Name:_____   Date:_____

Math 9 Section 2.4 Exponent Rules:

1. Complete the following table of values. You may use a calculator to find the value:

Statement	Expanded Form	Power	Value
$5^3 \times 5^4$	$(5\times5\times5)\times(5\times5\times5\times5)$		
	$(3\times3\times3\times3)\div(3\times3\times3)$		
	$(4\times4)\times(4\times4)\times(4\times4)\times(4\times4)\times(4\times4)$		
	$\left(\dfrac{2\times2\times2\times2\times2}{2\times2\times2}\right)\left(\dfrac{2\times2\times2\times2\times2}{2\times2\times2}\right)\left(\dfrac{2\times2\times2\times2\times2}{2\times2\times2}\right)\left(\dfrac{2\times2\times2\times2\times2}{2\times2\times2}\right)$		
$\left(\dfrac{1}{5^3}\right)^4$			
	$\left(\dfrac{1}{3\times3\times3}\right)\left(\dfrac{1}{3\times3\times3}\right)\left(\dfrac{1}{3\times3\times3}\right)\left(\dfrac{1}{3\times3\times3}\right)$		
$\left(\dfrac{6^4\times6^3\times6^2}{6^6}\right)^3$			

2. Simplify each of the following expressions by writing it as a single power:

a) $3^2 \times 3^3 =$	b) $6^4 \times 6^3 =$	c) $5^1 \times 5^{-2} \times 5^7 =$	d) $2^6 \times 4^3 \times 2^{-3} =$
e) $11^{12} \div 11^8 =$	f) $\dfrac{7^3}{7} =$	g) $\dfrac{8^3}{2^6} =$	h) $\left(4^2\right)^3$
i) $7^3 \times 7^2 \div 7^4$	j) $81^4 \div 3^4 \times 9^2$	k) $\left(7^3\right)^{-2} =$	L) $\left(3^2\right)^4 =$
m) $\dfrac{3^3 \times 9^2}{3^4} =$	n) $\dfrac{\left(2^2\right)^3 \times 2^2}{2^5}$	o) $13^2 \times \left(13^4\right)^2 =$	p) $\left(\left(5^3\right)^4\right)^2 =$

3. Solve for "x" in each of the following:

a) $8^3 \times 8^4 = 8^x$	b) $2^3 \times 2^4 \times 2^5 = 2^x$	c) $13^5 \div 13^{11} = 13^x$
d) $\left(5^4\right)^2 \times 5 = 5^x$	e) $5 \times 5^4 \times 5^3 \times 5^2 = 5^x$	f) $4^{100} \div 4^{20} \div \left(4^{30}\right)^2 = 4^x$
g) $\dfrac{6^x \times 6^4}{6^2} = 6^{12}$	h) $\left(7^3\right)^x \times 7^2 = 7^{28}$	i) $81^3 \times 3^x = 9^3$

4. Indicate whether if the following statements are TRUE or FALSE. Then explain why:

a) $y^4 \times y^3 = y^{12}$	b) $a^{12} \div a^6 = a^2$	c) $\left(z^3\right)^4 = z^7$
d) $2^2 \times 4^3 = 8^6$	e) $2^3 + 2^4 = 2^7$	f) $n^7 - n^3 = n^4$

5. Why is any number to the power of zero equal to 1? $a^0 = 1$ Explain your answer:

6. If $a^b = 81$, where "a" and "b" are integers, how many different combinations of (a, b) are there? List them out:

7. Suppose you have "n" number of cubes and the side length of each cube is "n" cm long. What is the volume of all the cubes combined in terms of "n"?