Rank Theorem

For an $m \times n$ matrix A, the rank of A

$$\begin{aligned} &= \text{the number of leading } 1\text{s in the reduced row echelon form of } A \\ &= \text{the number of non-zero rows in any row echelon form of } A \\ &= \dim(\text{Row}(A)) \\ &= \dim(\text{Col}(A)) \\ &= n - \dim(\text{Null}(A)) \end{aligned}$$

Notice that $\dim(\text{Row}(A)) = \dim(\text{Col}(A))$.
This does not mean that $\text{Row}(A) = \text{Col}(A)$.
The last fact comes from Theorem 3.4.7, which says that $\dim(\text{Null}(A)) = n - \text{rank}(A)$.

Theorem 3.4.8 - Rank Theorem

If A is any $m \times n$ matrix, then

$$\text{rank}(A) + \text{nullity}(A) = n$$

This is also referred to as the Rank-Nullity Theorem.