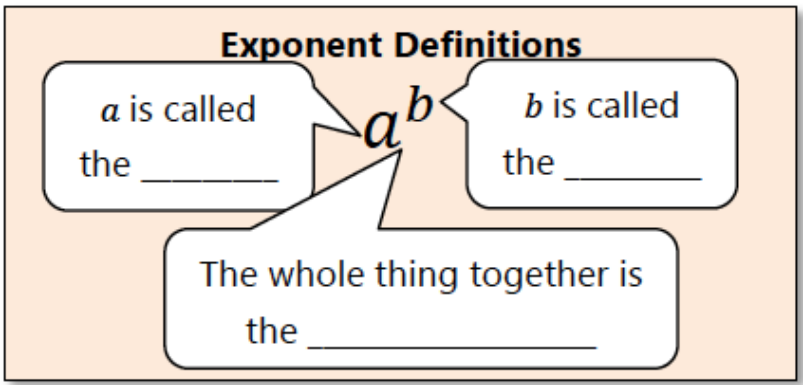
Algebra 1: Exponent Rules – Part 1 **Name** _____ **Period** _____

Exponents

An **exponential function** is _____ .



$2^5 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 32$

The **exponent** tells us how many times the base is multiplied together.

Unwritten Exponents

If a number or a variable does not have a written exponent, then the exponent is _____.

$7 = 7^1$ $xy^2z = x^1y^2z^1$

Exponent Rules

- ***Remember, you can only use Exponent Rules with*** _____**.**
- Combining Like Terms

  _____ have the _____ and the

  _____.

  If you have LIKE terms, you can combine them by _____ or

  _____ their _____.

  The variables and exponents do _____ change.

  Simplify.

  $(2x^2 + 3x + 5) + (x^2 - x - 1)$

  Simplify.

  $6x + 7x - x + 9y - y - 2x$

What is the difference between $3x$ and x^3?

Combine each expression into a single term.

a. $a + a + a + a$

b. $2b + 5b$

c. $a \cdot a \cdot a \cdot a$

d. $b^2 \cdot b^5$

- Product Rule

$x^a \cdot x^b = x^{a+b}$

When you _____ with the **same base**, _____ their _____.

The coefficients are multiplied as usual.

Fill out the table.

Product	**Repeated Multiplication**	**Power of the Form a^b**
$2^2 \cdot 2^3$	$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$	2^5
$5^1 \cdot 5^4 \cdot 5^3$		
$x^2 \cdot x^7$		

Use the Product Rule to simplify each of the following.

a. $x^4 \cdot x^3$

b. $a^2 \cdot a^3 \cdot a^5$

c. $b^7 \cdot c^6 \cdot b$

- Quotient Rule

$$\frac{x^a}{x^b} = x^{a-b}$$

When you _____ with the **same base**, _____ their _____.

Think of it as "canceling".

The leftover exponent remains where the bigger exponent was originally.

Fill out the table.

Quotient	**Repeated Multiplication That Cancels Out**	**Power of the Form a^b**
$\frac{2^3}{2^2}$	$\frac{2 \cdot 2 \cdot 2}{2 \cdot 2}$	$2^1 = 2$
$\frac{3^7}{3^4}$		
$\frac{x^4}{x^{10}}$		

Use the Quotient Rule to simplify each of the following.

a. $\frac{x^{12}}{x^4}$

b. $\frac{4x^7y^3}{2x^3y^6}$

c. $\frac{27s^5}{54s}$