Step-1

Consider the statement,

If $m = n$, then the row space of A equals the column space and if $m < n$, then the null space has a larger dimension than the column space

Need to determine whether the statement is true or false.

The statement is false.

For example:

Let $A = \begin{bmatrix} 3 & 4 \\ 6 & 8 \end{bmatrix}$.

Here, the number of rows equal to the number of columns $(m = n = 2)$, but the row space of A contains multiples of $(3,4)$ while the column space of A contains multiples of $(1,2)$.

If $m < n$, the left null space has smaller dimension $m - r$ and r is the rank of the matrix A

Thus, the row space of A is not equal to the column space.

Hence, the statement is false.