KFUPM/ Department of Mathematics & Statistics/ 162/ MATH 260-04/ Long Quiz

Name: **ID #:** **Serial #:**

PART A

1. Is the matrix $A = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ diagonalizable? Justify your answer.

2. Compute A^{17} if $A = \begin{bmatrix} 1 & 2 \\ 0 & -1 \end{bmatrix}$.

PART B

1. Find the value of the constant K such that $X = \begin{bmatrix} Ke^t \cos t \\ e^t (3\cos t - \sin t) \end{bmatrix}$ is a solution of the system $X' = \begin{bmatrix} -2 & 5 \\ -2 & 4 \end{bmatrix} X$.

2. Use the eigenvalue method to solve the system $X' = AX$, where $A = \begin{bmatrix} 0 & 2 \\ 1 & 1 \end{bmatrix}$.