Factorisation of Algebraic Expressions Ex 5.4 Q12

Answer :

The given expression to be factorized is

$3\sqrt{3}a^3 - b^3 - 5\sqrt{5}c^3 - 3\sqrt{15}abc$

This can be written in the form

$3\sqrt{3}a^3 - b^3 - 5\sqrt{5}c^3 - 3\sqrt{15}abc = (\sqrt{3}a)^3 + (-b)^3 + (-\sqrt{5}c)^3 - 3.(\sqrt{3}a).(-b)(-\sqrt{5}c)$

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

$3\sqrt{3}a^3 - b^3 - 5\sqrt{5}c^3 - 3\sqrt{15}abc$

$= \{(\sqrt{3}a) + (-b) + (-\sqrt{5}c)\}\{(\sqrt{3}a)^2 + (-b)^2 + (-\sqrt{5}c)^2 - (\sqrt{3}a).(-b) - (-b).(-\sqrt{5}c) - (-\sqrt{5}c).(\sqrt{3}a)\}$

$= (\sqrt{3}a - b - \sqrt{5}c)(3a^2 + b^2 + 5c^2 + \sqrt{3}ab - \sqrt{5}bc + \sqrt{15}ca)$

We cannot further factorize the expression.

So, the required factorization is of $3\sqrt{3}a^3 - b^3 - 5\sqrt{5}c^3 - 3\sqrt{15}abc$ is

$\boxed{(\sqrt{3}a - b - \sqrt{5}c)(3a^2 + b^2 + 5c^2 + \sqrt{3}ab - \sqrt{5}bc + \sqrt{15}ca)}$.

Factorisation of Algebraic Expressions Ex 5.4 Q13

Answer :

The given expression to be factorized is

$8x^3 - 125y^3 + 180xy + 216$

This can be written in the form

$8x^3 - 125y^3 + 180xy + 216 = 8x^3 - 125y^3 + 216 + 180xy$

$= (2x)^3 + (-5y)^3 + (6)^3 - 3.(2x).(-5y).(6)$

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

$8x^3 - 125y^3 + 180xy + 216$

$= \{2x + (-5y) + 6\}\{(2x)^2 + (-5y)^2 + (6)^2 - (2x).(-5y) - (-5y).(6) - (6).(2x)\}$

$= (2x - 5y + 6)(4x^2 + 25y^2 + 36 + 10xy + 30y - 12x)$

We cannot further factorize the expression.

So, the required factorization is of $8x^3 - 125y^3 + 180xy + 216$ is

$\boxed{(2x - 5y + 6)(4x^2 + 25y^2 + 36 + 10xy + 30y - 12x)}$.

Factorisation of Algebraic Expressions Ex 5.4 Q14

Answer :

The given expression to be factorized is

$2\sqrt{2}a^3 + 16\sqrt{2}b^3 + c^3 - 12abc$

This can be written in the form

$2\sqrt{2}a^3 + 16\sqrt{2}b^3 + c^3 - 12abc = (\sqrt{2}a)^3 + (2\sqrt{2}b)^3 + (c)^3 - 3.(\sqrt{2}a).(2\sqrt{2}b).(c)$

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

$2\sqrt{2}a^3 + 16\sqrt{2}b^3 + c^3 - 12abc$

$= (\sqrt{2}a + 2\sqrt{2}b + c)\{(\sqrt{2}a)^2 + (2\sqrt{2}b)^2 + (c)^2 - (\sqrt{2}a).(2\sqrt{2}b) - (2\sqrt{2}b).(c) - (c).(\sqrt{2}a)\}$

$= (\sqrt{2}a + 2\sqrt{2}b + c)(2a^2 + 8b^2 + c^2 - 4ab - 2\sqrt{2}bc - \sqrt{2}ca)$

We cannot further factorize the expression.

So, the required factorization is of $2\sqrt{2}a^3 + 16\sqrt{2}b^3 + c^3 - 12abc$ is

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

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

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