Quadratic Equations Ex 8.6 Q10

Answer :

The quadric equation is $(p-q)x^2+5(p+q)x-2(p-q)=0$

Here,

$a=(p-q), b=5(p+q) \text{and}, c=-2(p-q)$

As we know that $D=b^2-4ac$

Putting the value of $a=(p-q), b=5(p+q) \text{and}, c=-2(p-q)$

D=5p+q2-4p-q-2p-q =25p2+2pq+q2+8p2-2pq+q2 =25p2+50pq+25q2+8p2-16pq+8q2 =33p2+34pq+33q2

Since, P and q are real and $p \neq q$, therefore, the value of $D \geq 0$.

Thus, the roots of the given equation are real and unequal.

Hence, proved

Quadratic Equations Ex 8.6 Q11

Answer :

The given quadric equation is $(c^2-ab)x^2-2(a^2-bc)x+(b^2-ac)=0$, and roots are equal.

Then prove that either $a=0$ or $a^3+b^3+c^3=3abc$

Here,

$a=(c^2-ab), b=-2(a^2-bc) \text{and}, c=(b^2-ac)$

As we know that $D=b^2-4ac$

Putting the value of $a=(c^2-ab), b=-2(a^2-bc) \text{and}, c=(b^2-ac)$

$$D=b^2-4ac$$
$$=\{-2(a^2-bc)\}^2-4\times(c^2-ab)\times(b^2-ac)$$
$$=4(a^4-2a^2bc+b^2c^2)-4(b^2c^2-ac^3-ab^3+a^2bc)$$
$$=4a^4-8a^2bc\cancel{+4b^2c^2}-\cancel{4b^2c^2}+4ac^3+4ab^3-4a^2bc$$
$$=4a^4-12a^2bc+4ac^3+4ab^3$$
$$=4a(a^3+b^3+c^3-3abc)$$

The given equation will have real roots, if $D=0$

$$4a(a^3+b^3+c^3-3abc)=0$$
$$a(a^3+b^3+c^3-3abc)=0$$

So, either

$$a=0$$

or

$$(a^3+b^3+c^3-3abc)=0$$
$$a^3+b^3+c^3=3abc$$

Hence $\boxed{a=0 \text{ or } a^3+b^3+c^3=3abc}$

Quadratic Equations Ex 8.6 Q12

Answer :

The quadric equation is $2\left(a^2+b^2\right)x^2+2\left(a+b\right)x+1=0$

Here,

$a=2\left(a^2+b^2\right), b=2\left(a+b\right) \text{and}, c=1$

As we know that $D=b^2-4ac$

Putting the value of $a=2\left(a^2+b^2\right), b=2\left(a+b\right) \text{and}, c=1$

$$D=\left\{2\left(a+b\right)\right\}^2-4\times 2\left(a^2+b^2\right)\times 1$$
$$=4\left(a^2+2ab+b^2\right)-8\left(a^2+b^2\right)$$
$$=4a^2+8ab+4b^2-8a^2-8b^2$$
$$=8ab-4a^2-4b^2$$
$$D=-4\left(a^2-2ab+b^2\right)$$
$$=-4\left(a-b\right)^2$$

We have,

$a\neq b$

$a-b\neq 0$

Thus, the value of $D<0$

Therefore, the roots of the given equation are not real

Hence, proved

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