Complex Analysis

Math 312 — MWF 10:30-11:25am
Spring 1996 — 201 Fowler

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Homework Set 1

ASSIGNED: Wed Jan 24 **DUE: Wed Jan 31**

1. On Page 11 of Churchill & Brown, 1(a) and 1(d), 4, 11(a), 11(c) and 13
2. Write the complex equation $z^3 + 5z^2 = z + 3i$ as two real equations.
3. Which of the points i, $2 - i$ and -3 is farthest from the origin? Which is closest?
4. Draw the vectors
   (a) $7\text{cis}(\frac{3\pi}{4})$
   (b) $4\text{cis}(\frac{-\pi}{6})$
5. Find the argument of the following complex numbers and write in polar form.
   (a) $-1/2$
   (b) $-\pi i$
   (c) $(\sqrt{3} - i)^2$
6. Show that $\arg z_1\overline{z_2} = \arg z_1 - \arg z_2$
7. Show that $|z_1 z_2 z_3| = |z_1||z_2||z_3|$
8. Find the set of points which solve the complex equation $|z + 3| + |z - 3| = 4$ and graph them
9. Find the following
   (a) $|\overline{(1+i)}(2-3i)(4i-3)|$
   (b) $\left|\frac{i(2+i)^3}{(1-i)^2}\right|$
   (c) $\left|\frac{(\pi+i)^{100}}{(\pi-i)^{100}}|\right|$

BONUS Given 4 particles of masses 2, 1, 3 and 5 located at the respective points $1+i$, $-3i$, $1-2i$ and -6, find the center of mass of the system.

NOTES

All homework sets will be due in class one week from the class they are given out in. You are encouraged to work together on the homework.