Math 24
Winter 2010
Special Assignment due Monday, March 1

Let V be any vector space over F and W be a subspace of V. We know that V/W is a vector space, and that $T(x) = x + W$ is a linear transformation from V to V/W.

Assignment: Let α be a basis for W that can be extended to a basis $\alpha \cup \beta$ for V (where $\alpha \cap \beta = \emptyset$). Show that $\{x + W \mid x \in \beta\}$ is a basis for V/W.

Note that we have not assumed V is finite-dimensional, so α and β may be infinite.