



Properties of Exponents

Example

$$a^m \cdot a^n = a^{m+n}$$

$$2^3 \cdot 2^4 = 2^7 \quad x^5 \cdot x^2 = x^7$$

$$(a^m)^n = a^{m \cdot n}$$

$$(2^3)^5 = 2^{15} \quad (x^6)^3 = x^{18}$$

$$(a^m b^n)^q = a^{mq} b^{nq}$$

$$(2^2 3^4)^4 = 2^8 3^{16} \quad (x^2 y^5)^2 = x^4 y^{10}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$\frac{2^6}{2^2} = 2^{6-2} = 2^4 \quad \frac{x^9}{x^5} = x^4$$

$$a^{-n} = \frac{1}{a^n}$$

$$2^{-7} = \frac{1}{2^7} \quad x^{-2} = \frac{1}{x^2}$$

$$a^0 = 1$$

$$3^0 = 1 \quad y^0 = 1$$

USE properties to simplify expressions

Example

$$\frac{(x^2)^3 y^6 x^4}{y^2} = \frac{x^6 \cdot x^4 \cdot y^6}{y^2} = \frac{x^{10} y^6}{y^2} = x^{10} y^4$$



Scientific Notation

What is it? A way to rewrite very large or small numbers using powers to the base of 10.

Example $29,600 \rightarrow$ scientific notation $\rightarrow 2.96 \times 10^4$

Write a number in scientific notation

$$467,000 \rightarrow 4.67 \times 10^5$$

↑
First use digits to write a number between 1 and 10

← always 10

The exponent is the number of digits between decimal point

Note - decimal point moved left, power of 10 positive; moved right power of 10 negative

467000.

4.67000

decimal point

moved 5 digits

Write .00019 in scientific notation

$$\underbrace{.00019}_{1.9} \rightarrow 1.9 \times 10^{-4}$$

decimal moved 4 right



Compound Interest

What is it? Growth rate that increases over time; used in investing money - your money will make you more money over time, this is called "interest"

Formula $A = P(1 + r)^t$

P ← principal
 r ← interest rate / rate as decimal
 t ← time in years

Example

\$5000 is invested for 10 years at 6% compounded every year - How much is the investment at the end of the 10 years?

$$A = P(1 + r)^t$$

$P = \$5000$ starting amt.
 $r = .06$, 6% as decimal
 $t = 10$ years

$$A = 5000(1 + .06)^{10}$$

$$= 5000(1.06)^{10}$$

$$= 5000(1.79)$$

$$= 8954^{23}$$

ANSWER - \$8954²³



Exponential Growth and Decay

