Homework Set 4

DUE: Thurs, Feb. 12, 2009. Late papers accepted until 1:00 Friday.

The *Problem Collection* is at `http://www.math.upenn.edu/ kazdan/609S09/hw/hw-collection.html`

1. Problem Collection p. 18 #7

2. Problem Collection p. 19 #2

3. Problem Collection p. 19 #3

4. Problem Collection p. 19 #5

5. Problem Collection p. 59 #46

6. (Alhfors, P. 108 #3) Compute $\displaystyle\int_{|z|=2} \frac{dz}{z^2-1}$. [Hint: partial fractions].

7. (Ahlfors, P. 108 #6) Assume that $f(z)$ is analytic in a region Ω and satisfies the inequality $|f(z)-1|<1$ there. Show that
$$\int_\gamma \frac{f'(z)}{f(z)}\,dz = 0$$
for every closed curve γ in Ω.

8. (Ahlfors, P. 108 #7) If $p(z)$ is a polynomial and C denotes the circle $|z-a|=R$, compute $\displaystyle\int_C p(z)\,d\bar{z}$. [*Answer*: $-2\pi i R^2 p'(a)$.]