Lesson 45 - ZERO POWER AND NEGATIVE EXPONENTS

DATE: _____

IV. ZERO POWER RULE

Review: Apply the exponent rules that you have learned to simplify the following problems.

1) $\frac{y^{12}}{y^{12}}$ 2) $x^{15} \bullet \frac{1}{x^{15}}$ 3) $2^3 \bullet 2^4 \bullet \frac{1}{2^7} =$

What do you notice about the three answers above?

_____

_____

Rule #4: **Zero Rule: Any base raised to the zero power will equal _____.**
Note: 0^0 is undefined.

Ex. $5^0 =$ $(-12)^0 =$ $y^0 =$ $(.26)^0 =$

V. NEGATIVE EXPONENT RULE

NEGATIVE EXPONENTS

Apply exponent rule: $\frac{3^4}{3^6}$

Discovery:

Instead of applying the rule, expand out the numerator and denominator:

$\frac{3^4}{3^6}$

Rule #5: When a base is raised to a **negative exponent** the answer will be a **fraction**. The numerator is the number one(1) and the base and exponent get moved to the denominator and the **exponent becomes positive**.

Ex: $7^{-2}=$ $2^{-3}=$ $x^{-5}=$

Directions: Write an equivalent expression for the following problems.

1) $6^{-4} =$

2) $\frac{x^6}{x^9} =$

3) $\frac{(b^7 \cdot b)}{b^8} =$

4) $\frac{5}{5^3} =$

5) $3^{-8} =$

6) $\frac{(3^2)^5}{3^{20}}$

7) Fill in the box with the missing exponent: $\frac{x^7}{x^{\square}} = x^{-2}$

8) Evaluate the expression below:
No calculator
$(6 - 1)^2 + 4^{-2} \bullet 4^5$

9) Evaluate completely: $3^3 \bullet 3^2 \bullet 3^1 \bullet 3^0 \bullet 3^{-1} \bullet 3^{-2}$
No calculator

10) Write each answer as a simplified expression that is equivalent to the given one:

a) xy^{-4}

b) $15 \bullet 25^{-1}$

11) Which exponential expression is equal to $2^{-5} \bullet 2^8$?

A) $\frac{2^2}{2^{-1}}$

C) $(2^3)^{-1}$

B) $\frac{2^{-2}}{2^{-1}}$

D) $(2^{-1})^3$