**Math 2890 Homework 10 Due date: Nov. 2**

(1) Diagonalize the following matrix if possible.
$\begin{bmatrix} 2 & 1 & 1 \\ 0 & 2 & 1 \\ 0 & 0 & 3 \end{bmatrix}$.

(2) Suppose $A = PDP^{-}1$ where $P = \begin{bmatrix} 1 & -1 & -1 \\ -1 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$ and $\begin{bmatrix} -2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 1 \end{bmatrix}$.
Find an expression $e^A$.

(3) Let $A = \begin{bmatrix} 2 & -1 \\ 3 & 1 \end{bmatrix}$. Find a polynomial $f(\lambda)$ such that $f(A) = 0$.
Also verify your answer.

(4) Let $W = Span\{ \begin{bmatrix} 1 \\ -1 \\ 1 \end{bmatrix}, \begin{bmatrix} 2 \\ 3 \\ 1 \end{bmatrix} \}$. Find a basis for $W^{\perp}$.

(5) Problem 16, 17, 18, 23 in Sec 6.1.

(6) Problem 2, 6, 10, 20 in Sec 6.2.