

THE CHINESE UNIVERSITY OF HONG KONG
Department of Mathematics
MATH 2050B Mathematical Analysis I
Tutorial 2 (September 19)

The following were discussed in the tutorial this week:

1. Definitions of supremum and infimum.
2. Let $A = \left\{ \frac{x-1}{x} : x \in (0, \infty) \right\}$. Find $\sup A$, $\inf A$, $\max A$, $\min A$ (if it exists). Justify your answer.
3. Determine the supremum and infimum of the set

$$S = \left\{ \frac{k}{n!} : k, n \in \mathbb{N}, \frac{k}{n!} < \sqrt{2} \right\}.$$

4. Let A and B be bounded non-empty subsets of \mathbb{R} , and let

$$A + B := \{a + b : a \in A, b \in B\}.$$

Prove that

$$\sup(A + B) = \sup A + \sup B \quad \text{and} \quad \inf(A + B) = \inf A + \inf B.$$

5. Show that, for any $n \in \mathbb{N}$, there exists a unique positive real number x such that $x^n = 2$.