

Name: \_\_\_\_\_

Math 362 Linear Algebra – Crawford

Take-Home Quiz 4

Due: Monday, November 12, 2018 by 4pm

This quiz is take-home and *you are on your honor to work alone* – you may not get help from other people, in person or via technology. By turning in the assignment with your name, you are verifying that you have worked alone on these problems. You may use books, notes, and calculators for these problems. You may use a calculator/technology for row reductions and matrix operations. Show all other work. Partial credit may be given for written work. ***Good luck!***

1. (4 pts) Given the following set of vectors in  $\mathbb{R}^3$ , determine if it is a basis for  $\mathbb{R}^3$ . If it is not a basis, determine if it is linearly independent or if it spans  $\mathbb{R}^3$ .

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

2. (4 pts) Find a basis for the following subspace.

$$\left\{ \begin{bmatrix} s + 2t - u + 2v \\ -5s - 10t + 4u - 11v \end{bmatrix} : s, t, u, v \text{ in } \mathbb{R} \right\}$$

3. (1 pts) True or False: If  $H$  is a subspace of  $\mathbb{R}^4$ , then there is a  $4 \times 4$  matrix  $A$  such that  $H = \text{Col } A$ .

4. (6 pts) Given the following matrix  $A$ , (a) find a basis for  $\text{Nul } A$  and  $\text{Col } A$  and (b) state the nullity and rank of  $A$ .

$$\begin{bmatrix} 1 & 0 & -2 & 1 & 0 \\ 0 & -1 & -3 & 1 & 3 \\ -2 & -1 & 1 & -1 & 3 \\ 0 & 3 & 9 & 0 & -12 \end{bmatrix}$$