

PROBLEM SET 10

INTRODUCTION TO MANIFOLDS

Problem 1. Compute the de Rham cohomology ring of the n -sphere S^n .

Problem 2. Compute the de Rham cohomology ring of the multiply-punctured Euclidean space $\mathbb{R}^n \setminus \{p_1, \dots, p_m\}$, where $m \geq 1$.

Problem 3. Compute the de Rham cohomology ring of the 3-dimensional torus $T^3 \cong \mathbb{R}^3/\mathbb{Z}^3$.

Problem 4. Compute the de Rham cohomology vector spaces of the real projective space $\mathbb{R}P^2$.

Problem 5. Compute the de Rham cohomology vector spaces of the compact orientable surface of genus 3.