

# Math 375 Final Topics Guide

Chapters 1-4: see Midterm Topics Guide; about 30%

Chapter 5: Cauchy's Formula

- (a) Cauchy's Integral Formula for derivatives
- (b) FTCs
- (c) Morera's Theorem

Chapter 6: Harmonic Functions

- (a) definition
- (b) relation to holomorphic
- (c) Mean-Value Theorem
- (d) Maximum/Minimum Principle

Chapter 7: Power Series

- (a) Sequences, series, power series
- (b) Convergence: pointwise vs. uniform; absolute; tests (root, ratio, etc)
- (c) regions of convergence/radii of convergence for power series

Chapter 8: Taylor Series

- (a) Taylor series = Holomorphic function (uniquely)
- (b) coefficients in terms of an integral
- (c) Classification of Zeros
- (d) Identity Principle and Max-Modulus Theorem
- (e) harmonic series; exp, sin, cos, geometric power series

Chapter 9: (and some of Ch. 8) Laurent Series and Singularities

- (a) double series
- (b) Singularities: isolated; classification into removable, pole, essential
- (c) singularities in terms of power series
- (d) Residues
- (e) the Argument Principle
- (f) Rouché's Theorem