Math 307 Quiz 3

March 2, 2015

Problem 1. Define what it means for a function $f : \mathbb{R}^m \to \mathbb{R}^n$ to be a linear transformation.

Problem 2. Define the range of a function $f : \mathbb{R}^m \to \mathbb{R}^n$.

Problem 3. Define what it means for a function $f : \mathbb{R}^m \to \mathbb{R}^n$ to be onto.

Problem 4. Give an example of a function $f : \mathbb{R}^2 \to \mathbb{R}^3$ that is not linear.

Problem 5. Let $f : \mathbb{R}^3 \to \mathbb{R}^3$ be the function defined by $f(\vec{x}) = A\vec{x}$ for

$$A = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}.$$

Prove that f is onto.