

Math 202-Quiz 5

Name: _____, Id: _____, Section _____, Serial # _____

Q1) Use matrix exponentials to solve the IVP $X'(t) = \begin{pmatrix} 2 & -3 & 2 \\ 0 & 0 & 0 \\ -2 & 5 & -2 \end{pmatrix} X$, $X(1) = \begin{pmatrix} 1 \\ -1 \\ -2 \end{pmatrix}$

(this means : first find the exponential of the matrix and use it to solve the system)

Q2) Let $X_1(t) = \begin{pmatrix} \cos t \\ -\sin t \end{pmatrix}$, $X_2(t) = \begin{pmatrix} \sin t \\ \cos t \end{pmatrix}$ be solutions of the system $X' = AX$ for some 2×2 matrix

A .

Use variation of parameters to solve the system $X'(t) = AX + \begin{pmatrix} 0 \\ \sec t \end{pmatrix}$