Homework Assignment 2

Due on April 12, 2011

Part I: [2, Chapter 8], Exercises 20, 21 and Problems 3, 9.

Part II:

1. Prove the Schwarz-Christoffel formula that describes the conformal mapping from the upper half plane to a polygonal domain.

2. The inverse $f(z)$ of the conformal mapping

$$F(w) = \int_0^w \frac{d\eta}{\sqrt{(1-\eta^2)(1-k^2\eta^2)}} \quad (0 < k < 1)$$

can be extended to the whole complex plane. Show that this extended $f(z)$ is indeed meromorphic (i.e., there is no essential singularity), and that all poles are simple.

References

[1] L. V. Ahlfors, *Complex analysis. An introduction to the theory of analytic functions of one complex variable*. Third edition. International Series in Pure and Applied Mathematics. McGraw-Hill Book Co., New York, 1978.

[2] E. Stein and R. Shakarchi, *Complex analysis*. Princeton Lectures in Analysis, II. Princeton University Press, Princeton, NJ, 2003.