Exercises

1. Stein and Shakarchi, pp. 145–147, #1,2,3,5,7 and 9.

Problems to be handed in

Due Wednesday, 6 April 2011

1. (Compare exercise 14, page 92 of Stein and Shakarchi.) Let v_d be the Lebesgue measure of the ball with radius one in $\mathbf{R}^d$.

   Show that
   $$v_d = 2v_{d-1} \int_0^1 (1 - t^2)^{(d-1)/2} \, dt.$$

   Use the above recurrence relation and what we know about the Γ-function and the B-function to find a formula for v_d. Hint: Your answer will involve the Γ-function.

2. Stein and Shakarchi, page 146, #4

March 29, 2011