Math 550A, Homework 3

Continuous Functions

Due in class, Thursday, 2/20

Reading Read §18 of Munkres.

Exercises (to do on your own)

1. Show that the subspace $(a, b) \subset \mathbb{R}$ with $a < b$ is homeomorphic to $(0, 1)$.
2. Define S^1 to be the following subset of $\mathbb{R}^2$:

$$S^1 = \{(x, y) \in \mathbb{R}^2 : x^2 + y^2 = 1\}.$$

   Prove that S^1 is closed by using the fact that the function $f : \mathbb{R}^2 \to \mathbb{R}$, where $f(x, y) = x^2 + y^2$, is continuous.
3. (Infinite pasting lemma?) Suppose $\{A_\alpha\}$ is a collection of closed subsets of X whose union is X and $f : X \to Y$ is a map such that every restriction map $f|_{A_\alpha} : A_\alpha \to Y$ is continuous. Must f be continuous?

Problems (to turn in)

1. Munkres §18, exericse 1.
2. Munkres §18, exercise 8 (replace Y with $\mathbb{R}$ if you would like).
3. Munkres §18, exercise 11. Be sure to also read exercise 12.