

Assignment 2 Math 456 Fall 2024
Due: Friday 1 November

Reading

Chaos, 1.4 - 1.8

Exercises

Write in concise, clear *sentences* (incorporating symbolic notation and computations).

- 1) **Chaos:** 1.6 (p. 36)
- 2) **Chaos:** 1.11 (p. 37)
- 3) Suppose p is ℓ -periodic (that is, ℓ is the period of p) under f and that

$$f^k(p) = p.$$

Show that ℓ divides k .

- 4) Suppose that p is fixed by and attracting under a continuous map f . Let $B_0(p) = (a, b)$ be the immediate basin of attraction of p —the largest interval containing p in which the orbit of each element converges to p .
 - a) Show that $f(B_0(p)) \subset B_0(p)$. Can you also show that $f(B_0(p)) = B_0(p)$?
Does this result require continuity? That is, can there be a discontinuous map g with $g(p) = p$ and p attracting, but $f(B_0(p)) \not\subset B_0(p)$?
 - b) Show that $f(\{a, b\}) \subset \{a, b\}$. If $f(\{a, b\}) \neq \{a, b\}$, give a condition that's necessary for this outcome.