Name: _____

Directions: Show all work. No credit for answers without work.

1. **[4 parts, 1 point each]** True/False. In the following, A and B are $n \times n$ matrices. Justify your answers.

   (a) For $n \geq 4$, an $(n \times n)$-matrix has at least 2 linearly independent eigenvectors.

   (b) The char. polynomial of A has enough information to tell whether A is diagonalizable.

   (c) If A and B are similar and A is diagonalizable, then B is also diagonalizable.

   (d) If A and B are similar matrices, then $\det(A) = \det(B)$.

2. **[2 parts, 3 points each]** Diagonalize the following matrices if possible. That is, for each diagonalizable matrix A below, construct an invertible matrix P and a diagonal matrix D such that $A = PDP^{-1}$. (There is no need to compute P^{-1} explicitly.) For each matrix A below that is not diagonalizable, explain why not.

   (a) $\begin{bmatrix} -15 & -14 \\ 21 & 20 \end{bmatrix}$

(b) $\begin{bmatrix} -7 & 0 & 10 \\ -10 & 3 & 10 \\ -8 & 0 & 11 \end{bmatrix}$