Part I: Read and Respond (prepare for class Wednesday, February 12)

Carefully read Section 2.3, 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 Question(s)

1. Give an example of a bounded sequence, including its bound, and an example of an unbounded sequence.
2. Consider the sequence $(x_n) = \left(4 - \dfrac{3}{n}\right)$. Following along the proof of Theorem 2.3.2 for this particular sequence, determine l, N, the set used to determine M, and M.
3. In the proof of (i) in the Order Limit Theorem, Abbott says that once we've assumed $a < 0$, we can find an N such that $|a_n - a| < |a|$ for all $n \geq N$. He follows this with the claim "In particular, this would mean that $|a_N - a| < |a|$, which implies $a_N < 0$." Why does it follow that $a_N < 0$ if $|a_N - a| < |a|$? Thinking geometrically may help here, though you can also argue for this algebraically.
4. Does the Order Limit Theorem still hold if all the inequalities are assumed to be strict (e.g.., $<$ instead of $\leq$)? If, for example, we assume that (x_n) is a convergent sequence for which $x_n > 0$ for all $n \in \mathbb{N}$, what can we say about the limit of (x_n)?

Part II: Exercises (prepare for class for Wednesday, February 12)

1. Exercise 2.3.7
2. Exercise 2.3.10

Part III: Problems (due Wednesday, February 12 at the beginning of class)

1. (I) Exercise 2.3.2(a).