Math 501
Dr. Klein Fall 2015

Instructions: This is NOT a take-home exam. This is a practice assignment for writing clear, coherent proofs, and you will not be graded on your solutions. Instead I will provide you with criticisms, suggestions, and other feedback. Your solutions must be typed. Use complete sentences only to prove the statements below. Do not look these problems up in other topology books or on the Internet. Do the problems yourself. Turn your solutions in Wednesday, September 30.

Let (X, d) be a metric space, $a \in X$, and let $r > 0$.

1. Prove that the closed ball $B[a, r]$ is a closed set.

2. Let (X, d) be a complete metric space. Let $\{U_1, U_2, ...\}$ be a sequence of dense open sets in X. Prove that the intersection of all of these sets is dense in X.