

Math. 423 - Homework 1

Due Date: September 9, 2008

Unless otherwise stated, all problems are from *Elementary Differential Geometry (revised 2nd Edition)* by Barret O'Neill

1. REVIEW

- (1) page 5: 1(b), 4(c)
- (2) page 11: 1(a), 2 (use Definition 2.4)
- (3) page 15: 3(a)

2. CURVES

- (1) page 22: 1, 2, 4, 7(a), 8
- (2) page 56: 1, 2, 3, 6, 10
- (3) page 66: 1, 2, 6
- (4) Consider the curve

$$\vec{\alpha}(t) = \left(\frac{2}{t^2 + 2}, \frac{2t}{t^2 + 2}, \frac{t^2}{t^2 + 2} \right), \quad t \in (-\infty, \infty)$$

- (a) Show that this curve lies on a sphere centered at the origin. Find the radius of the sphere.
- (b) Show that this curve lies on a plane (give the equation of the plane).
- (c) Sketch the curve.