

MATH 555: INTRODUCTION TO 3-MANIFOLDS, HOMEWORK 1

REVIEW OF 550 AND DEFINITION OF TOPOLOGICAL MANIFOLD

Due Thursday, 2/2

Problems (to turn in).

- (1) Carefully and with lots of details show that $S^1 = \{(x, y) \in \mathbb{R}^2 \mid x^2 + y^2 = 1\}$ is a topological 1-manifold.
- (2) Prove that if $f : X \rightarrow Y$ is a continuous bijection from a compact space X to a Hausdorff space Y , then f is a homeomorphism. (Hint: Use the definition of continuity that considers closed sets.)