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 $y \neq 0$,

$$y^0 = 1$$

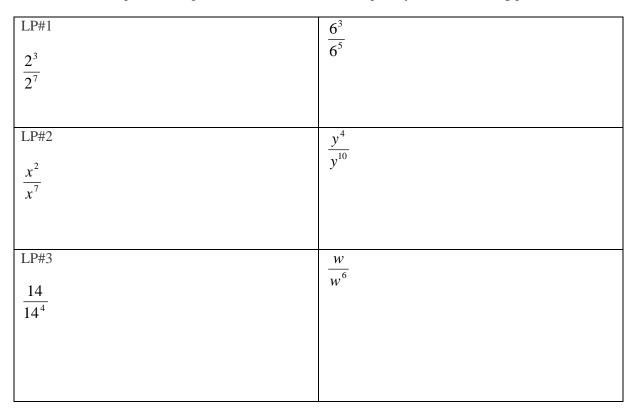


raised to a negative exponent.

Numbers 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.

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

$ LP#4 \frac{2^3}{2^7} $	$\frac{6^3}{6^5}$
$\frac{LP\#5}{\frac{x^2}{x^7}}$	$\frac{y^4}{y^{10}}$
$ 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	13 ⁻²	2^{-4}	3 ⁻³
5 ⁻³			
LP#8	m^{-8}	15^{-1}	7 ⁻²
y ⁻⁵			
LP#9	m^{-1}	9 ⁻²	4 ⁻³
x^{-10}			
LP#10	$3m^{-4}$	$(4ab)^{-2}$	$4ab^{-2}$
$(3m)^{-4}$			

Review – Express the following expressions using positive exponents.

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