Factorisation of Algebraic Expressions Ex 5.2 Q10

Answer :

The given expression to be factorized is

$$(a-2b)^3 - 512b^3$$

This can be written in the form

$$(a-2b)^3 - 512b^3 = (a-2b)^3 - (8b)^3$$

Recall the formula for difference of two cubes

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

Using the above formula, we have

$$
\begin{aligned}
(a-2b)^3 - 512b^3 &= \{(a-2b)-8b\}\{(a-2b)^2 + (a-2b).8b + (8b)^2\} \\
&= (a-2b-8b)[\{(a)^2 - 2.a.2b + (2b)^2\} + (8ab - 16b^2) + 64b^2] \\
&= (a-10b)\{(a^2 - 4ab + 4b^2) + (8ab - 16b^2) + 64b^2\} \\
&= (a-10b)(a^2 - 4ab + 4b^2 + 8ab - 16b^2 + 64b^2) \\
&= (a-10b)(a^2 + 4ab + 52b^2) \\
&= (a-10b)(a^2 + 4ab + 52b^2)
\end{aligned}
$$

We cannot further factorize the expression.

So, the required factorization of $(a-2b)^3 - 512b^3$ is $\boxed{(a-10b)(a^2 + 4ab + 52b^2)}$.

Factorisation of Algebraic Expressions Ex 5.2 Q11

Answer :

The given expression to be factorized is

$$(a+b)^3 - 8(a-b)^3$$

This can be written in the form

$$(a+b)^3 - 8(a-b)^3 = (a+b)^3 - \{2(a-b)\}^3$$

Recall the formula for difference of two cubes

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

Using the above formula, we have

$$
\begin{aligned}
(a+b)^3 - 8(a-b)^3 &= \{(a+b)-2(a-b)\}[(a+b)^2 + (a+b).2(a-b) + \{2(a-b)\}^2] \\
&= \{(a+b)-(2a-2b)\}[\{(a)^2 + 2.a.b + (b)^2\} + 2(a^2 - b^2) + 4\{(a)^2 - 2.a.b + (b)^2\}] \\
&= (a+b-2a+2b)(a^2 + 2ab + b^2 + 2a^2 - 2b^2 + 4a^2 - 8ab + 4b^2) \\
&= (-a+3b)(7a^2 - 6ab + 3b^2)
\end{aligned}
$$

We cannot further factorize the expression.

So, the required factorization of $(a+b)^3 - 8(a-b)^3$ is $\boxed{(-a+3b)(7a^2 - 6ab + 3b^2)}$.

Factorisation of Algebraic Expressions Ex 5.2 Q12

Answer :

The given expression to be factorized is

$$(x+2)^3 + (x-2)^3$$

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

$$
\begin{aligned}
(x+2)^3 + (x-2)^3 &= \{(x+2)+(x-2)\}\{(x+2)^2 - (x+2).(x-2) + (x-2)^2\} \\
&= (x+2+x-2)[\{(x)^2 + 2.x.2 + (2)^2\} - (x^2 - 4) + \{(x)^2 - 2.x.2 + (2)^2\}] \\
&= 2x(x^2 + 4x + 4 - x^2 + 4 + x^2 - 4x + 4) \\
&= 2x(x^2 + 12)
\end{aligned}
$$

We cannot further factorize the expression.

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

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