1. For \( n \times n \) matrices \( A \) and \( B \) do \( AB \) and \( BA \) always have the same eigenvalues? Use MATLAB/Octave to guess an answer and then verify your guess in the special case that one of the matrices, say \( A \), is invertible. Do they have the same singular values? What happens when \( A \) is \( n \times m \) and \( B \) is \( m \times n \) matrices with \( n \neq m \)? Guess the answer using MATLAB/Octave.

2. Suppose the matrix \( A \) given by

\[
\begin{pmatrix}
0.95 & 0.70 & 0.10 \\
0.57 & 0.52 & 0.25 \\
0.28 & 0.67 & 0.76 \\
0.63 & 0.61 & 0.30
\end{pmatrix}
\]

contains measured values that are accurate to within 0.1. Is it possible that the "real" matrix \( AA \) (i.e., without errors) has a non trivial null space? If so, what is a good approximation for this matrix and for a basis of its null space? Verify that the vector(s) you have found are in the null space of the matrix \( AA \) you have found.