MA676
MWF 1-1:50pm
CB 345
Spring 2011

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Exercises

1. Please try really, really hard to attend one of Whiteley's presentations on Monday or Tuesday, 18 or 19 April and the Hayden Howard lecture on Thursday, 21 April.

2. Study for the final. Review test 1, the graded homework and the following exercises: Chapter 1, #4, 8, 11, 14, Chapter 2, #9, 10, 16, 19, and Chapter 3, #1, 2, 7, 9.

Problems to be handed in

Due Wednesday, 27 April 2011.

1. S&S p. 148, #16 and 19.

2. (Cheap polar coordinates). Let f be a continuous function on $[a,b] \subset [0,\infty)$.

   (a) Show that on $\mathbf{R}^d$

   $$\int_{a<|x|<b} f(|x|)\,dx = dv_d \int_a^b f(r) r^{d-1}\,dr.$$

   Hint: Let $r_k = a + (b-a)k/n$. Let $M_k = \sup\{f(r) : a_{k-1} \le r \le a_k\}$ and convince yourself that

   $$\int_{a<|x|<b} f(|x|)\,dx = \lim_{n\to\infty} \sum_{k=1}^{n} M_k v_d (r_k^d - r_{k-1}^d).$$

   (b) For $k > d$ and $a \in (0,\infty)$, evaluate

   $$\int_{|x|>a} \frac{1}{|x|^k}\,dx.$$

April 15, 2011