Chapter 1 - Complex Numbers

1. Complex arithmetic; complex conjugates, modulus, argument.
2. Triangle Inequality and Reverse Triangle Inequality.
3. Euler’s Formula; forms of complex numbers: rectangular, polar, exponential.
5. Sketching regions in the complex plane.

Chapter 2 - Analytic Functions

1. Definition of \( f \) differentiable at \( z_0 \); definition of \( f \) analytic at \( z_0 \).
2. Cauchy-Riemann equations.
3. Necessary Condition for \( f \) differentiable at \( z_0 \).
4. Sufficient Condition for \( f \) differentiable at \( z_0 \).
5. Harmonic functions; harmonic conjugates.

Chapter 3 - Elementary Functions

1. Definitions of \( e^z \), \( \cos z \), \( \sin z \), \( \cosh z \), \( \sinh z \), \( \log z \) and their basic properties.
2. Branches of \( \log z \): \( \mathcal{L}_r(z) \); principal branch of logarithm \( \text{Log} z \).
3. Determining where \( \mathcal{L}_r(g(z)) \) is analytic.
4. Definitions of \( z^\alpha \) and \( c^z \).
5. Solving equations.