RULES OF EXPONENTS

Work in pairs to figure out a rule for each of the following situations. Try out different numeric examples to find a pattern. Use $a = 4$, $m = 3$, and $n = 2$ for your first example, then choose your own numbers for the other two. Once you have a conjecture for what the rule is, try proving it by using non-exponential notation (or think of a different way to show it!). Use colors and highlighters to show connections and make your work more clear.

Situation	Numeric Examples	Rule Conjuncture	Demonstration
$a^m \cdot a^n$	$4^3 \cdot 4^2 = 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 = 4^5 = 1{,}024$		
$(a^m)^n$	$(4^3)^2 = 4^3 \cdot 4^3 = 4^6 = 4{,}096$		
a^{-m}	$4^{-3} = 1 \div (4 \cdot 4 \cdot 4) = \frac{1}{4^3} = \frac{1}{64}$		
a^0	$\frac{4^1}{4^1} = \frac{4}{4} = 1$		
$\dfrac{a^m}{a^n}$	$\frac{4^3}{4^2} = \frac{4 \cdot 4 \cdot 4}{4 \cdot 4} = 4^1 = 4$		

Handout adapted from: Exploring Exponents. (n.d.). Retrieved from
https://www.youcubed.org/tasks/exploring-exponents/
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