

Part I: Read and Respond (prepare for class Wednesday, January 22)

Carefully read Section 1.3, taking notes for yourself and answering the following questions. Review the syllabus for parts (a)–(c) that should be included in this assignment. Here are the reading questions for part (a):

Reading Questions

1. Make up a really good example of a nonempty set of real numbers that is bounded below. What do you think its infimum is? Give a very short justification for your answer (as in, not a formal proof, but more of an explanation of why you think that).
2. What happens if we let $\epsilon = s - b$ in the backwards direction of the proof of Lemma 1.3.8? Write out the details.

Part II: Exercises (prepare for class for Wednesday, January 22)

1. Exercise 1.2.10c (the direction we were talking about at toward the end of class Friday: if for all $\epsilon > 0$, $a < b + \epsilon$, then $a \leq b$.)
2. Compute supremums and infimums for the following sets (you don't need to prove your answers for these, but be able to explain in class how you arrived at them).

(a) $S = \left\{ \frac{n+2}{3n-1} : n \in \mathbb{N} \right\}$

(b) \mathbb{Z}

(c) $S = \left\{ 2 + \frac{(-1)^n}{n} : n \in \mathbb{N} \right\}$

(d) $S = \left\{ \frac{n-1}{2n+1} : n \in \mathbb{N} \right\}$

(e) $S = \{r \in \mathbb{Q} : 0 < r^2 < 5\}$

3. Just before class Wednesday, refresh your memory on Exercise 1.2.11c and Sam's Conjecture since we didn't get to those presentations on Friday but will do them Wednesday.

Part III: Problems (due Wednesday, January 22 at the beginning of class)

1. (I) Exercise 1.2.7. Note on this problem: $f(A)$, $f(B)$, etc., are sets, so make sure you're thinking about them as such.