## **ERG 2012B Advanced Engineering Mathematics**

## **Assignment #1**

Due time: 4:30pm on Monday, January 22, 2007 to the assignment box.

Q-1. Let  $z_1 = 4+3i$  and  $z_2 = 2-5i$ . Find each of the following in the form of , showing the details of your work:

a. 
$$(3z_1 - z_2)^2$$
 b.  $\frac{z_2 z_2}{z_1 \overline{z_1}}$  c.  $\frac{25z_2}{z_1}$ 

Q-2. Let z = x + iy. Find (showing the details of your work)

**a.** Im
$$(\frac{1}{z})$$
 **b.**  $(1+i)^{16}$  **c.** Re $(\frac{z^2}{z})$ 

Q-3. Represent each of the following in polar form and plot in the complex plane, showing the details of your work:

**a.** -2+2i **b.** -10 **c.**  $\frac{1-i}{1+i}$ 

Q-4. Determine the principle value of the argument of  $3\pm 4i$ .

Q-5. Represent each of the following in the form of x + iy and plot in the complex plane:

**a.** 
$$\cos\frac{\pi}{2} + i\sin\frac{\pi}{2}$$
 **b.**  $\sqrt{18}\left(\cos\frac{3\pi}{4} + i\sin\frac{3\pi}{4}\right)$ 

Q-6. Find and plot all roots:

**a.** 
$$\sqrt[3]{8i}$$
 **b.**  $\sqrt{-7+24i}$ 

Q-7. Solve the equations:

**a.** 
$$z^2 - (5+i)z + 8 + i = 0$$
  
**b.**  $z^4 - (3+6i)z^2 - 8 + 6i = 0$