

Math 8061 Homework 3

Due Wednesday, 9/19/12

1. This problem concerns smooth structures on manifolds with boundary.
 - a) Let M be a manifold *with* boundary, with smooth atlas $\{(U_i, \varphi_i)\}$. Let N be a manifold *without* boundary, with smooth atlas $\{(V_j, \psi_j)\}$. Show that a smooth structure on $M \times N$ can be given by the atlas $\{(U_i \times V_j, \varphi_i \times \psi_j)\}$.
 - b) Suppose that M and N are both manifolds with boundary. What (if anything) will go wrong if one attempts to construct a smooth structure on $M \times N$ using the method of part (a)?

2. Problem 2–3 in Lee’s book.

3. Problem 2–5 in Lee’s book.

4. Problem 2–18 in Lee’s book.