

MATH 2010-1 SPRING 2025 PRACTICE TEST #2

Write clearly, on separate paper.

- (1) [5pts.] Consider the subset $E = \{x \mid 2^x < 3\}$ of \mathbb{Q} .
- (a) Show that E is bounded above in \mathbb{Q} .
 - (b) Show that there is no least upper bound of E in \mathbb{Q} .
- (2) [4pts.] Find a number M such that $|2x^3 + 3x^2 - 2| \leq M$ for all $-2 \leq x \leq 1$. Justify your claim.
- (3) [5pts.] Consider the subset $E = \{x_1, x_2, x_3\}$ of \mathbb{R} . Show that
- $$\max\{|x_1 - x_2 + x_3|, |x_2 - x_3 + x_1|, |x_3 - x_1 + x_2|\} \leq 3 \max\{|x| \mid x \in E\}.$$