Polynomials Ex 2.1 Q3

Answer :

Since α and β are the zeros of the quadratics polynomial

$f(x) = 6x^2 + x - 2$

$$\text{sum of zeros} = \frac{-\text{Coefficient of } x}{\text{Coefficient of } x^2}$$

$$\alpha + \beta = -\frac{1}{6}$$

$$\text{Product of the zeros} = \frac{\text{Constant term}}{\text{Coefficient of } x^2}$$

$$\alpha\beta = \frac{-2}{6}$$

$$\alpha\beta = -\frac{1}{3}$$

We have, $\dfrac{\alpha + \beta}{\beta + \alpha}$

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

$$\frac{\alpha + \beta}{\beta + \alpha} = \frac{(\alpha + \beta)^2 - 2\alpha\beta}{\alpha\beta}$$

By substituting $\alpha + \beta = \dfrac{-1}{6}$ and $\alpha\beta = -\dfrac{1}{3}$ we get ,

$$\dfrac{\alpha + \beta}{\beta + \alpha} = \dfrac{\left(-\dfrac{1}{6}\right)^2 - 2\left(-\dfrac{1}{3}\right)}{-\dfrac{1}{3}}$$

$$\dfrac{\alpha + \beta}{\beta + \alpha} = \dfrac{\dfrac{1}{36} + \dfrac{2}{3}}{\dfrac{-1}{3}}$$

$$\dfrac{\alpha + \beta}{\beta + \alpha} = \dfrac{\dfrac{1}{36} + \dfrac{24}{36}}{\dfrac{-1}{3}}$$

$$\dfrac{\alpha + \beta}{\beta + \alpha} = \dfrac{\dfrac{25}{36}}{-\dfrac{1}{3}}$$

$$\dfrac{\alpha + \beta}{\beta + \alpha} = \dfrac{25}{36_{12}} \times \dfrac{\cancel{3}}{-1}$$

$$\dfrac{\alpha + \beta}{\beta + \alpha} = \dfrac{-25}{12}$$

Hence, the value of $\dfrac{\alpha}{\beta} + \dfrac{\beta}{\alpha}$ is $\boxed{\dfrac{-25}{12}}$.

Polynomials Ex 2.1 Q4

Answer :

Since α and β are the zeros of the quadratic polynomials $f(x) = x^2 - x - 4$

$$\text{sum of the zeros} = \dfrac{-\text{Coefficient of } x}{\text{Coefficient of } x^2}$$

$$\alpha + \beta = -\left[-\dfrac{1}{1}\right]$$

$$\alpha + \beta = \dfrac{1}{1}$$

$$\alpha + \beta = 1$$

$$\text{Product if zeros} = \dfrac{\text{Constant term}}{\text{Coefficient of } x^2}$$

$$\alpha\beta = \dfrac{-4}{1}$$

$$\alpha\beta = -4$$

We have,

$$\dfrac{1}{\alpha} + \dfrac{1}{\beta} - \alpha\beta$$

$$\dfrac{\alpha + \beta}{\alpha\beta} - \alpha\beta$$

By substituting $\alpha + \beta = 1$ and $\alpha\beta = -4$ we get,

$$\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta = \frac{1}{-4} - (-4)$$

$$\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta = \frac{1}{-4} + \frac{4}{1}$$

$$\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta = \frac{1}{-4} + \frac{4 \times 4}{1 \times 4}$$

$$\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta = \frac{1}{-4} + \frac{16}{4}$$

$$\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta = \frac{-1+16}{4}$$

$$\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta = \frac{15}{4}$$

Hence, the value of $\dfrac{1}{\alpha} + \dfrac{1}{\beta} - \alpha\beta$ is $\boxed{\dfrac{15}{4}}$.

********** END *********