QUIZ 11   Math 304-06   Print your name _____
Nov. 21, 2023

No consultation!—that includes no electronics.

(1) (10 points) In $\mathbb{R}^2$ the set $\mathcal{U} = \{\mathbf{u}_1, \mathbf{u}_2\}$, where $\mathbf{u}_1 = \begin{bmatrix} 1/\sqrt{2} \\ 1/\sqrt{2} \end{bmatrix}$ and $\mathbf{u}_2 = \begin{bmatrix} 1/\sqrt{2} \\ -1/\sqrt{2} \end{bmatrix}$, is

an orthonormal basis. Find the expression of $\mathbf{x} = \begin{bmatrix} 2 \\ 5 \end{bmatrix}$ as a linear combination of this

basis, *using the orthonormality of* $\mathcal{U}$.

(2) (15 points) Diagonalize the matrix $A = \begin{bmatrix} 1 & 2 \\ 2 & 0 \end{bmatrix}$.