Math 350 **Winter 2016**

Extra Practice problems #1

1. Convert the complex number $z = \dfrac{2i}{e^{1+i}}$ to polar form and to cartesian form.

2. Let $f(z) = \frac{z^2}{|z^2|}$. Does f have a limit as $z \to 0$?

3. (a) Solve for z: $iz = 4 - iz$.

(b) Evaluate Arg $\left(\frac{i}{-2-2i}\right)$

(c) Find all distinct values of $(1 - \sqrt{3}i)^{1/3}$

(d) Evaluate $\left(\frac{1}{1+i}\right)^{10}$.

4. Find the solutions of $\cos z = 2i$.

5. If u and v are harmonic conjugates, is the product uv always harmonic?

6. Use the definition of $\sin z$ and $\cos z$ to derive the identity $\sin^2 z + \cos^2 z = 1$.

7. Let $f(z) = (1 + e^z)^{-1}$.

(a) Find the domain and range of f.

(b) Where is f analytic?

8. Use the rigorous definition of limits to show that the function $f(z) = \bar{z}$ is continuous on the whole complex plane.