

MATH 54 – QUIZ 10

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Name: _____

Instructions: You have 20 minutes to take this quiz, for a total of 10 points. May your luck be orthonormal!

1. (5 points) Find an orthonormal basis for $W = \text{Span}\{\mathbf{u}_1, \mathbf{u}_2, \mathbf{u}_3\}$, where:

$$\mathbf{u}_1 = \begin{bmatrix} 1 \\ 0 \\ 1 \\ 0 \end{bmatrix}, \mathbf{u}_2 = \begin{bmatrix} 0 \\ 1 \\ 1 \\ 0 \end{bmatrix}, \mathbf{u}_3 = \begin{bmatrix} 1 \\ 0 \\ 0 \\ 1 \end{bmatrix}$$

(TURN PAGE)

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2. (5 points) Find the least-squares solution of $A\mathbf{x} = \mathbf{b}$, where:

$$A = \begin{bmatrix} 2 & 1 \\ 1 & 0 \\ 1 & -2 \end{bmatrix}, \quad \mathbf{b} = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$$

Hint: If it helps you, notice that the columns of A are orthogonal.