## Homework 5 Due: Friday, September 22

- 1. [BC] 17.1, 17.2.
- 2. [BC] 17.5.
- 3. (a) [BC] 19.2.a
  - (b) Show that the  $j^{th}$  derivative of *P*, evaluated at 0, is

$$P^{(j)}(0)=j!a_j.$$

- 4. Consider the function  $f(z) = \overline{z}$ .
  - (a) Prove that *f* is continuous everywhere.
  - (b) Prove that f is not differentiable anywhere.
- 5. Let  $P(z) = (z z_1) \cdots (z z_n)$ . Prove, by induction on the degree *n*, that

$$\frac{P'(z)}{P(z)} = \frac{1}{z - z_1} + \frac{1}{z - z_2} + \dots + \frac{1}{z - z_n}.$$

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