Quiz 5

MATH 2184-10 - Linear Algebra

Summer 2017

Total Points: 30 **Total Time:** 20 minutes

Name: _____ **Date:** 2017-06-26

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. (a) Find all the eigenvalues of the matrix $\begin{bmatrix} 0 & 2 \\ -2 & 0 \end{bmatrix}$. [4]

(b) Find an **orthonormal** basis for $\text{Span}\{v_1, v_2\}$ where $v_1 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$, $v_2 = \begin{bmatrix} -1 \\ -1 \\ 1 \end{bmatrix}$. [6]

2. Solve the **least square problem** $Ax = b$ where [12]

$$A = \begin{bmatrix} 1 & 2 \\ -1 & 4 \\ 1 & 2 \end{bmatrix}, \; b = \begin{bmatrix} 3 \\ -1 \\ 5 \end{bmatrix}.$$

3. Prove the parallelogram identity: [8]

$$||u + v||^2 + ||u - v||^2 = 2||u||^2 + 2||v||^2$$

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