Factorisation of Algebraic Expressions Ex 5.3 Q4

Answer :

The given expression to be factorized is $8x^3+27y^3+36x^2y+54xy^2$

This can be written in the form

$8x^3+27y^3+36x^2y+54xy^2=(2x)^3+(3y)^3+36x^2y+54xy^2$

Take common $18xy$ from the last two terms. Then we get

$=(2x)^3+(3y)^3+18xy(2x+3y)$

This can be written in the following form

$8x^3+27y^3+36x^2y+54xy^2=(2x)^3+(3y)^3+3.2x.3y(2x+3y)$

Recall the formula for the cube of the sum of two numbers

$(a+b)^3=a^3+b^3+3ab(a+b)$

Using the above formula, we have

$8x^3+27y^3+36x^2y+54xy^2=(2x+3y)^3$

We cannot further factorize the expression.

So, the required factorization is of $8x^3+27y^3+36x^2y+54xy^2$ is $\boxed{(2x+3y)^3}$.

Factorisation of Algebraic Expressions Ex 5.3 Q5

Answer :

The given expression to be factorized is $a^3-3a^2b+3ab^2-b^3+8$

This can be written in the form

$$\begin{aligned} a^3-3a^2b+3ab^2-b^3+8 &= a^3-b^3-3a^2b+3ab^2+8 \\ &= (a)^3-(b)^3-3a^2b+3ab^2+8 \end{aligned}$$

Take common $-3ab$ from the third and fourth terms. Then we get

$=(a)^3-(b)^3-3ab(a-b)+8$

This can be written in the following form

$a^3-3a^2b+3ab^2-b^3+8=\{(a)^3-(b)^3-3ab(a-b)\}+8$

Recall the formula for the cube of the difference of two numbers

$(a-b)^3=a^3-b^3-3ab(a-b)$

Using the above formula, we have

$a^3-3a^2b+3ab^2-b^3+8=(a-b)^3+8$

This can be written in the following form

$a^3-3a^2b+3ab^2-b^3+8=(a-b)^3+(2)^3$

Recall the formula for the sum of two cubes

$a^3+b^3=(a+b)(a^2-ab+b^2)$

Using the above formula, we have

$$\begin{aligned} a^3-3a^2b+3ab^2-b^3+8 &= \{(a-b)+2\}\{(a-b)^2-(a-b).2+(2)^2\} \\ &= (a-b+2)\{(a^2-2ab+b^2)-(2a-2b)+4\} \\ &= (a-b+2)(a^2-2ab+b^2-2a+2b+4) \end{aligned}$$

We cannot further factorize the expression.

So, the required factorization is of $a^3-3a^2b+3ab^2-b^3+8$ is

$\boxed{(a-b+2)(a^2-2ab+b^2-2a+2b+4)}$.

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