1. Fill in the missing words: if $AB = 0$ then the columns of $B$ are in the ________ of $A$, and the rows of $A$ are in the ________ of $B$.

2. Find the matrix $Q$ corresponding to the orthogonal projection onto the linear space spanned by $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$ and $\begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$.

3. Exercise 2.3, Chapter 2 of Trefethen-Bau (a Hermitian matrix is a matrix obeying $A^* = A$). [Hint: when writing $Ax = \lambda x$, think about taking the dot product on both sides with a judiciously chosen vector, e.g. $x$ for part a)?]

4. Exercise 2.6, Chapter 2 of Trefethen-Bau.