

Class 9 maths - chapter 1

Number System : Laws of Exponents (concept and Mcq's)

$$\underline{a^m \cdot a^n = (a)^{m+n}}$$

$$5^2 \cdot 5^3 = 5^{2+3} = 5^5$$

$$\underline{(a^m)^n = a^{mn}}$$

$$[(2)^3]^2 = (2)^{3 \times 2} = 2^6$$

$$\underline{\frac{(a)^m}{(a)^n} = (a)^{m-n}}$$

Base same \rightarrow
Powers add.

(Power)^{Power}

\rightarrow Multiply.

Base same - divide

\rightarrow Powers
subtract

$$\frac{2^4}{2^3} = 2^{4-3} = 2^1 = 2.$$

$$a^m b^m = (ab)^m$$

$$\frac{a^m}{b^m} = \left(\frac{a}{b}\right)^m$$

NCERT Ex 24 (i) $2^{2/3} \cdot 2^{1/3} = (2)^{\frac{2}{3} + \frac{1}{3}} = 2^{\frac{2+1}{3}} = 2^{3/3} = 2$

(ii) $[(3)^{1/5}]^4 = (3)^{1/5 \times 4} = (3)^{4/5}$

(iii) $\frac{7^{1/5}}{7^{1/3}} = (7)^{\frac{1}{5} - \frac{1}{3}} = (7)^{\frac{3-5}{15}} = (7)^{-2/15}$

(iv) $(13)^{1/5} \cdot (17)^{1/5} = (13 \times 17)^{1/5} = (221)^{1/5}$

On simplifying $8^3 \times 2^4$, we get

(a) 16^7

✓ (b) 2^{13}

(c) 2^{10}

(d) 8^4

$$8^3 \times 2^4$$
$$[(2)^3]^3 \times 2^4$$

$$(2)^{3 \times 3} \times 2^4$$

$$= 2^9 \times 2^4 = 2^{9+4}$$

$$= 2^{13}$$

$$\begin{array}{r|l} 2 & 8 \\ \hline 2 & 4 \\ \hline 2 & 2 \\ \hline & 1 \end{array}$$

$$13 \times 17$$

$$\begin{array}{c} 3 \quad 7 \\ \hline \end{array}$$

$$200$$

$$\hline 21$$

$$\hline 221$$

$(16)^{3/4}$ is equal to

(a) 2

(b) 4

✓ (c) 8

(d) 16

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

$$[(2)^4]^{\frac{3}{4}}$$

$$(2)^{4 \times \frac{3}{4}} = 2^3 = 8$$

2	16
2	8
2	4
2	2
	1

Value of $(256)^{0.16} \times (256)^{0.09}$ is

✓ (A) 4

(B) 16

(C) 64

(D) 256.25

$$(256)^{0.16} \times (256)^{0.09}$$

$$(256)^{0.16 + 0.09}$$

$$= (256)^{0.25}$$

$$(256)^{\frac{25}{100}} = (256)^{\frac{1}{4}}$$

$$[(2)^8]^{\frac{1}{4}}$$

$$= 2^{8 \times \frac{1}{4}} = 2^2 = 4$$

2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

$\sqrt[4]{\sqrt[3]{2^2}}$ equals

(A) $2^{-\frac{1}{6}}$

(B) 2^{-6}

(C) $2^{\frac{1}{6}}$

(D) 2^6

$$\sqrt[4]{\sqrt[3]{(2)^2}}$$
$$\left(\left((2)^2 \right)^{\frac{1}{3}} \right)^{\frac{1}{4}}$$

$$(2)^{2 \times \frac{1}{3} \times \frac{1}{4}} = 2^{\frac{1}{6}}$$

$$\sqrt{a} = a^{\frac{1}{2}}$$

$$\sqrt[3]{a} = a^{\frac{1}{3}}$$

$$\sqrt[4]{a} = a^{\frac{1}{4}}$$

$$\sqrt[5]{a} = a^{\frac{1}{5}}$$

Value of $\sqrt[4]{(81)^{-2}}$ is

(A) $\frac{1}{9}$

(B) $\frac{1}{3}$

(C) 9

(D) $\frac{1}{81}$

$$[(81)^{-2}]^{\frac{1}{4}}$$

$$(81)^{-2 \times \frac{1}{4}} = (81)^{-1/2}$$

$$(9 \times 9)^{-1/2} = [(9)^2]^{-1/2} = (9)^{2 \times -\frac{1}{2}}$$

$$= 9^{-1} = \frac{1}{9}$$

The cube root of 125 divided by square root of 25, is

a) 5

b) 1

c) 1/5

d) None of these

$$\sqrt[3]{a} = (a)^{\frac{1}{3}}$$

$$\sqrt{a} = (a)^{\frac{1}{2}}$$

$$\frac{\sqrt[3]{125}}{\sqrt{25}} = \frac{[(5)^3]^{\frac{1}{3}}}{[(5)^2]^{\frac{1}{2}}}$$

$$\begin{array}{r|l} 5 & 125 \\ \hline 5 & 25 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

$$\frac{(5)^{3 \times \frac{1}{3}}}{5^{2 \times \frac{1}{2}}} = \frac{5}{5} = 1.$$

The value of $\{-3/8\}^{-3} \times \{4/9\}^{-2}$ is:

(A) -96

(B) $\frac{-8192}{2187}$

(C) $\frac{4}{96}$

(D) $\frac{-1}{192}$

$$\left(\frac{-3}{8}\right)^{-3} \times \left(\frac{4}{9}\right)^{-2}$$

$$\left(\frac{a}{b}\right)^{-3} = \left(\frac{b}{a}\right)^3$$

$$\left(\frac{-8}{3}\right)^3 \times \left(\frac{9}{4}\right)^2$$

$$\frac{\overset{2}{-8} \times \overset{2}{-8} \times -8}{\cancel{3} \times \cancel{3} \times 3} \times \frac{\overset{2}{9} \times \overset{2}{9}}{\cancel{4} \times \cancel{4}} = -96$$