

## 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

$$a+b+c = (3x-2y)+(2y-4z)+(4z-3x)$$
  
= 3x-2y+2y-4z+4z-3x  
= 0

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

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

$$=0.(a^2+b^2+c^2-ab-bc-ca)$$

$$=0$$

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

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

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

## 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

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

$$=0$$

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

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

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

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

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

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