



NCERT solutions for class 9 Maths Number System Ex-1.6

Q1. Find: (i) $64^{\frac{1}{2}}$ (ii) $32^{\frac{1}{5}}$ (iii) $125^{\frac{1}{3}}$

Ans: (i) $64^{\frac{1}{2}}$

We know that $a^{\frac{1}{n}} = \sqrt[n]{a}$, where $a > 0$.

We conclude that $64^{\frac{1}{2}}$ can also be written as

$$\sqrt[2]{64} = \sqrt[2]{8 \times 8}$$

$$\sqrt[2]{64} = \sqrt[2]{8 \times 8} = 8.$$

Therefore, the value of $64^{\frac{1}{2}}$ will be 8.

(ii) $32^{\frac{1}{5}}$

We know that $a^{\frac{1}{n}} = \sqrt[n]{a}$, where $a > 0$.

We conclude that $32^{\frac{1}{5}}$ can also be written as

$$\sqrt[5]{32} = \sqrt[5]{2 \times 2 \times 2 \times 2 \times 2}$$

$$\sqrt[5]{32} = \sqrt[5]{2 \times 2 \times 2 \times 2 \times 2} = 2$$

Therefore, the value of $32^{\frac{1}{5}}$ will be 2.

(iii) $125^{\frac{1}{3}}$

We know that $a^{\frac{1}{n}} = \sqrt[n]{a}$, where $a > 0$.

We conclude that $125^{\frac{1}{3}}$ can also be written as

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

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

Therefore, the value of $125^{\frac{1}{3}}$ will be 5.

Q2. Find: (i) $9^{\frac{3}{2}}$ (ii) $32^{\frac{2}{5}}$ (iii) $16^{\frac{3}{4}}$ (iv) $125^{\frac{-1}{3}}$

Ans: (i) $9^{\frac{3}{2}}$

We know that $a^{\frac{1}{n}} = \sqrt[n]{a}$, where $a > 0$.

We conclude that $9^{\frac{3}{2}}$ can also be written as

$$\sqrt[2]{(9)^3} = \sqrt[2]{9 \times 9 \times 9} = \sqrt[2]{3 \times 3 \times 3 \times 3 \times 3 \times 3}$$

$$\sqrt[2]{(9)^3} = \sqrt[2]{3 \times 3 \times 3 \times 3 \times 3 \times 3}$$

$$= 3 \times 3 \times 3$$

$$= 27$$

Therefore, the value of $9^{\frac{3}{2}}$ will be 27.

(ii) $32^{\frac{2}{5}}$

We know that $a^{\frac{1}{n}} = \sqrt[n]{a}$, where $a > 0$.

We conclude that $32^{\frac{2}{5}}$ can also be written as

$$\sqrt[5]{(32)^2} = \sqrt[5]{(2 \times 2 \times 2 \times 2 \times 2)(2 \times 2 \times 2 \times 2 \times 2)} = 2 \times 2$$

$$= 4$$

Therefore, the value of $32^{\frac{2}{5}}$ will be 4.

$$(iii) 16^{\frac{3}{4}}$$

We know that $a^{\frac{1}{n}} = \sqrt[n]{a}$, where $a > 0$.

We conclude that $16^{\frac{3}{4}}$ can also be written as

$$\begin{aligned}\sqrt[4]{(16)^3} &= \sqrt[4]{(2 \times 2 \times 2 \times 2)(2 \times 2 \times 2 \times 2)(2 \times 2 \times 2 \times 2)} \\ &= 2 \times 2 \times 2 \\ &= 8\end{aligned}$$

Therefore, the value of $16^{\frac{3}{4}}$ will be 8.

$$(iv) 125^{\frac{-1}{3}}$$

We know that $a^{-n} = \frac{1}{a^n}$

We conclude that $125^{\frac{-1}{3}}$ can also be written as

$$\frac{1}{125^{\frac{1}{3}}}, \text{ or } \left(\frac{1}{125}\right)^{\frac{1}{3}}.$$

We know that $a^{\frac{1}{n}} = \sqrt[n]{a}$, where $a > 0$.

We know that $\left(\frac{1}{125}\right)^{\frac{1}{3}}$ can also be written as

$$\begin{aligned}\sqrt[3]{\left(\frac{1}{125}\right)} &= \sqrt[3]{\left(\frac{1}{5 \times 5 \times 5}\right)} \\ &= \frac{1}{5}.\end{aligned}$$

Therefore, the value of $125^{\frac{-1}{3}}$ will be $\frac{1}{5}$.

Q3. Simplify:

(i) $2^{\frac{2}{3}} \cdot 2^{\frac{1}{3}}$

(ii) $\left(3^{\frac{1}{3}}\right)^7$

(iii) $\frac{11^{\frac{1}{2}}}{11^{\frac{1}{4}}}$

(iv) $7^{\frac{1}{2}} \cdot 8^{\frac{1}{2}}$

Ans: (i) $2^{\frac{2}{3}} \cdot 2^{\frac{1}{3}}$

We know that $a^m \cdot a^n = a^{(m+n)}$.

We can conclude that $2^{\frac{2}{3}} \cdot 2^{\frac{1}{3}} = (2)^{\frac{2}{3} + \frac{1}{3}}$.

$$2^{\frac{2}{3}} \cdot 2^{\frac{1}{3}} = (2)^{\frac{10+3}{15}} = (2)^{\frac{13}{15}}$$

Therefore, the value of $2^{\frac{2}{3}} \cdot 2^{\frac{1}{3}}$ will be $(2)^{\frac{13}{15}}$.

$$(ii) \left(3^{\frac{1}{3}}\right)^7$$

We know that $a^m \times a^n = a^{m+n}$

We conclude that $\left(3^{\frac{1}{3}}\right)^7$ can also be written as

$$\left(3^{\frac{7}{3}}\right).$$

$$(iii) \frac{11^{\frac{1}{2}}}{11^{\frac{1}{4}}}$$

We know that $\frac{a^m}{a^n} = a^{m-n}$

We conclude that $\frac{11^{\frac{1}{2}}}{11^{\frac{1}{4}}} = 11^{\frac{1}{2} - \frac{1}{4}}.$

$$\begin{aligned} \frac{11^{\frac{1}{2}}}{11^{\frac{1}{4}}} &= 11^{\frac{1}{2} - \frac{1}{4}} = 11^{\frac{2-1}{4}} \\ &= 11^{\frac{1}{4}} \end{aligned}$$

Therefore, the value of $\frac{11^{\frac{1}{2}}}{11^{\frac{1}{4}}}$ will be $11^{\frac{1}{4}}.$

$$(iv) 7^{\frac{1}{2}} \cdot 8^{\frac{1}{2}}$$

We know that $a^m \cdot b^m = (a \times b)^m.$

We can conclude that $7^{\frac{1}{2}} \cdot 8^{\frac{1}{2}} = (7 \times 8)^{\frac{1}{2}}.$

$$7^{\frac{1}{2}} \cdot 8^{\frac{1}{2}} = (7 \times 8)^{\frac{1}{2}} = (56)^{\frac{1}{2}}$$

Therefore, the value of $7^{\frac{1}{2}} \cdot 8^{\frac{1}{2}}$ will be $(56)^{\frac{1}{2}}.$

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