

**Quiz 4**  
MATH 2184-10 - Linear Algebra  
Summer 2017

**Total Points:** 30

**Total Time:** 20 minutes

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

**Date:** 2017-06-19

**Read all of the following information before starting the quiz:**

- Show all work, clearly and in order, to get full credit.
- Do not use calculators.
- Circle or otherwise indicate your final answers.

1. **Write true or false and give a brief reason in support of your answer.**

Let  $A$  be a  $3 \times 3$  **upper triangular** matrix with diagonal entries as  $-1, 0$  and  $1$ . [15]

(a)  $A$  is diagonalizable. \_\_\_\_\_

**Reason:**

(b)  $A$  is invertible. \_\_\_\_\_

**Reason:**

(c) The eigenvectors of  $A$  form a basis for  $\mathbb{R}^3$ . \_\_\_\_\_

**Reason:**

(d) The sum of the eigenvalues of  $A$  (trace of  $A$ ) is zero. \_\_\_\_\_

**Reason:**

(e) The product of the eigenvalues of  $A$  (determinant of  $A$ ) is zero. \_\_\_\_\_

**Reason:**

2. Is  $\begin{bmatrix} -1 \\ 1 \end{bmatrix}$  an eigenvector of  $\begin{bmatrix} 5 & 2 \\ 3 & 6 \end{bmatrix}$ ? If so, find the corresponding eigenvalue. [5]

3. Find all the real eigenvalues of the matrix  $\begin{bmatrix} -4 & 2 \\ 6 & 7 \end{bmatrix}$  from its characteristic equation. [10]