1. ASSIGNMENT 4

1.1. Problem 1. Suppose $K \subset \mathbb{R}^n$ is compact and for every $x \in K$ there exists an $r_x = r(x)$ such that

$$B_{r_x}(x) \cap K \ = \ \{x\}$$

Prove that K is a finite set.

1.2. Problem 2. Suppose $K \subset \mathbb{R}^n$ is compact and $E \subseteq K$. Prove that E is compact if and only if E is closed.

1.3. Problem 3. Prove that a sequence $\{x_k\}$ in $\mathbb{R}^n$ is Cauchy if and only if it converges.

1.4. Problem 4. If $\{x_n\}$ is a sequence in $\mathbb{R}^n$ which converges to a and $\{x_{n_j}\}$ is any subsequence of $\{x_n\}$, then $\{x_{n_j}\}$ converges to a as $j \to \infty$.