

**Dr. Z.'s Math 250 REAL Quiz #1**

**NAME:** (print!) \_\_\_\_\_

**E-MAIL ADDRESS:** (print!) \_\_\_\_\_

- 1.** (3 pts.) Compute the matrix-vector product

$$\begin{bmatrix} 2 & -3 \\ -4 & 5 \\ 11 & -1 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} a \\ 2a \end{bmatrix} ,$$

where  $a$  is a real number.

- 2.** (3 pts.) If possible, write the vector

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

as a linear combination of the vectors in  $\mathcal{S}$ , where

$$\mathcal{S} = \left\{ \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} , \begin{bmatrix} 3 \\ 4 \\ 5 \end{bmatrix} \right\} .$$

- 3.** True or False (Explain when appropriate)

(a) (1 pt.) The coefficients in a linear combination can always be chosen to be positive numbers.

(b) (1 pt.) If  $A$  is an  $m \times n$  matrix, then the only vector  $\mathbf{u}$  in  $R^n$  such that  $A\mathbf{u} = \mathbf{0}$  is  $\mathbf{u} = \mathbf{0}$ .