

## MATH 54 – QUIZ 9

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

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

1. (5 points) Find a matrix  $C$  of the form  $\begin{bmatrix} a & -b \\ b & a \end{bmatrix}$  (where  $a$  and  $b$  are **real** numbers) and an invertible matrix  $P$  such that  $A = PCP^{-1}$ , where

$$A = \begin{bmatrix} 3 & -5 \\ 2 & 5 \end{bmatrix}$$

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Date: Friday, October 24, 2014.

2. (5 points) Find all vectors  $\mathbf{x}$  in  $\mathbb{R}^4$  which are (simultaneously) orthogonal to:

$$\mathbf{u} = \begin{bmatrix} 0 \\ 1 \\ 1 \\ 0 \end{bmatrix}, \mathbf{v} = \begin{bmatrix} 1 \\ 0 \\ 1 \\ 0 \end{bmatrix}, \mathbf{w} = \begin{bmatrix} 1 \\ 0 \\ 0 \\ 1 \end{bmatrix}$$