



Cubes and Cubes Roots Ex 4.4 Q13

Answer :

(i)

36 and 384 are not perfect cubes; therefore, we use the following property:

$$\sqrt[3]{ab} = \sqrt[3]{a} \times \sqrt[3]{b} \text{ for any two integers } a \text{ and } b$$

$$\begin{aligned} \therefore \sqrt[3]{36} \times \sqrt[3]{384} \\ = \sqrt[3]{36 \times 384} \end{aligned}$$

$$= \sqrt[3]{(2 \times 2 \times 3 \times 3) \times (2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3)} \quad (\text{By prime factorisation})$$

$$\begin{aligned} &= \sqrt[3]{\{2 \times 2 \times 2\} \times \{2 \times 2 \times 2\} \times \{2 \times 2 \times 2\} \times \{3 \times 3 \times 3\}} \\ &= 2 \times 2 \times 2 \times 3 \\ &= 24 \end{aligned}$$

Thus, the answer is 24.

(ii)

96 and 122 are not perfect cubes; therefore, we use the following property:

$$\sqrt[3]{ab} = \sqrt[3]{a} \times \sqrt[3]{b} \text{ for any two integers } a \text{ and } b$$

$$\begin{aligned} \therefore \sqrt[3]{96} \times \sqrt[3]{144} \\ = \sqrt[3]{96 \times 144} \end{aligned}$$

$$= \sqrt[3]{(2 \times 2 \times 2 \times 2 \times 2 \times 3) \times (2 \times 2 \times 2 \times 2 \times 3 \times 3)} \quad (\text{By prime factorisation})$$

$$\begin{aligned} &= \sqrt[3]{\{2 \times 2 \times 2\} \times \{2 \times 2 \times 2\} \times \{2 \times 2 \times 2\} \times \{3 \times 3 \times 3\}} \\ &= 2 \times 2 \times 2 \times 3 \\ &= 24 \end{aligned}$$

Thus, the answer is 24.

(iii)

100 and 270 are not perfect cubes; therefore, we use the following property:

$$\sqrt[3]{ab} = \sqrt[3]{a} \times \sqrt[3]{b} \text{ for any two integers } a \text{ and } b$$

$$\begin{aligned} \therefore \sqrt[3]{100} \times \sqrt[3]{270} \\ = \sqrt[3]{100 \times 270} \end{aligned}$$

$$= \sqrt[3]{(2 \times 2 \times 5 \times 5) \times (2 \times 3 \times 3 \times 3 \times 5)} \quad (\text{By prime factorisation})$$

$$\begin{aligned} &= \sqrt[3]{\{2 \times 2 \times 2\} \times \{3 \times 3 \times 3\} \times \{5 \times 5 \times 5\}} \\ &= 2 \times 3 \times 5 \\ &= 30 \end{aligned}$$

Thus, the answer is 30.

(iv)

121 and 297 are not perfect cubes; therefore, we use the following property:

$$\sqrt[3]{ab} = \sqrt[3]{a} \times \sqrt[3]{b} \text{ for any two integers } a \text{ and } b$$

$$\therefore \sqrt[3]{121} \times \sqrt[3]{297} \\ = \sqrt[3]{121 \times 297}$$

$$= \sqrt[3]{(11 \times 11) \times (3 \times 3 \times 3 \times 11)} \quad (\text{By prime factorisation})$$

$$= \sqrt[3]{\{11 \times 11 \times 11\} \times \{3 \times 3 \times 3\}} \\ = 11 \times 3 \\ = 33$$

Thus, the answer is 33.

Cubes and Cubes Roots Ex 4.4 Q14

Answer :

(i)

To find the cube root, we use the following property:

$$\sqrt[3]{ab} = \sqrt[3]{a} \times \sqrt[3]{b} \text{ for two integers } a \text{ and } b$$

Now

$$\sqrt[3]{3048625} \\ = \sqrt[3]{3375 \times 729} \\ = \sqrt[3]{3375} \times \sqrt[3]{729} \quad (\text{By the above property}) \\ = \sqrt[3]{3 \times 3 \times 3 \times 5 \times 5 \times 5} \times \sqrt[3]{9 \times 9 \times 9} \quad (\text{By prime factorisation}) \\ = \sqrt[3]{\{3 \times 3 \times 3\} \times \{5 \times 5 \times 5\}} \times \sqrt[3]{\{9 \times 9 \times 9\}} \\ = 3 \times 5 \times 9 \\ = 135$$

Thus, the answer is 135.

(ii)

To find the cube root, we use the following property:

$$\sqrt[3]{ab} = \sqrt[3]{a} \times \sqrt[3]{b} \text{ for two integers } a \text{ and } b$$

Now

$$\begin{aligned}
& \sqrt[3]{20346417} \\
&= \sqrt[3]{9261 \times 2197} \\
&= \sqrt[3]{9261} \times \sqrt[3]{2197} \quad (\text{By the above property}) \\
&= \sqrt[3]{3 \times 3 \times 3 \times 7 \times 7 \times 7} \times \sqrt[3]{13 \times 13 \times 13} \quad (\text{By prime factorisation}) \\
&= \sqrt[3]{\{3 \times 3 \times 3\} \times \{7 \times 7 \times 7\}} \times \sqrt[3]{\{13 \times 13 \times 13\}} \\
&= 3 \times 7 \times 13 \\
&= 273
\end{aligned}$$

Thus, the answer is 273.

(iii)

To find the cube root, we use the following property:

$$\sqrt[3]{ab} = \sqrt[3]{a} \times \sqrt[3]{b} \text{ for two integers } a \text{ and } b$$

Now

$$\begin{aligned}
& \sqrt[3]{210644875} \\
&= \sqrt[3]{42875 \times 4913} \\
&= \sqrt[3]{42875} \times \sqrt[3]{4913} \quad (\text{By the above property}) \\
&= \sqrt[3]{5 \times 5 \times 5 \times 7 \times 7 \times 7} \times \sqrt[3]{17 \times 17 \times 17} \quad (\text{By prime factorisation}) \\
&= \sqrt[3]{\{5 \times 5 \times 5\} \times \{7 \times 7 \times 7\}} \times \sqrt[3]{\{17 \times 17 \times 17\}} \\
&= 5 \times 7 \times 17 \\
&= 595
\end{aligned}$$

Thus, the answer is 595.

(iv)

To find the cube root, we use the following property:

$$\sqrt[3]{ab} = \sqrt[3]{a} \times \sqrt[3]{b} \text{ for two integers } a \text{ and } b$$

Now

$$\begin{aligned}
& \sqrt[3]{57066625} \\
&= \sqrt[3]{166375 \times 343} \\
&= \sqrt[3]{166375} \times \sqrt[3]{343} \quad (\text{By the above property}) \\
&= \sqrt[3]{5 \times 5 \times 5 \times 11 \times 11 \times 11} \times \sqrt[3]{7 \times 7 \times 7} \quad (\text{By prime factorisation}) \\
&= \sqrt[3]{\{5 \times 5 \times 5\} \times \{11 \times 11 \times 11\}} \times \sqrt[3]{\{7 \times 7 \times 7\}} \\
&= 5 \times 11 \times 7 \\
&= 385
\end{aligned}$$

Thus, the answer is 385.

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