Polynomials Ex 2.1 Q7

Answer :

Since α and β are the zeros of the quadratic polynomial $f(x) = x^2 - 5x + 4$

Therefore $\alpha + \beta = \dfrac{-\text{Coefficient of } x}{\text{Coefficient of } x^2}$

$= \dfrac{-(5)}{1}$

$= 5$

$\alpha\beta = \dfrac{\text{Constant term}}{\text{Coefficient of } x^2}$

$= \dfrac{4}{1}$

$= 4$

We have, $\dfrac{1}{\alpha} + \dfrac{1}{\beta} - 2\alpha\beta$

$$\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta = \frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta$$

$$\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta = \frac{\alpha + \beta}{\alpha\beta} - 2\alpha\beta$$

By substituting $\alpha + \beta = 5$ and $\alpha\beta = 4$ we get ,

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

$$\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta = \frac{5}{4} - \frac{8 \times 4}{1 \times 4}$$

Taking least common factor we get ,

$$\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta = \frac{5 - 32}{4}$$

$$\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta = \frac{-27}{4}$$

Hence, the value of $\dfrac{1}{\alpha} + \dfrac{1}{\beta} - 2\alpha\beta$ is $\boxed{\dfrac{-27}{4}}$.

Polynomials Ex 2.1 Q8

Answer :

Since α and β are the zeros of the quadratic polynomial $p(y)=t^2-4t+3$

$$\alpha+\beta=\frac{-\text{Coefficient of } x}{\text{Coefficient of } x^2}$$

$$=\frac{-(-4)}{1}$$

$$=4$$

$$\alpha\beta=\frac{\text{Constant term}}{\text{Coefficient of } x^2}$$

$$=\frac{3}{1}$$

$$=3$$

We have $\alpha^4\beta^3+\alpha^3\beta^4$

$$\alpha^4\beta^3+\alpha^3\beta^4=\alpha^3\beta^3(\alpha+\beta)$$

$$\alpha^4\beta^3+\alpha^3\beta^4=(\alpha\beta)^3(\alpha+\beta)$$

$$\alpha^4\beta^3+\alpha^3\beta^4=(3)^3(4)$$

$$\alpha^4\beta^3+\alpha^3\beta^4=27\times4$$

$$\alpha^4\beta^3+\alpha^3\beta^4=108$$

Hence, the value of $\alpha^4\beta^3+\alpha^3\beta^4$ is $\boxed{108}$.

Polynomials Ex 2.1 Q9

Answer :

Since α and β are the zeros of the quadratic polynomial $p(y)=5y^2-7y+1$

$$\alpha+\beta=\frac{-\text{Coefficient of } x}{\text{Coefficient of } x^2}$$

$$=-\frac{(-7)}{5}$$

$$=\frac{7}{5}$$

$$\alpha\beta=\frac{\text{Constant term}}{\text{Coefficient of } x^2}$$

$$=\frac{1}{5}$$

We have, $\frac{1}{\alpha}+\frac{1}{\beta}=\frac{\alpha+\beta}{\alpha\beta}$

By substituting $\alpha+\beta=\frac{7}{5}$ and $\alpha\beta=\frac{1}{5}$ we get ,

$$\frac{1}{\alpha}+\frac{1}{\beta}=\frac{\frac{7}{5}}{\frac{1}{5}}$$

$$\frac{1}{\alpha}+\frac{1}{\beta}=\frac{7}{\cancel{5}}\times\frac{\cancel{5}}{1}$$

$$\frac{1}{\alpha}+\frac{1}{\beta}=7$$

Hence, the value of $\frac{1}{\alpha}+\frac{1}{\beta}$ is $\boxed{7}$.

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