

Number & Arithmetic

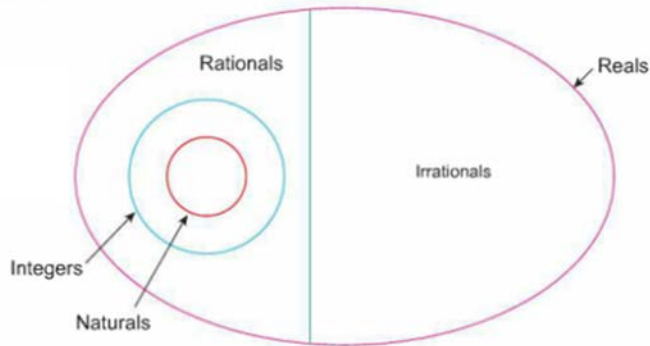
HCF – The highest number that divides evenly into two others.

LCM – The smallest multiple that two numbers share

Primes – Are natural numbers that have only two factors.

Composite – Natural numbers that are not primes

Numbers



Natural numbers are the ordinary counting numbers

$$N = \{1, 2, 3, 4 \dots\}$$

Integers are all positive and negative whole numbers.

$$Z = \{\dots - 4, -3, -2, -1, 0, 1, 2, 3, 4 \dots\}$$

Rational numbers are also called fractions

$$Q = \left\{ \text{any number that can be written } \frac{a}{b} \right\}$$

Irrational numbers cannot be written $\frac{a}{b}$

$$\text{Example} - \sqrt{2}$$

We need to be able to prove that $\sqrt{2}$ and $\sqrt{3}$ are irrational.

We also need to be able to construct $\sqrt{2}$ and $\sqrt{3}$.

The rational numbers and irrational numbers make up the Real Number System, R

Numbers not in the real number system are dealt with in Complex Numbers.

Scientific Notation

A number is written in scientific notation if it is in the form

$$a \times 10^n \text{ where } 1 \leq a < 10$$

$$8,547,000 = 8.547 \times 10^6$$

$$0.000458 = 4.58 \times 10^{-5}$$

Order of Magnitude

A number rounded to the nearest power of 10 is called order of magnitude.

$$548,789 = 5.48789 \times 10^5$$

Decimal less than 5 therefore of magnitude 5

$$3,789 = 3.789 \times 10^3$$

Decimal more than 5 therefore of magnitude 4

Percentage Error

Get the observed value and the accurate value.

$$\text{Error} = |\text{Accurate} - \text{Observed}|$$

$$\text{Relative Error} = \frac{\text{Error}}{\text{Accurate Value}}$$

$$\text{Percentage Error} = \frac{\text{Error}}{\text{Accurate Value}} \times 100$$

Accumulation of Error

Accumulated Error is the collected inaccuracy that can occur when multiple errors are combined.

Tolerance and tolerance intervals

Tolerance is the greatest range of variation that can be allowed

Tolerance Interval of 10.5 ± 0.05 cm means we can accept values from 10.45cm to 10.55cm