

$$x^2 - 5x + 2 = 0 \quad \alpha, \beta \rightarrow \text{ریشه ها}$$

$$\beta^2 = 5\beta - 2 \quad \beta = 5 - \frac{2}{\beta} \rightarrow \beta^3 = 5(5\beta - 2) - 2(5 - \frac{2}{\beta}) = 25\beta - 10 - 10 + \frac{4}{\beta} = 25\beta - 20 + \frac{4}{\beta}$$

$$x(5 - \beta) + (25\beta - 20 + \frac{4}{\beta}) = 25\beta - 19$$

$$\beta = \frac{5 + \sqrt{25 - 4}}{2} = \frac{5 + \sqrt{21}}{2} \quad \alpha = \frac{5 - \sqrt{21}}{2}$$

$$\frac{25\beta(21 - 5\sqrt{21}) + 95\sqrt{21}(21 - 5\sqrt{21})}{421 - 226} = \frac{304}{14} = 19 \quad \text{جواب}$$

ریشه ها یکبار است پس طول رأس ها پس یکبار ریشه ها است.

$$(3, -4) \quad (-1, 5, -1) \quad \frac{3 + (-1, 5)}{2} = 0, 1, 5$$

$$\text{مختصات} = \frac{-b}{2a} = 0, 1, 5 \quad \text{جواب} = 1, 5$$

$$|\alpha - \beta| = \frac{\sqrt{\Delta}}{|a|} \quad x^2 + 2kx + 5 = 0 \quad |\alpha - \beta| = \frac{2}{k}k$$

$$k = \sqrt{4k^2 - 20} \rightarrow 4k^2 - 20 = 16 \rightarrow 4k^2 = 36 \rightarrow k^2 = 9 \rightarrow k = 3 \quad \text{جواب}$$

$$A(3, 9) \quad B(-5, 9) \quad \text{مختصات} = \frac{1}{k} \quad \alpha, \beta \rightarrow \text{ریشه ها}$$

$$y = a(x - h)^2 + k \quad \alpha(3 - h)^2 + 1 = 9(-5 - h)^2 + 1 \rightarrow (3 - h)^2 = (-5 - h)^2 \rightarrow 9 - 2h + h^2 = 25 + 10h + h^2$$

$$14h = -14 \rightarrow h = -1 \quad y = a(x + 1)^2 + 1 \rightarrow y = ax^2 + 2ax + a + 1$$

$$5^2 - 2p = 5 \rightarrow \frac{5 - 2a}{a} = -2 \quad p = \frac{a+1}{a} \rightarrow 5 - 2(\frac{a+1}{a}) = 5 \rightarrow -2(\frac{a+1}{a}) = 1 \quad \frac{a+1}{a} = -\frac{1}{2}$$

$$-a = 2a + 2 \rightarrow 3a = -2 \rightarrow a = -\frac{2}{3} \quad \text{جواب} = (0, \frac{1}{3})$$

$$\Delta > 0 \quad -x^2 + 5x + m = 0 \quad \frac{c}{a} = \frac{-m}{1} = -m \quad \frac{-b}{a} = \frac{5}{1} = 5$$

$$10 < 5a < 20 \rightarrow 2a + 4m > 0 \rightarrow 4m > -2a \rightarrow m > -\frac{a}{2}$$

$$\alpha\beta - \frac{9}{4}(\alpha + \beta) + \frac{11}{4} > 0 \rightarrow -m - \frac{9}{4}(5) + \frac{11}{4} > 0 \rightarrow m < -\frac{9}{4}$$

$$\text{جواب} = \text{مجموع}$$

$$y = mx^2 - 12m + 5m - 1 \quad \text{مختصات} = \frac{1}{2}$$

$$20m^2 - 12m - 12 = 0 \rightarrow 5m^2 - 3m - 3 = 0 \rightarrow m^2 - 3m - 18 = 0 \rightarrow (m - 6)(m + 3) = 0 \rightarrow m = 6 \quad \text{جواب}$$

$$x^2 + 2(a+1)x + 2a - 1 = 0 \quad \alpha, \beta \rightarrow \text{ریشه ها}$$

$$\Rightarrow a^2 = \alpha\beta \quad \alpha\beta = \frac{c}{a} = \frac{2a-1}{1} = 2a-1$$

$$x^2 + 2x + 1 = 0 \quad a^2 = 2a - 1 \rightarrow a^2 - 2a + 1 = 0 \rightarrow (a - 1)^2 = 0 \rightarrow a - 1 = 0 \rightarrow a = 1 \quad \text{جواب}$$

$$\frac{x^2}{t^2} - \frac{v x^2}{t} - 5 = 0 \rightarrow t^2 - vt - 5 = 0 \rightarrow \frac{v \pm \sqrt{v^2 + 20}}{2} = \frac{v \pm \sqrt{49}}{2}$$

$$t_1 = \frac{v + \sqrt{49}}{2} \checkmark \quad t_2 = \frac{v - \sqrt{49}}{2} \times \rightarrow \text{چون } t^2 \text{ نمی تواند منفی باشد.} \quad x^2 = \frac{v + \sqrt{49}}{2} \rightarrow x = \pm \sqrt{\frac{v + \sqrt{49}}{2}}$$

$$2p^2 - 2sp + 2s^2 = 2p^2 \rightarrow p = \frac{v + \sqrt{49}}{2}$$

چون گزینه ی هم هستند پس جمع آن ها منفی شود.
چون در جمع دیگر ضرب می شوند را اعداد بزرگ از پس می رود.

$$p^2 = \frac{118 + 14\sqrt{49}}{4} \rightarrow 2p^2 = 2 \times \frac{118 + 14\sqrt{49}}{4} = \frac{118 + 14\sqrt{49}}{2} = \frac{2(59 + 7\sqrt{49})}{2} = \boxed{59 + 7\sqrt{49}} \text{ جواب}$$

$$y = kx^2 - 2x - 2 \quad y = -2x - 2 \quad x^2 - \frac{2}{k}x = \frac{1}{k}(y + 2) \rightarrow (x - \frac{1}{k})^2 = \frac{1}{k^2} \rightarrow x = \frac{1}{k}$$

$$\rightarrow \frac{-b}{2a} = \frac{2}{2k} = \frac{1}{k} \quad (x - \frac{1}{k})^2 = \frac{1}{k^2} \rightarrow \frac{1}{k} + \frac{2}{k} + \frac{4}{k^2} \rightarrow \frac{-2 - 4k}{k} = \frac{-2}{k} - 2 \rightarrow \frac{-2}{k} - 2 = \frac{-2}{k} - 2$$

$$\rightarrow \frac{-2}{2a} = \frac{-2 - 2k}{2k} = \frac{-2 - 2k}{k} \quad \frac{2}{k} = 2 \rightarrow 2k = 2 \rightarrow k = 1 \quad \frac{-2 - 4 \times 2}{2} = \frac{-10}{2} = \boxed{-5} \text{ جواب}$$

$$y = -mx^2 + mx + 1$$

$$y = -m - x$$

$$-mx^2 + mx + 1 = -m - x$$

$$mx^2 - mx - m - x - 1 = 0 \rightarrow mx^2 - (m+1)x - m - 1 = 0 \rightarrow \Delta < 0$$

$$b^2 - 4ac < 0 \rightarrow (m+1)^2 - 4(m)(-m-1) < 0 \rightarrow m^2 + 1 + 2m + 4m^2 + 4m < 0$$

$$5m^2 + 5m + 1 < 0 \rightarrow m^2 + m + \frac{1}{5} < 0 \rightarrow (m+1)(m+\frac{1}{5}) < 0 \rightarrow (5m+1)(m+1) < 0$$

$$-\frac{1}{5} < m < -1$$

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