

Math 250–Section #4 Quiz #5

Name: _____

1. (4 pts) (a) Find a basis for the nullspace of

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

(b) Show that

$$\left\{ \begin{bmatrix} 0 \\ 3 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} -1 \\ 2 \\ 1 \\ 1 \end{bmatrix} \right\}$$

is a basis of the nullspace of A .

Answer:

2. (4 pts) (a) What is a *subspace* S of the vector space \mathbb{R}^n ? What is a *basis* of a subspace S ?

(b) Consider the set S of all 3×3 skew-symmetric matrices

$$A = \begin{bmatrix} 0 & a & b \\ -a & 0 & c \\ -b & -c & 0 \end{bmatrix}.$$

Why can we view this set as a subspace of \mathbb{R}^9 ?

(c) Find a basis (and consequently read the dimension) of S .

Answer:

3. (2 pts) Explain the following basic fact: A matrix A and its row reduced echelon form R have the same row space.

Answer:

Scratch