DUE Friday, April 24, 2015.

§ 9.3: #2, 4, 11a,d, 12a,d, 13c, 15.
§ 9.4: #6, 7, 8, 9.

Problems to turn in:

WeBWork Homeworks 13 and 14


A. (2) Use #22 to prove that a non-diagonalizable $n \times n$ matrix with real eigenvalues is arbitrarily close to a diagonalizable matrix.

§ 9.3: #17a,b† (3), 18 (3), 21 (2).
§ 9.4: #7 (2), 8 (2), 9 (2), 15 (3).

Challenge problems (Turn in separately):

§ 9.2: #20 (4), 21 (3).

B. (3) Suppose $A$ is a $2 \times 2$ matrix. Suppose $\lambda$ is its only eigenvalue, having algebraic multiplicity 2 but geometric multiplicity 1. Prove that there is a basis for $\mathbb{R}^2$ with respect to which the matrix of $A$ is

\[
\begin{bmatrix}
\lambda & 1 \\
\lambda & \lambda
\end{bmatrix}.
\]

(This is a special case of the Jordan canonical form.) Hint: Show that $C(A - \lambda I) \subset N(A - \lambda I)$ and therefore $C(A - \lambda I) = N(A - \lambda I)$.


*Don’t forget the hint for part (c) at the top of p. 436.
†As the hint suggests, consider $f(t) = e^{tA}e^{-tA}$ and compute $\dot{f}(t)$. 