Subspace Proofs
Math 4 Take-home Quiz due Monday, 10/31/2016

1. $M_{44}$ (the set of all 4x4 matrices with real entries) is a vector space. (You don’t have to prove this.)
   (a) Prove that the set of all diagonal matrices in $M_{44}$ is a subspace of $M_{44}$.
   (b) Prove that the set of all symmetric matrices in $M_{44}$ is a subspace of $M_{44}$. (Recall that, if a matrix $A$ is symmetric, then $a_{ij} = a_{ji}$ for all applicable values of $i$ and $j$.)
   (c) Prove that the set of all invertible matrices in $M_{44}$ is not a subspace of $M_{44}$.

2. Let $V$ be the vector space $F(-\infty, \infty)$.
   (a) Prove the set of all functions $f$ in $V$ for which $f(3) = 0$ is a subspace of $V$.
   (b) Prove that the set of all functions $f$ in $V$ for which $f(3) = 1$ is not a subspace of $V$. 