Proof assignment #2

Write up solutions to one of the two problems below. The due date for this assignment is Tuesday, April 15th.

Problems:

1. Let $A$ be an $n \times n$ matrix such that $A^6 = -I_n$. Prove that $A$ has no real eigenvalues.

2. Let $B$ be a $2 \times 2$ matrix with column vectors $b_1$ and $b_2$. Prove that

$$\det B \leq (\|b_1\|)(\|b_2\|).$$