

Complex Analysis: Main ideas

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1. **Schwarz Lemma**

Assume that $f: \mathbb{D} \rightarrow \mathbb{D}$ is a holomorphic map such that $f(0) = 0$.

Then $|f(z)| \leq |z|$ for all $z \in \mathbb{D}$ and $|f'(0)| \leq 1$. Also, if $|f(z)| = |z|$ for some $z \neq 0$ or if $|f'(0)| = 1$, then f is a rotation.