

Math 5378, Differential Geometry
Homework 1
Due in-class on **Wednesday, January 30**

Numbered exercises are from Do Carmo, *Differential Geometry of Curves and Surfaces*.

1. Section 1.2, Exercise 1.
2. Section 1.2, Exercise 3.
3. Section 1.2, Exercise 4.
4. Find a parameterized curve whose trace is the circle

$$x^2 + y^2 = 2.$$

5. Find the singular points of the curve

$$\alpha(t) = (t^2, 2t^2)$$

between $t = -1$ and $t = 2$. Draw the trace of the curve in this region.

6. Section 1.3, Exercise 1.
7. Section 1.3, Exercise 2.
8. Find the arc length of the parameterized curve

$$\alpha(t) = (e^t, 2e^t, -2e^t)$$

between $t = 0$ and $t = 1$.