

Math 241, Spring 2022 — Homework 4

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Due February 23 at 5:00 pm

Instructions. This problem set covers material from Week 4 of class. The exercises below come from Chapter 5 on page 59.

Problem 1. Do the following exercises from Chapter 5.

1. Exercise 7
2. Exercise 8
3. Exercise 9 (Note that we did Exercises 5 and 6 on the worksheet from Tuesday, February 15 and in this exercise I want you to summarize our findings about neutral fixed points)

Problem 2. Each of the following functions has a neutral fixed point at 0. Use the summary you wrote in Exercise 9 to determine whether it is weakly attracting, weakly repelling, or neither. Remember that you can use cobweb diagrams to check your conclusions, but I want you to base your conclusions on derivative computations. Feel free to use something like Wolfram Alpha to help you remember derivatives of functions like $\tan x$ and $\sec x$.

1. $S(x) = \sin x$
2. $T(x) = \tan x$

Problem 3. Do Exercise 2, parts b, c, d, f, from Chapter 5. Once you've done this, for each attracting cycle you found, draw a cobweb diagram showing an orbit that converges toward the cycle.