

Zero Exponent Property

Quotient	Expanded Form	Simplified	Thus...
$\frac{x^5}{x^5}$	$\frac{x \cdot x \cdot x \cdot x \cdot x}{x \cdot x \cdot x \cdot x \cdot x}$	$\frac{1}{1} = 1$	$\frac{x^5}{x^5} = 1$
$\frac{4^3}{4^3}$			
$\frac{(ab)^2}{(ab)^2}$			

Quotient	Simplify using the Quotient Rule	Thus...	Zero Exponent Property
$\frac{x^5}{x^5}$	$x^{5-5} = x^0$	$\frac{x^5}{x^5} = x^0$	Since $\frac{x^5}{x^5} = x^0$ and $\frac{x^5}{x^5} = 1$, then $x^0 = 1$
$\frac{4^3}{4^3}$			
$\frac{(ab)^2}{(ab)^2}$			

$$\rightarrow 2^{-3} = \frac{1}{2^3} = \frac{1}{8} \quad 10^{-4} = \frac{1}{10^4} = \frac{1}{10,000} \quad 5^{-2} = \frac{1}{5^2} = \frac{1}{25}$$

Negative Exponent Rule

Quotient	Column 1 rewritten in expanded form or as repeated multiplication.	Column 1 simplified using the Quotient Rule.	Compare your answers; one written as a fraction and the other in exponent form.
$\frac{3^3}{3^5}$	$\frac{3 \cdot 3 \cdot 3}{3 \cdot 3 \cdot 3 \cdot 3 \cdot 3} = \frac{1}{3^2} = \frac{1}{9}$	$3^{3-5} = 3^{-2}$	$\frac{1}{3^2} = 3^{-2}$
$\frac{a^4}{a^7}$			
$\frac{a^3b^6}{a^6b^{10}}$			
$\frac{4^{15}a^{30}}{4^{20}a^{50}}$	<i>This is too long to expand, find a short cut.</i>		

Product of Powers

Column 1	Column 1 rewritten in expanded form or as repeated multiplication.	Column 2 rewritten in exponential form.
$5^3 \cdot 5^2$		
$b^6 \cdot b^2$		
$y^2 y^{10} y^4$		

Quotient of Powers

	Column 1 rewritten in expanded form or as repeated multiplication.	Column 2 rewritten in exponential form.
$\frac{3^5}{3^2}$		
$\frac{a^4}{a^3}$		
$\frac{b^3}{b^5}$		
$\frac{4^5 \cdot x^7}{4^2 \cdot x^4}$		

Power of a Product

	Column 1 rewritten in expanded form or as repeated multiplication.	Column 2 rewritten in exponential form.
$(ab)^4$		
$(abc)^3$		
$(a^2b)^3$		
$(4xy^2)^4$		