1. October 12–October 16,
   Compactness: Theorems of Bolzano-Weierstrass and of Heine-Borel.
   Read §13 in the textbook.

   **Some details:** October 14:
   - Review: Open and closed sets in a metric space. (the metric space we focus on as main example is \( \mathbb{R} \) or \( \mathbb{R}^k \)). The union of any set of open sets is open; the intersection of finitely many open sets is open.
   - The intersection of any number of closed sets is closed; finite unions of closed sets are closed.
   - Limit points, a set is closed if it contains its limit points.
   - The set of limit points of any set is closed.
   - Proof of of Bolzano-Weierstrass (repeated).
   - Closure and interior of a set. Boundary.
   - Open cover and subcover. Proof of Heine-Borel

2. October 19–October 23
   Series. Absolute versus conditional convergence.
   Summation (limit of the sequence of partial sums) and summability.
   Read §14 – §16 in the textbook.

   **Some details:** A permuted *absolutely* convergent series converges to the same limit as the original.
   - A permuted conditionally (not absolutely) convergent series \( \sum a_n \) can converge to any prescribed limit: given a value \( L \in \mathbb{R} \), or a “mode of divergence”, there exists a permutation \( \sigma \) of \( \mathbb{N} \) such that \( \sum a_{\sigma(n)} \) behaves as prescribed.

3. October 26–October 30
   Continuity and basic properties of continuous functions.
   Read Chapter 3 in the textbook.