

$$y = ax^2 + bx + c \quad A(-1, 9) \quad B(3, 1)$$

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

$$\Rightarrow a - b + c = 9 \Rightarrow c - a = 9 \Rightarrow c = a + 9$$

$$\Rightarrow 9a + 2b + c = 1 \Rightarrow 9a + 4a + a = -1 \Rightarrow 14a = -1 \Rightarrow a = -\frac{1}{14} \rightarrow b = -\frac{1}{7} \rightarrow c = \frac{13}{14}$$

$$\boxed{y = -\frac{1}{14}x^2 - \frac{1}{7}x + \frac{13}{14}}$$

$$y = 2x^2 + mx + m + 4 = 0$$

$$m^2 - 4(m + 4) \geq 0$$

$$m^2 - 4m - 16 > 0 \Rightarrow (m - 12)(m + 4) > 0$$

$$m \in (-\infty, -4) \cup (12, \infty)$$

$$\frac{-m}{2} > 0 \Rightarrow m < 0$$

$$\frac{m+4}{2} > 0 \Rightarrow m+4 > 0 \Rightarrow m > -4$$

$$\Rightarrow -4 < m < -2$$

$$\Delta > 0 \Rightarrow (2m-1)^2 - 12(2-m) > 0 \Rightarrow 4m^2 - 4m + 1 - 24 + 12m > 0$$

$$4m^2 + 8m - 23 > 0$$

$$m > \frac{-2 + \sqrt{4 + 232}}{2} = \frac{-2 + \sqrt{236}}{2} = \frac{-2 + 2\sqrt{59}}{2} = -1 + \sqrt{59}$$

$$m < \frac{-2 - \sqrt{236}}{2} = \frac{-2 - 2\sqrt{59}}{2} = -1 - \sqrt{59}$$

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

$$(2m - 1)(m - 1) = 0 \Rightarrow m = \frac{1}{2} \text{ or } m = 1$$

$$x^2 - x - \varepsilon = 0 \Rightarrow S = x_1 + x_2 = 1, P = x_1 x_2 = -\varepsilon$$

$$S^2 = x_1^2 + x_2^2 + \frac{1}{x_1} + \frac{1}{x_2} = S^2 - 2SP + \frac{S}{P} = 1 - \frac{2 \cdot 1 \cdot (-\varepsilon)}{-\varepsilon} - \frac{1}{-\varepsilon} = 1 + 2 + \frac{1}{\varepsilon} = 3 + \frac{1}{\varepsilon}$$

$$P^2 = \left(x_1^2 + \frac{1}{x_1}\right) \left(x_2^2 + \frac{1}{x_2}\right) = (x_1 x_2)^2 + x_1^2 + x_2^2 + \frac{1}{x_1 x_2} = -4\varepsilon + 1 + 1 - \frac{1}{\varepsilon} = -2 - \frac{1}{\varepsilon}$$

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

$$x^2 - 2x - 1 = 0 \Rightarrow \boxed{x_1 + x_2 = 2}$$

$$\left(\frac{\sqrt{4\varepsilon + 1} + \sqrt{4\varepsilon}}{\sqrt{4\varepsilon}}\right) (\sqrt{4\varepsilon} - 1) = 2\sqrt{4\varepsilon} \Rightarrow \frac{4\varepsilon - 1}{\sqrt{4\varepsilon}} = 2\sqrt{4\varepsilon}$$

$$4\varepsilon - 1 = 16\varepsilon \Rightarrow -1 = 12\varepsilon \Rightarrow \varepsilon = -\frac{1}{12}$$

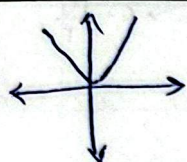
$$3x^2 - ax + \varepsilon = 0$$

$$a + 3a = \frac{\varepsilon}{\mu} \Rightarrow 3a^2 = \frac{\varepsilon}{\mu} \Rightarrow a^2 = \frac{\varepsilon}{3\mu} \Rightarrow a = \pm \sqrt{\frac{\varepsilon}{3\mu}} \Rightarrow a = \pm \frac{1}{\sqrt{3}} \Rightarrow 3a = \pm \sqrt{3} \Rightarrow S = 1 + \frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}}$$

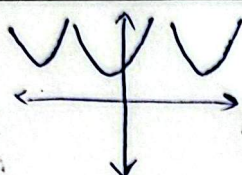
$$S_1 = \frac{a}{\mu} = \frac{1}{\mu} \Rightarrow a = 1$$

$$S_2 = -\frac{1}{\varepsilon} = a \Rightarrow a = -1$$

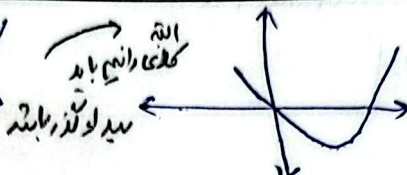
14 - مثال



$$3 + 2a = 0 \Rightarrow a = -\frac{3}{2} > 0$$



$$\Delta < 0 \Rightarrow a > 0 \Rightarrow (3 + 2a)^2 < 0$$



$$\Delta > 0 \Rightarrow a > 0 \Rightarrow S = -\frac{(3 + 2a)}{2} > 0 \Rightarrow a \in (-\frac{3}{2}, 0)$$

$$y = ax^2 + (3 + 2a)x$$

مجموع الجذور

$$y = -x^2 - 2x + b$$

$$y = x^2 + 4x - 2 \Rightarrow y = x^2 + 2x - 2$$

$$\frac{y}{x} = \frac{1 + a}{x} \Rightarrow a = 1 \Rightarrow -1 - 2 + b = 1 \Rightarrow b = 4$$

$$1 = x^2 + 2x - 2 \Rightarrow x^2 + 2x - 3 = 0 \Rightarrow (x + 3)(x - 1) = 0 \Rightarrow x = -3 \text{ or } x = 1 \Rightarrow -9 + 4 + b = 1 \Rightarrow b = 6$$

$$ab = 2 \times 4 = 8$$

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

$$\alpha + \frac{1}{\beta} > \beta + \frac{1}{\alpha}$$

$$S = \alpha + \beta + 1 = \frac{1}{\alpha} = \frac{a}{3} \Rightarrow a = 1$$

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

$$\frac{1}{\alpha} + \frac{1}{\beta} + \alpha\beta = \alpha\beta = -2 = \frac{b}{3} \Rightarrow b = -6$$

$$3ax^2 + 4ax - 4 = 0$$

$$\alpha, \beta$$

$$S = \alpha + \beta = \frac{-4}{3a} = -\frac{1}{3}$$

$$P = \alpha\beta = \frac{-4}{3a} = -2$$

$$a = 1$$

$$b = -4$$

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

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

$$x^2 + 4x + m = 0$$

$$\alpha, \beta$$

$$\alpha + \beta = -4$$

$$\alpha = -4 - \beta$$

$$x^2 + 2x - m = 0$$

$$\alpha, \gamma$$

$$\alpha + \gamma = -2$$

$$\alpha = -2 - \gamma$$

$$\Rightarrow -2 - \gamma = -4 - \beta$$

$$\Rightarrow \gamma - \beta = 4 - 2 = \boxed{2}$$