NAME:_____ Math 7.2, Period_____

Mr. Rogove Date:_____

LEARNING OBJECTIVE: We will review the rules of exponents that we have learned. (Lesson 61)

CONCEPT DEVELOPMENT:

Exponent Rules for ALL integers

WHAT'S THE BASE?

$x^m \cdot x^n = x^{m+n}$ $10^3 \cdot 10^{10} = 10^{13}$ $2^3 \cdot 2^2 = (2\cdot2\cdot2)\cdot(2\cdot2) = 2^5$	When you multiply exponents with the same base, just add the exponents $3^{10} \cdot 3^7 = 3^{17}$
$\frac{x^m}{x^n} = x^{m-n}$ $\frac{13^{10}}{13^5} = 13^5$	When you divide exponents with the same base, you subtract the powers. $\frac{x^{21}}{x^{14}} = x^7$ $\frac{85^{20}}{85^5} = 85^{15}$ $\frac{85x^{20}}{85x^5} = x^{15}$
$(x^m)^n = x^{m\cdot n}$ $(14^2)^4 = 14^8$	When you raise an exponent to a power, you multiply the exponents. $(3^5)^2 = 3^5 \cdot 3^5 = 3^{10}$
$(xy)^n = x^n y^n$ $(x^5y)^2 = x^5y \cdot x^5y = x^{10}y^2$	When you raise a product to a power, raise each FACTOR to that power. $(3x^2y)^3 = 3^3(x^2)^3y^3 = 27x^6y^3$
$\left(\frac{x}{y}\right)^n = \frac{x^n}{y^n}$ $\left(\frac{5x^3}{y}\right)^4 = \frac{5^4x^{12}}{y^4}$	When you raise a quotient to a power, raise the numerator and denominator to that power. $\left(\frac{2x^{10}}{y^3}\right)^2 = \frac{4x^{20}}{y^6}$ $\left(\frac{3x^2}{y}\right)^4 = \frac{3^4(x^2)^4}{y^4} = \frac{81x^8}{y^4}$
$x^0 = 1$	When you have a number raised to the power of zero, it will always equal 1. $(4x^3)^0 = 1$
$x^{-n} = \frac{1}{x^n}$ 3^{-10} $\frac{1}{3^{10}}$	Raising a number to a negative exponent is equal to the reciprocal of that number raised to the positive exponent $5^{-3} = \frac{1}{5^3}$
$\frac{1}{x^{-n}} = x^n$	See above! $\frac{1}{5^{-3}} = \frac{\frac{1}{1}}{\frac{1}{5^3}} = \frac{1}{1} \div \frac{1}{5^3} = 5^3$ No negative exponents!!

NAME:_____ Math 7.2, Period_____

Mr. Rogove Date:_____

Guided Practice:

Simplify each expression, showing individual steps:

$(7^{-5})^{-8}$

$\frac{1}{(7^{-5})^{8}} = \frac{1}{7^{-40}} = 7^{40}$

7^{40}

$x^{-5} \cdot x^{-7}$

$x^{-5-7} = x^{-12} = \frac{1}{x^{12}}$

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.

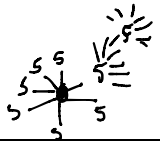
$7 \times 5 = 35$

$7 \times 5 \times 5 = 7 \times 5^2 = 175$

$7 \times 5 \times 5 \times 5 = 7 \times 5^3 = 875$

7
35
175
875
1092

1092 people see the photo



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.

$1 + 6 + 6^2 + 6^3$

6×6 $6 \times 6 \times 6$

1
6
36
+ 216
259

Use the properties of exponents to write an equivalent expression that is the product of distinct primes, each raised to an integer power.

$\frac{10^5 \cdot 9^2}{6^4}$

$\frac{2^5 \cdot 5^5 \cdot 3^2 \cdot 3^2}{2^4 \cdot 3^4} = 2^1 \cdot 5^5$

$\frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}{2 \cdot 2 \cdot 2 \cdot 2}$

Use the properties of exponents to write an equivalent expression that is the product of distinct primes, each raised to an integer power.

$\frac{12^6 \cdot 21^7}{3^{12} \cdot 2^{11}}$

$4 \cdot 4 \cdot 3^6$
$4^5 \cdot 2$

$\frac{(2 \cdot 2 \cdot 3)^6 \cdot (7 \cdot 3)^7}{3^{12} \cdot 2^{11}}$

$\frac{2^6 \cdot 2^6 \cdot 3^6 \cdot 7^7 \cdot 3^7}{3^{12} \cdot 2^{11}} = 2 \cdot 3 \cdot 7^7$

$6 \cdot 7^7$

NAME:_____ Math 7.2, 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.

DISTINCT PRIMES

$(xy)^4 = x^4y^4$

$10^4 = 2^4 \cdot 5^4$

$(2 \cdot 5)^4 = 2^4 5^4$

PRIMES

$6 \cdot 6 \cdot 6 \cdot 6 \cdot 6$

$2 \cdot 3 \cdot 2 \cdot 3 \cdot 2 \cdot 3 \cdot 2 \cdot 3 \cdot 2 \cdot 3$

$$\frac{6^5}{2^4} = \frac{2^5 \cdot 3^5}{2^4} = 2 \cdot 3^5$$