Math 153H **Homework 2 Extra Credit** **Due 9/9/14**

1. (a) Suppose f is continuous on the interval $[0, 1]$. Show

$$\int_0^\pi xf(\sin(x))\,dx = \frac{\pi}{2}\int_0^\pi f(\sin(x))\,dx.$$

(b) Let n be a positive integer. Use the formula from (a) to compute the following integral:

$$\int_0^\pi \frac{x\sin^{2n}(x)}{\sin^{2n}(x)+\cos^{2n}(x)}\,dx.$$

2. Let $A = \int_0^\pi \frac{\cos(x)}{(x+2)^2}\,dx$. Compute the integral

$$\int_0^{\pi/2} \frac{\sin(x)\cos(x)}{x+1}\,dx$$

in terms of A.