Department of Mathematics
Christopher Newport University

Math 355-01 **Complex Variables** *Spring Term 2007*

Homework # 2

Due Friday Jan.26.07

1. Simplify each expression.

   (a) $\overline{\left(\dfrac{2+i}{1+2i}\right)} - \overline{\left(\dfrac{i}{2-i}\right)}$

   (b) $\left|\left(\dfrac{3+i}{1+2i}\right)^3\right|$

   (c) $(1 - i\sqrt{3}\,)^5$

2. Show that the hyperbola $x\,y = 1$, can be written $z^2 - \overline{z}^2 = 4\,i$.

3. Find the principal argument $Arg\,z$, where

$$z = \frac{i}{1-i}$$

4. Find all of the roots in rectangular coordinates $(-32)^{\frac{1}{5}}$.

5. Find the four roots of the equation $z^4 + 1 + i = 0$, and give the absolute value of each root.