Lesson 1.5 – Numbers Raised to a Negative Exponent

Recall that when we raise "anything" to the zeroth power, the value of the exponential expression is _____. Technically, that is not entirely true. There is one value that cannot be raised to the a power of zero. Do you know what value it is?

For any number *y,* such that $y \neq 0$,

$$y^0 = 1$$

Numbers Raised to a Negative Exponent

3^{-4}

A number in exponential form raised to a negative exponent.

Similar to the last lesson, we will use two methods of simplifying exponential expression to help determine what occurs when we raise a base to a negative power. In the first set of notes, we will expand our expression, condense it, then simplify. In the second set of notes, we will use the algorithm from lesson 2 for dividing numbers in exponential form.

Complete the notes on the next page.

Class Notes – Expand the expression, then condense it. Express your answer using powers.

LP#1 $\frac{2^3}{2^7}$	$\frac{6^3}{6^5}$
LP#2 $\frac{x^2}{x^7}$	$\frac{y^4}{y^{10}}$
LP#3 $\frac{14}{14^4}$	$\frac{w}{w^6}$

Class Notes – Use the division rule and express your answers as a power.

LP#4 $\frac{2^3}{2^7}$	$\frac{6^3}{6^5}$
LP#5 $\frac{x^2}{x^7}$	$\frac{y^4}{y^{10}}$
LP#6 $\frac{14}{14^4}$	$\frac{w}{w^6}$

Use the two sets of class notes above to simplify the exponential expressions below.

$2^{-4} =$	$6^{-2} =$	$x^{-5} =$	$y^{-6} =$	$14^{-3} =$	$w^{-5} =$

Complete the rule for negative exponents below by reflecting on what occurred with our notes.

$$x^{-a} =$$

Class Notes –Express the following expressions using positive exponents.

LP#7 5^{-3}	13^{-2}	2^{-4}	3^{-3}
LP#8 y^{-5}	m^{-8}	15^{-1}	7^{-2}
LP#9 x^{-10}	m^{-1}	9^{-2}	4^{-3}
LP#10 $(3m)^{-4}$	$3m^{-4}$	$(4ab)^{-2}$	$4ab^{-2}$

Review – Express the following expressions using positive exponents.

R#1 3^{-2}	5^{-4}	x^{-2}	y^{-5}
R#2 10^{-2}	6^{-3}	p^{-3}	d^{-6}
R#3 9^{-1}	2^{-3}	k^{-10}	h^{-7}