Math 207 Section A, Quiz 8 Name: _____

To receive any credit, you must **show your work!**

1. Find bases for the four fundamental subspaces of the matrix

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

(a) $N(A)$:

Answer: $\left\{ \begin{bmatrix} -4 \\ 0 \\ 1 \end{bmatrix} \right\}$

(b) $N(A^T)$:

Answer: $\left\{ \begin{bmatrix} 0 \\ 0 \end{bmatrix} \right\}$

(c) $R(A)$:

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

(d) $R(A^T)$:

Answer: $\left\{ \begin{bmatrix} 1 \\ 3 \\ 4 \end{bmatrix}, \begin{bmatrix} 0 \\ 2 \\ 0 \end{bmatrix} \right\}$

2. Let $T : R^3 \to R^3$ be a linear transformation such that

$$T(1,0,0) = (1,2,4), \quad T(0,1,0) = (3,2,1), \quad T(0,0,1) = (0,2,2).$$

Compute $T(1,0,3)$. (*Hint: First write* $(1,0,3)$ *as a linear combination of basis vectors.*)

Answer: $T(1,0,3) = (1,8,10)$

"On my honor as a student I, _____, have neither given nor received unauthorized aid on this quiz."
(print name clearly)

Signature: _____ Date: _____

Score: