

$$\frac{\alpha + \beta}{\alpha\beta} = \frac{1}{\alpha} + \frac{1}{\beta} = \frac{1}{\alpha\beta} \Rightarrow \alpha + \beta = 1$$

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

$$s = \alpha + \beta = \frac{-b}{a} = \frac{-(-2)}{1} = 2 \Rightarrow \alpha + \beta = 2$$

$$p = \alpha\beta = \frac{c}{a} = \frac{1}{1} = 1 \Rightarrow \alpha\beta = 1$$

$$\alpha = 1, \beta = 1$$

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$$\alpha = 1, \beta = 1$$

$$x^2 + 2kx + 5 = 0 \Rightarrow \Delta = 4k^2 - 20 \geq 0 \Rightarrow k^2 \geq 5 \Rightarrow k \geq \sqrt{5} \text{ or } k \leq -\sqrt{5}$$

$$| \alpha - \beta | = \frac{\sqrt{\Delta}}{|a|} = \frac{\sqrt{4k^2 - 20}}{1} = 2\sqrt{k^2 - 5}$$

$$\frac{\Delta}{4} = 1 \Rightarrow \Delta = 4$$

$$x^2 + 2kx + 5 = 0 \Rightarrow \Delta = 4k^2 - 20 = 4 \Rightarrow k^2 = 6 \Rightarrow k = \pm\sqrt{6}$$

$$s = \alpha + \beta = -\frac{b}{a} = -\frac{2k}{1} = -2k$$

$$p = \alpha\beta = \frac{c}{a} = \frac{5}{1} = 5$$

$$-x^2 + 2x + m = 0 \Rightarrow \Delta = 4 + 4m \geq 0 \Rightarrow m \geq -1$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-2 \pm \sqrt{4 + 4m}}{-2} = 1 \pm \sqrt{1 + m}$$

$$y = mx^2 - 12x + 5m - 1$$

$$\Delta = 144 - 4m(5m - 1) \geq 0 \Rightarrow 144 - 20m^2 + 4m \geq 0 \Rightarrow 5m^2 - 4m - 36 \leq 0$$

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

$$\alpha\beta = \alpha - 1$$

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

$$x^2 - 4x^2 - 5 = 0 \Rightarrow -3x^2 - 5 = 0 \Rightarrow x^2 = -\frac{5}{3}$$

$$x = \pm \sqrt{-\frac{5}{3}}$$

$$y = kx^2 - 4x - 5 \Rightarrow k(\frac{y}{k})^2 - 4(\frac{y}{k}) - 5 = 0 \Rightarrow ky^2 - 4y - 5k = 0$$

$$\Delta = 16 + 20k \geq 0 \Rightarrow k \geq -\frac{4}{5}$$

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

$$y = -m - x$$

$$-m \cdot x^r + m \cdot x + 1 = -m - x$$

$$-m \cdot x^r + (m+1)x + 1+m \rightarrow \Delta < 0 \rightarrow (m+1)^r - 4(-m)(1+m) \rightarrow m^r + 1 + 2m + 4m + 4m^r < 0$$

$$5m^r + 4m + 1 < 0$$

$$\Delta = 4 - 4(a)(1) = 14$$

$$x = \frac{-4 \pm \sqrt{14}}{1} \rightarrow -1$$

$$\rightarrow -\frac{1}{a}$$

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

$$\left| \frac{-4 \pm \sqrt{14}}{1} \right|$$