

# Exponent Rules

Base

Exponent

Expression

$x^2$

**Notice:** these rules only apply when you have the same base

Name	Rule	Explanation	Examples
Product Rule	$x^a \bullet x^b = x^{a+b}$	add the exponents	$x^2 \bullet x^3 = x^5$
Power of a Power Rule	$(x^a)^b = x^{a \bullet b}$	multiply the exponents	$(x^2)^3 = x^6$
Power of a Product Rule	$(ax)^b = a^b \bullet x^b$	each base is to the exponent	$(2x)^3 = 2^3 \bullet x^3 = 8x^3$
Quotient Rule	$\frac{x^a}{x^b} = x^{a-b}$	subtract the exponents	$\frac{x^5}{x^3} = x^2$
Negative Exponent Rule	$x^{-a} = \frac{1}{x^a}$	flip the term in a fraction and change sign of exponent	$\frac{1}{x^{-6}} = x^6$ $x^{-8} = \frac{1}{x^8}$
Zero Exponent Rule	$x^0 = 1$	anything to the zero equals 1	$7x^0 = 7(1) = 7$
Fractional Exponent Rule	$\sqrt[b]{x^a} = x^{\frac{a}{b}}$	inside exponent goes on top, outside number goes on bottom	$\sqrt[9]{x^4} = x^{\frac{4}{9}}$ $\sqrt{x} = x^{\frac{1}{2}}$