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,

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

$$144 = p^2 - 4 \times 45$$

$$144 = p^2 - 180$$

$$144 + 180 = p^2$$

$$324 = p^2$$

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

$$\pm 18 = p$$

Hence, the value of p is $\boxed{\pm 18}$.

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 **********