

Analysis 1+, MATH 4217/5217, Fall 2025

Homework 6, 2-3 The Bolzano-Weierstrass Theorem,

3-1 Topology of the Real Numbers

Due Saturday, October 4, at 11:59 p.m.

Write in complete sentences and paragraphs!!! *Explain* what you are doing and convince me that you understand what you are doing and why. Justify all steps by quoting relevant results from the hypotheses, class notes, or textbook. Use the notation and techniques described in the in-class hints (this is part of the instructions!). Do not copy the work of others (including websites or AI generated solutions). If you have any questions, then contact me (gardnerr@etsu.edu).

2.3.8. Prove part (b) of Theorem 2-18: Let $\{a_n\}$ and $\{b_n\}$ be bounded sequences. Then

$$\underline{\lim} a_n + \underline{\lim} b_n \leq \underline{\lim} (a_n + b_n).$$

3.1.6 (a) If A is closed and B is open, then $A \setminus B$ is closed.

(b) If A is open and B is closed, then $A \setminus B$ is open.

3.1.8. Prove that if $A \subset B$ then $\bar{A} \subset \bar{B}$.

3.1.10. (a) Prove that $\text{int}(A)$ is an open set.