

## Math 220, Quiz 4 Section 8

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

ID Number: \_\_\_\_\_

Instructions: Clearly answer each of the questions below. Remember to check the back side. Show your work and any formulas you employ. Simplify all answers as far as possible.

1. (1 pt) How many vectors must a set of vectors from  $\mathbb{R}^7$  contain for you to be sure the set is linearly dependent? 8

2. (1 pt) At least how many vectors must every set of vectors spanning a 5-dimensional subspace of  $\mathbb{R}^8$  contain? 5

3. (1 pt) If a square matrix has linearly dependent columns, then its determinant is 0

4. (1 pt) The columns of which matrix below forms a basis of a two dimensional subspace of  $\mathbb{R}^4$ ? b

$$a. \begin{bmatrix} -2 & -9 & 10 & -6 \\ -5 & 7 & -4 & -1 \end{bmatrix}$$

$$b. \begin{bmatrix} -8 & -2 \\ 6 & 0 \\ 0 & -9 \\ 3 & -1 \end{bmatrix}$$

$$c. \begin{bmatrix} 3 & 1 & 3 \\ -12 & 4 & 0 \\ 0 & 0 & 1 \\ 6 & 2 & 1 \end{bmatrix}$$

$$d. \begin{bmatrix} 3 & 2 \\ 0 & 4 \end{bmatrix}$$

5. (2 pts) Use the determinant to calculate the area of a parallelogram with vertices  $(0, 0)$ ,  $(3, 1)$ ,  $(1, 4)$ , and  $(4, 5)$ . 11

6. (2 pts) Calculate the determinant of the matrix  $\begin{bmatrix} 1 & -7 \\ -9 & -10 \end{bmatrix}$ . -73