1. Abbott 2.7.10

2. Abbott 2.7.13 **(Hand this one in to David.)**

3. Let (x_n) be a sequence. Prove that $\lim x_n = x$ if and only if for any open set G containing x, there is an N such that if $n \geq N$, $x_n \in G$.

4. Let G be an open set and let $x_1, \ldots, x_n$ be finitely many points in G. Prove that $G \setminus \{x_1, \ldots, x_n\}$ is open. *Hint:* : Prove it first in the case of just one point, and then apply Theorem 3.2.3

5. Prove or disprove:

a) $\mathbb{R} \setminus \mathbb{Q}$ is open.

b) $\mathbb{R} \setminus \mathbb{Z}$ is open.

6. Abbott 3.2.2 (Don't worry about being too rigorous for this one)

7. Let $A \subseteq \mathbb{R}$. Prove that A is closed if and only if every convergent sequence (a_n) with each $a_n \in A$ converges to a limit in A. You may not cite Theorem 3.2.8 (unless you choose to prove it.)

8. 4.2.1 a, b

9. 4.2.3