Polynomials Ex 2.1 Q12

Answer :

Given α and β are the zeros of the quadratic polynomial $f(x)=x^2+px+45$

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

$$=\frac{-p}{1}$$

$$=-p$$

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

$$=\frac{45}{1}$$

$$=45$$

We have,

$$(\alpha-\beta)^2=\alpha^2+\beta^2-2\alpha\beta$$

$$144=(\alpha+\beta)^2-2\alpha\beta-2\alpha\beta$$

$$144=(\alpha+\beta)^2-4\alpha\beta$$

Substituting $\alpha+\beta=-p$ and $\alpha\beta=45$ then we get,

$$144=(-p)^2-4\times4$$

$$144=p^2-4\times45$$

$$144=p^2-180$$

$$144+180=p^2$$

$$324=p^2$$

$$\sqrt{18\times18}=p\times p$$

$$\pm18=p$$

Hence, the value of p is $\boxed{\pm18}$.

Polynomials Ex 2.1 Q13

Answer :

Let α, β be the zeros of the polynomial $f(t) = kt^2 + 2t + 3k$ .Then,

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

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

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

$$\alpha\beta = \frac{3k}{k}$$

$$\alpha\beta = \frac{3\cancel{k}}{\cancel{k}}$$

$$\alpha\beta = 3$$

It is given that the sum of the zero of the quadratic polynomial is equal to their product then, we have

$$\alpha + \beta = \alpha\beta$$

$$\frac{-2}{k} = 3$$

$$-2 = 3 \times k$$

$$\frac{-2}{3} = k$$

Hence, the value of k is $\boxed{\frac{-2}{3}}$

Polynomials Ex 2.1 Q14

Answer :

Since α and $-\alpha$ are the zeros of the quadratic polynomial $f(x) = 4x^2 - 8kx - 9$

$$\alpha - \alpha = 0$$

$$\frac{-\text{Coefficient of } x}{\text{Coefficient of } x^2} = 0$$

$$\frac{-8k}{4} = 0$$

$$-8k = 0 \times 4$$

$$-8k = 0$$

$$k = \frac{0}{-8}$$

$$k = 0$$

Hence, the Value of k is $\boxed{0}$.

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