Algebra 1, Mr. Gonzalez

Below is List of Rules for Exponents and an example or two of using each rule:

Zero-Exponent Rule: $a^0 = 1$, this says that anything raised to the zero power is 1.	$\left(-\frac{2}{5}\right)^0 = 1$ $(5x^3y^4)^0 = 1$
Power Rule (Powers to Powers): $(a^m)^n = a^{mn}$, this says that to raise a power to a power you need to multiply the exponents. There are several other rules that go along with the power rule, such as the product-to-powers rule and the quotient-to-powers rule.	$(x^5)^4 = x^{20}$ $(2x^4y^2)^3 = (2)^3(x^4)^3(y^2)^3 = 8x^{12}y^6$ $\left(\frac{x^2}{y^5}\right)^4 = \frac{(x^2)^4}{(y^5)^4} = \frac{x^8}{y^{20}}$
Negative Exponent Rule: $a^{-n} = \frac{1}{a^n}$, this says that negative exponents in the numerator get moved to the denominator and become positive exponents. Negative exponents in the denominator get moved to the numerator and become positive exponents. Only move the negative exponents.	$5^{-2} = \frac{1}{5^2}$ $4x^{-2} = \frac{4}{x^2}$ $\frac{x^{-3}}{y^{-7}} = \frac{y^7}{x^3}$
Product (Multiplication) Rule: $a^m \cdot a^n = a^{m+n}$, this says that to multiply two exponents with the same base, you keep the base and add the powers.	$x \cdot x^5 = x^6$ $y^4 + y^9 = y^{13}$
Quotient (Division) Rule: $\frac{a^m}{a^n} = a^{m-n}$, this says that to divide two exponents with the same base, you keep the base and subtract the powers. This is similar to reducing fractions; when you subtract the powers put the answer in the numerator or denominator depending on where the higher power was located. If the higher power is in the denominator, put the difference in the denominator and vice versa, this will help avoid negative exponents.	$\frac{x^5}{x^3} = x^2$ $\frac{y^4}{y^9} = \frac{1}{y^5}$ $\frac{x^3y^2}{x^2y^5} = \frac{x}{y^3}$