

TEACHER STATION: POWER OF POWERS

HOW DO WE DEAL WITH A POWER BEING RAISED TO A POWER?

Ex: Simplify:

$$\begin{aligned} (2^3)^4 &= (2^3) \cdot (2^3) \cdot (2^3) \cdot (2^3) \\ 2^{3 \cdot 4} &= (2 \cdot 2 \cdot 2) \cdot (2 \cdot 2 \cdot 2) \cdot (2 \cdot 2 \cdot 2) \cdot (2 \cdot 2 \cdot 2) \\ 2^{12} &= 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \\ \boxed{4096} &= \boxed{4096} \end{aligned}$$

Ex:

$$\begin{aligned} (a^{-2})^5 &= a^{-2 \cdot 5} \\ &= a^{-10} \\ &= \frac{1}{a^{10}} \end{aligned}$$

oyo:

$$\begin{aligned} (6^3)^2 &= 6^{3 \cdot 2} \\ &= 6^6 \\ &= \boxed{46,656} \end{aligned}$$

Ex:

$$\begin{aligned} (7^9)^0 &= 7^{9 \cdot 0} \\ &= 7^0 \\ &= \boxed{1} \end{aligned}$$

oyo:

$$\begin{aligned} (2^{-2})^{-3} &= 2^{(-2) \cdot (-3)} \\ &= 2^6 \\ &= 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \\ &= \boxed{64} \end{aligned}$$