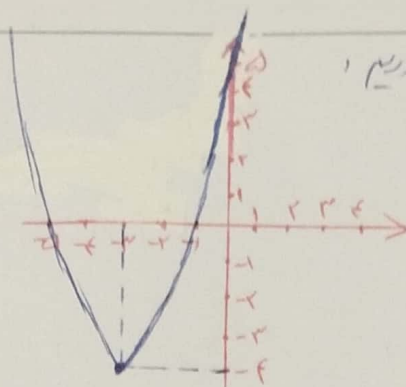


$$a > 0 \Rightarrow \text{ext} = \text{Min} = [-2]$$

$$\text{Min} \left| \begin{array}{l} -\frac{b}{2a} = \frac{-4}{2} = -2 \\ -\frac{\Delta}{4a} = \frac{16-16}{4} = -2 \end{array} \right|$$

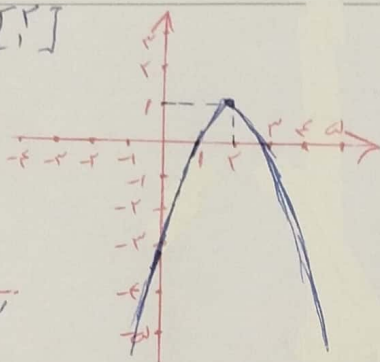


الف) برطبق فرمول داریم

ب)

$$a < 0 \Rightarrow \text{ext} = \text{Max} = [2]$$

$$\text{Max} \left| \begin{array}{l} -\frac{b}{2a} = \frac{-4}{-2} = 2 \\ -\frac{\Delta}{4a} = \frac{16-16}{-4} = 2 \end{array} \right|$$



الف)

مجموع ریشه ها $\frac{c}{a}$ و $\frac{c}{a} = \frac{1}{2}$ و $\frac{c}{a} = \frac{1}{2}$ و $\frac{c}{a} = \frac{1}{2}$

ب) در نقطه اول
حل تقاطع محور x و منفی
ریشه یکی معادل اند

$$9 - 1a > 0 \Rightarrow 9 > 1a \Rightarrow \frac{9}{1} > a$$

$$\Rightarrow a \in (-\infty, 9)$$

الف) برای داشتن دو ریشه باید که مثبت شود

$$9 - 1a = 0 \Rightarrow 9 = 1a \Rightarrow a = \frac{9}{1}$$

ب) برای داشتن یک ریشه باید که صفر شود

$$9 - 1a < 0 \Rightarrow 9 < 1a \Rightarrow \frac{9}{1} < a \Rightarrow a \in (9, \infty)$$

ج) برای داشتن ریشه مختلف باید که منفی شود

$$9 - 1a \geq 0 \Rightarrow 9 \geq 1a \Rightarrow a \leq \frac{9}{1} \Rightarrow a \in (-\infty, 9]$$

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

$$\Rightarrow x - 1 = \pm \sqrt{2} \Rightarrow x = \begin{cases} 1 - \sqrt{2} \\ 1 + \sqrt{2} \end{cases}$$

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

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

$$\Rightarrow x = \begin{cases} \frac{1+\sqrt{5}}{2} \\ \frac{1-\sqrt{5}}{2} \end{cases}$$

$$\text{الف) } x^2 - 2x - 1 = 0 \Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{2 \pm \sqrt{4 - (-4)}}{2} = \frac{2 \pm \sqrt{8}}{2} \Rightarrow x = \begin{cases} 1 + \sqrt{2} \\ 1 - \sqrt{2} \end{cases}$$

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$$\text{ب) } x^2 + x - 1 = 0 \Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-1 \pm \sqrt{1 - (-4)}}{2} = \frac{-1 \pm \sqrt{5}}{2} \Rightarrow x = \begin{cases} \frac{-1+\sqrt{5}}{2} \\ \frac{-1-\sqrt{5}}{2} \end{cases}$$

$$\text{الف)} x^2 - 11x + 21 = 0 \Rightarrow (x-5)(x-7) = 0 \Rightarrow x = \begin{cases} 5 \\ 7 \end{cases}$$

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

$$\text{الف)} \underline{dx^2 - 12x + 1} = x^2 - 12x + 36 = (x-6)(x-6) \Rightarrow x = \begin{cases} \frac{d}{2} = 6 \\ \frac{v}{2} = 6 \end{cases}$$

$$\text{ب)} 3x^2 - 10x + 1 = 0 \Rightarrow x^2 - 10x + 31 = (x-5)(x-6) \Rightarrow x = \begin{cases} \frac{5}{3} = 1\frac{2}{3} \\ \frac{6}{3} = 2 \end{cases}$$

$$\text{الف)} 2x^2 - dx + 3 = 0 \xrightarrow[\text{جمع ضرایب صفر}]{2+(-d)+3=0} x = \begin{cases} \frac{1}{2} \\ \frac{3}{2} \end{cases} \Rightarrow x = \begin{cases} \frac{1}{2} \\ \frac{3}{2} \end{cases}$$

$$\text{ب)} 2x^2 + dx + 3 = 0 \xrightarrow[a+c=b]{2+3=d} x = \begin{cases} -1 \\ -\frac{3}{2} \end{cases} \Rightarrow x = \begin{cases} -1 \\ -\frac{3}{2} \end{cases}$$

$$\text{ج)} 2x^2 - dx + 1 = 0 \Rightarrow x = \frac{d \pm \sqrt{d^2 - 4}}{4} \Rightarrow x = \begin{cases} \frac{d+\sqrt{d^2-4}}{4} \\ \frac{d-\sqrt{d^2-4}}{4} \end{cases}$$

$$\text{د)} 4x^2 + 7x + 9 = 0 \Rightarrow x = \frac{-7 \pm \sqrt{49 - 144}}{8} \Rightarrow x = \frac{-7 \pm \sqrt{-95}}{8} \rightarrow \text{معادله دارای ریشه مختلط است}$$

$$S = \frac{b}{a} \text{ و } P = \frac{c}{a} \Rightarrow S = \frac{7}{1} = 7 \text{ و } P = \frac{-1}{1} = -1 \quad \text{مجموع و حاصلضرب}$$

$$\text{الف)} S^2 - 2P = 7^2 - 2(-1) = 49 - (-2) = 49 + 2 = 51$$

$$\text{ب)} S^2 - 3SP = 7^2 - 3(7)(-1) = 49 - (-21) = 49 + 21 = 70$$

$$\text{الف)} \binom{7}{d} + \binom{9}{r} = \frac{7!}{r!d!} + \frac{9!}{v!r!} = \frac{7 \times 6}{r \times d} + \frac{9 \times 8}{r \times v} = 21 + 36 = 57$$

$$\text{ب)} \binom{9}{r} - \binom{1}{r} = \frac{9!}{r!v!} - \frac{1!}{r!} = \frac{9 \times 8 \times 7}{r \times v} - \frac{1 \times 1}{r} = 18 - 1 = 17$$