

Name: _____

Date: _____

Time Begun: _____

Time Ended: _____

Friday February 6

Ron Buckmire

Topic : Mappings and Points Sets in the Extended Argand Plane

The point of this quiz is to provide another example of using functions as mappings and to give you more practice becoming familiar with describing and sketching point sets of complex numbers. In addition it also tests taking limits of and evaluating functions of a complex variable in the extended z -plane.

Reality Check:

EXPECTED SCORE : _____/10

ACTUAL SCORE : _____/10

Instructions:

0. Before you open the quiz, check out the hint at <http://blackboard.oxy.edu>.
1. Once you open the quiz, you have 40 minutes to complete it.
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, February 9**, 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.

1. The **inversion mapping** is a very useful mapping used in a number of applications. It is defined as $w = \frac{1}{z}$
- (a) (*2 points*) Sketch the image of the circle $|z| = 2$ under the inversion mapping $w = 1/z$. (Describe the image in the w -plane using complex inequalities, and in English.)
- (b) (*2 points*) Sketch the image of the circle $|z| = 1/2$ under the inversion mapping $w = 1/z$. (Describe the image in the w -plane using complex inequalities, and in English.)
- (c) (*2 points*) Sketch the image of the ray $\text{Arg}(z) = \pi/4$ under the inversion mapping $w = 1/z$. (Describe the image in the w -plane using complex inequalities, and in English.)
- (d) (*4 points*) Use your results from above to assist you in determining the image of the set $D = \{z : 0 \leq \text{Arg}(z) \leq \pi/2 \cap |z| \leq 1\}$ under the inversion mapping $w = 1/z$. (Sketch D and its image!)