3.1½ POWERS OF TEN & THE ZERO EXPONENT RULE

Name:_____ Block_____

Investigation: Complete the following table for the ***powers of ten.***

Power	Expanded Form	Standard Form	Number in Words
10^9			
10^8			
10^7			
10^6			
10^5			
10^4			
10^3			
10^2			
10^1			
10^0			

Have another look at the chart above, can you see the following patterns?

~ for powers of 10, the exponent = _____

~ dividing by _____ for each descending power

~ zero exponent = _____

We could make **similar tables** for any power with *any base not equal to zero.*

☆This means that we can write 1 for any power with exponent zero.

For example:

9^0 =_____

200^0 =_____

$(-3)^0$ =_____

K^0 =_____

$(flower)^0$ =_____

$(any\ number\ that\ isn't\ 0)^0$ =_____

$x^0 = 1$

"Zero Exponents"

Properties of Exponents

THE ZERO EXPOPNENT RULE:

*"any base number or any base variable (letter) raised to the zero exponent, is **always equal to 1**"*

…BUT the base cannot also be zero.

$$x^0 = 1, \quad x \neq 0$$

Example #1: Evaluate each expression

a) 8^0 b) $(-8)^0$ c) $-(-8)^0$

Evaluate the following:

1. 6^0
2. $-(6)^0$
3. $(-6)^0$
4. -6^0
5. $2^0 + 3^0$
6. $2^0 - 3^0$
7. $3^0 \times 4^0$
8. $(2^0 + 3^0)^0$

ASSIGNMENT #2 Complete the Following Worksheet on "The Zero Power Rule"

Applying the Exponent Rule for Zero Exponents

Evaluate the following powers. ***Show working out where you can!***

1) n^0

2) $(3x)^0$

3) $5y^0$

4) $-8a^0$

5) $(a+b)^0$

6) $a^0 + b^0$

7) $3x^0y$

8) $10(mn)^0$

9) $(0.005w)^0abc$

10) $\left(\frac{1}{2b}\right)^0$

11) $-\left(\frac{1}{5}\right)^0$

12) $2a^0 + (2a)^0 + 2^0a$

13) $(9x)^0 - 9x^0 - (-9x)^0$

14) $(m+2)^0 - m^0 - 2m^0$

15) $\frac{(t+v)^0}{t^0+v^0}$

19) $(xy)^0 + x^0 - y^0 - x^0y^0$

20) $5^0(3+z^0)$

Answers:

1) 1
2) 1
3) 5
4) -8
5) 1
6) 2
7) 3y
8) 10
9) abc
10) 1
11) -1
12) $3+a$
13) -9
14) -2
15) $\frac{1}{2}$
19) 0
20) 4