Problem Set 8 **Set Theory & Topology** **Due 4/11/16**

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.

1. [Baker 7.R.1] Any indiscrete topological space is not Hausdorff.
2. [Baker 7.R.2] Any indiscrete topological space with two or more points is not Hausdorff.
3. [Baker 7.R.3] Singleton subsets of T_2-spaces are closed.
4. [Baker 7.R.4] Singleton subsets of T_1-spaces are closed.
5. [Baker 7.R.5] Singleton subsets of T_0-spaces are closed.
6. [Baker 7.R.6] Subspaces of regular spaces are regular.
7. [Baker 7.R.7] Subspaces of T_2-spaces are T_2-spaces.
8. [Baker 7.R.8] Closed subsets of normal spaces are normal.
9. [Baker 7.R.9] Every normal space is regular.
10. [Baker 7.R.10] Every normal space is a T_1-space.
11. [Baker 8.1.8] Let (X, d) be a metric space and let $U \subseteq X$. Then U is open with respect to the metric topology iff for each $x \in U$, there exists $r > 0$ such that $B_r(x) \subseteq U$.
12. [Baker 8.1.9] If d is the metric on $\mathbb{R}$ given by $d(x, y) = |x - y|$ for all $x, y \in \mathbb{R}$, then the corresponding metric topology for $\mathbb{R}$ is $\mathscr{U}$.