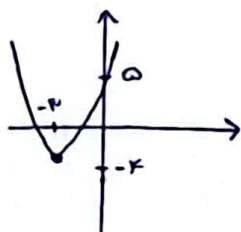


الف) چون ضریب x مثبت است نقطه مینیموم دارد

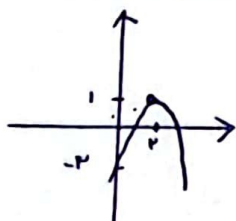
$$\min \left| \begin{array}{l} \text{طول} = -\frac{b}{2a} = -\frac{9}{2} = -4.5 \\ \text{عرض} \Rightarrow y = 9 - 18 + 5 = -4 \end{array} \right.$$



ب)

الف) چون ضریب x منفی است نقطه ماکسیموم دارد

$$\max \left| \begin{array}{l} \text{طول} = -\frac{b}{2a} = -\frac{-4}{-2} = 2 \\ \text{عرض} = -4 + 8 - 3 = 1 \end{array} \right.$$



$$\Delta = b^2 - 4ac = 16 - 12 = 4$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-4 \pm 2}{-2} \Rightarrow \boxed{3, 1}$$

ب) ریشه‌ها را می‌خواهیم از فرمول دلتا می‌رویم.

$$\Delta = b^2 - 4ac \rightarrow 9 - 4a > 0 \quad 9 > 4a \rightarrow \frac{9}{4} > a$$

$$9 - 4a = 0 \Rightarrow 9 = 4a \Rightarrow a = \frac{9}{4}$$

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

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

(برای قسمت د می‌توانیم از اجتماع قسمت الف و ب کمک بگیریم)

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

$$(x-1)^2 = 2 \Rightarrow x-1 = \pm\sqrt{2} \Rightarrow \boxed{x = \pm\sqrt{2} + 1}$$

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

$$x - \frac{1}{2} = \pm\sqrt{\frac{5}{4}} \Rightarrow \boxed{x = \frac{\pm\sqrt{5} + 1}{2}}$$

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

$$\Delta = 4 + 4 = 8$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow \frac{2 \pm \sqrt{8}}{2} = \frac{1 \pm \sqrt{2}}{1}$$

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

$$\Delta = 1 + 16 = 17$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow \frac{-1 \pm \sqrt{17}}{2}$$

$$(x-v)(x-k) \rightarrow \begin{cases} x=v \\ x=k \end{cases}$$

$$(x+v)(x-k) \rightarrow \begin{cases} x=k \\ x=-v \end{cases}$$

(الف)

(ب)

$$\omega x^2 - 12x + v = 0$$

$$x^2 - 12x + 3\omega = (x-v)(x-\omega) \rightarrow \begin{cases} x=\omega \\ x=v \end{cases}$$

$$\begin{cases} x = \frac{\omega}{\omega} = 1 \\ x = \frac{v}{\omega} \end{cases}$$

(الف)

(ب)

$$3x^2 - 10x + v = 0$$

$$x^2 - 10x + 21 = (x-3)(x-7) \rightarrow \begin{cases} x=7 \\ x=3 \end{cases}$$

$$\begin{cases} x = \frac{v}{3} \\ x=1 \end{cases}$$

(ب)

$$2 - \omega + 3 = 0 \rightarrow \begin{cases} x = \frac{c}{a} = \frac{3}{2} \\ x=1 \end{cases}$$

$$2 + 3 = \omega \rightarrow \begin{cases} x = -1 \\ x = -\frac{c}{a} = -\frac{3}{2} \end{cases}$$

$$2x^2 - \omega x + 1 = 0 \Rightarrow \Delta = b^2 - 4ac \rightarrow 3\omega - 4 = 17 \quad x = \frac{\omega \pm \sqrt{17}}{4}$$

$$4x^2 + vx + 9 \Rightarrow \Delta = b^2 - 4ac \rightarrow 49 - 144 \rightarrow \Delta \text{ منفی است معادله جواب ندارد}$$

$$\text{الف) } \frac{b^2}{a^2} - 4\frac{c}{a} = \frac{9}{1} + 4 = 13$$

$$\text{ب) } \left(-\frac{b}{a}\right)^2 - \frac{4bc}{a^2} = 4 + 18 = 22$$

$$-3(3)(1-2) = 18$$

$$S=3$$

$$P=-2$$

$$(1, \omega)$$

$$\text{الف) } \binom{v}{\omega} + \binom{q}{r} = \frac{v!}{\omega!(r!)} + \frac{q \times 1}{r!} = 21 + 14 = 35$$

$$\text{ب) } \binom{q}{r} - \binom{1}{r} = \frac{r \times 1 \times v}{r!} - \frac{1 \times v}{r!} = 14 - 21 = -7$$