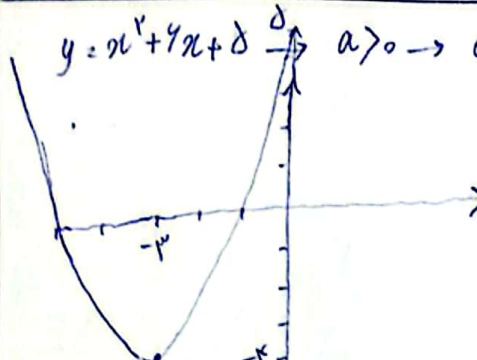
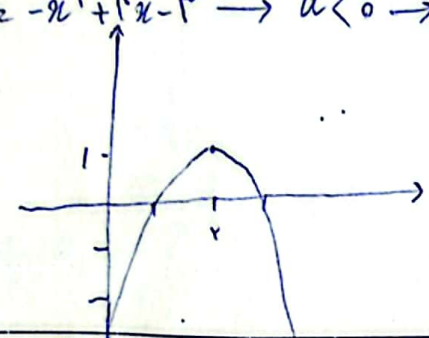


$y = x^2 + 4x + 8 \rightarrow a > 0 \rightarrow \text{ext} = \text{Min}$
 $\left| \begin{aligned} \frac{-b}{2a} &= \frac{-4}{2} = -2 \\ (-2)^2 + 4(-2) + 8 &= -4 \end{aligned} \right.$
 $\text{Min} = \left| \begin{matrix} -2 \\ -4 \end{matrix} \right|$ (الف)



(-)

$y = -x^2 + 4x - 3 \rightarrow a < 0 \rightarrow \text{ext} = \text{Max}$
 $\left| \begin{aligned} \frac{-b}{2a} &= \frac{-4}{-2} = 2 \\ -(2)^2 + 4(2) - 3 &= 1 \end{aligned} \right.$
 $\text{Max} = \left| \begin{matrix} 2 \\ 1 \end{matrix} \right|$ (الف)



$-x^2 + 4x - 3 = 0$
 $a + b + c = 0 \rightarrow x = 1$
 $x = \frac{c}{a} = 3$

(-)

$2x^2 - 3x + a = 0 \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{3 \pm \sqrt{9 - 11a}}{4}$
 $a < \frac{9}{11}$ (الف)

$9 - 11a > 0 \rightarrow 11a < 9 \rightarrow a < \frac{9}{11}$ (مکمل درجه اول دارد)

$9 - 11a = 0 \rightarrow 11a = 9 \rightarrow a = \frac{9}{11} \rightarrow \Delta = 0 \rightarrow$ (مکمل یک)

$9 - 11a < 0 \rightarrow 11a > 9 \rightarrow a > \frac{9}{11} \rightarrow$ (مکمل درجه دوم حقیقی ندارد)

$\Delta \geq 0 \rightarrow 9 - 11a \geq 0 \rightarrow 11a \leq 9 \rightarrow a \leq \frac{9}{11}$

$a = \frac{9}{11}$ (-)
 $a > \frac{9}{11}$ (ج)
 $a \leq \frac{9}{11}$ (د)

الف) $x^2 - 2x - 1 = 0$ فرمول فاولر $x^2 - 2x + 1 = 2 \rightarrow (x-1)^2 = 2 \quad x-1 = \pm\sqrt{2}$
 $x = 1 \pm \sqrt{2}$

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

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

ب-) $x^2 + x - 4 = 0 \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-1 \pm \sqrt{1 + 16}}{2} = \frac{-1 \pm \sqrt{17}}{2}$

$$\begin{aligned} \text{الف) } x^2 - 11x + 11 &= 0 & x &= 1 \\ (x-1)(x-11) &= 0 & x &= 11 \end{aligned}$$

$$\begin{aligned} \text{ب) } x^2 + 3x - 11 &= 0 & x &= -1 \\ (x+1)(x-11) &= 0 & x &= 11 \end{aligned}$$

$$\begin{aligned} \text{الف) } \delta x^2 - 12x + 1 &= 0 \rightarrow x^2 - 12x + 1 = 0 & (x-1)(x-11) &= 0 \\ \hookrightarrow x &= \frac{1}{\delta} \\ x &= \frac{\delta}{\delta} = 1 \end{aligned}$$

$$\begin{aligned} \text{ب) } 3x^2 - 10x + 1 &= 0 \rightarrow x^2 - 10x + 1 = 0 & (x-1)(x-11) &= 0 \\ \hookrightarrow x &= \frac{1}{3} \\ x &= \frac{\frac{1}{3}}{\frac{1}{3}} = 1 \end{aligned}$$

$$\text{الف) } 2x^2 - 8x + 3 = 0 \quad a+b+c=0 \begin{cases} x=1 \\ x=\frac{c}{a} = \frac{3}{2} \end{cases}$$

$$\text{ب) } 2x^2 + 8x + 3 = 0 \quad a+c=b \begin{cases} x=-1 \\ x=\frac{-c}{a} = \frac{-3}{2} \end{cases}$$

$$\text{ج) } 2x^2 - 8x + 1 = 0 \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{8 \pm \sqrt{64 - 8}}{2} = \frac{8 \pm \sqrt{56}}{2}$$

$$\text{د) } 3x^2 + 11x + 9 = 0 \quad x = \frac{-b \pm \sqrt{\Delta}}{2a} \quad \sqrt{\Delta} = \sqrt{b^2 - 4ac} = \sqrt{121 - 108} = \sqrt{13}$$

$$\text{الف) } S^2 - 2P = \left(\frac{-b}{a}\right)^2 - 2\left(\frac{c}{a}\right) = (3)^2 - 2(-2) = 9 + 4 = 13 \quad x^2 - 12x - 1 = 0$$

$$\text{ب) } S^3 - 3SP = \left(\frac{-b}{a}\right)^3 - 3\left(\frac{-b}{a}\right)\left(\frac{c}{a}\right) = (3)^3 - 3(3)(-2) = 27 + 18 = 45$$

$$\text{الف) } \binom{V}{\delta} + \binom{9}{2} \geq \binom{V}{\delta} = \binom{V}{2} \quad \frac{V \times V}{2!} + \frac{9 \times 1}{2!} = \frac{V^2}{2} + \frac{9}{2} = 11 + 36 = 47$$

$$\text{ب) } \binom{9}{3} - \binom{1}{2} = \frac{9 \times 1 \times V}{3!} - \frac{1 \times V}{2!} = \frac{80}{6} - \frac{8 \times 3}{2 \times 3} = \frac{80 - 12}{6} = \frac{68}{6} = \frac{34}{3}$$