Linear Algebra, Spring 2016

Quiz 3   Name: _____

You must show all your work to receive credit. Calculators are allowed.

Problem 1: (3 points) Let A be a matrix such that

$$A\begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix} = \begin{bmatrix} -2 \\ 3 \\ 0 \end{bmatrix}, \quad A\begin{bmatrix} -2 \\ 4 \\ 3 \end{bmatrix} = \begin{bmatrix} 1 \\ -1 \\ -2 \end{bmatrix}, \quad A\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} = \begin{bmatrix} -5 \\ 5 \\ 3 \end{bmatrix}.$$

Find A^{-1}.

$$A\begin{bmatrix} 1 & -2 & 0 \\ 0 & 4 & 0 \\ -1 & 3 & 1 \end{bmatrix} = \begin{bmatrix} -2 & 1 & -5 \\ 3 & -1 & 5 \\ 0 & -2 & 3 \end{bmatrix}$$

So

$$A = \begin{bmatrix} -2 & 1 & -5 \\ 3 & -1 & 5 \\ 0 & -2 & 3 \end{bmatrix}\begin{bmatrix} 1 & -2 & 0 \\ 0 & 4 & 0 \\ -1 & 3 & 1 \end{bmatrix}^{-1}$$

$$= \begin{bmatrix} -7 & .5 & -5 \\ 8 & 0 & 5 \\ 3 & -1.25 & 3 \end{bmatrix}$$

$$A^{-1} = \begin{bmatrix} 3.6 & 2.7 & 1.4 \\ -5.1 & -3.4 & -2.9 \\ -5.7 & -4.1 & -2.3 \end{bmatrix}$$