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 |
| --- | --- | --- | --- |
|  $a^{m}∙a^{n}$ |  $4^{3}∙4^{2}=4∙4∙4∙4∙4=4^{5}=1,024$ |   |   |
|   |
|   |
|  $(a^{m})^{n}$ |  $\left(4^{3}\right)^{2}=4^{3}∙4^{3}=4^{6}=4,096$ |   |   |
|   |
|   |
| $a^{-m}$  |  $4^{-3}=1÷(4∙4∙4)=\frac{1}{4^{3}}=\frac{1}{64}$ |   |   |
|   |
|   |
| $a^{0}$  |  $\frac{4^{1}}{4^{1}}=\frac{4}{4}=1$ |   |   |
|   |
|  |
| $\frac{a^{m}}{a^{n}}$  |  $\frac{4^{3}}{4^{2}}=\frac{4∙4∙4}{4∙4}=4^{1}=4$ |   |   |
|  |
|  |

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

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