1. Abbott 2.4.2

2. Abbott 2.4.4

3.

a) Let $x, y > 0$ and $k \in \mathbb{N}$. Prove that $x > y$ if and only if $x^k > y^k$. *Hint:* The proof is by induction.

b) Let $x, y > 0$ and $k \in \mathbb{N}$. Prove that $x > y$ if and only if $x^{1/k} > y^{1/k}$. *Hint:* Use part *a*.

c) Let $c > 1$. Prove that $c^{1/(n+1)} \leq c^{1/n}$ for every n. *Hint:* Compare $\left[c^{1/(n+1)}\right]^{(n+1)}$ and $\left[c^{1/n}\right]^{(n+1)}$.

d) Compute (with proof) $\lim_{n\to\infty} c^{1/n}$ if $c > 1$.

4. Abbott 2.5.1

5. **(W) (Hand this one in to David.)** Let (a_n) be an unbounded sequence. Prove there is a subsequence (a_{n_k}) such that $\lim_k 1/a_{n_k} = 0$.

6. Abbott 2.5.2

7. **(Hand this one in to David.)**2.5.4