Complex analysis Part 1.

1. Reminder about complex numbers.
(You have to be fluent with cartesian and polar representations, arithmetic, real and imaginary parts, conjugate etc.

2. Geometry and inequalities (You should be able to see which domains are described, by elementary inequalities for complex #'s.
   2a. Domains
   3. Continuous functions (Standard things)

4. Complex derivative. Examples.

5. Cauchy-Riemann conditions, also in polar coordinates.

6. (Standard) rules for derivative.

7. Analytic functions.

8. Polynomials, rational functions, exponentials

9. Harmonic functions. Conjugate harmonic functions examples.

10. Simply connected domains. Finding conjugate harmonic function

11. Definition an properties of exponential function. Mapping performed by exponential function.

12. Trigonometric and hyperbolic functions

13. Logarithmic function

14 Power function. Roots of unity.

15. Geometry: angle between curves. Angle preservation

16. Conformal mapping.

17. Riemann theorem (no proof!)

18. Inverse mapping.

19. Mappings by elementary functions

20 Joukowski mapping.