

$$1) x^2 - 4x + 8 = 0 \xrightarrow{+1} x^2 - 4x + 9 = 1 \Rightarrow (x-3)^2 = 1 \Rightarrow x-3 = \pm 1 \begin{cases} x = 4 \\ x = 2 \end{cases}$$

$$2) x^2 + 8x + 7 = 0 \xrightarrow{+9} x^2 + 8x + 17 = 9 \Rightarrow (x+4)^2 = 9 \Rightarrow x+4 = \pm 3 \begin{cases} x = -7 \\ x = -1 \end{cases}$$

$$1) x^2 - 8x + 9 = 0 \Rightarrow (x-2)(x+3) \begin{cases} x = 3 \\ x = 2 \end{cases}$$

$$2) x^2 - 8x - 15 = 0 \Rightarrow (x-7)(x+2) \begin{cases} x = 7 \\ x = -2 \end{cases}$$

$$1) x^2 - 3x - 10 = 0 \Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Rightarrow \frac{3 \pm \sqrt{9 + 40}}{2} = \begin{cases} \frac{3 + \sqrt{49}}{2} \\ \frac{3 - \sqrt{49}}{2} \end{cases}$$

$$2) 2x^2 - 8x + \frac{1}{2} = 0 \Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Rightarrow \frac{4 \pm \sqrt{16 - 2}}{2} = \begin{cases} \frac{4 + \sqrt{14}}{2} = \frac{4 + \sqrt{14}}{2} \\ \frac{4 - \sqrt{14}}{2} = \frac{4 - \sqrt{14}}{2} \end{cases}$$

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

$$2) \underline{8x^2 + x - 3} = 0 \xrightarrow{12} x^2 + x - 12 = 0 = (x+4)(x-3) \begin{cases} x = \frac{3}{8} \\ x = -\frac{4}{8} = -\frac{1}{2} \end{cases}$$

$$1) \underline{5x^2 - 12x + 7} = 0 \Rightarrow x^2 - 12x + 14 = 0 \Rightarrow (x-7)(x-2) \begin{cases} x = \frac{7}{5} \\ x = \frac{2}{5} = 1 \end{cases}$$

$$2) \underline{3x^2 - 10x + 7} = 0 \Rightarrow x^2 - 10x + 11 = 0 \Rightarrow (x-3)(x-7) \begin{cases} x = \frac{7}{3} \\ x = \frac{3}{3} = 1 \end{cases}$$

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

$$1) -x^2 + 5x - 1 = 0 \Rightarrow \Delta = 25 - 12 = 13 \quad \text{دو مثبت} \leftarrow \text{دارای ۲ ریشه حقیقی}$$

$$2) 2x^2 - x + 2 = 0 \Rightarrow \Delta = 1 - 16 = -15 \quad \text{دو منفی} \leftarrow \text{فاقد ریشه}$$

$$3) 2x^2 - 8x + 2 = 0 \Rightarrow \Delta = 16 - 16 = 0 \quad \text{دو برابر} \leftarrow \text{دارای یک ریشه مضاعف}$$

$$4) 2x^2 - x + 1 = 0 \Rightarrow \Delta = 1 - 8 = -7 \quad \text{دو منفی} \leftarrow \text{فاقد ریشه}$$

$$\text{الف } \Delta > 0 \Rightarrow b^2 - 4ac = 9 - 12a > 0 \Rightarrow a < \frac{3}{4}$$

$$\begin{matrix} 2x^2 - 3x + a = 0 \\ \downarrow \quad \downarrow \quad \downarrow \\ a & b & c \end{matrix}$$

$$\text{ب } \Delta = 0 \Rightarrow b^2 - 4ac = 9 - 12a = 0 \Rightarrow a = \frac{3}{4}$$

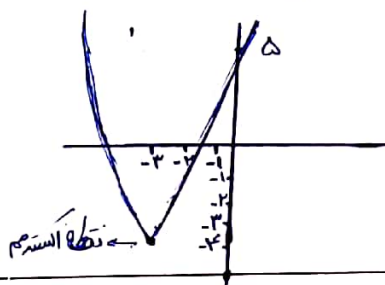
$$\text{ج } \Delta < 0 \Rightarrow b^2 - 4ac = 9 - 12a < 0 \Rightarrow a > \frac{3}{4}$$

$$\text{د } \Delta \geq 0 \Rightarrow b^2 - 4ac = 9 - 12a \geq 0 \Rightarrow a \leq \frac{3}{4}$$

$$1) \text{ د } \Delta = \frac{b^2}{4a} \Rightarrow \frac{9}{4} = -3$$

$$\text{نقطه} = \frac{-\Delta}{4a} = \frac{-(12-10)}{4} = \frac{-2}{4} = -\frac{1}{2}$$

$$a > 0 \Rightarrow \text{سیمی دارای minimum}$$

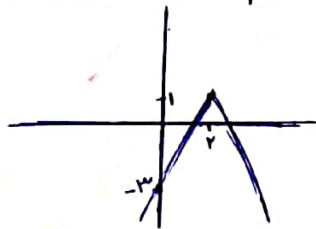


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$$y = x^2 + 4x + 5$$

$$\text{د } \Delta = \frac{b^2}{4a} \Rightarrow \frac{16}{4} = 4$$

$$\text{نقطه} = \frac{-\Delta}{4a} = \frac{-(16-12)}{4} = \frac{-4}{4} = -1$$



$$y = -x^2 + 6x - 3$$

$$1) x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Rightarrow \frac{-4 \pm \sqrt{16 - 12}}{-2} < \begin{matrix} \frac{-4 + \sqrt{4}}{-2} = -1 = x \\ \frac{-4 - \sqrt{4}}{-2} = -2 = x \end{matrix}$$

$$x^2 - 3x - 2 = 0$$

$$\text{طبق نکته} \Rightarrow S = \frac{-b}{a} = 3$$

$$P = \frac{c}{a} = \frac{-2}{1} = -2$$

$$1) S^2 - 2P \Rightarrow 9 - 2(-2) = 9 + 4 = 13$$

$$2) S^3 - 3SP \Rightarrow 27 - 3(-4) = 27 + 12 = 39$$