

Differential Geometry

Homework 9

due on Tuesday, November 20

1. Compute the De Rham cohomology $H^\bullet(M)$, when:

(a) $M = X - (Y \cup Z)$, where $X = \{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 + z^2 < 1\}$, $Y = \{(x, 0, 0) \in \mathbb{R}^3 : -1 < x < 1\}$ and $Z = \{(0, 1/2, 0)\}$;

(b) $M = \mathbb{P}^d$.

(note that \mathbb{P}^d is orientable if d is odd and it is non-orientable if d is even).

Hint: Let Mr. Mayer and Mr. Vietoris help you.