Problem Set 1 **Set Theory & Topology** **Due 1/12/18**

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 1.R.13] The inverse of the inverse of a one-to-one onto function is the original function.
2. [Baker 1.R.14] Let $f : X \to Y$ be a function and let A and B be subsets of Y. If $f^{-1}(A) = f^{-1}(B)$, then $A = B$.
3. [Baker 1.R.15] If $f : X \to Y$ is a function, then $f(X) = Y$.
4. [Baker 1.R.16] If $f : X \to Y$ is onto, then $f(X) = Y$.
5. [Baker 1.R.17] Inverse images of sets are only defined for one-to-one functions.
6. [Baker 1.R.18] If $f : X \to Y$ is a function, then $f^{-1}(Y) = X$.
7. [Baker 1.R.19] If $f : X \to Y$ is a function and U and V are subsets of X, then $f(U \cap V) = f(U) \cap f(V)$.
8. [Baker 1.R.20] If $f : X \to Y$ is a function and U and V are subsets of X, then $f(U \cap V) \subseteq f(U) \cap f(V)$.