Factorisation of Algebraic Expressions Ex 5.4 Q7

Answer :

The given expression to be factorized is $(3x-2y)^3+(2y-4z)^3+(4z-3x)^3$

Let $a=(3x-2y)$, $b=(2y-4z)$ and $c=(4z-3x)$. Then the given expression becomes

$(3x-2y)^3+(2y-4z)^3+(4z-3x)^3=a^3+b^3+c^3$

Note that

$$\begin{aligned}a+b+c&=(3x-2y)+(2y-4z)+(4z-3x)\\&=3x-2y+2y-4z+4z-3x\\&=0\end{aligned}$$

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

When $a+b+c=0$, this becomes

$$\begin{aligned}&a^3+b^3+c^3-3abc\\&=0.(a^2+b^2+c^2-ab-bc-ca)\\&=0\\&\Rightarrow a^3+b^3+c^3=3abc\end{aligned}$$

So, we have the new formula

when $a+b+c=0$.

Using the above formula, the given expression can be written as

$a^3+b^3+c^3=3abc$

Put $a=(3x-2y)$, $b=(2y-4z)$ and $c=(4z-3x)$. Then we have

$(3x-2y)^3+(2y-4z)^3+(4z-3x)^3=3(3x-2y)(2y-4z)(4z-3x)$

We cannot further factorize the expression.

So, the required factorization is of $(3x-2y)^3+(2y-4z)^3+(4z-3x)^3$ is

$\boxed{3(3x-2y)(2y-4z)(4z-3x)}$.

Factorisation of Algebraic Expressions Ex 5.4 Q8

Answer :

The given expression to be factorized is

$(2x-3y)^3+(4z-2x)^3+(3y-4z)^3$

Let $a=(2x-3y)$, $b=(4z-2x)$ and $c=(3y-4z)$. Then the given expression becomes

$(2x-3y)^3+(4z-2x)^3+(3y-4z)^3=a^3+b^3+c^3$

Note that

$$\begin{aligned}a+b+c&=(2x-3y)+(4z-2x)+(3y-4z)\\&=2x-3y+4z-2x+3y-4z\\&=0\end{aligned}$$

Recall the formula

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

When $a+b+c=0$, this becomes

$$\begin{aligned}a^3+b^3+c^3-3abc&=0.(a^2+b^2+c^2-ab-bc-ca)\\&=0\end{aligned}$$

$\Rightarrow a^3+b^3+c^3=3abc$

So, we have the new formula

$a^3+b^3+c^3=3abc$, when $a+b+c=0$.

Using the above formula, the given expression can be written as

$a^3+b^3+c^3=3abc$

Put $a=(2x-3y)$, $b=(4z-2x)$ and $c=(3y-4z)$. Then we have

$(2x-3y)^3+(4z-2x)^3+(3y-4z)^3=3(2x-3y)(4z-2x)(3y-4z)$

We cannot further factorize the expression.

So, the required factorization is of $(2x-3y)^3+(4z-2x)^3+(3y-4z)^3$ is

$\boxed{3(2x-3y)(4z-2x)(3y-4z)}$.

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