Homework Three, due Monday, September 14.

1. In the proof of Proposition 1.6 on page 7 of **The real numbers** it is left to the reader to verify that "$\mathcal{A}$ is a Dededind cut". Do so.

2. Prove Theorem 1.11 on page 8 of **The real numbers**.

3. Suppose a and b are sequences of real numbers with limits L and M, respectively. Show that

$$\lim_{n \to \infty} a_n + b_n = L + M \quad \text{and that} \quad \lim_{n \to \infty} a_n b_n = LM.$$

You may assume that L and M are finite.

4. Prove (i) and (ii) of Proposition 2.1 on page 11 of **The real numbers**.

5. Prove (i) and (ii) of Proposition 2.2 on page 11 of **The real numbers**.

6. Prove Theorem 1.4 on page 4 of **The real numbers.**

7. Do Exercise 2.2 on page 12 of **The real numbers.**

8. Do Exercise 2.3 on page 12 of **The real numbers.**

9. Do Exercise 2.4 on page 12 of **The real numbers.**