Chapter 2 Section 4

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Theorem 1. *An $n \times n$ matrix A is invertible if and only if*

$$rref(A) = I_n$$

or, equivalently, if

$$rank(A) = n$$

Theorem 2. *To find the inverse of an $n \times n$ matrix A, form the $n \times (2n)$ matrix $\begin{bmatrix} A \mid I_n \end{bmatrix}$ and compute $rref[A \mid I_n]$.*

- *If $rref[A \mid I_n]$ is of the form $\begin{bmatrix} I_n \mid B \end{bmatrix}$ then A is invertible and $A^{-1} = B$.*
- *If $rref[A \mid I_n]$ is of another form (i.e., its left half fails to be I_n) then A is not invertible.*