Year 13 Calculus Notation

Number Sets

$\mathbb{N}$ – Natural numbers (integers > 0, sometimes ≥ 0)
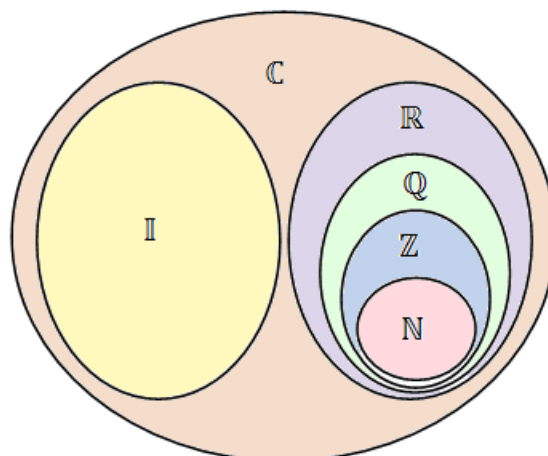
$\mathbb{Z}$ – Integers

$\mathbb{Q}$ – Rational numbers

$\mathbb{R}$ – Real numbers

$\mathbb{I}$ – Imaginary numbers (or sometime Irrational)

$\mathbb{C}$ – Complex numbers

$\in$ means "a member (element) of" that set, so that $x \in \mathbb{R}$ means x is a real number

$\forall$ means "for all", so that $\forall\, x \in \mathbb{Z}$ means x is any integer.

Complex Numbers

Re(z)   real part of a complex number

Im(z)   imaginary part of a complex number

Arg(z) the argument of a complex number (i.e. θ from $z = r\cosθ$)

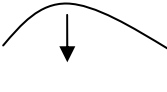$\overline{z}$ the complex conjugate of a complex number

$|\,z\,|$ the modulus of a complex number (i.e. the r from $z = r\cosθ$)

(note: this is the same as absolute value – basically the distance of the number from zero. In general vertical parallel line around a number | | are used to convert *directed* quantities, such as vectors, to *scalar* quantities – values with a size but no direction.)

Differentiation

$\dfrac{da}{db}$ the rate of change of a relative to b, or in function notation: $f'(b)$ where $a = f(b)$

$\dfrac{d^2 a}{db^2}$ the rate of change of the rate of change of a relative to b, or in function notation: $f''(b)$

concave up, where $\dfrac{d^2 y}{dx^2} > 0$, and   concave down, where $\dfrac{d^2 y}{dx^2} < 0$