Real Analysis 1, MATH 5210, Spring 2019

Homework 3, Normed Linear Spaces (7.1)

Due Friday, February 1, at 1:30

Write in complete sentences!!! *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 textbook, class notes, or hypotheses. Do not copy the work of others; **do your own work!!!**

7.2. Let X be the family of all polynomials with real coefficients defined on $\mathbb{R}$. Show that this is a linear space. For a polynomial p define $\|p\|$ to be the sum of the absolute values of the coefficients of p. Prove that $\|\cdot\|$ is a norm.

7.3. For $f \in L^1[a,b]$, define $\|f\| = \int_a^b x^2|f(x)|\,dx$. Prove that $\|\cdot\|$ is a norm on $L^1[a,b]$.

7.5(a). Prove that ℓ^∞ is a normed linear spaces.