Laws of Exponents, Part 1

1. **a.** In the expression $2^4\,2^3$, both powers have the same base of 2. See if you can find a way to write this expression in a shorter form, as a single power of 2 (using only one exponent).
Hint: Expand the powers as repeated multiplications..

b. Do the same with $3^2\,3^4$.

c. Do the same with a^3a^9.

2. Are the following statements true? If not, correct them.

a. $2^4\,2^2 = 2^8$

b. $2^3\,2^3 = 4^6$

c. $10^3\,10^2 = 10^5$

3. Expand the powers by writing out the repeated multiplications. Then simplify. Lastly, write the entire expression as a single power of 4.

$$\frac{4^7}{4^5} = \frac{\square \cdot \square \cdot \square \cdot \square \cdot \square \cdot \square \cdot \square}{\square \cdot \square \cdot \square \cdot \square \cdot \square} =$$

4. Simplify the expression, writing it as a single power of 5.

$$\frac{5^5}{5^2} = \underline{\qquad\qquad\qquad\qquad} =$$

5. Using the same technique as above, write the expression $\frac{x^6}{x^2}$ as a single power of x.

6. Sandra believes that $\frac{2^5}{2^4} \cdot 2 = 1$. Is she correct? If not, explain why not.

7. Are the following statements true? Use the table of powers of 3 to help.

Hint 1: Often estimation is sufficient to see that a statement is wrong.

Hint 2: To check the veracity of a division statement, you can also use multiplication.

a. $3^3 + 3^4 = 3^7$

b. $3^3 \cdot 3^4 = 3^7$

c. $\frac{3^6}{3^3} = 3^2$

d. $\frac{3^6}{3^3} = 3^3$

$3^2 = 9$
$3^3 = 27$
$3^4 = 81$
$3^5 = 243$
$3^6 = 729$
$3^7 = 2{,}187$
$3^8 = 6{,}561$