Math 33b, Winter 2013, Tonći Antunović - Homework 9

From the textbook solve the problems:

Section 9.3: 10, 12, 16 and 18 (don't use numerical solver)
Section 9.4: 4, 6, 10, 20
Section 9.5: 12, 18, 22, 26, 28, 32.

And also the problems below:

Problem 1. Both the trace and the determinant of a 2x2 matrix A are equal to 2. Classify the equilibrium point and compute the characteristic polynomial. Then give one example of such a matrix A.

Problem 2. Any solution to the equation $y' = Ay$ is periodic with period $3\pi/2$ (A is a 2x2 matrix). Classify the equilibrium point and give one example of such a matrix A.

Problem 3. Find the solution of the initial value problem $y' = Ay$, $y(0) = y_0$ where

$$A = \begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 0 & 0 & -1 \end{pmatrix}, \quad y_0 = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$$

Problem 4. Find the general solution of the equation $y' = Ay$ where

$$A = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 2 \\ 0 & -2 & 0 \end{pmatrix}.$$