

Chapter 13

Exponents and Powers

Exponents

- Exponents are used to express large numbers in shorter form to make them easy to read, understand, compare and operate upon. For example, $10,000 = 10 \times 10 \times 10 \times 10 = 10^4$.

Laws of Exponents

Multiplying Powers with the Same Base

- For any non-zero integer a and whole number m and n , $a^m \times a^n = a^{m+n}$

Dividing Powers with the Same Base

- For any non-zero integer a and whole number m and n ($m > n$), $a^m \div a^n = a^{m-n}$

Taking Power of a Power

- For any non-zero integer a and whole number m and n , $(a^m)^n = a^{mn}$

Multiplying Powers with the Same Exponents

- For any non-zero integers a and b and whole number m , $a^m \times b^m = (ab)^m$

Dividing Powers with the Same Exponents

- For any non-zero integers a and b and whole number m , $a^m \div b^m = a^m/b^m = (a/b)^m$

Expressing large numbers in the standard form

- Any number can be expressed as a decimal number between 1.0 and 10.0 (including 1.0) multiplied by a power of 10. Such form of a number is called its standard form or scientific notation. For example: Speed of light in vacuum = 300000000 m/s = 3.0×10^8 m/s.