Factorisation of Algebraic Expressions Ex 5.4 Q1

Answer :

The given expression to be factorized is

$a^3+8b^3+64c^3-24abc$

This can be written in the form

$a^3+8b^3+64c^3-24abc=(a)^3+(2b)^3+(4c)^3-3.a.2b.4c$

Recall the formula $a^3+b^3+c^3-3abc=(a+b+c)(a^2+b^2+c^2-ab-bc-ca)$

Using the above formula, we have

$$a^3+8b^3+64c^3-24abc=(a+2b+4c)\{(a)^2+(2b)^2+(4c)^2-a.2b-2b.4c-4c.a\}$$
$$=(a+2b+4c)(a^2+4b^2+16c^2-2ab-8bc-4ca)$$

We cannot further factorize the expression.

So, the required factorization of $a^3+8b^3+64c^3-24abc$ is

$\boxed{(a+2b+4c)(a^2+4b^2+16c^2-2ab-8bc-4ca)}$.

Factorisation of Algebraic Expressions Ex 5.4 Q2

Answer :

The given expression to be factorized is

$x^3-8y^3+27z^3+18xyz$

This can be written in the form

$x^3-8y^3+27z^3+18xyz=(x)^3+(-2y)^3+(3z)^3-3.x.(-2y).3z$

Recall the formula $a^3+b^3+c^3-3abc=(a+b+c)(a^2+b^2+c^2-ab-bc-ca)$

Using the above formula, we have

$$x^3-8y^3+27z^3+18xyz$$
$$=\{x+(-2y)+3z\}\{(x)^2+(-2y)^2+(3z)^2-(x).(-2y)-(-2y).(3z)-(3z).(x)\}$$
$$=(x-2y+3z)(x^2+4y^2+9z^2+2xy+6yz-3zx)$$

We cannot further factorize the expression.

So, the required factorization is of $x^3-8y^3+27z^3+18xyz$ is

$\boxed{(x-2y+3z)(x^2+4y^2+9z^2+2xy+6yz-3zx)}$.

Factorisation of Algebraic Expressions Ex 5.4 Q3

Answer :

The given expression to be factorized is

$27x^3-y^3-z^3-9xyz$

This can be written in the form

$27x^3-y^3-z^3-9xyz=(3x)^3+(-y)^3+(-z)^3-3.(3x).(-y).(-z)$

Recall the formula

$a^3+b^3+c^3-3abc=(a+b+c)(a^2+b^2+c^2-ab-bc-ca)$

Using the above formula, we have

$$27x^3-y^3-z^3-9xyz$$
$$=\{3x+(-y)+(-z)\}\{(3x)^2+(-y)^2+(-z)^2-(3x).(-y)-(-y).(-z)-(-z).(3x)\}$$
$$=(3x-y-z)(9x^2+y^2+z^2+3xy-yz+3zx)$$

We cannot further factorize the expression.

So, the required factorization is of $27x^3-y^3-z^3-9xyz$ is

$\boxed{(3x-y-z)(9x^2+y^2+z^2+3xy-yz+3zx)}$.

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