DIFFERENTIAL TOPOLOGY
PROBLEM SHEET 9

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Problem 1 (10 points, covering map)**.** Let $f \in C^\infty(M, N)$ be a covering map between smooth manifolds. Show that f^* is injective on $\Omega^*(N)$. Is f^* injective on de Rham cohomology?

Problem 2 (10 points, Möbius strip)**.** Compute the de Rham cohomology of the Möbius strip.

Problem 3 (10 points, projective space)**.** Compute the de Rham cohomology of the n-dimensional real projective space.

Problem 4 (10 points, torus)**.** Compute the de Rham cohomology of $S^1 \times S^1$.