**Investigation: Powers of Powers**

You can use what you learned in the previous lesson to find a shortcut for simplifying expressions with powers. Complete each statement by showing equivalent expressions. Let your final answer be written as a base raised to a single power.

1. $\left(3^{6}\right)^{2}= 3^{6}•3^{6}= $
2. $\left(5^{4}\right)^{3}= 5^{4}•5^{4}•5^{4}=$
3. $\left(2^{7}\right)^{4}=\\_\\_\\_\\_\\_\\_•\\_\\_\\_\\_\\_\\_•\\_\\_\\_\\_\\_\\_•\\_\\_\\_\\_\\_\\_=$
4. $\left(4^{5}\right)^{5}=\\_\\_\\_\\_\\_\\_•\\_\\_\\_\\_\\_\\_•\\_\\_\\_\\_\\_\\_•\\_\\_\\_\\_\\_\\_•\\_\\_\\_\\_\\_\\_=$
5. $\left(1^{4}\right)^{6}=$
6. $\left(6^{2}\right)^{4}=$

***Look at your answers.***

* What do you notice about the two exponents in the original expression as compared to the value of the exponent in the final expression?
* What operation would allow you to go straight from the original two exponents to the final one?
* Write a math rule to show how this would work in general or write it out in words.