

Name:

1. Let  $A$  and  $B$  be any  $n \times n$  matrices with an eigenvalue of 2. For each of the following statements, write the word “true” or “false.”

(a) The matrix  $A^2$  must have an eigenvalue of 4.

(b) The matrix  $AB$  must have an eigenvalue of 4.

2. Find any nonzero eigenvector for the following matrix and its associated eigenvalue:

$$\begin{pmatrix} 1 & 0 & 3 \\ 2 & 1 & 4 \\ -1 & 2 & 1 \end{pmatrix}$$