

Math 112  
Jonny Comes  
Fall 2005  
Assignment #9  
Due Friday Dec. 2

**From the Textbook:**

- Section 9.1: 1-16 all, 17, 18, 23, 24.
- Section 9.2: 11, 12, 36, 37, 38.

**Additional Exercises:**

(Be sure to justify all your answers)

1. Plot each of the following complex numbers in the complex plane, and write each of the complex numbers in standard form ( $a + bi$ ).

- (a)  $e^{\pi i}$
- (b)  $e^{\frac{\pi}{2}i}$
- (c)  $3e^{\frac{\pi}{4}i}$
- (d)  $6e^{\frac{2\pi}{3}i}$
- (e)  $2e^{6\pi i}$
- (f)  $3e^{-\frac{\pi}{6}i}$

2. Plot each of the following complex numbers in the complex plane, and write each of the complex numbers in polar form using Euler  $e$ -notation ( $re^{i\theta}$ ).

- (a)  $-6i$
- (b)  $-12$
- (c)  $5 + 5i$
- (d)  $2 - 2\sqrt{3}i$
- (e)  $-\sqrt{3} + i$

3. Write the following in Euler  $e$ -notation ( $re^{i\theta}$ ).

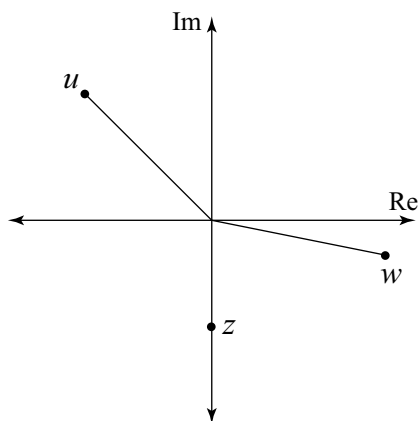
(a)  $(2e^{\pi i}) \left(5e^{-\frac{\pi}{2}i}\right)$

(b)  $(\sqrt{2}e^{\frac{\pi}{3}i}) \left(\sqrt{2}e^{\frac{\pi}{6}i}\right)$

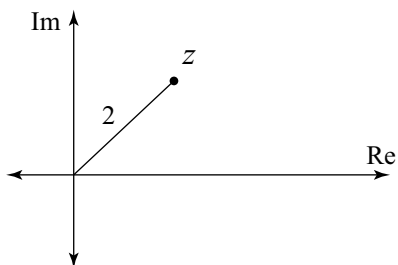
(c)  $\frac{6e^{\frac{3\pi}{2}i}}{2e^{-\frac{\pi}{2}i}}$

(d)  $\frac{7e^{\frac{\pi}{6}i}}{21e^{\frac{2\pi}{3}i}}$

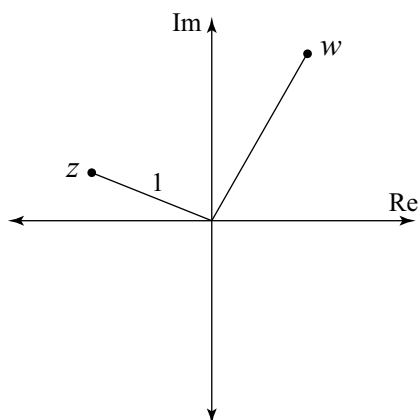
4. Plot the points  $-iz$ ,  $-iw$  and  $-iu$  where  $z$ ,  $w$ , and  $u$  are the complex numbers pictured below



5. Plot the two points  $\bar{z}$  and  $z \cdot \bar{z}$  where  $z$  is the complex number pictured below.



6. Plot the three points  $z^2$ ,  $zw$ , and  $\frac{w}{z}$  where  $z$  and  $w$  are the complex numbers pictured below.



7. (a) Plot all the 3rd roots of unity.  
 (b) Plot all the 6th roots of unity.  
 (c) Plot all the 8th roots of unity.