Let $A$ be a square $n \times n$ matrix. Then the following statements are equivalent. That is, for a given $A$, the statements are either all true or all false.

1. $A$ is an invertible matrix.
2. $A$ is row equivalent to the $n \times n$ identity matrix.
3. $A$ has $n$ pivot positions.
4. $A$ has a pivot in each column.
5. $A$ has a pivot in each row.
6. The equation $Ax = 0$ has only the trivial solution.
7. The equation $Ax = b$ has at least one solution for each $b$ in $\mathbb{R}^n$.
8. The equation $Ax = b$ has exactly one solution for each $b$ in $\mathbb{R}^n$.
9. The columns of $A$ span $\mathbb{R}^n$.
10. The columns of $A$ are linearly independent.