MASS-07; GEOMETRY

FALL 2007

A.Katok

HOMEWORK # 3

September 7, 2007

Due on Friday, September 14

ATTENTION: due to a delay with presentation of the course material the September 14 deadline is optional; you may choose to postpone a part of this homework till MONDAY, September 17.

8. Express the area of a geodesic polygon in the sphere through its angles.

9. Express the area of a geodesic triangle in the sphere through lengths of its sides.

10. Describe all isometries of the (i) flat Mobius strip and (ii) the flat Klein bottle, i.e. the square with properly identified one or two pairs of opposite sides.

11. Consider a regular hexagon with pairs of opposite sides identified by the corresponding translations. Prove that it is (homeomorphic to) a torus.

12. Prove that the torus of the previous exercise is NOT isometric to the standard flat torus obtained by identifying the opposite sides of a square.

OPTIONAL PROBLEM (deadline September 24)

O1. Write a parametric representation for a projective plane in R^3 (with self-intersections) and in R^4 without self-intersections.