NAME:_____ Math _____, Period_____

Mr. Rogove Date:_____

Learning Objective: We will raise bases to the 0th power. (G8M1L4)

Concept Development:

Raising to the 0th power:

$$x^0 = 1$$

Two explanations:

$\frac{5^3}{5^3} = 5^{3-3} = 5^0$ $\frac{5^3}{5^3} = \frac{5 \cdot 5 \cdot 5}{5 \cdot 5 \cdot 5} = 1$	$x^3 \cdot x^0 = x^{3+0} = x^3$, so x^0 must be 1

Rewriting Numbers Using Powers of 10

Think about place value when rewriting numbers:

$$1 = 10^0$$
$$10 = 10^1$$
$$100 = 10^2$$
$$1000 = 10^3$$
$$10{,}000 = 10^4$$

Example: $8{,}374 = (8\times10^3) + (3\times10^2) + (7\times10^1) + (4\times10^0)$

Guided Practice:

Steps to Simplifying Exponents with Zero Exponents

1. Simplify all exponents.
2. Set numbers raised to the 0th power equal to one.

$\frac{y^{12}}{y^{12}}$	$\frac{6^{11}}{6^{11}}$
$(7(123.456789)^4)^0$	$(6x^3)^0$

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Steps to Simplifying Exponents with Zero Exponents

1. Simplify all exponents.
2. Set numbers raised to the 0th power equal to one.

$\frac{4x^3y^0}{x^3}$ $\frac{4 \cdot x^3 \cdot y^0}{x^3}$ $\frac{4 \cdot x^3 \cdot 1}{x^3} = 4$	$\frac{-12y^4}{y^4}$ $\frac{y^4}{y^4} = y^0 = 1$ -12
$\frac{2^5}{1} \cdot \frac{1}{2^2} \cdot \frac{2^2}{1} \cdot \frac{1}{2^5}$ $\frac{2^5 \cdot 1 \cdot 2^2 \cdot 1}{1 \cdot 2^2 \cdot 1 \cdot 2^5} = \frac{2^7}{2^7} = 2^0 = 1$	$\frac{1}{x^{12}} \cdot \frac{1}{y^{19}} \cdot \frac{y^{19}}{1} \cdot \frac{x^{12}}{1} = 1$

$3^0 = 1$

$\frac{21^3}{21^3} = 1$

$(3x)^0 = 1$

$3x^0 = 3$

$0^4 = 0$

Steps for Rewriting Numbers using Powers of 10

1. Identify the place value of each number and multiply it by the appropriate power of 10.

6,906,174	326,103
$(5\times10^7) + (3\times10^6) + (9\times10^5) + (1\times10^4) + (5\times10^3) + (2\times10^2) + (7\times10^1) + (8\times10^0)$	$(4\times10^4) + (5\times10^3) + (3\times10^2) + (9\times10^1) + (8\times10^0)$

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Independent Practice:

Activating Prior Knowledge:

We know the rules for multiplying and dividing exponents

$\frac{7x^5}{7x^3}$	$12^3 \cdot 12^{10} \cdot 12^2$

Closure:

Hand out exit Ticket

Teacher Notes:

Fluency sprint toward the end. Need to make copies!!