

Properties of Exponentials

An exponent (also called power or degree) indicates how many times the base number will be multiplied by itself. The number a^b represents a raised to the base b . The base and the variable will be multiplied by itself b times. The following table lists the most important properties:

Below is a list of important properties:

Property	General Form	Application	Example
Product Rule When multiplying exponents	$a^m \cdot a^n$	a^{m+n}	$a^2 \cdot a^3 = a^{2+3} = a^5$
Quotient Rule When dividing exponents	$\frac{a^m}{a^n}$	a^{m-n}	$\frac{a^5}{a^2} = a^{5-2} = a^3$
Power Rule 1 When raising an exponent to another exponent	$(a^m)^n$	$a^{m \cdot n}$	$(a^2)^3 = a^{2 \cdot 3} = a^6$
Power Rule 2 When raising a power structure to another base	$(ab)^n$	$a^n \cdot b^n$	$(2a^2)^3 = 2^3 \cdot a^{2 \cdot 3} = 8a^6$
Reciprocal Property The reciprocal of a^n is a^{-n}	a^{-n}	$\frac{1}{a^n}$	$a^{-2} = \frac{1}{a^2}$
Reciprocal Property The reciprocal of $\frac{1}{a^n}$ is a^n	$\frac{1}{a^{-n}}$	a^n	$\frac{1}{a^{-2}} = a^2$
Identity Property Anything to the power of zero is equal to one	a^0	$a^0 = 1$	$(2-3a)^0 = 1$

1. It is important to understand the rules of the exponentiation process if the numbers are the same.

The numbers $\frac{1}{a^n}$ are also written as a^{-n} .