# MATH 201 FALL 2018 PRACTICE TEST #2

*Write clearly, on separate paper.*

(1) [5pts.] Consider $A = \{x \in \mathbb{Q} \mid x < \pi\}$. Give a careful formal proof that $\sup A = \pi$.

(2) [5pts.] Consider a real number $x$ with $|x| < 1$. Show that

$$|1 - x + x^2 + x^3| \leq \frac{1 - |x|^4}{1 - |x|}\,.$$

(3) [4pts.] Find a number $M$ such that $|x^3 + 4x^2 - 3x| \leq M$ for all $-3 \leq x \leq 2$. Justify your claim.