

Ques: If α and β are the roots of $2x^2 - 7x + 6 = 0$, then find $\frac{\alpha^{-1} + \beta^{-1}}{\alpha^2 + \beta^2}$.

Sol.ⁿ: Given quadratic equation is
 $2x^2 - 7x + 6 = 0$

comparing the above given equation with general equation, we get

$$ax^2 + bx + c = 0$$

$$a = 2, \quad b = -7, \quad c = 6$$

Applying Shridhar Acharyas formula, we get

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

$$= \frac{-(-7) \pm \sqrt{(-7)^2 - 4 \cdot 2 \cdot 6}}{2 \cdot 2}$$

$$= \frac{7 \pm \sqrt{49 - 48}}{4}$$

$$= \frac{7 \pm 1}{4}$$

$$= \frac{7+1}{4}, \quad \frac{7-1}{4}$$

$$= \frac{8}{4}, \quad \frac{6}{4}$$

$$= 2, \quad \frac{3}{2}$$

$$\therefore \alpha = 2, \quad \beta = \frac{3}{2}$$

$$\frac{(2)^{-1} + (\frac{3}{2})^{-1}}{(2)^2 + (\frac{3}{2})^2} = \frac{\frac{1}{2} + \frac{2}{3}}{4 + \frac{9}{4}} = \frac{\frac{3+4}{6}}{\frac{16+9}{4}}$$