

Math 2890 Homework Due date: April 19 (Monday)

(1) (a) Let $A = \begin{bmatrix} 0 & -4 & -6 \\ -1 & 0 & -3 \\ 1 & 2 & 5 \end{bmatrix}$.

Show that $\det(A - \lambda) = (1 - \lambda)(2 - \lambda)^2$. You may use the fact that $(1 - \lambda)(2 - \lambda)^2 = 4 - 8\lambda + 5\lambda^2 - \lambda^3$

(b) Use the information above to find the eigenvalues and eigenvectors of A .

(c) Find an expression for e^A .

(2) Diagonalize the following matrices if possible.

$$\begin{bmatrix} 0 & -4 & -6 \\ -1 & 0 & -3 \\ 1 & 2 & 5 \end{bmatrix} \text{ (you can use your result from problem 1),}$$
$$\begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 2 \end{bmatrix}.$$

(3) Sec 7.1 (Problem from the book) 2, 4, 17