

# MATH 100—HOMEWORK 05

Due: Friday April 05

NAME \_\_\_\_\_

**Directions: please print this page, and put your solutions in the space provided.**  
If you need extra space, you can attach another sheet of paper.

1. Determine if each of the following are bases for  $\mathbb{R}^3$ . *Show all work and explain your answers.*

(a)  $\begin{bmatrix} 2 \\ -8 \\ 6 \end{bmatrix}, \begin{bmatrix} -3 \\ 8 \\ -7 \end{bmatrix}, \begin{bmatrix} -4 \\ 6 \\ -7 \end{bmatrix}$

(b)  $\begin{bmatrix} 1 \\ -6 \\ -7 \end{bmatrix}, \begin{bmatrix} 3 \\ -4 \\ 7 \end{bmatrix}, \begin{bmatrix} -2 \\ 7 \\ 5 \end{bmatrix}, \begin{bmatrix} 0 \\ 8 \\ 9 \end{bmatrix}$

(c)  $\begin{bmatrix} 1 \\ 1 \\ -2 \end{bmatrix}, \begin{bmatrix} -5 \\ -1 \\ 2 \end{bmatrix}, \begin{bmatrix} 7 \\ 0 \\ -5 \end{bmatrix}$

2. Let  $A = \begin{bmatrix} 3 & -1 & 7 & 3 & 9 \\ -2 & 2 & -2 & 7 & 5 \\ -5 & 9 & 3 & 3 & 4 \\ -2 & 6 & 6 & 3 & 7 \end{bmatrix}$ . Row reducing  $A$  yields

$$A \sim \begin{bmatrix} 3 & -1 & 7 & 0 & 6 \\ 0 & 2 & 4 & 0 & 3 \\ 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}.$$

(a) Find a basis for  $\text{Nul } A$ , and determine the dimension of  $\text{Nul } A$ . *Make sure to show all work.*

(b) Find a basis for  $\text{Col } A$ , and determine the dimension of  $\text{Col } A$ . *Make sure to show all work.*