Problem Set 6 **Set Theory & Topology** **Due 4/6/18**

You are expected to do the following problems to a high standard (i.e., at least well enough to be published in a textbook) for full credit. Four of these problems will be selected (by Jon) for grading, with each worth 5 points.

1. [Baker 7.1.5.2] The T_1-property is a topological property.
2. [Baker 7.1.8.1] If X is a T_1-space and $A \subseteq X$, then A is a T_1 space.
3. [Baker 7.1.9] Let X and Y be topological spaces. Prove that if Y is a T_2-space and $f : X \to Y$ is a continuous one-to-one function, then X is a T_2-space.
4. [Baker 7.1.10] Let X and Y be nonempty topological spaces. The product space $X \times Y$ is a T_1-space iff both X and Y are T_1-spaces.
5. [Baker 7.1.15] Prove that if $(X, \mathscr{T})$ is a finite T_1-space, then $\mathscr{T}$ is the discrete topology.
6. [Baker 7.1.16] Prove that if X is a T_1-space and $A \subseteq X$, then the set of limit points of A, A' is a closed subset of X.