Math 312 Spring 2004

Quiz 8   Complex Analysis

Name: _____

Date: _____   **Friday March 26**

Time Begun: _____   Ron Buckmire

Time Ended: _____

Topic : Complex Integration

The point of this quiz is to provide practice with complex integration on contours

Reality Check:

EXPECTED SCORE : _____/10   ACTUAL SCORE : _____/10

Instructions:

0. Please look for a hint on this quiz posted to `blackboard.oxy.edu`

1. Once you open the quiz, you have **30 minutes** to complete, please 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. Relax and enjoy...

7. **This quiz is due on Monday, March 29**, 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.

a. (*6 points*) One interesting application of contour integration is the ability to find the area of odd shapes in the plane. If we denote the area enclosed by a positively-oriented contour C by A, then

$$A = \frac{1}{2i} \oint_C \bar{z} \, dz$$

Recalling that the parametrization given by $z(t) = a\cos t + ib\sin t, 0 \leq t \leq 2\pi$ represents an elliptical contour C with horizontal axis a and vertical axis b use the formula for A to compute the area enclosed by an ellipse. (Your final answer should only involve π, a and b.)

b. (*4 points*) On the same contour as part **(a)** find the value of B, where

$$B = \frac{1}{2i} \oint_C z \, dz$$

(HINT: think how the integrands of A and B are different to obtain the value of the integral without much work.) EXPLAIN YOUR ANSWER.