Read each problem **very carefully** before starting to solve it and do only what is asked. Each problem is worth around 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. [4 points] Find the general solution of the homogeneous linear system

$$y' = \begin{bmatrix} 1 & 4 \\ 6 & 3 \end{bmatrix} y.$$

2. [4 points] Find the general solution of the homogeneous linear system

$$\left\{ \begin{array}{rcl} y_1' & = & 3y_1(t) - y_2(t) \\ y_2' & = & y_1(t) + 3y_2(t) \end{array} \right\}.$$

3. [4 points] Find the general solution of the homogeneous linear system

$$\mathbf{y}' = \begin{pmatrix} 1 & 3 & 0 \\ 2 & 2 & 1 \\ 0 & 0 & -2 \end{pmatrix} \mathbf{y}.$$