(If you need the space, clearly mark work to be graded on the scrap page.)

1) (25 pt) Let $A = \begin{bmatrix} 0 & -2 & 0 \\ 2 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$.

a) (10 pt) Find all (real or complex) eigenvalues of A and a corresponding eigenvector for each eigenvalue.

b) (10 pt) Find the general solution of the matrix differential equation $\frac{d}{dt}\mathbf{x}(t) = A\mathbf{x}(t)$.

c) (5 pt) Find $\mathbf{x}(3\pi/2)$, where $\mathbf{x}(t)$ is the particular solution satisfying the initial condition $\mathbf{x}(0) = \begin{bmatrix} 0 \\ 1 \\ 3 \end{bmatrix}$.