MATH 361 — HOMEWORK 6.

due on Friday, October 16.

Textbook: *"Elementary Classical Analysis"* , second edition
by J. E. Marsden and M. J. Hoffman

Topics:

- **5. Uniform Convergence**
  - 5.7 The Contraction Mapping Principle and Its Applications
  - 5.8 The Stone-Weierstrass Theorem
  - 5.10 Power Series

Sixth Homework Assignment.

Reading:

- Read Read Section 5.10. Read your notes.

Exercises:

Problem 1. Prove that every continuous function $f : [1, 7] \to \mathbb{R}$ is a uniform limit of polynomials without constant term.

Problem 2. Prove Hadamard's formula for the radius of convergence of the power series $\sum_0^\infty a_n z^n$:

$$\frac{1}{R} = \limsup_n \|a_n\|^{\frac{1}{n}}.$$

Problem 3. Prove that the two power series $\sum_0^\infty a_n z^n$ and $\sum_0^\infty n a_n z^{n-1}$ have the same radius of convergence, once by using Hadamard's formula and then directly, by using only Abel's Lemma.

***Problems*:**

- Page 286: problems $4, 6$
- Page 294: problems: $1, 2$