Math 115A: Problem set 2

Sections 1 and 3. Instructor: James Freitag

Due 10/2

Problem 1 Showing finite dimensionality

Let V be a vector space and suppose that $V = span(\{x_1, \ldots, x_n\})$. Show that V is finite dimensional.

Problem 2 Functions without restrictions

Recall that $\mathcal{F}(\mathbb{R}, \mathbb{R})$ denotes the space of functions $f : \mathbb{R} \to \mathbb{R}$. Show that $\mathcal{F}(\mathbb{R}, \mathbb{R})$ is infinite dimensional.

Problem 3 Intermediate subspace

Let $m, n \in \mathbb{N}$ such that $m < n - 1$. Suppose V is a vector space of dimension n and W is a subspace of dimension m. Show that for each k with $m < k < n$ there is a subspace U such that $W \leq U \leq V$.

Problem 4 Interpolation

Given an example of a polynomial p which has degree at most 2 such that $p(x) = 3^x$ for $x = 1, 2, 3$.

Problem 5 Exercises from the book

Do the following exercises from book:

- 1 from section 1.6.
- 3 from section 1.6.