Math 350 **Winter, 2013**

Assignment #1

Due: Tuesday, January 21, 4:00 pm

You are being evaluated on the presentation, as well as the correctness, of your answers. Try to answer questions in a clear, direct, and efficient way. Sloppy or incorrect use of technical terms will lower your mark.

1. Evaluate

(a) $\left|\dfrac{i^9(2+i)^2}{(3+4i)^3}\right|$ (b) $\operatorname{Arg}\big((-\sqrt{3}-i)^2\big)$ (c) $\arg\left(\dfrac{i}{-2-2i}\right)$

2. Prove that $(\bar{z})^k = \overline{(z^k)}$ for every integer k provided $z \neq 0$ when k is negative.

3. Show that for all z,

(a) $e^{z+\pi i} = -e^z$

(b) $\overline{e^z} = e^{\bar{z}}$

4. Prove that if $|z| = 1$ $(z \neq 1)$, then

$$\operatorname{Re}\left[\tfrac{1}{1-z}\right] = \tfrac{1}{2}.$$

5. Write in the polar form $re^{i\theta}$

(a) $\dfrac{2+2i}{-\sqrt{3}+i}$ (b) $\dfrac{2i}{3e^{4+i}}$

6. Solve the equation $(z+1)^3 = z^3$.

7. Find all the values for the following expressions

(a) $\sqrt{1-i}$ (b) $(-1+i)^7$ (c) $\left(\dfrac{2i}{1+i}\right)^{1/3}$