Product Rule
When multiplying two expressions that have the same base, simplify the product by adding the exponents.

$$x^m \cdot x^n = x^{m+n}$$

Power to a Power Rule
When a base is raised to an exponent and that expression is raised to another exponent, multiply the exponents.

$$\left(x^m\right)^n = x^{m \cdot n}$$

Product to a Power Rule
When a product is raised to an exponent, apply the exponent to each factor in the product. Important, please put each factor in a ( ).

$$\left(xy\right)^n = \left(x\right)^n \left(y\right)^n$$

Quotient Rule
When dividing two expressions that have the same base, simplify the quotient by subtracting the exponents.

$$\frac{a^n}{a^m} = a^{n-m} \qquad a \neq 0$$

Quotient to a Power Rule
When there is a fraction to a power, separately raise the numerator and denominator to that power. Important, please put numerator in a separate ( ) and he denominator in a separate ( ).

$$\left(\frac{a}{b}\right)^n = \frac{\left(a\right)^n}{\left(b\right)^n}$$

Zero Exponent Rule

When there is a non-zero base to a power of zero, the result is one.

$$a^0 = 1 \qquad a \neq 0$$

Negative Exponent Rule

When there is a base with a negative exponent in a fraction, it can be flipped to either side of the fraction and the exponent will change to positive.

$$a^{-n} = \frac{1}{a^n}$$

and

$$\frac{1}{a^{-n}} = a^n$$

Taken together, these facts tell us that a negative exponent power in the numerator belongs in the denominator (with a positive exponent) and a negative exponent power in the denominator belongs in the numerator (with a positive exponent). In other words, you can see a negative exponent as telling you to flip things in and out of the numerator and denominator of an expression.