Teacher Station: Power of Powers

How do we deal with a power being raised to a power?

Ex:) Simplify:

$(2^3)^4$

$2^{3 \cdot 4}$

2^{12}

$\boxed{4096}$

$= (2^3) \cdot (2^3) \cdot (2^3) \cdot (2^3)$

$(2 \cdot 2 \cdot 2) \cdot (2 \cdot 2 \cdot 2) \cdot (2 \cdot 2 \cdot 2) \cdot (2 \cdot 2 \cdot 2)$

$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

2^{12}

$\boxed{4096}$

Ex:) $(a^{-2})^5$

$a^{-2 \cdot 5}$

a^{-10}

$\boxed{\frac{1}{a^{10}}}$

Ex:) $(7^9)^0$

$7^{9 \cdot 0}$

7^0

$\boxed{1}$

Ex:) $(6^3)^2$

$6^{3 \cdot 2}$

6^6

$\boxed{46,656}$

Ex:) $(2^{-2})^{-3}$

2^6

$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

$\boxed{64}$