Exponent Rules

Rule	Symbolic	Why?	Other examples
When you multiply powers with the same base, _____ the exponents.	$b^m \cdot b^n =$	$x^3 \cdot x^4$ $= (x \cdot x \cdot x) \cdot (x \cdot x \cdot x \cdot x)$ $= x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x$ $= x^7$	$2^5 \cdot 2^6 =$ $x^{24} \cdot x^{11} =$
When you divide powers with the same base, _____ the exponents.	$\frac{b^m}{b^n} =$	$\frac{x^5}{x^3} = \frac{x \cdot x \cdot x \cdot x \cdot x}{x \cdot x \cdot x}$ $= \frac{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot x \cdot x}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x}} = x^2$	$\frac{5^7}{5^3} =$ $\frac{x^5 y^7}{x^2 y^5} =$
When you raise a power to a power, _____ the exponents.	$(b^m)^n =$	$(x^4)^3$ $= x^4 \cdot x^4 \cdot x^4$ $= x^{4+4+4} = x^{12}$	$(3^4)^3 =$ $(2x^2y^4)^3 =$
Anything to the zero power equals _____.	$b^0 =$	$\frac{x^4}{x^4} = \frac{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x}}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x}} = 1$ $\frac{x^4}{x^4} = x^{4-4} = x^0$ $So\ x^0 = 1$	$\left(\frac{8x^4y^5}{7z^2}\right)^0 =$ $5 \cdot 479^0 =$
Raising anything to a negative power gives you the _____.	$b^{-m} =$	$\frac{x^3}{x^5} = \frac{\cancel{x} \cdot \cancel{x} \cdot \cancel{x}}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot x \cdot x} = \frac{1}{x^2}$ $\frac{x^3}{x^5} = x^{3-5} = x^{-2}$ $So\ x^{-2} = \frac{1}{x^2}$	$7^{-2} =$ $\left(\frac{2}{3}\right)^{-1} =$ $\frac{x^3}{y^2 z^{-4}} =$