I. Reading:

- Read Patty, §2.2.
- Skim Patty, §2.6. (*We will not cover §§2.3 through 2.5.*)

II. Practice problems:

1. Patty, Exercises 2.1 (pp. 65–67) #1, 2, 6, 7, 16, 17, 21.

III. Required problems:

1. Patty, Exercises 2.1 (pp. 65–67) #4.
2. Patty, Exercises 2.1 (pp. 65–67) #5.
3. Patty, Exercises 2.1 (pp. 65–67) #8.
4. Patty, Exercises 2.1 (pp. 65–67) #9.
5. Patty, Exercises 2.1 (pp. 65–67) #15.
6. Patty, Exercises 2.1 (pp. 65–67) #22.
7. (a) Prove the following generalization of the pasting lemma (Theorem 2.15): *Let* \( X \) *and* \( Y \) *be topological spaces, let* \( A_1, \ldots, A_k \) *be closed subsets of* \( X \) *such that* \( X = A_1 \cup \cdots \cup A_k \), *and for each* \( i = 1, \ldots, k \), *let* \( f_i: A_i \rightarrow Y \) *be a continuous function such that* \( f_i|_{A_i \cap A_j} = f_j|_{A_i \cap A_j} \) *for each* \( i \) *and* \( j \). *Then there is a unique continuous function* \( h: X \rightarrow Y \) *such that* \( h|_{A_i} = f_i \) *for each* \( i \).

(b) By considering the space \( X = [0, 1] \subset \mathbb{R} \) *with the usual topology, and the subspaces* \( A_0 = \{0\}, a_i = \left[ \frac{1}{i+1}, \frac{1}{i} \right] \) *for* \( i = 1, 2, \ldots \), *show that the previous result is false if the sets \( \{A_1, \ldots, A_k\} \) *are replaced by an infinite sequence of closed sets.*