MAT430 Exam 1 (Spring 2010) − Take home portion

Name:

Directions: This is the take-home complement to your in-class exam. You may do the following two problems by hand, or using computer software. Needless to say (but I'll say it anyway) you are to work alone. Each solution should be on a separate page or pages. This is due Friday in class.

Problem 1. (30 pts)

    a. (20 pts) Use two planes and an appropriate choice of linear features in either the domain or range to illustrate the mapping $w(z) = \dfrac{1}{z}$.

    b. (10 pts) Use at least one other technique to visualize the mapping; for example, you might illustrate the impact of w on some well-chosen region(s). But we discussed other possibilities in class, too.

Problem 2. (15 pts) Using only the limit definition, prove that $\lim\limits_{z \to z_0} \dfrac{\bar{z}^2}{z} = 0$.