# Math 6458 - Spring 2009
# Homework 3

Work all the problems, but carefully write up and turn in Problems 1, 3, 5, 7

1. Suppose $p : (M, g) \to (N, h)$ is a local isometry (that is every point $x \in M$ has a neighborhood $U$ such that $p|_U$ is an isometry form $U$ to $p(U)$). If $(M, g)$ is geodesically complete, then $p$ is a covering map. Moreover $p$ is a Riemannian covering map (that is a covering map that is a local isometry).

2. Give a counterexample to the above problem if you do not assume geodesically complete. Hint: consider a geodesically complete example and then do some thing to make it not complete.

3. Work problem 6-5 in Lee's book.

4. Work problem 6-6 in Lee's book.

5. Work problem 6-8 in Lee's book.

6. Work problem 6-10 in Lee's book.

7. Work problem 7-2 in Lee's book.