Math 313A **Homework 1**

Due Wednesday 2/4/09

(1) Find all roots of the equation $z^2 + 2z + 2 = 0$.

(2) Describe the set of points in the Complex plane that satisfy the equation.

(a) $|z - 1 + i| = 3$

(b) $|z| = 3|z - 1|$

(c) $|z| > 6$

(d) $|z| = \mathrm{Re}(z) + 2$

(3) Write the following Complex numbers in polar form.

(a) $\dfrac{-1}{2}$

(b) $-3 + 3i$

(c) $-2\sqrt{3} - 2i$

(d) $\dfrac{-1 + \sqrt{3}i}{2 + 2i}$

(4) Write the following Complex numbers in rectangular form.

(a) $4 \text{ cis} \left(\dfrac{-\pi}{6}\right)$

(b) $5 \text{ cis} \left(\dfrac{-3\pi}{4}\right)$

(c) $2 \text{ cis} \left(\dfrac{-7\pi}{6}\right)$

(d) $-3 \text{ cis} \left(\dfrac{2\pi}{3}\right)$

(5) Prove that $\dfrac{z_1 + z_2}{2}$ is the midpoint of the line segment joining z_1 and z_2.