Unit 2: Powers and Exponent Laws

$$\underbrace{5^{4}}_{\text{power}} = \underbrace{5 \times 5 \times 5 \times 5}_{\text{Repeated Multiplication}} = \underbrace{625}_{\text{standard form}}$$

base

exponent

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The zero exponent law: the negative is included with the base if and only if the brackets are strickly around the negative sign and the base.

Power	Base	Standard Form
-5^0	5	$-(5^0) = -(1) = -1$
$(-5)^0$	-5	$(-5)^0 = 1$
(-5^0)	5	$-(5)^0 = -(1) = -1$
$-(-5)^0$	-5	$-(-5)^0 = -(1) = -1$

⊛ Anything to the exponent zero equals 1

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Order of operation involving exponents:

() y^x ÷ x + −

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Exponent Laws

Exponent Law	Rule	Example
Product of Powers	$a^m \times a^n = a^{m+n}$	$2^5 \cdot 2^3 = 2^{5+3} = 2^8$ (· means multiply)
Quotient of Powers	$b^x \div b^y = b^{x-y}$	$\frac{6^7}{6^3} = 6^{7-3} = 6^4$
Power of Power	$(z^w)^v = z^{wv}$	$(10^3)^5 = 10^{3\times5} = 10^{15}$
Power of a Product	$(ab)^m = a^m \cdot b^m$ (· multiply)	$(9\times8)^3 = 9^3 \times 8^3$
Power of a Quotient	$(a \div b)^m = a^m \div b^m$	$\left(\frac{4}{9}\right)^2 = \frac{4^2}{9^2}$

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