Homework 2  
Due: Friday, August 31

1. [BC]4.2, 4.4, 4.5.

2. [BC]5.1, 5.2, 5.3.

3. (a) [BC] 5.11.
   
   (b) Describe all $z$ for which $\overline{z} = iz$. Prove that your answer is correct.

4. (a) Prove that
   $$|z + w|^2 = |z|^2 + |w|^2 + 2 \text{Re}(zw).$$
   
   (b) Use this to prove the parallelogram rule:
   $$|z + w|^2 + |z - w|^2 = 2(|z|^2 + |w|^2).$$


6. (a) Write each of $e^{i\alpha}$, $e^{i\beta}$, and $e^{i(\alpha + \beta)}$ in rectangular coordinates.
   
   (b) Prove the following formulas from trigonometry:
   $$\cos(\alpha + \beta) = \cos(\alpha) \cos(\beta) - \sin(\alpha) \sin(\beta)$$

   $$\sin(\alpha + \beta) = \sin(\alpha) \cos(\beta) + \sin(\beta) \cos(\alpha)$$