Complex Variables
Spring 2011

Assignment 5.1
Due October 3

**Exercise 1.** Let $A$ be a connected open set and suppose that $f$ and $g$ are both analytic functions on $A$. Prove that if $\operatorname{Re} f = \operatorname{Re} g$ everywhere on $A$ then there is a purely imaginary number $ik$ so that $f = g + ik$. In other words, the real part of an analytic function (almost) determines it completely. [*Suggestion:* Apply the Cauchy-Riemann equations to the analytic function $f - g$.]

**Exercise 2.** 1.5.16. Note that this exercise proves that if the image of an analytic function is contained in any fixed line, then that function is actually constant.

**Exercise 3.** 1.5.28

**Exercise 4.** 1.5.29