1. Explain why each of the following statements is true.

a. $\dfrac{3^5}{3^2} = 3^3$ **b.** $\dfrac{4^6}{4^5} = 4^1$ **c.** $\dfrac{5^{10}}{5^{10}} = 5^0$

When dividing _____ with the same _____, the

_____ remains the same and the new _____

becomes the _____ of the exponents.

Explain in your own words why this rule works. Then give an example that you create to illustrate the rule.

2. Tom says $\dfrac{4^5}{4^6} = 4^{-1}$. Mary says $\dfrac{4^5}{4^6} = \dfrac{1}{4^1}$. Who is correct and why?

3. Complete the following equation to show how you can find the base and exponent of the quotient when you divide two powers with the same base. (Assume a is not 0.) Explain your reasoning.
$$\dfrac{a^m}{a^n} = \underline{\ ?\ }$$

E. Use the pattern from Question D to explain why $a^0 = 1$ for any nonzero number a.