

## Properties of Exponents

The following properties hold true when the base and exponent do not both equal zero.

For real numbers  $a$ ,  $b$ ,  $m$ , and  $n$ :

Negative Exponents	$a^{-n} = \frac{1}{a^n}$ and $\frac{1}{a^{-n}} = a^n$
Product of Powers	$a^m \cdot a^n = a^{m+n}$
Quotient of Powers	$\frac{a^m}{a^n} = a^{m-n}$ also written as $a^m \div a^n = a^{m-n}$
Power of a Power	$(a^m)^n = a^{m \cdot n} = (a^n)^m$
Power of a Product	$(ab)^m = a^m \cdot b^m$
Power of a Quotient	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$ and $\left(\frac{a}{b}\right)^{-m} = \left(\frac{b}{a}\right)^m = \frac{b^m}{a^m}$
Zero Powers	$a^0 = 1, a \neq 0$