Review for Test 1.

First of all go over all the homework to be sure you understand it. And on the class web page there are links to my previous Math 552 class and their tests (but be warned I never do a class quite the same twice).

Here are the main topics that will be covered. In this I give references to some problems in the text. Generally there will be other problems are relevant, and as the text has the answers to all problems you should be to find others examples for problems with which you are having trouble.

- Basic complex arithmetic. For sample problems see the text Problems 1.1, 1.2, 1.3, 1.7.
- Polar form of complex numbers and Euler's formula $e^{i\theta} = \cos\theta + i\sin\theta$. For sample problems see the text problems 1.16, 1.23, 1.25, 1.28, 1.29.
- Roots of polynomials. From the text 1.32, 1.36, 1.57, 1.95(a).
- We have done a lot with geometric series and some with the binomial theorem. Know the results form Homework 1 and Homework 3.
- Also know how to find the radius of convergence for series. As an examples see problem 6.59 (a), (c) (on page 195 of the text).
- Know the definitions of the basic functions we have studied to date. This would include e^z, $\sin(z)$, $\cos(z)$, $\arg(z)$, $\mathrm{Arg}(z)$, $\log(z)$, $\mathrm{Log}(z)$ and the relations between these function and how to find their real and imaginary parts. This includes knowing things like $\cos(z) = (e^{iz} + e^{-iz})/2$ and being able to solve things like $\sin(z) = 9$.
- **Very important**. Know the definition of the ***complex derivative*** $f'(z)$ in terms of a limit and also the definitions of partial derivatives in terms of limits. Know the definition of ***analytic function*** and the relationship between a function being analytic and and the ***Cauchy-Riemann equations***. Be able to derive the Cauchy-Riemann equations (see the text page 87 problem 3.5 (a)).
- Be able to use the Cauchy-Riemann equations to do problems such as were on Homework 7.
- ***Various*** and *Sundry* SURPRISE *Mystery* questions.