Math 721A1, Homework #1
Differential Topology I

1. Guillemin and Pollack 1.6, 7, 12, 17
2. Prove that a function $f : M \to N$ is C^∞ if and only if $g \circ f$ is C^∞ for every C^∞ function $g : N \to \mathbb{R}$.
3. (a) Prove that $M_1 \times M_2$ is diffeomorphic to $M_2 \times M_1$.
   (b) Prove that the differentiable structure on $M_1 \times M_2$ makes the "slice" maps
   $p_1 \mapsto (p_1, \overline{p}_2)$
   $p_2 \mapsto (\overline{p}_1, p_2)$
   of $M_1 \to M_1 \times M_2$ and $M_2 \to M_1 \times M_2$ are differentiable for all $\overline{p}_1$ in M_1 and $\overline{p}_2$ in M_2.