Name	Date: Alg 1
Control Contro	1A Day 6: The Zero Power and Negative Exponents Question: How do I simplify zero and negative exponents?
	A. Revisiting Scientific notation When we looked at scientific notation we said if the exponent was positive, it moved the decimal right and if the exponent was negative, it moved the decimal left. So the exponent that will not move the decimal is 700.
	Fill in the blanks:
	$6 \cdot 10^2 = 6 \cdot \underline{100} = 600$
	$6 \underbrace{10^{0}}_{0} = 6 \cdot \underbrace{10^{0}}_{0} = 6 \text{(Think, what can I multiply by that doesn't change the value?)}$ $80 \cdot 10^{0} \text{ must equal} \underbrace{10^{-2}}_{0} = 6 \cdot 10^{0} \cdot 10$
-100	$6(10^{-2}) = 6 \cdot 100 = 0.06$ (Think, how do you say that decimal correctly? What would that look like as a fraction?)So 10^{-2} must equal 100 .
B.	The Exponent of Zero 1. Use a calculator to find the following: a. 42^0 b. 247^0 c. 8408^0 2. What if the base is a variable? Fill in the table.
	*Remember: If you work a problem two different ways and get two different answers, one answer must simplify to the other answer.
Problem $\frac{x^{3}}{x^{3}}$	Work Using the Quotient Rule Work Using Expanded Form So we know 3-3
$\frac{m^2}{m^2}$	$M_{3-3} = M_{0} \qquad \frac{\psi \cdot \psi}{\psi \cdot \psi} \Rightarrow \frac{1}{2} \Rightarrow 1$
$\frac{b^5}{b^5}$	b ⁵⁻⁵ = b°
ANY E	ASE raised to the zero power simplifies to (except $0^0 = \sqrt{2}$ because you can $4 \div by 0$
Easy E	xamples: $5^0 = 1$ $5.62 \times 10^0 = 5.62$ $a^0 = 1$
Toughe 4x0	er Examples: $60 + 60$ $(4x - 2y^{7})^{0}$ $7 - 30$
401	$\frac{1}{1+1}$ $\frac{1}{1+1}$ $\frac{1}{1+1}$ $\frac{1}{1+1}$ $\frac{1}{1+2}$ $\frac{1}{1+2}$
	[] [] [4n ² +2]

C. Negative exponents

1. Fill in the table for $f(x) = 3 \cdot 10^x$

1	1. Fill in the table for $f(x) = 3 \cdot 10^{\circ}$				
5	Input (x)	Substitution	Answer in standard form	Answer as a fraction	Answer in expanded for
SI				I KEED IT GED GE LE GEOLETE	
0					
2	1	0 10-1		3	
31	-1	7.00	().3	10	
				2	2
7	-2	7 17-0	h +2		- or -
2		010	0.00	100	10.10
2		\sim $1-3$		3	3
)	-3	4. 10	002	1000	10.10.10 or 3
, [1000	10.10.10

2. Fill in the table for each problem

Problem	Work Using the Quotient Rule	Work Using Expanded Form	So we know
$\frac{x^3}{5}$	X3-5 = X-2	X · X · X	V-2-1
$\frac{x}{2}$		X . X . X . X	X -
$\frac{m^2}{m^6}$			
$\frac{b^4}{b^4}$	$6^{1-4} = 6^{-3}$	P. P. P. P.	$\frac{1}{5} - \frac{3}{5}$

3. Negative exponents are NOT considered SIMPLIFIED. So we must only have positive exponents in final answers. So, when a base has a negative exponent, the exponent will become <u>positive</u> when the base is moved to the opp. part of the fraction (A negative exponent means make the reciprocal of the base.) It USUALLY works best if you wait until the end to simplify the negative exponent.

$$\frac{y^{-7}}{1} = \boxed{\frac{1}{y^{7}}}$$

$$\frac{1}{x^{-2}} = \sqrt{\frac{2}{x}}$$

$$4^{\circ} + 2^{-1}$$
 $1 + \frac{1}{2} = \boxed{3}$

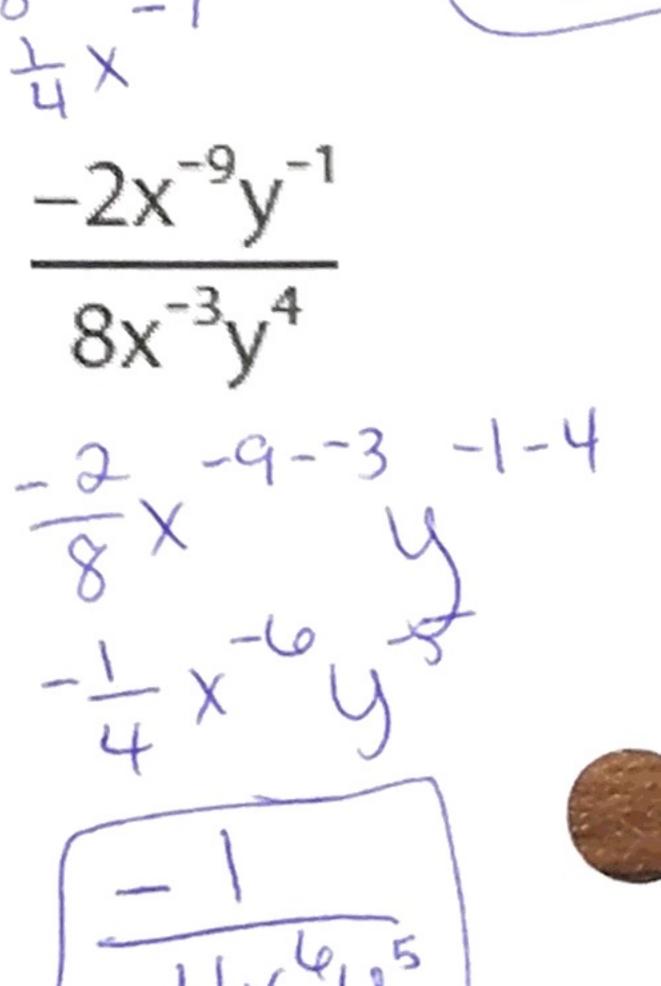
$$\frac{2x^{-12}}{8x^{-5}}$$

$$\frac{2}{8} \times \frac{1}{3} = -5$$

$$\frac{2}{4} \times \frac{1}{4} \times \frac{1}{4$$

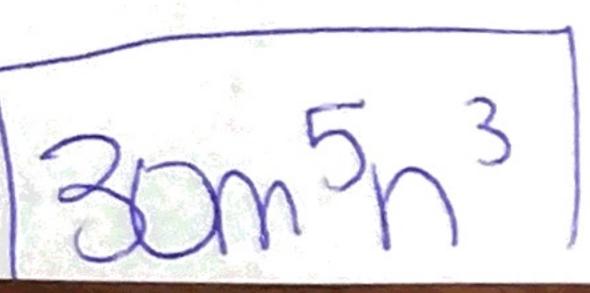
$$(4c^{-3})(9c^{-6})$$

 $4.9c^{-5+-6}$
 $36c^{-11}$ $36c^{-11}$



 $(3m^{2}n^{2}p^{-2})(2m^{2}n^{-3}p^{4})(5m^{-2}n^{2}p^{-2})$ $(3m^{2}n^{2}p^{-2})(2m^{2}n^{-3}p^{4})(5m^{-2}n^{2}p^{-2})$

30m⁵n³p



$$\frac{3}{x}$$

$$\frac{3}{x}$$

$$\frac{3}{x}$$