\beta + \tfrac{1}{2}(\alpha+\beta) + \tfrac{1}{4} =$$

$$\frac{b}{2} - \frac{3}{4} + \frac{1}{4} = \frac{-3}{\underset{-3}{a}} = 1 \Longrightarrow \frac{b}{2} = \frac{3}{2} \to b = 3$$

$$\left[\frac{ab}{4}\right] = \left[-\frac{9}{4}\right] = \boxed{-3}$$

$$ax^2 - ax - b = 0 \qquad 40\beta^2 + 20\alpha^2 - 20\alpha = 17 \qquad \leftarrow 7$$

$$\hookrightarrow x^2 = \frac{ax+b}{a} \longrightarrow \beta^2 = \frac{a\beta+b}{a}$$

-۱ ۲

$$40 \times \frac{a\beta+b}{a} + 20 \times \frac{a\alpha+b}{a} - 20\beta = 17 \xrightarrow{\times\alpha}$$

$$40\alpha\beta + 40b + 20a\alpha + 20b - 20\beta\alpha = 17\alpha$$

$$\Longrightarrow 20a + 40b = 17a \Longrightarrow 40b = -3a \longrightarrow b = \frac{-3a}{40}$$

اختلاف ریشه‌ها $\longrightarrow \dfrac{\sqrt{\Delta}}{|a|} = \dfrac{\sqrt{a^2 + 4a \times \frac{-3}{40}a}}{|a|} = \dfrac{\sqrt{\frac{7}{10}a^2}}{|a|}$

$$\boxed{= \sqrt{\frac{7}{10}}}$$

$\alpha = 1 - \beta$ $\qquad 40\beta^2 + 20(1-\beta)^2 - 20\beta = 7 \Longrightarrow 20\beta\underbrace{(\beta - 1)}_{-\alpha} = -1 \longrightarrow \alpha\beta = \frac{1}{20} = \frac{-b}{a}$ $\qquad$ (7

$\Longrightarrow a = -20b$ $\qquad ax^2 - ax - b = 0 \longrightarrow -20bx^2 + 20bx - b = 0 \qquad |\alpha - \beta| = \frac{\sqrt{\Delta}}{|a|} = \frac{2}{\sqrt{5}}$

$x^2-(a+1)x+a=0 \longrightarrow \alpha\,,\ \alpha+2$ ← 8

$\rightarrow S=a+1=2\alpha+2$

$P=a=\alpha^2+2\alpha$

$\Rightarrow \alpha^2+2\alpha+1=2\alpha+2 \rightarrow \alpha^2=1 \longrightarrow \alpha=\pm 1$

$\xrightarrow{\alpha \text{ عددی طبیعی است}} a=1\times 3=3$

$x^2-(\cancel{3a+1}^{\,10})x+b=0 \longrightarrow \beta\,,\ \beta+2$

2

$S=10=2\beta+2 \longrightarrow \beta=4$

$b=4\times 6=24$

$b-a=24-3=\boxed{21}$

$x^2+x-1-m^2=0$ ← 9

2

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

$\alpha\beta=-1-m^2$

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

$2m^2+3 \xrightarrow{m^2\geq 0} \boxed{\min=3}$

$A(3,y) \quad B(-5,y)$ $\xrightarrow{\text{هم عرض اند}}$ ← 10

4

$$x_s = \frac{-5+3}{2} = -1 \ , \ y_s = 1$$

$$y - 1 = a(x+1)^2$$

$$0 - 1 = a(x+1)^2 \Longrightarrow (x+1)^2 = \frac{-1}{a}$$

$$r = \sqrt{\frac{-1}{a}} \qquad x = -1 \pm r$$

$$\alpha = -1 + r \qquad \beta = -1 - r$$

$$(\alpha^2 + \beta^2) = 5 \longrightarrow (-1+r)^2 + (-1-r)^2 =$$

$$(1 - 2r + r^2) + (1 + 2r + r^2) = 2 + 2r^2$$

$$2r^2 + 2 = 5 \longrightarrow r^2 = \frac{3}{2}$$

$$\frac{-1}{a} = \frac{3}{2} \longrightarrow a = -\frac{2}{3}$$

$$y - 1 = a(0+1)^2 = a \Longrightarrow$$ $\leftarrow x = 0 \leftarrow$ سعدی

$$y = 1 + a = 1 - \frac{2}{3} = \frac{1}{3} \longrightarrow$$ $\boxed{\text{عرض از مبدا} = \tfrac{1}{3}}$

$$2x^2 - ax + b = 0 \begin{cases} S = \frac{a}{2} \\ P = \frac{b}{2} \end{cases} \qquad 2ax^2 + ax - 4 \begin{cases} S = \frac{-1}{2} \longrightarrow \alpha + \beta = \frac{1}{2} = \frac{a}{2} \rightarrow a = 1 \\ P = -2 \longrightarrow b = -4 \end{cases}$$ (4

$$\left[\frac{ab}{4}\right] = -2$$