Factorisation of Algebraic Expressions Ex 5.2 Q19

Answer :

The given expression to be factorized is

$x^3+6x^2+12x+16$

This can be written as

$x^3+6x^2+12x+16=x^3+4x^2+2x^2+8x+4x+16$

Take common x^2 from first two terms, $2x$ from the next two terms and 4 from the last two terms. Then we have,

$x^3+6x^2+12x+16=x^2(x+4)+2x(x+4)+4(x+4)$

Finally, take common $(x+4)$. Then we get,

$x^3+6x^2+12x+16=(x+4)(x^2+2x+4)$

We cannot further factorize the expression.

So, the required factorization of $x^3+6x^2+12x+16$ is $\boxed{(x+4)(x^2+2x+4)}$.

Factorisation of Algebraic Expressions Ex 5.2 Q20

Answer :

The given expression to be factorized is

a^3+b^3+a+b

This can be written as

$a^3+b^3+a+b=\{(a)^3+(b)^3\}+(a+b)$

Recall the formula for sum of two cubes

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

Using the above formula, we have

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

Take common $(a+b)$. Then we have

$$\begin{aligned}a^3+b^3+a+b&=(a+b)\{(a^2-ab+b^2)+1\}\\&=(a+b)(a^2-ab+b^2+1)\end{aligned}$$

We cannot further factorize the expression.

So, the required factorization of a^3+b^3+a+b is $\boxed{(a+b)(a^2-ab+b^2+1)}$.

Factorisation of Algebraic Expressions Ex 5.2 Q21

Answer :

The given expression to be factorized is

$$a^3 - \frac{1}{a^3} - 2a + \frac{2}{a}$$

This can be written as

$$a^3 - \frac{1}{a^3} - 2a + \frac{2}{a} = \{(a)^3 - (\frac{1}{a})^3\} - 2a + \frac{2}{a}$$

Recall the formula for sum of two cubes

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

Using the above formula and taking common -2 from the last two terms, we get

$$\begin{aligned} a^3 - \frac{1}{a^3} - 2a + \frac{2}{a} &= [(a - \frac{1}{a})\{(a)^2 + a.\frac{1}{a} + (\frac{1}{a})^2\}] - 2(a - \frac{1}{a}) \\ &= (a - \frac{1}{a})(a^2 + 1 + \frac{1}{a^2}) - 2(a + \frac{1}{a}) \end{aligned}$$

Take common $(a - \frac{1}{a})$. Then we have,

$$\begin{aligned} a^3 - \frac{1}{a^3} - 2a + \frac{2}{a} &= (a - \frac{1}{a})\{(a^2 + 1 + \frac{1}{a^2}) - 2\} \\ &= (a - \frac{1}{a})(a^2 + 1 + \frac{1}{a^2} - 2) \\ &= (a - \frac{1}{a})(a^2 + \frac{1}{a^2} - 1) \end{aligned}$$

We cannot further factorize the expression.

So, the required factorization of $a^3 - \frac{1}{a^3} - 2a + \frac{2}{a}$ is $\boxed{(a - \frac{1}{a})(a^2 + \frac{1}{a^2} - 1)}$.

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