

## MATH 427: COMPLEX ANALYSIS (SUMMER 2018)

### Homework 4: due Monday, July 30th.

- Section 2.6 (Cauchy integral formula): 10, 13.
- Section 2.7: 2, 10.
- Section 3.1: 1, 2.

### Additional problem:

- (1) Let  $f(z)$  be an analytic function on  $\mathbb{C}$  and  $f(z)$  be bounded (i.e.  $|f(z)| \leq M < \infty$  for all  $z \in \mathbb{C}$ ). By using Cauchy integral formula and considering the limit of the integral

$$\int_{|z|=R} \frac{f(z)}{(z-a)(z-b)} dz,$$

as  $R \rightarrow \infty$ , where  $|a|, |b| < R$ , show that  $f(z)$  must be a constant. (This is Liouville's theorem, and we will see another proof later.)