

Advanced Calculus II, Fall 2022, Worksheet for Lecture 11

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Name: _____

Discussing the problems with other people is encouraged,
but you must write up your own work independently!

1. Let $Mat_{m,n}(\mathbb{R})$ be the vector space of $m \times n$ real matrices, whose elements are represented by tuples $(a_{i,j})_{1 \leq i \leq m, 1 \leq j \leq n}$. Let $L(\mathbb{R}^n, \mathbb{R}^m)$ denote the vector space of linear transformations from \mathbb{R}^n to \mathbb{R}^m , whose elements are those functions $T : \mathbb{R}^n \rightarrow \mathbb{R}^m$ which are linear transformations.

Describe down the standard isomorphism $Mat_{m,n}(\mathbb{R}) \rightarrow L(\mathbb{R}^n, \mathbb{R}^m)$ and its inverse $L(\mathbb{R}^n, \mathbb{R}^m) \rightarrow Mat_{m,n}(\mathbb{R})$.