

QUIZ #9, 9/25/07

MATH 54, FALL 2007

Show your work and justify your answers! Feel free to use both sides.

Name:

1. (4 pts) Write $\vec{x} = \begin{bmatrix} 4 \\ 1 \\ 1 \end{bmatrix}$ in terms of the basis $\vec{v}_1 = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$, $\vec{v}_2 = \begin{bmatrix} 0 \\ -2 \\ 0 \end{bmatrix}$, $\vec{v}_3 = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$.

(That is, write \vec{x} as a linear combination of the v 's).

2. (3 pts each) Find the dimension. Be sure to justify your answers.

(a) What's the dimension of the subspace in \mathbb{R}^4 defined by solutions to the equation $x_1 + 3x_2 - 3x_3 + x_4 = 0$?

(b) A linear transformation from \mathbb{R}^5 to \mathbb{R}^8 has image a line (i.e. spanned by one vector). What's the dimension of its kernel?