Due: Wednesday, September 5

1. Exercise 1.1.D in the text.

2. Define a sequence \((x_n)\) by \(x_1 = 2\) and, for \(n \geq 2\),

   \[ x_n = 1 + \frac{1}{x_1 \cdots x_{n-1}}. \]

   Show that there is an integer \(m\) so that \(x_1 \cdots x_m > 100\). HINT: Proof by contradiction.

3. Exercise 1.5.H in the text.

4. Exercise 2.2.H in the text.

5. Exercise 2.3.A(e) in the text. Optional: What is the smallest value of \(N\) that satisfies the limit definition for \(\epsilon = 10^{-6}\)? Justify your answer, of course.

6. (a) Exercise 2.3.D in the text.

   (b) Find convergent sequences \((a_n)\) and \((b_n)\) so that

   i. \(a_n \leq b_n\) for all \(n\),
   ii. there is no \(N\) so that for all \(n \geq N\), \(a_n \leq \lim_{n \to \infty} b_n\), and
   iii. there is no \(N\) so that for all \(n \geq N\), \(b_n \geq \lim_{n \to \infty} a_n\).