

Math 250–Section #3 Quiz #8

Name: _____

1. (4 pts) (a) What is an orthogonal matrix?

(b) The matrix

$$\begin{bmatrix} 1/\sqrt{2} & 1/\sqrt{2} \\ 1/\sqrt{2} & -1/\sqrt{2} \end{bmatrix}$$

is not a rotation. Explain why not.

(c) If P and Q are $n \times n$ orthogonal matrices, show that PQ^T is an orthogonal matrix.

(d) If P and Q are orthogonal, must $P + Q$ be orthogonal? (If not, give an example.)

Answer:

2. (6 pts) Find an orthogonal matrix P such that $P^{-1}AP$ is diagonal, where

$$A = \begin{bmatrix} 10 & 3 \\ 3 & 2 \end{bmatrix}.$$

Answer: (Find the eigenvalues of A first)