Name: ID #: Section #:

Q1) Solve the initial value problem

$$X' = \begin{pmatrix} \frac{1}{2} & 0 \\ 1 & -\frac{1}{2} \end{pmatrix} X, \quad X(0) = \begin{pmatrix} 3 \\ 5 \end{pmatrix}.$$

Q2) Find the general solution of

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

Q3) Use variation of parameters to solve the system

$$X' = \begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix} X + \begin{pmatrix} \cos t \\ \sin t \end{pmatrix} e^t.$$