

PROBLEM SET #4

MA 109C: INTRODUCTION TO GEOMETRY AND TOPOLOGY

Due on Friday May 9, 2024

Solve the following problems from the textbook *Differential Topology* by V. Guillemin and A. Pollack. You may only use the relevant course material described below.

- (1) Chapter 2, section 4, exercise 14 (you do not need to show the part after “However, ...”.)
- (2) Chapter 3, section 2, exercise 3
- (3) Chapter 3, section 2, exercise 4
- (4) Chapter 3, section 3, exercise 1
- (5) Chapter 3, section 3, exercise 14,¹
- (6) Chapter 3, section 4, exercise 7

Relevant course material for this homework: Up to section 4 of Chapter 3.

You may not search the solutions to the homework problems from any source and you must write the homework in your own words. If you collaborated with other students, you must list their names on the solutions.

I strongly recommend that you solve, but not submit solutions for, the following additional problems.

- Chapter 2, section 4, exercise 14 (you do not need to show the part after “However, ...”.)
- Chapter 3, section 2, exercise 18 (the definition of triviality of normal bundles is given in exercise 19 of section 3 of Chapter 2.)
- Chapter 3, section 3, exercises 8, 9
- Chapter 3, section 3, exercise 17
- Chapter 3, section 4, exercises 8, 11

¹Note that the conditions of the problem do not guarantee that X is orientable. You may assume that X is orientable.