Quiz 10 Complex Analysis

Name: _____

ASSIGNED: **Friday April 22**
DUE: **Monday April 25**

Time Begun: _____
Time Ended: _____

Prof. Ron Buckmire

Topic : Linear Fractional Transformations

The **learning goal** of this quiz is to provide the student with an opportunity to illustrate their understanding, facility and familiarity with linear fractional transformations.

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 April 25**, 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. I also pledge that I will not lie, cheat or steal and that I will report any such violation that I may witness.

SHOW ALL YOUR WORK & EXPLAIN EVERY ANSWER

Adapted from **Math 312 Spring 2001 Final Exam, Question 7**.

We want to find the image of $|z| \leq 1$ under the mapping $w = T(z) = \dfrac{(1+2i)z+1}{z+1}$.

(a) *[2 pts]* Find the fixed points of $T(z)$.

(b) *[2 pts]* Find the pre-image of the point at infinity under $T(z)$ and the image of the point at infinity under $T(z)$

(c) *[6 pts]* Compute and sketch the image of the set $S = \{z \in \mathbb{C} : |z| \leq 1\}$ under the mapping $w = T(z)$. Show as much work so that it is clear how you have computed your answer. (At the very least show where 3 points in the z-plane get mapped to in the w-plane.) Write down the image S' using set-builder notation in the $w = u + iv$ plane.