

MAT 320: PROBLEM SET 2

DUE MONDAY SEPTEMBER 20

Problem 1: Let $a, b \in \mathbb{R}$, with $a < b$. Find a bijective map from \mathbb{R} to the following sets:

- (i) (a, b)
- (ii) (a, ∞)
- (iii) $[a, b)$
- (iv) $[a, b]$

Problem 2: The interior of A , $\text{int}(A)$ is defined as $\{x \in A : \text{there exists } \epsilon > 0, \text{ with } (x - \epsilon, x + \epsilon) \subset A\}$. The boundary of a set $A \subset \mathbb{R}$ is defined as $\partial A = \overline{A} \setminus \text{int}(A)$. Show that ∂A is closed and that $\overline{A} = A \cup \partial A$.

Problem 3: Let $a, b \in \mathbb{R}$ with $a < b$. Construct an open cover of (a, b) so that it has no finite subcover.

Problem 4: Chapter 1.3 Question 22.

Problem 5: Chapter 1.3 Question 23.

Problem 6: Chapter 1.4 Question 28.