

Complex Analysis Reference Sheet

Stuyvesant Class of 2022

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Complex Calculus, Mr. Stern

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1 THE COMPLEX NUMBER SYSTEM

1.1 The Algebra of Complex Numbers

1.2 The Geometry of Complex Numbers

1.2.1 Möbius Transformations and the Riemann Sphere

2 COMPLEX FUNCTIONS

2.1 The Complex Exponential

3 TOPOLOGY OF \mathbb{C}

3.1 Compact Sets

3.2 Sequences in \mathbb{C}

3.3 Limits of functions, continuity

Definition 3.1 (Limit of a function, (ϵ, δ) definition). A function $f : D \rightarrow \mathbb{C}$ is said to have a *limit* of L as $z \rightarrow a$ if $\forall \epsilon > 0, \exists \delta > 0, \forall z \in D : (0 < |z - a| < \delta \implies |f(z) - L| < \epsilon)$.