Problems (Turn these in. A subset will be graded.)

1. Problem 19 of Chapter 9 in Rudin

2. Problem 23 of Chapter 9 in Rudin

3. In class, we used the inverse function theorem to prove the implicit function theorem. Do the reverse. Use the implicit function theorem to prove the inverse function theorem.

4. Let $E$ be an open subset of $\mathbb{R}^n$ and let $f : E \to \mathbb{R}^m$ be continuously differentiable.
   a. Prove that if $Df(x)$ has rank $m$ at each point of $E$, then $f$ is an open map.
   b. Prove that if $Df(x_0)$ has rank $n$, then there exists an open neighborhood $U$ of $x_0$ on which $f$ is one-to-one.

5. Problem 27 of Chapter 9 in Rudin

6. Part a of 21 in Rudin for the functions in 21 and 22.

Exercise
Carefully read Problem 30 of Chapter 9 in Rudin. This outlines a proof of the higher dimensional version of Taylor’s theorem, and gives two ways of stating it.