



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

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

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

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

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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