BONUS Quiz **3** Complex Analysis

Name: _____

ASSIGNED: **Friday April 8**
DUE: **Monday April 11**

Time Begun: _____
Time Ended: _____

Prof. Ron Buckmire

Topic : Applications of Cauchy's Residue Theorem

The point of this quiz is to provide you with an opportunity to demonstrate your ability to use Cauchy's Residue Theorem in an applied context.

Reality Check:

EXPECTED SCORE : _____/5 ACTUAL SCORE : _____/5

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 April 11**, 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 BONUS QUIZ **THREE**

SHOW ALL YOUR WORK & EXPLAIN EVERY ANSWER

1. Adapted from Question 2 of the **Math 312 Spring 1998 Final Exam**. Consider

$$\oint_{|z-1|=4} z^n e^{1/z}\, dz$$

where n is any integer. The point of this quiz is to derive a formula for the value of the contour integral involving all integer values of n.

(a) *[2 points.]* Consider $n \geq 0$. Derive a formula which evaluates this integral. Explain the method you are using and why you chose this method.

(b) *[1 point.]* Consider $n < 0$. Derive a formula which evaluates this integral. Explain the method you are using and why you chose this method.

(c) *[1 point.]* In order to verify your previously derived formula (found in part (b)), write down the value of $\displaystyle\oint_{|z-1|=4} \frac{e^{1/z}}{z^4}\, dz$.

(d) *[1 point.]* In order to verify your previously derived formula (found in part (a)), write down the value of $\displaystyle\oint_{|z-1|=4} z^3 e^{1/z}\, dz$.