1. Define the complex projective space $\mathbb{C}P^{n-1}$ to be the set of complex lines through the origin in $\mathbb{C}^n$ and prove that it is a manifold. What are the coordinate charts? Transition maps?

2. If $M$ and $N$ are manifolds, show that $M \times N$ is diffeomorphic to $N \times M$. What is the diffeomorphism in question?