Name: Solutions

Consider the matrix

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

(a) Find a basis for the row space of A.

RREF is $\begin{pmatrix} 1 & 3 & 0 & 2 & 3 \\ 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix}$.

$\Rightarrow$ Basis is $\{(13023), (00111)\}$.

(Alternatively $\{(13134), (00111)\}$ if using REF).

(b) Find a basis for the column space of A.

Basis is $\{(1000)^T, (1123)^T\}$.

(c) What is the rank of A? What is the nullity of A?

Rank is 2.

Nullity is 3.