Assignment 1

Turn in starred problems Wednesday, January 25, at the beginning of the period. See the remarks below for hints or modifications of several of these problems.

Exercises from Abbott, *Understanding Analysis*:

Section 1.2: 3, 4, 6(d)*, 11*

Section 1.3: 6, 7, 8, 10*, 11

Section 1.4: 1, 2, 5, 8*

1.A* Suppose that A and B are nonempty sets of nonnegative real numbers (that is, $A, B \subset \mathbb{R}_+$, where $\mathbb{R}_+ = \{x \in \mathbb{R} \mid x \geq 0\}$) and that A and B are bounded above. Let $AB = \{ab \mid a \in A, b \in B\}$. Prove that $\sup AB = (\sup A)(\sup B)$.

Remarks, hints, and further instructions:

2.3 As well as giving a counterexample for the false statements, give a proof for the statements which are true.

3.6(d) A very useful corollary of the triangle inequality.

3.10 Part (b) here is not very clearly stated; $\mathbb{R}$ *does* satisfy the Axiom of Completeness (that is part of its definition), so in that sense there is nothing to prove. A better formulation:

(b) Suppose that $\mathbb{F}$ is an ordered field which satisfies the Cut Property. Prove that $\mathbb{F}$ satisfies the Axiom of Completeness.

4.8 Let us take it that by "provide a compelling argument", Abbott means "provide a proof."

1.A Compare with Exercise 1.3.6.