Tentative Assignments - Chapter 2

Section Exercises*

7  1(ac), 2, 3, 5
8  1(c), 2(ae), 4–6, 8(b), 10
9  1(b), 2, 4, 9, 10, 12;
   (i) Suppose that $a, b \in \mathbb{R}$ and that $|a - b| < \varepsilon$ for all $\varepsilon > 0$, then $a = b$.
   (ii) Show that limits are unique. That is, if $\lim_{n \to \infty} s_n = s$ and $\lim_{n \to \infty} s_n = t$, $s, t \in \mathbb{R}$, then $s = t$.
10 1, 6–8
   (i) Show that the MCT implies the Axiom of Completeness.
11 1, 3, 4, 10, 11
   11. Let $S$ be a bounded set. Prove that there is an increasing sequence $\{s_n\} \subset S$ such that $\lim s_n = \sup S = \sigma$. Note: It suffices to consider the case when $\sigma$ is not an element in $S$.
12 1, 2, 4, 5, 7, 10, 12, 13
14 1(ab), 2(b), 3(af), 4(c), 5(ab), 6(a), 7, 8, 13(bc)
   (i) Show that $x > 1$ implies $\frac{1}{x-1} + \frac{1}{x} + \frac{1}{x+1} > \frac{3}{2}$.
   (ii) Use part (i) to give an alternate proof that the Harmonic series diverges.
15 3, 7
17 1, 3(adf), 4, 5, 7(b), 8(a), 9, 10, 12, 14; (read only: 11 & 15)
   (i) Use an $\varepsilon$-$\delta$ argument to show that $\lim_{x \to 5} x^2 = 25$. Hint: Mimic Example 4 from section 3.17 of the posted lecture notes.

* - Graded homework exercises will be selected from assigned problems and additional handouts to be distributed throughout the semester.