Math 312 Spring 98

Quiz **5** Complex Analysis

Name: ______________________

Date: ______________________ **Friday February 13**

Time Begun: ______________________ Ron Buckmire

Time Ended: ______________________

Topic : The Complex Exponential and Logarithm functions

The point of this quiz is for you to get practice using Complex Exponents, which involve the complex exponential and complex logarithm functions.

Instructions:

1. Once you open the quiz, you have as much time as you need to complete it, but record your start time and end time at the top of this sheet.
2. You may use the book or any of your class notes. You must work alone.
3. If you use your own paper, please staple it to the quiz before coming to class. If you don't have a stapler, buy one.
4. After completing the quiz, sign the pledge below stating on your honor that you have adhered to these rules.
5. Your solutions must have enough details such that an impartial observer can read your work and determine HOW you came up with your solution.
6. Sometime over the weekend I will post a hint on solving this quiz on the Complex Analysis wwwboard at `http://abacus.oxy.edu/wwwboard/complex` . You can access the board by using the login and password `complex`. If you do not understand the hint or have any other questions you should post a response on the wwwboard.
7. Relax and enjoy...
8. **This quiz is due on Wednesday, February 18**, in class. NO LATE QUIZZES WILL BE ACCEPTED.

Pledge: I, ______________________, pledge my honor as a human being and Occidental student, that I have followed all the rules above to the letter and in spirit.

Consider the function $f(z) = z^z$ which has features similar to both z^c and c^z (where c is some complex number).

(a) (*1 points*) Show that $f(z)$ can be written as $e^{z \log z}$

(b) (*2 points*) Compute $f(-i)$

(c) (*1 points*) As usual, the principal branch of our given function $f(z) = z^z$ involves using the principal branch of $\log z$ and choosing a branch cut along the negative real axis. Use this information to compute the principal value of $(-i)^{(-i)}$

(d) (*4 points*) Use the Chain Rule to find $f'(z)$

(e) (*2 points*) Compute $f'(-i)$ (You should be able to use results from **(c)** and **(d)** to help you.)

BONUS (*5 points*) Compute $f(i)$ and $f'(i)$ using $\mathcal{L}_{\pi/4}(z)$ instead of $\operatorname{Log} z$