

Math 241, Spring 2022 — Homework 7

Tim Chumley

Due April 6 at 5:00 pm

Instructions. This problem set covers material from Week 10 of class.

Problem 1. Do the following exercises from Chapter 7, page 90.

1. Exercise 22, parts b, f, h, i, j
2. Exercise 23, parts b, f, h, i, j
3. Exercise 24

Problem 2. Our end of semester project is coming up and I'd like us to start thinking about it. The goal of the project will be for you to work together to learn and communicate about a topic on dynamical systems that hasn't been discussed in class. You'll work in groups of 2 or 3 and give a short presentation. I have some suggested topics listed below that come from our textbook. As your submission for this homework, please tell me which topics interest you. For most of the suggestions below, there is more material than one group could cover, so I'll help pare it down and multiple groups might get assigned different pieces of the same topic, depending on interest. Please give me more than one preference and a ranking, any reasons for your choices, and tell me whether you have preferences for groupmates. This will help me assign groups and topics. Please feel free to state a preference for a topic that's not listed below, but please come talk to me about it.

1. Chaos and Feigenbaum's constant (parts of Chapters 8, 10)
2. Newton's method (Chapter 13)
3. Fractals (Chapter 14)
4. Complex numbers, Julia sets, the Mandelbrot set (parts of Chapters 16, 17)