Homework Seven

Chaos and Fractals

College of the Atlantic

Due Friday, May 15(ish), 2026[1]

There are two parts to this assignment.

Part 1: WeBWorK Do Homework 07 which you will find on your WeBWorK page. **Note: Wait until after Monday's class to do the WeBWorK!**

Part 2: Problems from the Textbook. Here are some instructions for how to submit this part of the assignment.

- Do the problems by hand using pencil (or pen) and paper. There is no need to type of this assignment.
- Make a pdf scan of your work using genius scan or some similar scanning app. Please make the homework into a single pdf, not multiple pdfs.
- Submit the assignment on google classroom. Please don't email it to me.

Here are some "textbook" problems, which aren't actually from the textbook.

1. Consider the following complex numbers:

$$z_1 = -4 - 2i\ , \quad z_2 = 3i\ , \quad z_3 = 2 + 0.5i\ , \quad z_4 = -2 + 0.5i\ , \tag{1}$$

$$z_5 = -2i\ , \quad z_6 = 2 + 0.5i\ , \quad z_7 = 4 - 2i\ , \quad z_8 = -4 - 2i\ . \tag{2}$$

   (a) Plot the above numbers[2] on the complex plane.

   (b) Connect the dots. The pattern should look familiar.

2. Consider the function $f(z) = iz$.

   (a) Determine first four iterates of $z_0 = 3$.

   (b) Determine first four iterates of $z_0 = 2i$.

   (c) Plot the iterates for each of the seeds in the complex plane.

   (d) How would you describe the behavior of the orbits?

[1] If you need more time, that's ok. Just let me know. Thanks!

[2] Yes, I know that there are two numbers that are there twice.