

(1) Upon Multiplying $x^3 \cdot x^2$ we are first multiplying x , 3 times and then again multiply x 2 times.

We can expand the multiplication for easier understanding as

$$\begin{aligned} x^3 \cdot x^2 &= (x \cdot x \cdot x)(x^2) \\ &= (x \cdot x \cdot x)(x \cdot x) \end{aligned}$$

Hence in total we end by multiplying a single number (here x) 5 times.

$$\therefore x^3 \cdot x^2 = x^5$$

On calculating $(x^3)^2$ we are multiplying $x^3 \cdot x^3$

Again on expanding this expression

$$(x^3) \cdot (x^3) = (x \cdot x \cdot x)(x \cdot x \cdot x)$$

Hence in total we multiply x , 6 times.

$$\therefore (x^3)^2 = x^6$$

(2) The general formula is

$$(i) \quad x^m \cdot x^n = x^{(m+n)}$$

$$(ii) \quad \text{and} \quad (x^m)^n = x^{m \times n} = x^{(m \cdot n)}$$

(3) Let the statement be $(x^4 \cdot x^3)^7$

$$\text{Now } (x^4 \cdot x^3) = x^{(4+3)} = x^7$$

and

$$(x^7)^7 = (x^7)^7 = x^{49}$$