

Numbers, Powers and Logarithms

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Types of Numbers

Integers

$\dots, -3, -2, -1, 0, 1, 2, 3$

Rational Numbers

Ratio of two integers p/q where q is positive

Real Numbers

A quantity x that has *decimal expansion* and is of form -

$$x = n + 0.d_1d_2d_3\dots$$

Example of real numbers which are not rational are -

$$\pi = 3.14159\dots$$

$\phi = 2.6280339 \dots$ the *golden ratio* $(1 + \sqrt{5})/2$

Complex Numbers

They are of form — $z = x + iy$ where $i^2 = -1$

$$|z| = \sqrt{x^2 + y^2}$$

Complex Conjugate $\bar{z} = x - iy$

$$z\bar{z} = x^2 + y^2 = |z|^2$$

Intervals

closed interval $[u..v]$ is the set of real numbers x such that $u \leq x \leq v$

open interval $(u..v)$ is the set of real numbers x such that $u < x < v$

half open intervals $(u..]$ and $[u..v)$

Power

Logarithm

$$x = b^{\log_b(x)} = \log_b(b^x)$$

$$\log_{10}$$