Math 312 Spring 2016 Occidental College

Quiz 7 Complex Analysis

Name: ______________________________

ASSIGNED: **Wednesday March 23**
DUE: **Monday March 28**

Time Begun: ____________________
Time Ended: ____________________

Prof. Ron Buckmire

Topic : Contour Integration

The **learning goal** of this quiz is to provide an opportunity to demonstrate facility and understanding of contour integration of complex functions of complex variables.

Reality Check:

EXPECTED SCORE : __________/**10** ACTUAL SCORE : __________/**10**

Instructions:

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. QUIZZES WITH UNSTAPLED SHEETS WILL NOT BE GRADED.
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 28**, in class. NO LATE OR UNSTAPLED 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.

Math 312 Spring 2016 **SHOW ALL YOUR WORK & EXPLAIN EVERY ANSWER** Quiz **SEVEN**

1. (*10 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

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

(a) (*6 points*) 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 functions in the integrands of A and B are different to obtain the value B of this integral without doing very much work.) EXPLAIN YOUR ANSWER.