

## MAT 215: PROBLEM SET 10

DUE THURSDAY APRIL 21

**Reading:** Abbot, Section 8.4

**Problem 1:** A function  $f: \mathbb{R} \rightarrow \mathbb{R}$  is analytic if for every point  $c \in \mathbb{R}$ , there exists  $\epsilon > 0$  so that  $f(x) = \sum_{n=0}^{\infty} a_n(x - c)^n$  for  $x \in (c - \epsilon, c + \epsilon)$ .

- (i) Show that if  $f$  and  $g$  are analytic and there exists an open set  $U$  such that  $f(x) = g(x)$  for  $x \in U$ , then  $f(x) = g(x)$  everywhere. **Hint:** First do exercise 6.5.8.
- (ii) Give an example that shows part (i) is not true if  $f$  and  $g$  are only assumed to be infinitely differentiable.

**Abbot exercises:** 6.5.4, 6.5.6, 6.5.8, 6.6.4, 6.7.10, 6.7.11.