Problem Set 10

Problem 1. *Suppose that a 3×3 real symmetric matrix A has the eigenvalues $\lambda_1 = 1, \lambda_2 = -1, \lambda_3 = 0$. The eigenvectors corresponding to λ_1, λ_2 are $p_1 = (1, 2, 2)^T, p_2 = (2, 1, -2)^T$. Find the matrix A.*

Problem 2. *Find an orthogonal diagonalizing matrix for the following matrix:*

$$A = \begin{bmatrix} 2 & 2 & -2 \\ 2 & 5 & -4 \\ -2 & -4 & 5 \end{bmatrix}$$

Problem 3. *Find a unitary diagonalizing matrix for the following matrix:*

$$A = \begin{bmatrix} 0 & 1-i \\ 1+i & 1 \end{bmatrix}$$