Problem Set 3 (§3.2.3–3.3.5) Math 660

Due Monday, July 11, 2011 Jim Fowler

As they say, *mathematics is not a spectator sport.* Stay involved by doing the homework. Have fun trying to craft your own problems!

Show Work

When you "solve" a problem, the goal is not merely to give a correct answer! Each problem has a story, and you should *tell the story* by clearly explaining your argument.

Problem 1

Page 72, problem 3 in Ahlfors' *Complex Analysis*.

Problem 2

Page 72, problem 1 in Ahlfors' *Complex Analysis*.

Problem 3

Page 78, problem 4 in Ahlfors' *Complex Analysis*.

Problem 4

Page 78, problem 3 in Ahlfors' *Complex Analysis*.

Problem 5

Page 80, problem 4 in Ahlfors' *Complex Analysis*.

Problem 6

Page 83, problem 8 in Ahlfors' *Complex Analysis*.

Problem 7

Page 83, problem 5 in Ahlfors' *Complex Analysis*.

Problem 8

Page 83, problem 6 in Ahlfors' *Complex Analysis*.

Problem 9

Let $k \geq 3$ be an integer. Let $0 \leq \ell \leq k$ be an integer. Prove that it is possible to define a branch $f(z)$ of the function

$$z^{\frac{k-1}{k}}(z-1)^{\frac{1}{k}}$$

defined on the z-plane minus the real closed interval $[0,1]$. Suppose the value of $f(z)$ at $z=2$ is equal to $e^{\frac{2\pi i \ell}{k}} 2^{\frac{k-1}{k}}$. Find the value of $f(z)$ at i.

Problem 10

Page 83, problem 4 in Ahlfors' *Complex Analysis*.