1. Suppose that $A$ and $B$ are two $n \times n$ positive definite matrices. Prove $\det(A + B) > 2\sqrt{\det(AB)}$. 
2. Let A be a $m \times n$ real matrix and B be a $n \times m$ real matrix, with $m \geq n$. Prove that $\det(\lambda I_m - AB) = \lambda^{m-n} \det(\lambda I_n - BA)$. 