

Proof Practice with Determinants

(a) Prove that if $|A| = |B| \neq 0$ and A and B are the same size, then there exists a matrix C such that $|C| = 1$ and $AC = B$.

(b) A square matrix A is called **nilpotent** if there exists a positive integer k such that $A^k = O$ (the zero matrix). Prove that if A is nilpotent, then $\det A = 0$.