Math 421 **Problem Set 7** **Fall 2010**

Due: Wednesday, Nov. 17

1. Do page 169, Exercise 6; also calculate $f'(z)$ there.

2. Do page 170, Exercise 12 (a).

3. Do page 175, Exercise 2 (a) and (e). In each part, find both the set of all values *and* the principal value.

4. Do page 186, Exercise 1 by using the definition of $\cos z$ as the sum of a power series (Definition 5.5, page 176). Be sure to include all details.

5. Do page 186, Exercise 2.

6. Do page 187, Exercise 14 (a).

7. (c) Do page 192, Exercise 2 (c). Explicitly, what you must show is that the set $\{\, w : \tan w = z \,\}$ is the same as the set $\dfrac{i}{2} \log\left(\dfrac{i+z}{i-z}\right)$.

   (d) Do page 192, Exercise 2 (d) but just for the principal branch Arctan of the multi-valued arctan. In other words, derive the formula

   $$\frac{d}{dz}\,(\operatorname{Arctan} z) = \frac{1}{1+z^2}$$

   and indicate for which z it is valid.

8. Do page 197, Exercise 2.