

*Please do the following four problems and hand them in with your other homework due on April 27.*

For each of the following matrices  $A \in M_{n \times n}(\mathbb{R})$ , determine whether  $A$  is diagonalizable or not. If  $A$  is diagonalizable, find a diagonal matrix  $D$  and an invertible matrix  $P$  such that  $A = PDP^{-1}$ .

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

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

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

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