

محور از مبدأ : ۵

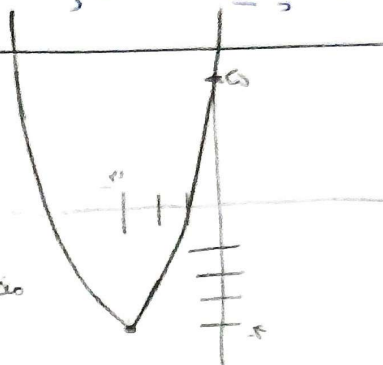
$$y = x^2 + 4x + 5$$

$$a > 0$$

$$\min \left| \frac{-b}{2a} \Rightarrow \frac{-4}{2} = -2 \right.$$

$$\left(\frac{-4}{2} \right)^2 + (4 \cdot \frac{-4}{2}) + 5 = -4$$

مقیاسات نقطه
 $\Rightarrow [-2]$



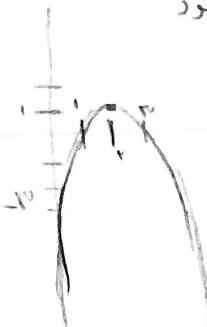
$$y = -x^2 + 4x - 3$$

$$a < 0$$

$$\left[\frac{2}{1} \right]$$

$$\max \left| \frac{-4}{-2} = 2 \right.$$

$$-2^2 + 4(2) - 3 = 1$$



برای یافتن نقاطی که قطع می شود
 ریشه های معادله را محاسبه می کنیم

$$b^2 - 4ac$$

$$16 - 4(-1)(-3) = 4$$

$$\frac{-b \pm \sqrt{4}}{2a} \Rightarrow \frac{-4 \pm 2}{-2}$$

$$\frac{-4 - 2}{-2} = 3$$

$$2x^2 - 3x + a = 0 \quad \Delta > 0 \quad b^2 - 4ac \quad \left(\frac{-3}{2} \right)^2 - 4(2)(a) = 9 - 16a > 0$$

$$\Delta = 0 \quad \left(\frac{-3}{2} \right)^2 - 4(2)(a) = 9 - 16a = 0 \quad 9 = 16a \quad a = \frac{9}{16}$$

$$\Delta < 0 \quad \left(\frac{-3}{2} \right)^2 - 4(2)(a) = 9 - 16a < 0 \quad 9 < 16a \quad \frac{9}{16} < a$$

$$\Delta \geq 0 \quad \left(\frac{-3}{2} \right)^2 - 4(2)(a) = 9 - 16a \geq 0 \quad 9 \geq 16a \quad \frac{9}{16} \geq a$$

در طرف معادله را $2x^2 - 3x + 1 = 0$ می بینیم

$$2x^2 - 3x + 1 = 0$$

$$2x^2 - 3x + 1 = 2$$

$$(x-1)^2 = 2 \quad x-1 = \pm \sqrt{2}$$

$$x = +\sqrt{2} + 1$$

$$x = -\sqrt{2} + 1$$

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

$$\left[\frac{1}{2}(1 + \sqrt{5}) \right]$$

$$x = \frac{1}{2} - \sqrt{\frac{5}{4}}$$

$$\frac{1}{2} - \frac{1}{2}\sqrt{5}$$

$$\left[\frac{1}{2}(1 - \sqrt{5}) \right]$$

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

$$2x^2 - x - 1 + \frac{5}{4} = \frac{5}{4}$$

$$\left(x - \frac{1}{4} \right)^2 = \frac{5}{4}$$

$$x - \frac{1}{4} = \pm \sqrt{\frac{5}{4}}$$

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

$$\Delta = b^2 - 4ac \quad (-2)^2 - 4(1)(-1) = 4 + 4 = 8$$

$$\frac{-b \pm \sqrt{8}}{2a} \Rightarrow \frac{2 \pm \sqrt{8}}{2} \Rightarrow \frac{2 \pm 2\sqrt{2}}{2}$$

ریشه ها

$$\frac{1 + \sqrt{2}}{1} \quad \frac{1 - \sqrt{2}}{1}$$

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

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

$$1 - 4(1)(-4) = 17 \Rightarrow \frac{-1 \pm \sqrt{17}}{2}$$

$$\frac{-1 + \sqrt{17}}{2} \quad \frac{-1 - \sqrt{17}}{2}$$

$$\text{الف) } x^2 - 11x + 18 = 0$$

$$(x-4)(x-7) = 0 \quad \begin{cases} x=4 \\ x=7 \end{cases}$$

(الف)

$$\text{ب) } x^2 + 3x - 28 = 0$$

(ب)

$$(x+7)(x-4) = 0 \quad \begin{cases} x=-7 \\ x=4 \end{cases}$$

$$\text{الف) } \omega x^2 - 12x + 7 = 0$$

$$x^2 - 12x + 7\omega \Rightarrow (x-7)(x-\omega) = 0$$

$$\rightarrow x = \frac{7}{\omega}$$

$$x = \frac{\omega}{\omega} = 1$$

$$\text{ب) } 2x^2 - 10x + 7 = 0$$

$$x = \frac{5}{2} = 1$$

$$x^2 - 10x + 21 = 0 \quad (x-3)(x-7) = 0 \rightarrow$$

$$x = \frac{7}{2}$$

$$\text{الف) } 2x^2 - 5x + 3 = 0$$

$$x^2 - 5x + 3 = 0 \quad (x-2)(x-3) = 0$$

$$\begin{cases} x = \frac{2}{2} = 1 \\ x = \frac{3}{2} \end{cases}$$

$$\text{ب) } 2x^2 + 5x + 3 = 0$$

$$x^2 + 5x + 3 = 0$$

$$(x+3)(x+2) = 0$$

$$\begin{cases} x = \frac{2}{2} = 1 \\ x = \frac{-3}{2} \end{cases}$$

$$\text{ج) } 2x^2 - 5x + 1 = 0$$

$$\Delta = 25 - 4(2)(1)$$

$$25 - 8 = 17$$

$$\frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow \frac{5 \pm \sqrt{17}}{4}$$

$$\text{د) } 4x^2 + 7x + 9 = 0$$

$$\Delta = 49 - 4(4)(9) = -95$$

$$\frac{-b \pm \sqrt{\Delta}}{2a} \Rightarrow \frac{-7 \pm \sqrt{-95}}{8}$$

چون Δ کمتر از صفر است
این معادله فاقد ریشه حقیقی است.

$$r \leftarrow \frac{-b}{a} : \text{حاصل جمع ریشه ها}$$

$$-2 \leftarrow \frac{c}{a} : \text{حاصل ضرب ریشه ها}$$

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

$$\Delta > 0 \quad \checkmark$$

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

$$9 - 4(1)(-2) = 9 + 8 = 17$$

$$\frac{-b}{a} = \frac{3}{1} = 3$$

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

$$\text{الف) } S^r - 2P = 3^r - 2(-2) = 9 + 4 = 13$$

$$\text{ب) } S^w - 2SP = (3^w) - 2(3)(-2) = 27 + 12 = 39$$

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

$$\frac{9!}{(9-2)! \times 2!} = \frac{9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1}{2 \times 1} = 36$$

$$\text{ب) } \binom{9}{2} - \binom{7}{2} = \frac{9!}{2! \times 7!} - \frac{7!}{2! \times 5!} = \frac{9 \times 8}{2} - \frac{7 \times 6}{2} = 36 - 21 = 15$$

$$\binom{7}{2} = \frac{7!}{2! \times 5!} = \frac{7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1}{2 \times 1} = 21$$