Name: _____

Worksheet and Quiz 6
Math 2250, Fall 2015   **October 21, 2015**   **R. Bruner**
(Corrected version)

The matrix A has reduced row echelon form R:

$$A = \begin{bmatrix} 1 & 2 & 1 & 0 & 0 \\ 3 & 6 & 1 & 2 & 0 \\ 1 & 2 & 0 & 0 & 2 \\ 2 & 4 & 1 & 1 & 0 \end{bmatrix} \quad \text{and} \quad R = \begin{bmatrix} 1 & 2 & 0 & 0 & 2 \\ 0 & 0 & 1 & 0 & -2 \\ 0 & 0 & 0 & 1 & -2 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

1. Find a basis $\mathcal{C}$ for the column space $\mathrm{Col}(A)$.

2. Find the coordinates $[x]_{\mathcal{C}}$ for the vector $\begin{bmatrix} 4 \\ 12 \\ 5 \\ 8 \end{bmatrix}$.

3. What are the dimensions $\mathrm{Dim}(\mathrm{Col}(A))$ and $\mathrm{Dim}(\mathrm{Nul}(A))$?

4. Find a basis $\mathcal{N}$ for the null space $\mathrm{Nul}(A)$.

5. Find the coordinates $[x]_{\mathcal{N}}$ for the vector $\begin{bmatrix} -4 \\ 3 \\ -2 \\ -2 \\ -1 \end{bmatrix}$.

6. Find a matrix N with $\mathrm{Col}(N) = \mathrm{Nul}(A)$.

7. (Extra Credit) Can you find a matrix C with $\text{Nul}(C) = \text{Col}(A)$?