

MATH 205A,B - LINEAR ALGEBRA
WINTER 2013

QUIZ 9

NAME:

Section:(Circle one) A(1 : 10) B(2 : 40)

Show ALL your work CAREFULLY.

(a) Let

$$\vec{u}_1 = \begin{bmatrix} -1 \\ 2 \\ 3 \end{bmatrix}, \vec{u}_2 = \begin{bmatrix} 3 \\ -6 \\ 5 \end{bmatrix}, \vec{u}_3 = \begin{bmatrix} 2 \\ 1 \\ 0 \end{bmatrix}.$$

Determine whether the set $S = \{\vec{u}_1, \vec{u}_2, \vec{u}_3\}$ is an orthogonal set. Justify your answer.

(b) Let $\vec{y} = \begin{bmatrix} 4 \\ -2 \\ 3 \end{bmatrix}$ and $\vec{u} = \begin{bmatrix} 1 \\ -1 \\ 2 \end{bmatrix}$. Find the projection of \vec{y} onto $W = \text{Span}\{\vec{u}\}$.

(c) Let \vec{y} and W be as in part (b). Find the shortest distance between \vec{y} and the line (through origin) W .