MATH 2250, Fall 2010.
Homework assignment, Oct. 29, 2010

1. Using conformal maps write down Poisson formula for the upper half-plane and for the strip $0 < \operatorname{Im} z < 1$.

In other words, write formulas restoring bounded harmonic functions in these domains which are continuous up to the boundary (but not necessarily at infinity) by their values on the boundary.

2. Find a bounded harmonic function u in the unit disc $\mathbb{D}$ such that

$$\lim_{r\to 1-} u(re^{it}) = \begin{cases} 1, & 0 < t < \pi/2, \\ 0, & \pi/2 < t < 2\pi \end{cases}$$

Use 2 methods: Poisson formula and conformal mapping to a strip.

3. p. 174 # 4, 5