Name ________________________________
Pd ____________ Date _______________

5. Review of exponents: Recall that

x^4 ➔ "x to the fourth power" means "4 factors of x"

3^4 ➔ "3 to the fourth power" means "4 factors of 3"

$3^4 = 3 \cdot 3 \cdot 3 \cdot 3$

$= 81$

a. 10^3 means "_______ factors of _______," therefore, 10^3 = ___________.

b. 2^4 means "_______ factors of _______," therefore, 2^4 = ___________.

c. 9^2 means "_______ factors of _______," therefore, 9^2 = ___________.

6. One of the Laws of Exponents tells us that $\frac{x^a}{x^b} = x^{a-b}$.

- This means that when you divide two expressions that have the same variable, you ***subtract the exponents***.
- Therefore, $\frac{x^7}{x^2} = x^5$ and $\frac{x^4}{x^1} = x^3$

Use this Law of Exponents to write an equivalent expression for the following quotients:

a. $\frac{x^9}{x^5} =$ ___________ b. $\frac{x^{24}}{x^{11}} =$ ___________ c. $\frac{x^6}{x^5} =$ ___________

7. A long time ago you learned that any time you divide a number by itself, the quotient is 1:

$\frac{4}{4} = 1$, $\frac{-13}{-13} = 1$, and $\frac{212}{212} = 1$.

The same result happens even when you divide a variable (with an exponent) by itself:

$\frac{x^9}{x^9} = 1$, $\frac{x^2}{x^2} = 1$, and $\frac{x^6}{x^6} = 1$.

But remember, the Law of Exponents that we used in question 6 (above) also tells us that when we are dividing the same variable, we can subtract the exponents to create an equivalent expression. So now we can say the following:

- Using that Law of Exponents, we know that $\frac{x^9}{x^9} = x^0$ ➔ but we also know that $\frac{x^9}{x^9} = 1$
- Using that Law of Exponents, we know that $\frac{x^2}{x^2} = x^0$ ➔ but we also know that $\frac{x^2}{x^2} = 1$
- Using that Law of Exponents, we know that $\frac{x^6}{x^6} = x^0$ ➔ but we also know that $\frac{x^6}{x^6} = 1$

a. **<u>Complete the following sentence</u>**: Based on the information above, I can conclude that x^0 = _____ . In other words, anything to the zero power will always equal _____ .