

$$3x^2 - ax + 1 = 0$$

$$a + 3a = 4a = \frac{a}{\frac{1}{4}} \Rightarrow a = 1$$

$$\alpha \times \frac{1}{\alpha} = \frac{1}{\alpha} = \frac{1}{\alpha} \Rightarrow \alpha^2 = \frac{1}{\alpha} \Rightarrow \alpha = \pm \frac{1}{\alpha}$$

$$3x \frac{1}{x} = \frac{a}{x} \Rightarrow a = 1$$

$$\Delta = 1 - (-1) = 14$$

$$3x \frac{-1}{x} = \frac{a}{x} \Rightarrow a = -1$$

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$$3x^2 - (m+1)x + 1 = 0$$

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

$$m\alpha^2 + 3\alpha + 1 = 0 \Rightarrow \frac{1}{m} = ?$$

$$\frac{1}{\sqrt{\alpha}} + \frac{1}{\sqrt{\beta}} = \frac{\sqrt{\alpha} + \sqrt{\beta}}{\sqrt{\alpha\beta}} = \omega \Rightarrow \sqrt{\alpha} + \sqrt{\beta} = \frac{\omega}{\frac{1}{\sqrt{\alpha\beta}}} \Rightarrow \alpha + \beta + 2\sqrt{\alpha\beta} = \frac{2\omega}{3}$$

$$\Rightarrow \frac{m+1}{3} + \frac{1}{3} = \frac{2\omega}{3}$$

$$\times 3 \Rightarrow m+1+1 = 2\omega \Rightarrow m = -1$$

$$\alpha\beta = \frac{1}{3} \Rightarrow \alpha = \frac{1}{3\beta} \quad \alpha + \beta = \frac{m+1}{3} = \frac{0}{3} = 0$$

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

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

$$\alpha + \beta = 1$$

$$\alpha\beta = -2 \Rightarrow \beta = \frac{-2}{\alpha} \Rightarrow \alpha + \frac{-2}{\alpha} = 1 \Rightarrow \frac{\alpha^2 - 2}{\alpha} = 1 \Rightarrow \alpha^2 - \alpha - 2 = 0$$

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

$$x=2 \Rightarrow 12 + k - 18 - 2 = 0 \Rightarrow k = 8 \Rightarrow k = -8$$

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$$x^2 + 4x + a = 0 \quad \alpha < \beta < 0 \quad 3\alpha^2 + 2\beta^2 = 14\sqrt{2} + 14$$

$$\Delta = b^2 - 4ac = 16 - 4a \Rightarrow x = \frac{-4 \pm \sqrt{16 - 4a}}{2} \quad \alpha < \beta \Rightarrow \alpha = \frac{-4 - \sqrt{16 - 4a}}{2} \quad \beta = \frac{-4 + \sqrt{16 - 4a}}{2}$$

$$\begin{aligned} 3\alpha^2 &= 3\left(\frac{-4 - \sqrt{16 - 4a}}{2}\right)^2 = 3(16 - 4\sqrt{16 - 4a} + 16 - 4a) \\ 2\beta^2 &= 2\left(\frac{-4 + \sqrt{16 - 4a}}{2}\right)^2 = 2(16 - 4\sqrt{16 - 4a} + 16 - 4a) \end{aligned} \Rightarrow 48 - 12\sqrt{16 - 4a} + 48 - 12a = 14\sqrt{2} + 14$$

$$-12\sqrt{16 - 4a} = 14\sqrt{2} + 14 - 96 + 12a \Rightarrow \omega - 12\sqrt{2} = 2a - 4\sqrt{16 - 4a} \Rightarrow a = 1$$

$$x^2 - 5x^2 - a = 0 \xrightarrow{x^2=t} t^2 - 5t - a = 0 \quad t = \frac{5 \pm \sqrt{25 + 4a}}{2} \xrightarrow{t=y} t = \frac{5 + \sqrt{49}}{2} = 7$$

$$\Rightarrow x^2 = \frac{5 + \sqrt{49}}{2} \Rightarrow x = \pm \sqrt{\frac{5 + \sqrt{49}}{2}} \Rightarrow s = \sqrt{\frac{5 + \sqrt{49}}{2}} - \sqrt{\frac{5 + \sqrt{49}}{2}} = 0$$

$$p = \frac{-5 - \sqrt{49}}{2}$$

$$3p^2 - 18p + 18 = 3p^2 = 3 \times \left(\frac{-5 - \sqrt{49}}{2}\right)^2 = \frac{75 + 49 + 14\sqrt{49}}{2} = \frac{124 + 14\sqrt{49}}{2}$$

$$= 62 + 7\sqrt{49}$$

$$\alpha x' - \alpha x + b = 0 \Rightarrow S = \alpha + \beta = \frac{a}{a} = 1 \Rightarrow \alpha = 1 - \beta$$

-V

$$r \cdot \beta' + r \cdot (1 - \beta)' - r \cdot \beta = 1V \Rightarrow r \cdot \beta (\beta - 1) = -1 \Rightarrow \alpha \beta = \frac{1}{r}$$

$$= \frac{1}{a} \Rightarrow a = -r \cdot b \quad \alpha x' - \alpha x - b = 0 \longrightarrow$$

$$-r \cdot b \alpha' + r \cdot b \alpha - b = 0 \quad |\alpha - \beta| = \frac{\sqrt{\Delta}}{|a|} =$$

$$\frac{\sqrt{\varepsilon \cdot b' - 1 \cdot b^2}}{|r \cdot b|} = \frac{\sqrt{r \cdot r \cdot b^2}}{r \cdot b} = \frac{r}{r \cdot b} = \frac{1}{b}$$

$$\begin{cases} r \alpha x' - \alpha x + b = 0 \\ S = \alpha + \beta = \frac{a}{r} \\ P = \alpha \beta = \frac{b}{r} \end{cases}$$

-Y

$$r \alpha x' + \alpha x - y = 0 \quad \begin{cases} S = \frac{-a}{r \alpha} = -\frac{1}{r} = \alpha + \beta - 1 \Rightarrow \alpha = 1 \\ \alpha + \beta = \frac{1}{r} = \frac{a}{r} \end{cases} \rightarrow$$

$$P = (\alpha - \frac{1}{r})(\beta - \frac{1}{r}) = \alpha \beta - \frac{1}{r}(\alpha + \beta)$$

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

$$\Rightarrow \frac{b}{r} - \frac{1}{r} + \frac{1}{r} = -y \Rightarrow b = -y$$

$$\begin{bmatrix} \frac{a}{r} \\ \frac{b}{r} \end{bmatrix} = \begin{bmatrix} -y \\ -x \end{bmatrix} + \begin{bmatrix} -1 \\ 1 \end{bmatrix}$$

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

$$x^r - \frac{r}{a+1}x + b = 0 \rightarrow \beta, \beta+r$$

$$S = 10 = \beta + \beta + r \Rightarrow r\beta = 1 \Rightarrow \beta = r$$

$$b = r \times r = r^2$$

$$r^2 - r = \boxed{11}$$

$$x^r + x - 1 - m^r = 0$$

$$x^r + \beta^r = S^r - rP = (-1)^r - r(-1 - m^r) =$$

$$\hookrightarrow S = \frac{-b}{a} = -1$$

$$P = \frac{c}{a} = -1 - m^r$$

$$1+r + rm^r = rm^r + r \xrightarrow{0 \leq m^r} \min = \boxed{10}$$

-9

$$S = a+1 = x + x+r = rx + r \Rightarrow -1$$

$$P = a = x(x+r) = x^r + rx$$

$$x^r + rx + 1 = rx + r \Rightarrow x^r = 1$$

$$a = 1 \times r = r \leq a = 1$$

$\Rightarrow x = \pm 1$
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$$A \begin{pmatrix} x \\ y \end{pmatrix} B \begin{pmatrix} -\frac{1}{2} \\ \frac{1}{2} \end{pmatrix} \xrightarrow{\text{نقطة التقاطع}} x_3 = \frac{-\frac{1}{2} + \frac{1}{2}}{r} = -1 \quad -10$$

$$y_5 = 1$$

$$\Rightarrow y = a(x+1)^r + 1 = ax^r + rax + a + 1 \leadsto \Delta = \sqrt{4a^2 - 4a(a+1)}$$

$$= \sqrt{-4a} = r\sqrt{-a} \Rightarrow a = \frac{-rc \pm r\sqrt{-a}}{ra} = \frac{-a \pm \sqrt{-a}}{a}$$

$$x_1 = -1 + \sqrt{\frac{-1}{a}}, \quad x_2 = -1 - \sqrt{\frac{-1}{a}}$$

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

$$x + \beta^r = s^r - r\rho = r\left(1 - \frac{1}{a}\right) = 0 \Rightarrow$$

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

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

$$\xrightarrow{x=0} y = \boxed{-\frac{1}{2}}$$