Midterm 2 Bonus Quiz MATH 304 Section 3 Name: Solution

Clearly circle "True" or "False" for each of the following problems. Circle "True" only if the statement is always true. No explanation necessary.

TRUE FALSE (a) Let V be a vector space and let X be an n element basis for V. Then the coordinate transfer map $K_X : V \to \mathbb{R}^n$ is an isomorphism.

TRUE FALSE (b) Let X be a subset of the vector space V. If $\vec{0} \in X$ then X is linearly independent. (LD)

TRUE FALSE (c) Assume that V is a finite dimensional vector space. Every spanning set for V contains a basis for V.

TRUE FALSE (d) If S is a linearly dependent (LI) subset of the vector space V and $\vec{u} \notin \text{Span}(S)$, then $S \cup \{\vec{u}\}$ is linearly independent.

TRUE FALSE (e) If V is a finite dimensional vector space, then any linearly independent set is contained in a basis for V.

TRUE FALSE (f) There exists a subset X of $\mathbb{R}^6$ that spans $\mathbb{R}^6$ and that has four elements. (this implies $\dim(\mathbb{R}^6) \leq 4$)

TRUE FALSE (g) If U is a subspace of V and $F : V \to W$ is a linear transformation, then $F(U)$ has the same dimension as U. (isomorphism)

TRUE FALSE (h) Let $k > n$. The k dimensional vector space V can have a linearly independent set with n elements.

TRUE FALSE (i) If $F : V \to W$ and $G : W \to U$ are linear transformations whose composition, $GF : V \to U$ is onto then G must be onto.

TRUE FALSE (j) If $F : V \to W$ and $G : W \to U$ are linear transformations whose composition, $GF : V \to U$ is 1-to-1 then G must be 1-to-1. (F)