

Power to a Power

Rule:

For all numbers x , and integers n and m ,

$$(x^n)^m = x^{nm}$$



"This simply means ...

when raising a power to a power, **multiply** the exponents."

Consider:

$$\begin{aligned}(x^3)^2 &= x^3 \cdot x^3 \\ &= x^3 \cdot x^3 \\ &= x^{3+3} \\ &= x^6\end{aligned}$$

...when in doubt, expand terms to see what is happening.

Take a look at the following examples which illustrate this rule:

$$(b^3)^4 = b^{12}$$

$$(10^2)^4 = 10^8$$

$$(a^b)^3 = a^{3b}$$

$$(2^x)^y = 2^{xy}$$

$$(x^2)^{x+2} = x^{2x+4}$$

$$(x^{-2})^3 = x^{-6} = \frac{1}{x^6}$$

$$(a^{-3})^{-4} = a^{12}$$