

## Math 304 (Spring 2015) - Homework 9

### Problem 1.

Find the eigenvalues and eigenvectors of the following matrices.

(a)  $\begin{pmatrix} 3 & 2 \\ 4 & 1 \end{pmatrix}$

(b)  $\begin{pmatrix} 3 & -8 \\ 2 & 3 \end{pmatrix}$

(c)  $\begin{pmatrix} 1 & 1 & 1 \\ 0 & 2 & 1 \\ 0 & 0 & 1 \end{pmatrix}$

### Problem 2.

Determine whether the matrix  $A = \begin{pmatrix} 1 & 3 \\ 0 & 1 \end{pmatrix}$  is diagonalizable.

### Problem 3.

In each of the following, write the matrix  $A$  as a product  $SDS^{-1}$ , where  $D$  is a diagonal matrix.

(a)  $\begin{pmatrix} 5 & 6 \\ -2 & -2 \end{pmatrix}$

(b)  $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$

(c)  $\begin{pmatrix} 1 & 0 & 0 \\ -2 & 1 & 3 \\ 1 & 1 & -1 \end{pmatrix}$

### Problem 4.

Compute  $e^A$  of the matrix  $A = \begin{pmatrix} 3 & 4 \\ -2 & -3 \end{pmatrix}$ .

### Problem 5.

Find the eigenvalues and eigenvectors of  $A = \begin{pmatrix} 2 & 1-i \\ 1+i & 1 \end{pmatrix}$ .