1. Compute the cohomology of the $n$ dimensional torus $\mathbb{T}^n = \mathbb{S}^1 \times \cdots \times \mathbb{S}^1$.

2. Let $M, N$ be two manifolds with finite dimensional cohomology. Prove that $\chi(M \times N) = \chi(M)\chi(N)$. Here $\chi(M) = \sum_{i=0}^n (-1)^i H^i(M)$.

3. Let $M$ be a compact oriented manifold of odd dimension. Prove $\chi(M) = 0$. 
