Math 2135: Linear Algebra, Quiz #9   Name: _____

1. (a) Let T be a linear transformation whose characteristic polynomial is t^5 and whose minimal polynomial is t^2 and whose nullity is 3. What is the Jordan canonical form of T?

(b) Let T be a linear transformation whose characteristic polynomial is t^5 and whose minimal polynomial is t^3 and whose nullity is 2. What is the Jordan canonical form of T?

2. [BONUS]

   (a) Give an example of a pair of nilpotent 2×2-matrices whose sum is not nilpotent.

   (b) Show that if A and B are nilpotent $n \times n$-matrices which commute with each other (i.e., $AB = BA$), then $A + B$ is nilpotent.