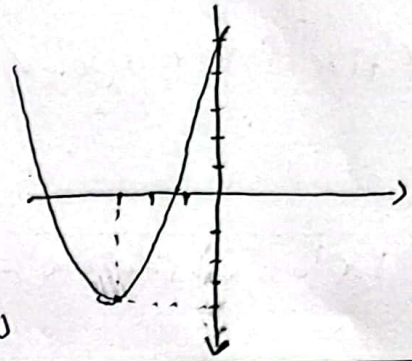


الف) $y = x^2 + 4x + 5 \rightarrow a > 0 \rightarrow \text{Min}$
 $\text{ext طول}(x) = \frac{-b}{2a} = \frac{-4}{2 \times 1} = -2$
 $\text{ext عرض}(y) = (-2)^2 + 4(-2) + 5 = 4 - 8 + 5 = -1$
 به روش جایگزینی

$\text{ext} \begin{bmatrix} -2 \\ -1 \end{bmatrix}$

ب)

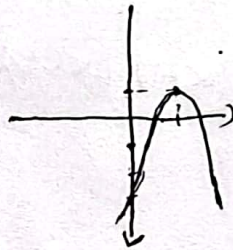


عرض از مبدأ = 5

الف) $y = -x^2 + 4x - 3 \rightarrow a < 0 \rightarrow \text{Max}$
 $\text{ext طول}(x) = \frac{-b}{2a} = \frac{-4}{2 \times (-1)} = 2$
 $\text{ext عرض}(y) = -(2)^2 + 4(2) - 3 = -4 + 8 - 3 = 1$
 به روش جایگزینی

$\text{ext} \begin{bmatrix} 2 \\ 1 \end{bmatrix}$

عرض از مبدأ = -3



ب)

و را باید با صفر برابر قرار دهیم
 به روشی روسی

$y = 0 \Rightarrow x^2 + 4x - 3 = 0$
 $x^2 + 4x + 3 = 0$
 $\Rightarrow (x+1)(x+3) = 0$
 $x = -1 = \boxed{-1}$
 $x = -3 = \boxed{-3}$

الف) $\Delta > 0 \Rightarrow b^2 - 4ac > 0 \Rightarrow (-3)^2 - 4 \times 2 \times a > 0$
 $\Rightarrow 9 - 8a > 0 \Rightarrow a < \frac{9}{8}$
 ب) $\Delta = 0 \Rightarrow b^2 - 4ac = 0 \Rightarrow (-3)^2 - 4 \times 2 \times a = 0$
 $\Rightarrow 9 - 8a = 0 \Rightarrow a = \frac{9}{8}$
 ج) $\Delta < 0 \Rightarrow b^2 - 4ac < 0 \Rightarrow (-3)^2 - 4 \times 2 \times a < 0$
 $9 - 8a < 0 \Rightarrow a > \frac{9}{8}$

د) $\Delta > 0 \Rightarrow b^2 - 4ac > 0$
 $(-3)^2 - 4 \times 2 \times a > 0$
 $9 - 8a > 0 \Rightarrow a < \frac{9}{8}$

الف) $(x^2 - 2x - 1 = 0) + 2 \Rightarrow x^2 - 2x + 1 = 2 \Rightarrow (x-1)^2 = 2 \Rightarrow x-1 = \sqrt{2} \Rightarrow x = 1 + \sqrt{2}$
 $x-1 = -\sqrt{2} \Rightarrow x = 1 - \sqrt{2}$

ب) $(x^2 - x - 1 = 0) + \frac{5}{4} \Rightarrow x^2 - x + \frac{1}{4} = \frac{5}{4} \Rightarrow (x - \frac{1}{2})^2 = \frac{5}{4}$
 $x - \frac{1}{2} = -\frac{\sqrt{5}}{2} \Rightarrow x = \frac{1 - \sqrt{5}}{2}$
 $x - \frac{1}{2} = \frac{\sqrt{5}}{2} \Rightarrow x = \frac{1 + \sqrt{5}}{2}$

الف) $x^2 - 2x - 1 = 0$
 $\Delta = b^2 - 4ac = (-2)^2 - (-4) = 8$
 $x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{2 \pm \sqrt{8}}{2} = 1 \pm \sqrt{2}$

ب) $x^2 + x - 4 = 0$
 $\Delta = 1 - (-16) = 17$
 $x = \frac{-1 \pm \sqrt{17}}{2}$

$$\text{الف)} x^2 - 11x + 18 = 0 \Rightarrow (x-4)(x-7) = 0 \Rightarrow x=4, x=7$$

$$\text{ب)} x^2 + 3x - 28 = 0 \Rightarrow (x+7)(x-4) = 0 \Rightarrow x=4, x=-7$$

$$\text{الف)} x^2 - 5x + 7 = 0 \Rightarrow x^2 - 5x + 3 = 0 \Rightarrow (x-5)(x-7) = 0 \Rightarrow x = \frac{5}{2}, \frac{7}{2}$$

$$\text{ب)} 3x^2 - 10x + 7 = 0 \Rightarrow x^2 - 10x + 21 = 0 \Rightarrow (x-3)(x-7) = 0 \Rightarrow x = \frac{3}{3}, \frac{7}{3}$$

$$\text{الف)} 2x^2 - 5x + 3 = 0 \Rightarrow x^2 - 5x + 6 = 0 \Rightarrow (x-3)(x-2) = 0 \Rightarrow x = \frac{2}{2}, \frac{3}{2}$$

$$\text{ب)} 2x^2 + 5x + 3 = 0 \Rightarrow x^2 + 5x + 4 = 0 \Rightarrow (x+4)(x+1) = 0 \Rightarrow x = -\frac{4}{2}, -\frac{1}{2}$$

$$\text{ج)} 2x^2 - 5x + 1 = 0, \Delta = 25 - 8 = 17 \Rightarrow x = \frac{5 \pm \sqrt{17}}{4}$$

$$\text{د)} \begin{cases} 4x^2 + 7x + 9 = 0 \\ \Delta = 49 - 144 < 0 \end{cases} \rightarrow \text{معادله جواب ندارد}$$

$$P = \frac{c}{a} = \frac{-2}{1} = -2 \quad S = \frac{-b}{a} = \frac{-(-3)}{1} = 3$$

$$\text{الف)} S^2 - 2P = 3^2 - 2(-2) = 17$$

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

$$\text{الف)} \binom{7}{5} + \binom{9}{2} = \frac{7 \times 6 \times 5 \times 4 \times 3}{5 \times 4 \times 3 \times 2 \times 1} + \frac{9 \times 8}{2 \times 1} = 7 \times 3 + 4 \times 9 = 21 + 36 = 57$$

$$\text{ب)} \binom{9}{3} - \binom{1}{2} = \frac{9 \times 8 \times 7}{3 \times 2 \times 1} - \frac{1 \times 1}{2 \times 1} = 3 \times 4 \times 7 - \frac{1}{2} = 84 - \frac{1}{2} = 83.5$$