

$$x^2 - 5x + 2 = 0 \quad \text{ریشه } S = \alpha + \beta = 5 \quad \text{و} \quad \text{ریشه } P = \alpha\beta = 2$$

$$\alpha\beta = 2 \Rightarrow \alpha = \frac{2}{\beta} \Rightarrow \frac{2\alpha + \beta^2}{5\beta^2} = \frac{2 \times \frac{2}{\beta} + \beta^2}{5\beta^2} = \frac{4 + \beta^3}{5\beta^2}$$

$$\beta^2 = 5\beta - 2$$

$$\beta^2 = 23\beta - 10$$

$$\beta^2 = 2115\beta - 951$$

$$\Rightarrow \frac{19(115\beta - 50)}{115\beta - 50} = 19$$

$$\frac{4 + \beta^3}{5\beta^2} = \frac{2115\beta - 951}{115\beta - 50}$$

چون در هر دو نقطه عرض ها ۴- هستند در تابع درجه دوم محور تقارن برابر میانگین ریشه های باشد.

$$x = \frac{3 + (-1, 5)}{2} = \frac{1, 5}{2} = 0, 75$$

$$\frac{\alpha + \beta}{2}$$

$$\alpha + \beta \Rightarrow \frac{\alpha + \beta}{2} = 0, 75 \Rightarrow \alpha + \beta = 1, 5 \quad \text{جواب نایی}$$

$$x^2 + 2Kx + 5 = 0 \quad |\alpha - \beta| = \frac{\sqrt{b^2 - 4ac}}{|a|} \quad a=1, b=2K, c=5$$

$$|\alpha - \beta| = \sqrt{(2K)^2 - 4(1)(5)} = \sqrt{4K^2 - 20} = 2\sqrt{K^2 - 5}$$

$$|\alpha - \beta| = \frac{4}{5}K \Rightarrow 2\sqrt{K^2 - 5} = \frac{4}{5}K \Rightarrow \sqrt{K^2 - 5} = \frac{2}{5}K \Rightarrow K^2 - 5 = \frac{4}{25}K^2$$

$$K^2 - \frac{4}{25}K^2 = 5 \Rightarrow \frac{21}{25}K^2 = 5 \Rightarrow K^2 = \frac{125}{21}$$

$$\frac{K^2}{2} = \left[\frac{9}{2} \right]$$

$$x = \frac{3 + (-5)}{2} = -1 \Rightarrow (-1, 1)$$

$$y = a(x+1)^2 + 1$$

$$y = a(0+1)^2 + 1 = a + 1$$

$$y = -\frac{1}{5} + 1 = \frac{4}{5}$$

$$\Rightarrow \left(0, \frac{4}{5} \right) \quad \text{نقطه}$$

$$0 = a(x+1)^2 + 1 \Rightarrow a(x+1)^2 = -1 \Rightarrow (x+1)^2 = -\frac{1}{a} \quad \begin{cases} \alpha = -1 + \sqrt{-\frac{1}{a}} \\ \beta = -1 - \sqrt{-\frac{1}{a}} \end{cases}$$

$$\text{ریشه } S: \alpha + \beta = -2 \quad , \quad \alpha\beta = 1 + \frac{1}{a} = -\frac{1}{5} \Rightarrow \frac{1}{a} = -\frac{6}{5} \Rightarrow \alpha = -\frac{6}{5}$$

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

$$-x^2 + 5x + m = 0$$

$$r_1 + r_2 = 5 \quad \text{جمع ریشه ها} \quad r_1 r_2 = -m \quad \text{ضرب ریشه ها}$$

$$r_1 < -\frac{9}{5} \quad , \quad r_2 < -\frac{9}{5} \Rightarrow r_1 + r_2 < 2\left(-\frac{9}{5}\right) = -\frac{18}{5}$$

$$r_1 + r_2 = 5$$

این بازه ها متغیر است
 برای همین مقادیر برای m وجود دارد

$$m = 0$$

$$y = mx^2 - 12x + 5m - 1 \quad x = -\frac{b}{2a} \rightarrow b = -12 \quad x = -\frac{-12}{2m} = \frac{12}{2m} = \frac{6}{m}$$

$$y_{min} = a\left(\frac{-b}{2a}\right)^2 + b\left(\frac{-b}{2a}\right) + c \Rightarrow y_{min} = m\left(\frac{6}{m}\right)^2 - 12 \cdot \frac{6}{m} + (5m - 1)$$

$$\Rightarrow y_{min} = -\frac{36}{m} + 5m - 1 \Rightarrow -\frac{36}{m} + 5m - 1 = 2 \Rightarrow -36 + 5m^2 = 3m$$

$$5m^2 - 3m - 36 = 0 \rightarrow m = 3$$

$$\rightarrow m = -\frac{12}{5}$$

اگر $m = 3$ ← محور تقارن (2) ← شیب مماسی (نقطه) مقدار
اگر $m = -\frac{12}{5}$ ← محور تقارن غلط

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

$$\alpha + \beta = -2(\alpha + 1) \Rightarrow 2\alpha - 1$$

$$\frac{\alpha}{\alpha} = \frac{\beta}{\alpha} \Rightarrow \alpha^2 = \alpha\beta$$

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

$$x^2 + 2(1+1)x + (2 \times 1 - 1) = x^2 + 4x + 1 = 0 \rightarrow x = -2 + \sqrt{3} \Rightarrow \alpha$$

$$\rightarrow x = -2 - \sqrt{3} \Rightarrow \beta$$

پس مقدار α باید 1 باشد.

$$x^2 - 7x^2 - 5 = 0 \Rightarrow x^2 = t \rightarrow t^2 - 7t - 5 = 0 \quad \Delta = 49 - 4(-5) = 69$$

$$t = \frac{7 \pm \sqrt{69}}{2} \Rightarrow t_1 = \frac{7 + \sqrt{69}}{2} \quad \text{جواب} \quad t_2 = \frac{7 - \sqrt{69}}{2} \quad \text{غلط}$$

$$S = 0 \Rightarrow 3sp = 0, 2s = 0$$

$$x^2 = \frac{7 + \sqrt{69}}{2} \rightarrow x_{1,2} = \pm \sqrt{\frac{7 + \sqrt{69}}{2}} \Rightarrow p_2 = \frac{7 + \sqrt{69}}{2}$$

$$2p^2 = x \left(\frac{49 + 14\sqrt{69} + 69}{4} \right) = \frac{118 + 14\sqrt{69}}{4} = \frac{59 + 7\sqrt{69}}{2}$$

$$y = kx^2 - 4x - 9, y = -4x - 4 \quad x = -\frac{b}{2a} \rightarrow b = -4$$

$$x_{\text{ماس}} = \frac{-(-4)}{2k} = \frac{4}{2k} = \frac{2}{k}$$

$$y_{\text{ماس}} = k\left(\frac{2}{k}\right)^2 - 4\left(\frac{2}{k}\right) - 9 \Rightarrow y_{\text{ماس}} = -\frac{4}{k} - 9 \quad \left. \begin{aligned} &\frac{-4}{k} - 9 = -\frac{1}{k} - 4 \\ &\Rightarrow k = \frac{4}{5} = 2 \end{aligned} \right\}$$

$$x_{\text{ماس}} = \frac{2}{k} \Rightarrow k = 2 \Rightarrow \frac{2}{2} = 1 \quad \text{عرض ماس}$$

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

$$mx^2 - (m+1)x - (m+1) = 0 \quad \Delta = [-(m+1)]^2 - 4 \times m \times [-(m+1)] = (m+1)^2 - 4m(-m-1)$$

$$\Delta = (m+1)^2 + 4m(m+1) = (m+1)[(m+1) + 4m] = (m+1)(5m+1)$$

$$(m+1)(5m+1) < 0 \rightarrow m = -\frac{1}{5} \rightarrow m = -1 \Rightarrow -1 < m < -\frac{1}{5} \Rightarrow m \in (-1, -\frac{1}{5})$$

$$\boxed{0} = \text{شماره اعداد صحیح}$$

هیچ عدد صحیح در این بازه تکرار ندارد.