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NOTE: Answers without proper justfication will receive NO credit.

Problem 1. Consider the matrix $A = \begin{bmatrix} 2 & 1 & 2 \\ 2 & 2 & 1 \\ 2 & 3 & 0 \end{bmatrix}$.

1. *(4 points)* Find a basis for the row space of the matrix A.

$$\begin{bmatrix} 2 & 1 & 2 \\ 2 & 2 & 1 \\ 2 & 3 & 0 \end{bmatrix} \begin{array}{l} 2-1 \\ 3-1 \\ \frac{1}{2}1 \end{array} \longrightarrow \begin{bmatrix} 1 & \frac{1}{2} & 1 \\ 0 & 1 & -1 \\ 0 & 2 & -2 \end{bmatrix} \begin{array}{l} 3-22 \\ 1-\frac{1}{2}2 \end{array} \longrightarrow \begin{bmatrix} 1 & 0 & \frac{3}{2} \\ 0 & 1 & -1 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\text{Row } Sp(A) = \left\{ \begin{bmatrix} 1 & 0 & \frac{3}{2} \end{bmatrix}, \begin{bmatrix} 0 & 1 & -1 \end{bmatrix} \right\}$$

2. *(1 point)* Using the calculations from the previous item, determine the rank and the nullity of A.

$$\text{Rank}(A) = 2$$

$$\text{Nullity}(A) = 1$$