Name:_____ Date:_____

Notes
Algebra Section 8.3
Pages 503-508

Goal: "You will use zero and negative exponents"

1) $a^0 = 1$	$5^0 = 1$
2) a^{-n} **is the reciprocal of** a^n	$2^{-1} = \frac{1}{2}$

Zero Exponent

Follow the Pattern:

2^5 = 32

2^4 = 16

2^3 = 8

2^2 = 4

2^1 = 2

2^0 = ? Since the pattern is that you keep dividing by 2, the next number would be 1

Proof:

$\frac{x^5}{x^5}$ = x^0 Use your exponent rule.

Anything divided by itself is? 1

so x^0 = 1

Negative Exponent

Follow the Patterm:

2^2 = 4

2^1 = 2

2^0 = 1

2^{-1} = $\frac{1}{2}$ *or* $\frac{1}{2^1}$

2^{-2} = $\frac{1}{4}$ *or* $\frac{1}{2^2}$

Proof:

$\frac{a^m}{a^n} = a^{m-n}$

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

Simplify the following expressions. Write your answer using positive exponents.

Ex: x^{-2}

$\frac{1}{x^2}$

Ex: 4^{-3}

$\frac{1}{4^3} = \frac{1}{64}$

Ex: $\frac{1}{y^{-3}}$

$\frac{1}{\frac{1}{y^3}} = 1 \div \frac{1}{y^3} = \frac{1}{1} \cdot \frac{y^3}{1} = y^3$

Ex: $\left(\frac{2}{3}\right)^0$

1

Ex: $(-8)^{-2}$

$\frac{1}{64}$

Ex: $\frac{1}{2^{-3}}$

8

Ex: $(-1)^0$

1

Ex: $\left(\frac{2}{3}\right)^{-2}$

$\frac{9}{4}$

Ex: $\frac{7^3}{7^5}$

$\frac{1}{49}$

Ex: $\frac{5^{-1}}{5^2}$

$\frac{1}{125}$

Ex: $(2xy^{-5})^3$

$\frac{8x^3}{y^{15}}$

Ex: $\frac{(2x)^{-2}y^5}{-4x^2y^2}$

$-\frac{y^3}{16x^4}$

Ex: $(3x^{-2}y^2)^3$

$\frac{27y^6}{x^6}$

Ex: $\frac{4x^{-2}y^4}{8xy^6}$

$\frac{1}{2x^3y^2}$