

Math 375 Midterm Topics Guide

1. Chapter 1: Complex Numbers
 - (a) the 4 definitions/viewpoints
 - (b) Algebraic properties
 - (c) conjugation
 - (d) topology
 - (e) calc theorems
2. Chapter 2: Differentiation
 - (a) limits
 - (b) derivative & holomorphic
 - (c) Cauchy-Riemann equations
 - (d) 0 derivative implies constant
3. Chapter 3: Examples of Functions
 - (a) Möbius transformations
 - (b) cross ratio
 - (c) infinity, stereographic projection, Riemann sphere
 - (d) *exp*, trig functions
 - (e) *log*, $\mathcal{L}og$, *Log*
4. Chapter 4: Integration
 - (a) Integral over a curve
 - (b) Homotopy
 - (c) Cauchy's Theorem
 - (d) Cauchy's Integral Formula
 - (e) Jordan Curve Theorem
5. Chapter 5: Consequences of Cauchy's Theorem
 - (a) Extensions of Cauchy's formula for derivatives
 - (b) Computing integrals using Cauchy formulas.