NAME:_____ Math _____, Period_____

Mr. Rogove Date:_____

LEARNING OBJECTIVE: We will review the rules of exponents that we have learned. (G8M1L6)

CONCEPT DEVELOPMENT:

WHAT'S THE BASE?

Exponent Rules for ALL integers

$x^m \cdot x^n = x^{m+n}$ $4^2 \cdot 4^{30} = 4^{30+2} = 4^{32}$	When we multiply exponents with the same base, we add the exponents and keep the base.
$\frac{x^m}{x^n} = x^{m-n}$ $\frac{3^2}{3^4} = 3^{2-4} = 3^{-2} = \frac{1}{3^2}$	When we divide exponents with the same base, we subtract the exponents and keep the base.
$(x^m)^n = x^{m \cdot n}$ $(9^8)^{12} = 9^{96}$ $(3^4)^2 = 3^8$	When we raise an exponent to a power, we MULTIPLY the exponents and keep the base!
$(xy)^n = x^n y^n$ $(3x)^4 = 3^4 x^4$	When we raise a product to a power, we multiply the exponents of each factor.
$\left(\frac{x}{y}\right)^n = \frac{x^n}{y^n}$ $\left(\frac{3}{4}\right)^5 = \frac{3^5}{4^5}$	When we raise a quotient to a power, we are raising each part of the division to the power
$x^0 = 1$ $(3x^5)^0 = 1$	Any number raised to the zero power is ONE!!!!
$x^{-n} = \frac{1}{x^n}$ $3^{-7} = \frac{1}{3^7}$ $(2x^{-3}y^2)^{-2}$ $2^{-2}x^6y^{-4} = \frac{x^6}{4y^4}$	When we raise a base to a negative power, we turn it into a fraction with 1 as the numerator, and make the exponent positive.
$\frac{1}{x^{-n}} = x^n$ $\left(\frac{2}{3}\right)^{-4} = \frac{2^{-4}}{3^{-4}} = \frac{3^4}{2^4}$	When we have a negative exponent in the denominator, we move it to the numerator and make the exponent positive.

NAME:_____ Math _____, Period_____

Mr. Rogove Date:_____

Guided Practice:

Simplify each expression, showing individual steps:

$(7^{-5})^{-8}$	$x^{-5} \cdot x^{-7}$
You sent a photo of you and your family on vacation to 7 friends. If each of them sends the photo to 5 of their friends, and each of those friends sends it to 5 of their friends, and each of those friends sends it to five of their friends, how many people will see the photo (not including you). Assume that no friend receives the photo twice.	Your friend returned from an overseas trip and got you and 5 other friends sick. Each of you got 6 other people sick, and each of those unfortunate people got 6 people of their own sick. How many people all together got sick? Assume that nobody got sick twice.
Use the properties of exponents to write an equivalent expression that is the **product of distinct primes**, each raised to an integer power. multiplication Prime numbers $\frac{10^5 \cdot 9^2}{6^4}$ $\frac{10\cdot10\cdot10\cdot10\cdot10\cdot9\cdot9}{6\cdot6\cdot6\cdot6}$ $\frac{5\cdot2\cdot5\cdot2\cdot5\cdot2\cdot5\cdot2\cdot5\cdot3\cdot3}{2\cdot3\cdot2\cdot2\cdot3\cdot2\cdot3} = \frac{5^5\cdot2^5\cdot3^4}{2^4\cdot3^4}$ $2\cdot5^5$	Use the properties of exponents to write an equivalent expression that is the **product of distinct primes**, each raised to an integer power. $\frac{12^6 \cdot 21^7}{3^{12} \cdot 2^{11}}$ $\frac{3^6\cdot2^6\cdot2^6\cdot3^7\cdot7^7}{3^{12}\cdot2^{11}} = \frac{3^{13}\cdot2^{12}\cdot7^7}{3^{12}\cdot2^{11}} = 6\cdot7^7$

NAME:_____ Math _____, Period_____

Mr. Rogove Date:_____

Independent Practice:

Activating Prior Knowledge:

We can evaluate expressions that result in negative exponents:

$(x^4)^{-8}$	$(3x^7y^{-1})^{-2}$

Closure:

Separate piece of paper:

Write your own exponents question using at least one of the rules we reviewed and provide the solution too

Teacher Notes:

Collect questions and then distribute them to each other.