

$$\text{الف) } x^2 - 4x + 1 = 0 \xrightarrow{+1} x^2 - 4x + 4 = (x-2)^2 - 1 \Rightarrow (x-2)^2 = 1 \Rightarrow x-2 = \pm 1 \begin{cases} x=3 \\ x=1 \end{cases}$$

$$\text{ب) } x^2 + 14x + 7 = 0 \xrightarrow{+9} x^2 + 14x + 49 = (x+7)^2 - 9 = (x+7)^2 = 9 \Rightarrow x+7 = \pm 3 \begin{cases} x=-4 \\ x=-10 \end{cases}$$

$$\text{الف) } x^2 - 2x + 4 = 0 \Rightarrow (x-2)(x-3) \begin{cases} x=+3 \\ x=+2 \end{cases}$$

$$\text{ب) } x^2 - 2x - 11 = 0 \Rightarrow (x-7)(x+2) \begin{cases} x=-2 \\ x=+7 \end{cases}$$

$$\text{الف) } x^2 - 3x - 2 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Rightarrow \frac{3 \pm \sqrt{9 + 20}}{2} = \frac{3 \pm \sqrt{29}}{2}$$

$$\text{ب) } 2x^2 - 4x + \frac{1}{2} = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Rightarrow \frac{4 \pm \sqrt{16 - 2}}{4} = \frac{4 \pm \sqrt{14}}{4}$$

$$\text{الف) } x^2 - 3x + 2 = 0 \Rightarrow (x-1)(x-2) \begin{cases} x=2 \\ x=1 \end{cases}$$

$$\text{ب) } 4x^2 + x - 3 = 0$$

$$x^2 + x - 12 = 0 \Rightarrow (x+4)(x-3) \begin{cases} x = -\frac{4}{3} = -1\frac{1}{3} \\ x = \frac{3}{4} \end{cases}$$

$$\text{الف) } 4x^2 - 12x + 7 = 0$$

$$x^2 - 12x + 32 = 0 \Rightarrow (x-4)(x-8) \begin{cases} x = \frac{4}{4} = 1 \\ x = \frac{8}{4} = 2 \end{cases}$$

$$\text{ب) } 3x^2 - 10x + 7 = 0$$

$$x^2 - 10x + 21 = 0 \Rightarrow (x-3)(x-7) \begin{cases} x = \frac{7}{3} \\ x = \frac{3}{1} = 3 \end{cases}$$

$$\text{الف) } -3x^2 + 2x - 1 = 0$$

$$\Delta = b^2 - 4ac = 2^2 - 12 = -8$$

$$\Delta < 0 \Rightarrow \text{لا يوجد حقيقي}$$

$$\text{ب) } 2x^2 - x + 1 = 0$$

$$\Delta = b^2 - 4ac = 1 - 4 = -3$$

$$\Delta < 0 \Rightarrow \text{لا يوجد حقيقي}$$

$$\text{ب) } 2x^2 - x + 2 = 0$$

$$\Delta = b^2 - 4ac = 1 - 16 = -15$$

$$\Delta < 0 \Rightarrow \text{لا يوجد حقيقي}$$

$$\text{ب) } 2x^2 - 4x + 2 = 0$$

$$\Delta = b^2 - 4ac = 16 - 16 = 0$$

$$\Delta = 0 \Rightarrow \text{واحد حقيقي}$$

$$2x^2 - 3x + a = 0$$

$$\text{الف) } \Delta = b^2 - 4ac = 9 - 4a$$

$$9 - 4a > 0 \Rightarrow 4a < 9 \Rightarrow a < \frac{9}{4}$$

$$\text{ب) } 9 - 4a = 0$$

$$4a = 9 \Rightarrow a = \frac{9}{4}$$

$$2) 9 - 4a < 0$$

$$4a > 9 \Rightarrow a > \frac{9}{4}$$

$$3) 9 - 4a \geq 0$$

$$4a \leq 9 \Rightarrow a \leq \frac{9}{4}$$

$$x^2 + 4x + a$$

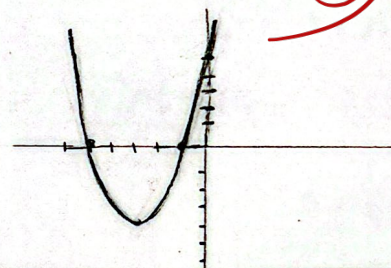
$$\text{الف) } x = \frac{-b}{2a} = \frac{-4}{2} = -2 \quad y = \frac{-\Delta}{4a} = \frac{-16 - 4a}{4} = -4 - a$$

$$\text{ب) } x^2 + 4x + a = (x+1)(x+a) \quad \begin{cases} x = -1 \\ x = -a \end{cases}$$

$$y = 0 \Rightarrow (-1, 0), (-a, 0)$$

$$x = 0 \Rightarrow (0)^2 + 4(0) + a = a \Rightarrow (0, a)$$

مخطط / حقائق $(-2, -4)$



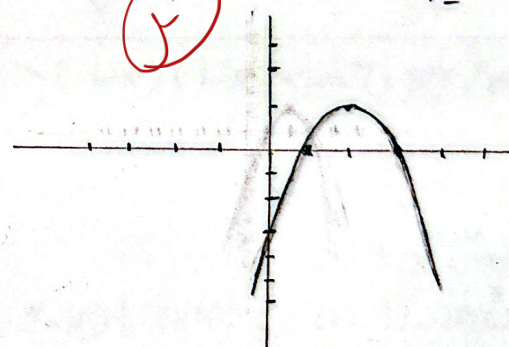
$$-x^2 + 4x - 3$$

$$\text{الف) } x = \frac{-b}{2a} = \frac{-4}{-2} = 2 \quad y = \frac{-\Delta}{4a} = \frac{-16 - 12}{-4} = 3$$

$$\text{ب) } y = 0 \Rightarrow -x^2 + 4x - 3 = -(x+1)(x+3) \quad \begin{cases} x = -1 \\ x = -3 \end{cases}$$

نقطة التقاطع هي (0, -3).

مخطط / حقائق $(2, 3)$



$$x^2 - 3x - 2 = 0 \Rightarrow S = \frac{-b}{a} = \frac{3}{1} = 3 \quad P = \frac{c}{a} = \frac{-2}{1} = -2$$

$$\text{الف) } S^2 - 2P = (3)^2 - 2(-2) = 9 + 4 = 13$$

$$\text{ب) } S^3 - 3SP = (3)^3 - 3(3)(-2) = 27 + 18 = 45$$