Review

Ch 1 Preliminaries to Cpx Analysis

Ch 2 Cauchy's Thm & Its applications (§5.5 omitted)

- Holomaphic functions defined in term of integrals

$$\int_a^b F(z,s)ds$$

- Schwarz reflection principle

Ch 3 Meromaphic Functions & the Logarithm

Ch 4 Fourier Transform

- Class $\mathcal{F} = \bigcup_{a>0} \mathcal{F}_a$
- Estimate of $\hat{f}$ for $f \in \mathcal{F}$
- Fourier Inversion Formula (for $f \in \mathcal{F}$)
- Poisson Summation Formula

$$\sum_{n\in\mathbb{Z}} f(n) = \sum_{n\in\mathbb{Z}} \hat{f}(n) \quad (\text{for } f \in \mathcal{F})$$

- Theta function
- Phragmén-Lindelöf Thm (max. principle for unbdd domain)

(other parts of §3 omitted)

Ch 5 Entire Function

- Jensen's Formula
- Functions of Finite Order

$$\rho_f = \inf\{\rho : |f(z)| \le Ae^{B|z|^\rho}, \text{ for some } A \& B\}$$

- Weierstrass Infinite Products &
- Hadamard's Factorization Theorem (for f with $\rho_f < +\infty$)

Ch 6 Gamma & Zeta Functions $\Gamma(s)$ & $\zeta(s)$

- Analytic continuations of Gamma & Zeta Functions
- Various properties, formulae, and estimates for $\Gamma(s)$ & $\zeta(s)$

Ch 7 Zeta Functions and Prime Number Theorem

- $\pi(x) \sim \frac{x}{\log x}$ as $x \to \infty$

Ch 8 Conformal Mappings

- Conformal maps & conformal equivalence
- Angle preserving property
- Explicit conformal map between $\mathbb{D}$ and $\mathbb{H}$
- Fractional linear transformations $z \mapsto \frac{az+b}{cz+d}$
  (translations, rotations, scalings,
  and inversion),
  maps "lines & circles" to "lines & circles"
- Elementary examples of conformal maps between specific domains.
- Dirichlet problem
- Schwarz Lemma
- Automorphism groups
  $\mathrm{Aut}(\mathbb{D})$, $\mathrm{Aut}(\mathbb{H})$ (and $\mathrm{Aut}_0(\mathbb{D})$)

- Riemann Mapping Theorem
- Normal Family and Montel's Theorem
- Hurwitz Thm (and corresponding Prop 3.5)
- Conformal Maps onto Polygons,
- Continuous extension to the boundary (pf. omitted)
- Schwarz-Christoffel Integral, Elliptic Integral

Take-home final:

- Concentrated on Ch 8!
  (but may need to use basic results in previous chapters)
- Gamma, Zeta, & Prime Number Theorem excluded!
- 3 questions as in the mid-term.