Some Definitions and Terminology

Definition: The rank of an $m \times n$ matrix A, denoted r or rank(A), is the number of pivots (i.e. number of non-zero rows in the REF and RREF of A.

Observations:

- if $n > m$, then there are atleast $n - m$ free variables.
- the "dimension" of $N(A)$, called the nullity of A, is the number of free variables
- nullity $= n$ - the number of pivots $= n - r$, or

$$\text{rank} + \text{nullity} = n$$

Recall that the column space $C(A)$ is by definition characterized by the linear combo representation. We elaborate now on how to find the restrictions representation.