

Math 31CH Spring 2017 Homework 4, due 5/3/2017 in HW box in the basement of AP&M by 5 pm

1 Reading

Read Sections 6.1,6.2.

2 Exercises to submit on Wednesday 5/3

2.1 Exercises from the text

Section 5.3: #1, 3, 5, 6, 8, 15, 20.

Hints and comments:

#1: What the problem means is that your curve is the image of the function $f : \mathbb{R} \rightarrow \mathbb{R}^2$ given by $f(t) = \begin{bmatrix} r(t) \cos \theta(t) \\ r(t) \sin \theta(t) \end{bmatrix}$ as t goes from a to b . A similar comment applies to #3.

#6: We did not do an example in class of integrating a function on a k -dimensional manifold with respect to k -dimensional volume, we only did examples of finding the k -dimensional volume. The function case is not really any harder, see Definition 5.3.2.

#15: In problems where you have a parameterization, it is tedious to prove that the parameterization really does satisfy Definition 5.2.3 of a “relaxed” parametrization. So you need not do this for every problem. However, this is the point of #15(a) so for that one do justify as well as you can that Definition 5.2.3 is satisfied.

#20: Recall that $|A|$ indicates the length of a matrix A , i.e. its length as a vector in \mathbb{R}^4 once we identify 2×2 matrices with \mathbb{R}^4 .