Cubes and Cubes Roots Ex 4.2 Q1

Answer :

(i)

Cube of -11 is given as:

$$(-11)^3 = -11 \times -11 \times -11 = -1331$$

Thus, the cube of 11 is (-1331).

(ii)

Cube of -12 is given as:

$$(-12)^3 = -12 \times -12 \times -12 = -1728$$

Thus, the cube of -12 is (-1728).

(iii)

Cube of -21 is given as:

$$(-21)^3 = -21 \times -21 \times -21 = -9261$$

Thus, the cube of -21 is (-9261).

Cubes and Cubes Roots Ex 4.2 Q2

Answer :

In order to check if a negative number is a perfect cube, first check if the corresponding positive integer is a perfect cube. Also, for any positive integer m, $-m^3$ is the cube of $-m$.

(i)

On factorising 64 into prime factors, we get:

$64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$

On grouping the factors in triples of equal factors, we get:

$64 = \{2 \times 2 \times 2\} \times \{2 \times 2 \times 2\}$

It is evident that the prime factors of 64 can be grouped into triples of equal factors and no factor is left over. Therefore, 64 is a perfect cube. This implies that -64 is also a perfect cube.

Now, collect one factor from each triplet and multiply, we get:

$2 \times 2 = 4$

This implies that 64 is a cube of 4.

Thus, -64 is the cube of -4.

(ii)

On factorising 1056 into prime factors, we get:

$1056 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 11$

On grouping the factors in triples of equal factors, we get:

$1056 = \{2 \times 2 \times 2\} \times 2 \times 2 \times 3 \times 11$

$1056 = \{2 \times 2 \times 2\} \times 2 \times 2 \times 3 \times 11$
It is evident that the prime factors of 1056 cannot be grouped into triples of equal factors such that no factor is left over. Therefore, 1056 is not a perfect cube. This implies that -1056 is not a perfect cube as well.

(iii)
On factorising 2197 into prime factors, we get:
$2197 = 13 \times 13 \times 13$
On grouping the factors in triples of equal factors, we get:
$2197 = \{13 \times 13 \times 13\}$
It is evident that the prime factors of 2197 can be grouped into triples of equal factors and no factor is left over. Therefore, 2197 is a perfect cube. This implies that -2197 is also a perfect cube.

Now, collect one factor from each triplet and multiply, we get 13.
This implies that 2197 is a cube of 13.
Thus, -2197 is the cube of -13.

(iv)
On factorising 2744 into prime factors, we get:
$2744 = 2 \times 2 \times 2 \times 7 \times 7 \times 7$
On grouping the factors in triples of equal factors, we get:
$2744 = \{2 \times 2 \times 2\} \times \{7 \times 7 \times 7\}$

It is evident that the prime factors of 2744 can be grouped into triples of equal factors and no factor is left over. Therefore, 2744 is a perfect cube. This implies that -2744 is also a perfect cube.

Now, collect one factor from each triplet and multiply, we get:
$2 \times 7 = 14$
This implies that 2744 is a cube of 14.
Thus, -2744 is the cube of -14.

(v)
On factorising 42875 into prime factors, we get:
$42875 = 5 \times 5 \times 5 \times 7 \times 7 \times 7$
On grouping the factors in triples of equal factors, we get:
$42875 = \{5 \times 5 \times 5\} \times \{7 \times 7 \times 7\}$
It is evident that the prime factors of 42875 can be grouped into triples of equal factors and no factor is left over. Therefore, 42875 is a perfect cube. This implies that -42875 is also a perfect cube.

Now, collect one factor from each triplet and multiply, we get:
$5 \times 7 = 35$
This implies that 42875 is a cube of 35.
Thus, -42875 is the cube of -35.

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