

# Quiz 10, Linear

Name: \_\_\_\_\_

1. (4 points) Find the characteristic polynomial and eigenvalue(s), if any exist, for the matrix  $\begin{bmatrix} 2 & 1 \\ -1 & 4 \end{bmatrix}$ .

2. (3 points) Let  $\lambda$  be an eigenvalue of an invertible matrix  $A$ . Show that  $\lambda^{-1}$  is an eigenvalue of  $A^{-1}$ . (Hint: Suppose a nonzero  $\mathbf{x}$  satisfies  $A\mathbf{x} = \lambda\mathbf{x}$ .)

3. (3 points)  $A$  is a  $4 \times 4$  matrix with three eigenvalues. One eigenspace is one-dimensional and one of the other eigenspaces is two-dimensional. Is it possible the  $A$  is *not* diagonalizable? Justify your answer.