

IIT Foundation
Mathematics (Indices)

Laws of Indices:-

I $(a^m \times a^n = a^{m+n})$ (Product of powers)

(i) $5^2 \times 5^4 \times 5^7 \times 5^{10} \times 5^3 = 5^{26}$

(ii) $(\sqrt{3})^4 \times (\sqrt{3})^7 = (\sqrt{3})^{11}$

II $(a^m \div a^n = a^{m-n}, a \neq 0)$ (Quotient of powers)

(i) $\left(\frac{4}{15}\right)^{12} \div \left(\frac{4}{5}\right)^7 = \left(\frac{4}{5}\right)^5$

III $(a^m)^n = a^{m \times n}$ (Power of a power)

(i) $\left[\left(\frac{6}{7}\right)^3\right]^5 = \left(\frac{6}{7}\right)^{3 \times 5} = \left(\frac{6}{7}\right)^{15}$

IV $(ab)^n = a^n \times b^n$ (Power of a product)

(i) $(210)^4 = (2 \times 3 \times 5 \times 7)^4$

(ii) $\frac{64 \times 27}{125 \times 1331} = \frac{4^3 \times 3^3}{5^3 \times 11^3} = \left(\frac{4}{5}\right)^3 \times \left(\frac{3}{11}\right)^3 = \left(\frac{4 \times 3}{5 \times 11}\right)^3 = \left(\frac{12}{55}\right)^3$

V $\frac{a^n}{b^n}$ (Power of a quotient)

(i) $\left(\frac{3}{4}\right)^5 = \frac{3^5}{4^5}$

VI
(i) $\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$

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