

Scientific Notation

Occasionally, we need to deal with very large or very small numbers. It is convenient to use a system called scientific notation to represent these numbers. Scientific notation is based on powers of ten to represent these numbers.

Large numbers

$$10^1 = 10$$

$$10^2 = 100$$

$$10^3 = 1000$$

$$10^4 = 10,000$$

notice the exponent indicates the number of zeroes

We can express large numbers as a number between 1 and 10 multiplied by the appropriate power of 10

$289 = 2.89 \times 10^2$ notice the decimal point moved 2 units to the left (same as exponent)

$$36782 = 3.6782 \times 10^4 \quad \text{4 place move and exponent of 4}$$

Small Numbers

$$10^{-1} = 0.1$$

$$10^{-2} = 0.01$$

$$10^{-3} = 0.001$$

notice the exponent indicates the number of places right of decimal point

$$10^{-4} = 0.0001$$

We can express small numbers as a number between 1 and 10 multiplied by the appropriate power of 10.

$$0.234 = 2.34 \times 10^{-1} \quad \text{we moved the decimal point 1 unit to the right}$$

$$0.000123 = 1.23 \times 10^{-4} \quad \text{we moved the decimal point 4 units right}$$