

Chapter 12

Exponents and Powers

Example:

How to define $a^{-n} = \frac{1}{a^n}$.

Sol.

Let us observe the following pattern:

$$10^3 = 10 \times 10 \times 10 = 1000$$

$$10^2 = 10 \times 10 = 100 = \frac{1000}{10}$$

$$10^1 = 10 = \frac{100}{10}$$

$$10^0 = 1 = \frac{10}{10}$$

$$10^{-1} = ?$$

As the exponent decreases by 1, the value becomes one – tenth of the previous value.

Continuing the above pattern, we say that,

$$10^{-1} = \frac{1}{10}$$

$$\text{Similarly, } 10^{-2} = \frac{1}{10} \times \frac{1}{10} = \frac{1}{100} = \frac{1}{10^2}$$

$$10^{-3} = \frac{1}{100} \times \frac{1}{10} = \frac{1}{1000} = \frac{1}{10^3}$$

$$\therefore \text{ We can write } \frac{1}{10^n} = 10^{-n} \text{ (or) } \frac{1}{10^{-n}} = 10^n.$$