Math 6250 Quiz 3

Name:_____

Section 1.2: Complex Numbers

1. Prove $|z + w| \leq |z| + |w|$

2. Prove that the set $\mathbb{C}$ is uncountable.

3. Calculate the square roots of i.

4. Calculate the cube roots of $1 + i$.

5. We showed $\mathbb{R}$ is the only complete ordered field. We know that $\mathbb{Q}$ is an ordered field but not complete. And $\mathbb{C}$ is a complete field but not ordered. Show $\mathbb{C}$ is not ordered. That is show since $i \neq 0$ that either $i < 0$ or $i > 0$. Show either possibility leads to a contradiction.

6. Graph $S = \{|z| \leq 1 : Z \in \mathbb{C}\}$

7. Graph $T = \{|z - 1| + |z + 1| = 2 : Z \in \mathbb{C}\}$

8. Prove DeMoivre's using power series.

9. Use DeMoivre's to show: $\cos(2\theta) = \cos^2 \theta - \sin^2 \theta$.