MATH 151B-HOMEWORK SET 2

The homework set is due Friday 1/27 at 2 pm.

1. Compute the cohomology groups of $S^1 \times S^3 \times S^5$.

2. Let $M = \mathbb{R}^2 - \{0\}$:
   a. Show that $\omega = -\frac{y \, dx + x \, dy}{x^2 + y^2}$ is a closed 1-form on $M$, but it is not exact.
   b. Show that $\omega$ generates $H^1_{dR}(M)$ (viewing $H^1_{dR}(M)$ as a real vector space).
   c. Compute the de Rham complexes (i.e. $\Omega^0(M), \Omega^1(M), \ldots$) and also the de Rham cohomology groups of $M$.
