

2.1 Use Properties of Exponents

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Properties of Exponents

Property Name	Definition	Example
Product of Powers	$a^m \cdot a^n = a^{m+n}$	$2^8 \cdot 2^{-5} = 2^{8+(-5)} = 2^3 = 8$
Power of a Power	$(a^m)^n = a^{mn}$	$(3^4)^2 = 3^{4 \cdot 2} = 3^8 = 6561$
Power of a Product	$(ab)^m = a^m b^m$	$(2 \cdot 3)^4 = 2^4 \cdot 3^4 = 16 \cdot 81 = 1296$
Negative Exponent	$a^{-m} = \frac{1}{a^m} \quad a \neq 0$	$7^{-2} = \frac{1}{7^2} = \frac{1}{49}$
Zero Exponent	$a^0 = 1 \quad a \neq 0$	$(-729)^0 = 1 \quad a^3 b^0 c^7 = a^3 c^7$
Quotient of Powers	$\frac{a^m}{a^n} = a^{m-n} \quad a \neq 0$	$\frac{5^{11}}{5^8} = 5^{11-8} = 5^3 = 125$
Power of a Quotient	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} \quad b \neq 0$	$\left(\frac{5}{8}\right)^2 = \frac{5^2}{8^2} = \frac{25}{64}$

Scientific Notation

85,000,000 x 1,200	Write in scientific notation
$(8.5 \times 10^7)(1.2 \times 10^3)$	Use multiplication property
$(8.5 \times 1.2)(10^7 \times 10^3)$	Product of a Power
10.2×10^{10}	Write 10.2 in scientific notation
$(1.02 \times 10^1) \times 10^{10}$	Product of a Power
1.02×10^{11}	