18.100B, Fall 2002, Homework 5

Due in 2-251, by Noon, Tuesday October 8. Rudin:

(1) Chapter 3, Problem 1

Yes, this really is $\mathbb{R}^k$ with the Euclidean metric.

(2) Chapter 3, Problem 20

(3) Chapter 3, Problem 21

Note that the problem should say that $\{E_n\}$ is a sequence of closed, bounded and *non-empty* sets in a complete metric space with $E_n \supset E_{n+1}$ and if $\lim_{n\to\infty} \operatorname{diam}(E_n) = 0$, where $\operatorname{diam}(E) = \sup_{p,q\in E} d(p,q)$, then $\bigcap_{n=1}^{\infty} E_n$ consists of exactly one point.

(4) Chapter 3, Problem 22. [You might find this tricky!]