

## Homework 11

Due Sunday, May 5th at 6pm

Read Boas Ch. 14, §§8-10.

1. In class I argued, without proof, that if a contour contains more than one isolated singularity that the residue theorem can be generalized to take the form

$$\oint_C f(z)dz = 2\pi i \cdot \text{sum of the residues of } f(z) \text{ inside } C.$$

Assuming you have already proved the residue theorem for one isolated singularity, prove this generalization by using contour arguments similar to that we used in proving Cauchy's theorem.

2. Complete our proof of the residue theorem by doing Boas 14.5.1. You don't have to prove the case  $n = 1$  since we did it together in class. But, feel free to do that case too if you want to check your understanding.
3. Boas 14.5.2
4. Boas 14.7.4
5. Boas 14.7.9