Real Analysis 2, MATH 5220, Spring 2023

Homework 8, Section 5.1. Groups, Fields, and Vector Spaces

(of Hong, Wang, Gardner)

Due Saturday, March 11, at 11:59 p.m.

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!!!**

- **5.1.4.** Consider the vector space \mathcal{P}_n of all polynomials of degree at most n. Find a basis for this space and find the matrix which represents the differentiation operator with respect to this basis.
- **5.1.10.** If T is a linear transformation from one vector space to another, then the set of vectors mapped to **0** under T is called the *kernel* of T. Prove that the kernel of T is a vector space.