Cubes and Cubes Roots Ex 4.4 Q2

Answer :

(i)

LHS = $\sqrt[3]{27} \times \sqrt[3]{64} = \sqrt[3]{3 \times 3 \times 3} \times \sqrt[3]{4 \times 4 \times 4} = 3 \times 4 = 12$

RHS = $\sqrt[3]{27 \times 64} = \sqrt[3]{3 \times 3 \times 3 \times 4 \times 4 \times 4} = \sqrt[3]{\{3 \times 3 \times 3\} \times \{4 \times 4 \times 4\}} = 3 \times 4 = 12$

Because LHS is equal to RHS, the equation is true.

(ii)

LHS

= $\sqrt[3]{64 \times 729} = \sqrt[3]{4 \times 4 \times 4 \times 9 \times 9 \times 9} = \sqrt[3]{\{4 \times 4 \times 4\} \times \{9 \times 9 \times 9\}} = 4 \times 9 = 36$

RHS = $\sqrt[3]{64} \times \sqrt[3]{729} = \sqrt[3]{4 \times 4 \times 4} \times \sqrt[3]{9 \times 9 \times 9} = 4 \times 9 = 36$

Because LHS is equal to RHS, the equation is true.

(iii)

LHS = $\sqrt[3]{-125 \times 216} = \sqrt[3]{-5 \times -5 \times -5 \times \{2 \times 2 \times 2 \times 3 \times 3 \times 3\}}$

$= \sqrt[3]{\{-5 \times -5 \times -5\} \times \{2 \times 2 \times 2\} \times \{3 \times 3 \times 3\}} = -5 \times 2 \times 3 = -30$

RHS

= $\sqrt[3]{-125} \times \sqrt[3]{216} = \sqrt[3]{-5 \times -5 \times -5} \times \sqrt[3]{\{2 \times 2 \times 2\} \times \{3 \times 3 \times 3\}} = -5 \times (2 \times 3) =$

-30

Because LHS is equal to RHS, the equation is true.

(iv)

LHS = $\sqrt[3]{-125 \times -1000} = \sqrt[3]{-5 \times -5 \times -5 \times -10 \times -10 \times -10}$

$= \sqrt[3]{\{-5 \times -5 \times -5\} \times \{-10 \times -10 \times -10\}} = -5 \times -10 = 50$

RHS

= $\sqrt[3]{-125} \times \sqrt[3]{-1000} = \sqrt[3]{-5 \times -5 \times -5} \times \sqrt[3]{\{-10 \times -10 \times -10\}} = -5 \times -10 = 50$

Because LHS is equal to RHS, the equation is true.

Cubes and Cubes Roots Ex 4.4 Q3

Answer :

Property:

For any two integers *a* and *b*, $\sqrt[3]{ab} = \sqrt[3]{a} \times \sqrt[3]{b}$

(i)

From the above property, we have:

$$\sqrt[3]{8 \times 125} = \sqrt[3]{8} \times \sqrt[3]{125} = \sqrt[3]{2 \times 2 \times 2} \times \sqrt[3]{5 \times 5 \times 5} = 2 \times 5 = 10$$

(ii)

From the above property, we have:

$\sqrt[3]{-1728 \times 216}$

$= \sqrt[3]{-1728} \times \sqrt[3]{216}$

$= -\sqrt[3]{1728} \times \sqrt[3]{216}$ (For any positive integer *x*, $\sqrt[3]{-x} = -\sqrt[3]{x}$)

Cube root using units digit:

Let us consider the number 1728.

The unit digit is 8; therefore, the unit digit in the cube root of 1728 will be 2.

After striking out the units, tens and hundreds digits of the given number, we are left with 1.

Now, 1 is the largest number whose cube is less than or equal to 1.

Therefore, the tens digit of the cube root of 1728 is 1.

$\therefore \sqrt[3]{1728} = 12$

On factorising 216 into prime factors, we get:

$216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$

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

$216 = \{2 \times 2 \times 2\} \times \{3 \times 3 \times 3\}$

Now, taking one factor from each triple, we get:

$\sqrt[3]{216} = 2 \times 3 = 6$

Thus

$$\sqrt[3]{-1728 \times 216} = -\sqrt[3]{1728} \times \sqrt[3]{216} = -12 \times 6 = -72$$

(iii)

From the above property, we have:

From the above property, we have:

$\sqrt[3]{-27 \times 2744}$

$= \sqrt[3]{-27} \times \sqrt[3]{2744}$

$= -\sqrt[3]{27} \times \sqrt[3]{2744}$ (For any positive integer *x*, $\sqrt[3]{-x} = -\sqrt[3]{x}$)

Cube root using units digit:

Let us consider the number 2744.

The unit digit is 4; therefore, the unit digit in the cube root of 2744 will be 4.

After striking out the units, tens, and hundreds digits of the given number, we are left with 2.

Now, 1 is the largest number whose cube is less than or equal to 2.

Therefore, the tens digit of the cube root of 2744 is 1.

$\therefore \sqrt[3]{2744} = 14$

Thus

$\sqrt[3]{-27 \times 2744} = -\sqrt[3]{27} \times \sqrt[3]{2744} = -3 \times 14 = -42$

(iv)

From the above property, we have:

$\sqrt[3]{-729 \times -15625}$

$= \sqrt[3]{-729} \times \sqrt[3]{-15625}$

$= -\sqrt[3]{729} \times -\sqrt[3]{15625}$ (For any positive integer *x*, $\sqrt[3]{-x} = -\sqrt[3]{x}$)

Cube root using units digit:

Let us consider the number 15625.

The unit digit is 5; therefore, the unit digit in the cube root of 15625 will be 5.

After striking out the units, tens and hundreds digits of the given number, we are left with 15.

Now, 2 is the largest number whose cube is less than or equal to 15 ($\left(2^3 < 15 < 3^3\right)$.

Therefore, the tens digit of the cube root of 15625 is 2.

$\therefore \sqrt[3]{15625} = 25$

Also

$\sqrt[3]{729} = 9$, because $9 \times 9 \times 9 = 729$

Thus

$\sqrt[3]{-729 \times -15625} = -\sqrt[3]{729} \times -\sqrt[3]{15625} = -9 \times -25 = 225$

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