#Chapter

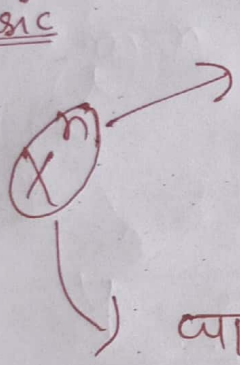
घातांक व करणी "Indices & Surd"

~~घातांक व करणी~~

Power indices & Surd

घात, घांताम एवं करणी

Basic



$x^n = x \times x \times x \times x$ ---- n time

Eg

$2^6 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$

$3^6 = 3 \times 3 \times 3 \times 3 \times 3 \times 3$

$9^5 = 9 \times 9 \times 9 \times 9 \times 9$

$2^3 = 2 \times 2 \times 2$

Rule of indices: घातांक के नियम

(i) $a^m \times a^n = a^{m+n}$

base (आधार)

जब आधार समान हो तो
When base are same

Ex $2^6 \times 2^{12} = ?$

Ex $2^4 \times 4^8 = ?$

Ex $2^6 \times 16^2 = ?$

(ii) $a^m = \frac{1}{a^m} = a^m$

Ex $2^6 = \frac{1}{2^{-6}}$

Ex $\frac{1}{2^{-7}} = 2^7$

Ex $2^{-8} = \frac{1}{2^8}$

Ex $\frac{1}{2^{+10}} = 2^{-10}$

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

$a^m \times \frac{1}{a^n}$

$a^m \times a^{-n}$

$a^{m+(-n)}$

a^{m-n}

Ex $\frac{4^3}{64^2} = ?$

Ex $\frac{256}{2^6} =$

Ex $\frac{343}{3^3} = ?$

(iv) $(a^m)^n = (a^n)^m = a^{mn}$

Ex $(2^6)^2 = ?$

Ex $((4^3)^2)^6 = ?$

$$(((3^3)^2)^3)^6 = ?$$

(v) $a^m \times b^m = (a \times b)^m$

When base are not equal but Power are same

जब आधार असमान हों एवं घात समान हो तो

Ex $(2^6 \times 4^6) = (8)^6$

Ex $16^3 = 4^3 \times 4^3 = 8^3 \times 2^3$

Ex $(120)^2 = 40^2 \times 3^2 = 2^2 \times 60^2 = 2^2 \times 15^2 \times 4^2$

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

Ex $\left(\frac{9}{5}\right)^7 = \frac{9^7}{5^7}$

(vii) $\boxed{a^0 = 9}$

(Something)$^0 = 1$

$\boxed{0^0 \neq 1}$

अपरिभाषित (Not define)

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Q $5^{x+3} = 25^{3x-4}$

x का मान ज्ञात करें

$x = ?$

Q $2^{2x-1} = \frac{1}{8^{x-3}}$

$x = ?$

Q $9^{18} \times 27^{15} = 3^{3x}$

$x = ?$

Q $a^b = 125$

$(a-b)^{a+b-4} = ?$

Q $3^{2^3} - (3^2)^3 = ?$

Q $2^{3^{2^2}} + \left((2^3)^2\right)^2 = ?$

Q $\left(\frac{3}{4}\right)^{3x-7} = \left(\frac{4}{3}\right)^{2-x}$

$x = ?$

Q $\left(\frac{3}{5}\right)^{3} \times \left(\frac{3}{5}\right)^{-6} = \left(\frac{3}{5}\right)^{2x-1}$

$x = ?$

(a) -2 (b) 2 (c) -1 (d) 1

Q $8^{x+1} = 64$

Then find $x = ?$ and $3^{2x+1} = ?$

Q $m^{n} = 25$

Then find

$n^{m} = ?$