Written Assignment 9: Due Friday, May 4

Problem 1: Let U and W be subspaces of $\mathbb{R}^6$ with $\dim(U) = 4$ and $\dim(W) = 3$. Show that $U \cap W \neq \{\vec{0}\}$
Hint: Do a proof by contradiction. Start by fixing bases of U and W. What would happen if $U \cap W = \{\vec{0}\}$? A previous homework problem will be helpful.

Problem 2: Let V and W be vector spaces. Suppose that $T \colon V \to W$ is an injective linear transformation and that $(\vec{u}_1, \vec{u}_2, \dots, \vec{u}_n)$ is a linearly independent sequence in V. Show that $(T(\vec{u}_1), T(\vec{u}_2), \dots, T(\vec{u}_n))$ is a linearly independent sequence in W.