

1

$y = x^2 + 4x + 2$ $\text{ext} \left| \begin{array}{l} \frac{b}{2a} \rightarrow -\frac{4}{2} = -2 \\ -\frac{\Delta}{4a} \rightarrow -2 \end{array} \right.$ min

2

$y = -x^2 + 2x - 3$ $\text{max} \text{ ext} \left| \begin{array}{l} \frac{b}{2a} \\ -\frac{\Delta}{4a} \end{array} \right.$

$\Delta \geq 0 \rightarrow 9 - 4a \geq 0 \Rightarrow a \leq \frac{9}{4}$

$x = \frac{3 \pm \sqrt{9 - 4a}}{2}$

الف) $a \leq 1$
 $a \geq 0$
 $x = 1$
 $x = \frac{1}{2}$

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

ج) $a > \frac{9}{4}$

3

$x^2 - 2x - 1 = 0 \rightarrow (x-1)^2 = 2 \rightarrow x-1 = \pm\sqrt{2} \rightarrow x = 1 \pm \sqrt{2}$

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

$x^2 - x - 1 = 0 \rightarrow x^2 - x + \frac{1}{4} = 1 + \frac{1}{4}$

$x = \frac{1 \pm \sqrt{5}}{2}$ $x = \frac{1 - \sqrt{5}}{2}$

$(x - \frac{1}{2})^2 = \frac{5}{4}$ $x - \frac{1}{2} = \pm \sqrt{\frac{5}{4}}$

4

$x^2 - 2x - 1 = 0$ $\Delta = b^2 - 4ac \rightarrow 2 - (-2) = 2 + 2 = 4 \Delta = 4$

$x = \frac{-b \pm \sqrt{\Delta}}{2a} \rightarrow x = \frac{2 \pm \sqrt{4}}{2}$

5

ب) $x^2 + x - 2 = 0$ $\Delta = b^2 - 4ac \rightarrow 1 - (-4) = 5$ $x = \frac{-1 \pm \sqrt{5}}{2}$

الف) $(x-v)(x-\varepsilon)$

ب) $(x+v)(x-\varepsilon)$

الف) $x^2 - 12x + 32 = 0$ $\Delta = 144 - 128 = 16$ $x = \frac{12 \pm \sqrt{16}}{2}$ $x = \frac{12 \pm 4}{2}$ $x = 8$ $x = 4$
 $x = \frac{v}{a}, x = \frac{b}{a} = 1$

ب) $x^2 - 10x + 21 = 0$ $\Delta = 100 - 84 = 16$ $x = \frac{10 \pm \sqrt{16}}{2}$ $x = \frac{10 \pm 4}{2}$ $x = 7$ $x = 3$

الف) $2x^2 - 5x + 3 = 0$ $x^2 - 2.5x + 1.5 = 0$ $(x-3)(x-1)$ $x = \frac{3}{2}$ $x = \frac{1}{2}$
 ب) $2x^2 + 2x + 1 = 0$ $x^2 + x + 0.5 = 0$ $(x+3)(x+2)$ $x = -\frac{3}{2}$ $x = -\frac{2}{2} = -1$
 ج) $2x^2 - 5x + 1 = 0$ $\Delta = 25 - 8 = 17$ $x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{5 \pm \sqrt{17}}{4}$

د) $2x^2 + 7x + 9 = 0$ $\Delta = 49 - 72 = -23$

$S = \frac{3 - \sqrt{17}}{2} + \frac{3 + \sqrt{17}}{2} = \frac{6}{2} = 3$

الف) $S^2 - 2P = 3^2 - 2(-2) = 9 + 4 = 13$

ب) $S^3 - 3SP = 27 + 18 = 45$

~~الف~~ $\frac{9!}{2! \times 7!} + \frac{9!}{2! \times 7!} = \frac{9 \times 8}{2} + \frac{9 \times 8}{2} = 72 + 72 = 144$

ب) $\binom{9}{3} - \binom{8}{2} = \frac{9!}{3! \times 6!} - \frac{8!}{2! \times 6!} = \frac{9 \times 8 \times 7}{3 \times 2 \times 1} - \frac{8 \times 7}{2 \times 1} = 84 - 28 = 56$