Polynomials Ex 2.1 Q17

Answer :

Given

$\alpha+\beta=24$ ......(i)

$\alpha-\beta=8$ ......(ii)

By subtracting equation (ii) from (i) we get

$$\alpha+\cancel{\beta}=24$$
$$\alpha-\cancel{\beta}=8$$
$$2\alpha=32$$
$$\alpha=\frac{32}{2}$$
$$\alpha=16$$

Substituting $\alpha=16$ in equation (i) we get,

$$\alpha+\beta=24$$
$$16+\beta=24$$
$$\beta=24-16$$
$$\beta=8$$

Let S and P denote respectively the sum and product of zeros of the required polynomial. then,

$$S=\alpha+\beta$$
$$=16+8$$
$$=24$$
$$P=\alpha\beta$$
$$=16\times 8$$
$$=128$$

Hence, the required polynomial if $f(x)$ is given by

$$f(x)=k(x^2-Sx+P)$$
$$f(x)=k(x^2-24x+128)$$

Hence, required equation is $\boxed{f(x)=k(x^2-24x+128)}$ where *k* is any non-zeros real number.

Polynomials Ex 2.1 Q18

Answer :

Since α and β are the zeros of the quadratic polynomial $f(x)=x^2-p(x+1)-c$

Then

$$x^2-p(x+1)-c$$
$$x^2-px-p-c$$
$$\alpha+\beta=\frac{-\text{Coefficient of } x}{\text{Coefficient of } x^2}$$
$$=\frac{-(-p)}{1}$$
$$=p$$
$$\alpha\beta=\frac{\text{Constant term}}{\text{Coefficient of } x^2}$$
$$=\frac{-p-c}{1}$$
$$=-p-c$$

We have to prove that $(\alpha+1)(\beta+1)=1-c$

$$(\alpha+1)(\beta+1)=1-c$$
$$(\alpha+1)\beta+(\alpha+1)(1)=1-c$$
$$\alpha\beta+\beta+\alpha+1=1-c$$
$$\alpha\beta+(\alpha+\beta)+1=1-c$$

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

$$-p-c+p+1=1-c$$

$$-\cancel{p}-c+\cancel{p}+1=1-c$$

$$1-c=1-c$$

Hence, it is shown that $\boxed{(\alpha+1)(\beta+1)=1-c}$.

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