

MATH 205A,B - LINEAR ALGEBRA  
FALL 2015

QUIZ 9

NAME:

Section:(Circle one) A(8 : 00) B(9 : 30)

Show ALL your work CAREFULLY.

Let

$$\vec{u}_1 = \begin{bmatrix} 4 \\ 3 \\ 2 \\ -1 \end{bmatrix}, \vec{u}_2 = \begin{bmatrix} -3 \\ 4 \\ 1 \\ 2 \end{bmatrix}, \vec{u}_3 = \begin{bmatrix} 1 \\ -2 \\ 3 \\ 4 \end{bmatrix}.$$

(a) Show that the set  $S = \{\vec{u}_1, \vec{u}_2, \vec{u}_3\}$  is an orthogonal set.

(b) Let  $\vec{y} = \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \end{bmatrix}$ . Find the projection of  $\vec{y}$  onto  $W = \text{Span}\{\vec{u}_1, \vec{u}_2, \vec{u}_3\}$ .

(c) Let  $\vec{y}$  and  $W$  be as in part (b). Find the point in  $W$  closest to  $\vec{y}$ .