



### Factorisation of Algebraic Expressions Ex 5.3 Q1

**Answer :**

The given expression to be factorized is  $64a^3 + 125b^3 + 240a^2b + 300ab^2$

This can be written in the form  $64a^3 + 125b^3 + 240a^2b + 300ab^2 = (4a)^3 + (5b)^3 + 240a^2b + 300ab^2$

Take common  $60ab$  from the last two terms,

$$64a^3 + 125b^3 + 240a^2b + 300ab^2 = (4a)^3 + (5b)^3 + 60ab(4a + 5b)$$

This can be written in the following form

$$64a^3 + 125b^3 + 240a^2b + 300ab^2 = (4a)^3 + (5b)^3 + 3 \cdot 4a \cdot 5b(4a + 5b)$$

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

$$64a^3 + 125b^3 + 240a^2b + 300ab^2 = (4a + 5b)^3$$

We cannot further factorize the expression.

So, the required factorization of  $64a^3 + 125b^3 + 240a^2b + 300ab^2$  is  $(4a + 5b)^3$ .

### Factorisation of Algebraic Expressions Ex 5.3 Q2

**Answer :**

The given expression to be factorized is  $125x^3 - 27y^3 - 225x^2y + 135xy^2$

This can be written in the form  $125x^3 - 27y^3 - 225x^2y + 135xy^2 = (5x)^3 - (3y)^3 - 225x^2y + 135xy^2$

Take common  $-45xy$  from the last two terms. Then we get  $125x^3 - 27y^3 - 225x^2y + 135xy^2$

$$= (5x)^3 - (3y)^3 - 45xy(5x - 3y)$$

This can be written in the following form  $125x^3 - 27y^3 - 225x^2y + 135xy^2$

$$= (5x)^3 - (3y)^3 - 3 \cdot 5x \cdot 3y(5x - 3y)$$

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

$$125x^3 - 27y^3 - 225x^2y + 135xy^2 = (5x - 3y)^3$$

We cannot further factorize the expression.

So, the required factorization is of  $125x^3 - 27y^3 - 225x^2y + 135xy^2$  is  $(5x - 3y)^3$ .

### Factorisation of Algebraic Expressions Ex 5.3 Q3

**Answer :**

The given expression to be factorized is

$$\frac{8}{27}x^3 + 1 + \frac{4}{3}x^2 + 2x$$

This can be written in the form

$$\frac{8}{27}x^3 + 1 + \frac{4}{3}x^2 + 2x = \left(\frac{2}{3}x\right)^3 + (1)^3 + \frac{4}{3}x^2 + 2x$$

Take common  $2x$  from the last two terms,. Then we get

$$\frac{8}{27}x^3 + 1 + \frac{4}{3}x^2 + 2x = \left(\frac{2}{3}x\right)^3 + (1)^3 + 2x\left(\frac{2}{3}x + 1\right)$$

This can be written in the following form

$$\frac{8}{27}x^3 + 1 + \frac{4}{3}x^2 + 2x = \left(\frac{2}{3}x\right)^3 + (1)^3 + 3 \cdot \frac{2}{3}x \cdot 1 \left(\frac{2}{3}x + 1\right)$$

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

$$\frac{8}{27}x^3 + 1 + \frac{4}{3}x^2 + 2x = \left(\frac{2}{3}x + 1\right)^3$$

We cannot further factorize the expression.

So, the required factorization is of  $\frac{8}{27}x^3 + 1 + \frac{4}{3}x^2 + 2x$  is  $\boxed{\left(\frac{2}{3}x + 1\right)^3}$ .

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