

Name : _____

Quiz #2

Math 301, Spring 2013

Wednesday, April 24, 2013

You may use your homework #10 for this quiz. But no other notes or neighbors!

1. A 2×2 matrix A has two eigenvalues $\lambda_1 = 0$ and $\lambda_2 = 3$. Answer the following as *true* or *false*. If you answer *false*, give a reason.
 - (a) A is invertible.
 - (b) A has two linearly independent eigenvectors.
 - (c) The sum of the diagonal entries of A is 2.
 - (d) The determinant of A is 0.
 - (e) A is diagonalizable.
 - (f) The eigenvalues of $2A$ are 0 and 4.
 - (g) The eigenvalues of A^2 are 0 and 9.
 - (h) The eigenvalues of A^{-1} are 0 and $1/3$.
 - (i) We can write $A = S^{-1}\Lambda S$ for some matrix S and diagonal matrix Λ .
 - (j) A is symmetric.

2. The eigenvalues of a A are $\lambda_1 = 2$ and $\lambda_2 = -1$. Find the eigenvectors of A

$$A = \begin{bmatrix} 0 & 2 \\ 1 & 1 \end{bmatrix}$$

3. Find the eigenvalues and eigenvectors of A below.

$$A = \begin{bmatrix} 1 & 1 \\ 0 & 2 \end{bmatrix}$$

4. Show that the 3×3 identity matrix has three eigenvalues equal to 1. What are the associated eigenvectors? Are they linearly independent?