Rules of Exponents Guided Notes

Algebra Standards:
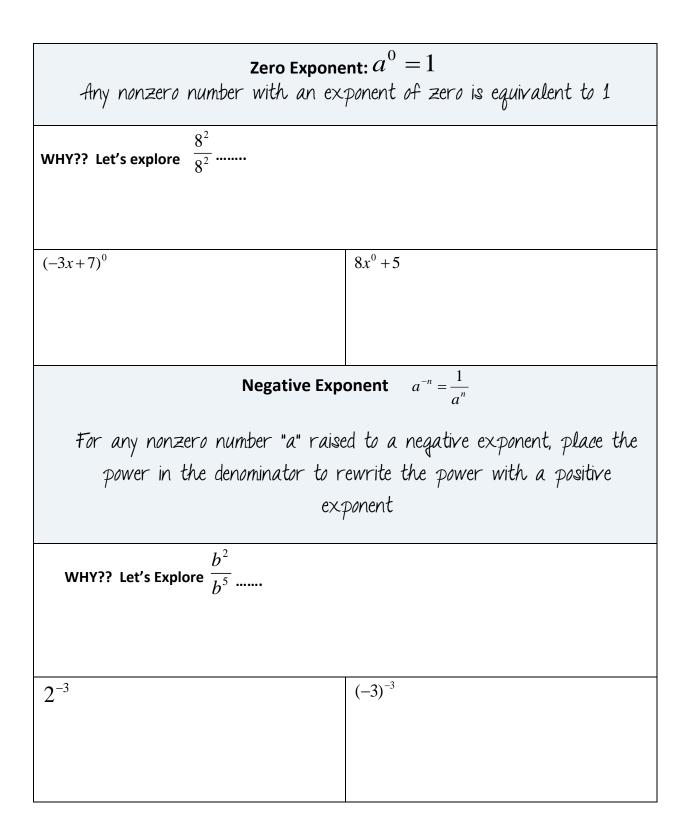N.RN.1

Rules of Exponents

vocabulary:

Monomial   A number, a variable, or a product of a number and one or more variables
Examples: $34xy$, $7a^2b$

Power { 5^2 }   → Exponent
    → Base

rules of exponents:

Product of Powers: $a^m \bullet a^n = a^{m+n}$
If multiplying two numbers with the **same base, ADD** the exponents

$5^2 \bullet 5^6$	$y^4 \bullet y^3 \bullet y$
$(7y^5)(6y)$	$(-3x^2y^7)(5xy^6)$

Quotient of Powers: $\dfrac{a^m}{a^n} = a^{m-n}$
If dividing two numbers with the **same base, SUBTRACT** the exponents

$\dfrac{y^6}{y}$	$\dfrac{6^{13}}{6^2}$	$\dfrac{10a^7b^9}{15a^5b^9}$

Rules of Exponents

Zero Exponent: $a^0 = 1$

Any nonzero number with an exponent of zero is equivalent to 1

WHY?? Let's explore $\dfrac{8^2}{8^2}$ ....

$(-3x+7)^0$	$8x^0 + 5$

Negative Exponent $a^{-n} = \dfrac{1}{a^n}$

For any nonzero number "a" raised to a negative exponent, place the power in the denominator to rewrite the power with a positive exponent

WHY?? Let's Explore $\dfrac{b^2}{b^5}$ ....

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

Rules of Exponents

Power of a Power: $(a^m)^n = a^{m \bullet n}$

If raising a power to a power, **multiply** the exponents

Examples: *Simplify. Write each answer using only positive exponents:*

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

Power of a Product: $(ab)^m = a^m b^m$

Find the power of **each** factor in the parenthesis and multiply

$\left(4x^3 yz\right)^3$	$\left(7xy^{-2}\right)^{-2}$	$\left(6x^{-6} y^{-7} z^0\right)^{-2}$

Power of a Quotient: $\left(\dfrac{a}{b}\right)^m = \dfrac{a^m}{b^m}$

For any numbers "a" and "b" where $b \neq 0$, if the quotient of a and b is raised to a power, raise both the numerator and the denominator to the given power

$\left(\dfrac{3}{5}\right)^2$	$\left(\dfrac{2a^5}{b^7}\right)^2$
$\left(\dfrac{3a^{-4}}{b^7}\right)^3$	$\left(\dfrac{a^{-2} b^{-5}}{c^{-11}}\right)^{-6}$