Math 54, Quiz 9 Section 108 GSI Carter

Name:

1. Determine whether each of the following matrices is diagonalizable. You must justify your answer, but it is not necessary to exhibit a diagonalization.

   (a) $\begin{bmatrix} 2 & 0 & 0 & 0 \\ 5 & 2 & 0 & 0 \\ -1 & 3 & 2 & 0 \\ 4 & -1 & 5 & 2 \end{bmatrix}$

   (b) $\begin{bmatrix} -5 & 4 & -4 & 4 \\ 3 & 6 & -6 & -6 \\ -9 & 3 & 11 & 13 \\ -6 & 2 & 12 & 2 \end{bmatrix}$, which has characteristic polynomial $(\lambda^2 - 49)(\lambda^2 - 14\lambda)$.

2. For the given matrix A, find a matrix Q and a diagonal matrix Λ such that $A = Q\Lambda Q^T$.

$$A = \begin{bmatrix} 2 & -2 \\ -2 & 5 \end{bmatrix}$$