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 ,

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

$$\frac{1}{\alpha}+\frac{1}{\beta}-2\alpha\beta=\frac{5}{4}-\frac{8\times4}{1\times4}$$

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

$$\alpha^4\beta^3+\alpha^3\beta^4=\alpha^3\beta^3(\alpha+\beta)$$
$$\alpha^4\beta^3+\alpha^3\beta^4=(\alpha\beta)^3(\alpha+\beta)$$
$$\alpha^4\beta^3+\alpha^3\beta^4=(3)^3(4)$$
$$\alpha^4\beta^3+\alpha^3\beta^4=27\times 4$$
$$\alpha^4\beta^3+\alpha^3\beta^4=108$$

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 **********