Part I: Read and Respond (prepare for class Monday, February 24)

Read Section 2.7, 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. In Example 2.7.5, Abbott says it's clear that the geometric series diverges if $r = 1$ and $a \neq 0$. Why is that the case?
2. Here's a different take on Example 2.7.5 that doesn't appeal to long-forgotten algebraic identities. For $r \neq 1$, follow these steps:
   (a) We have
   $$s_n = a + ar + ar^2 + ar^3 + \cdots + ar^{n-1}. \tag{1}$$
   Multiply both sides of (1) by r.
   (b) Subtract your answer from (1).
   (c) Now solve for s_n.
   (d) Take the limit as $n \to \infty$ of the expression you get for s_n.
3. Which series tests do you remember from calculus (just a curiosity question)?

Part II: Exercises (prepare for class for Monday, February 24)

1. Give an example or explain why such an example is impossible to give of a set $S \subset \mathbb{R}$ and a Cauchy sequence $(a_n) \subseteq S$ such that $a_n \to a$ but $a \notin S$.
2. In the proof of the lemma saying that Cauchy sequences are bounded, how does $|x_m - x_n| < 1$ for all m, n imply $|x_n| < |x_N| + 1$?
3. Exercise 2.6.5
4. Exercise 2.7.4

Part III: Problems (due Wednesday, February 26 at the beginning of class)

1. (I) Exercise 2.6.1
2. (P) Exercise 2.6.3

Reminder

We'll have a Chapter 2 quiz on Friday, February 28.