HW 4

Problem 1 Let V be a n-dimensional vector space over $\mathbf{R}$ with a basis α. Show that the mapping from V to $\mathbf{R}^n$ defined by $[\mathbf{x}]_\alpha$ where $\mathbf{x} \in V$, is injective and surjective (bijective).
Notation: $[\mathbf{x}]_\alpha$ is the coordinates of $\mathbf{x}$ with respect to the basis α.

Problem 2 Let $T : V \longrightarrow W$ be an injective mapping. Suppose $\{\mathbf{v}_1, \cdots, \mathbf{v}_n\}$ is a linearly independent subset of V. Show that $\{T(\mathbf{v}_1), \cdots, T(\mathbf{v}_n)\}$ is linearly independent.

Problem 3 sec2.4 #3

Problem 4 sec2.5 #8