Chapter 12

Exponents and Powers

Law (4): Zero exponent

$a^0 = 1$

Example:

$x^4 \div x^4$

$\Rightarrow \frac{x^4}{x^4} = 1$

$\Rightarrow x^{4-4} = 1$

$\Rightarrow x^0 = 1$

Note:

- In general, any quantity raised to the zero power is equal to 1.
- 0^o is not defined.

Law (5):

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

Example:

$(3x^2y^3)^2 = (3)^2(x^2)^2(y3)^2$

$\therefore (3x^2y^3)^2 = 9x^4y^6$

Note:

This law can be extended to 3 or more quantities.

Law (6):

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

Example:

$$\left(\frac{8}{27}\right)^{1/3} = \frac{(8)^{1/3}}{(27)^{1/3}} = \frac{(2^3)^{1/3}}{(3^3)^{1/3}} = \frac{2^{3/3}}{3^{3/3}} = \frac{2}{3}$$

Note:

- $(-1)^{\text{odd number}} = -1$
- $(-1)^{\text{even number}} = 1$

Example:

- $(-1)^3 = (-1) \times (-1) \times (-1) = -1$
- $(-1)^2 = (-1) \times (-1) = +1$