
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 $\bar{z} = iz$. Prove that your answer is correct.

4. (a) Prove that

$$|z + w|^2 = |z|^2 + |w|^2 + 2 \operatorname{Re}(z\bar{w}).$$

(b) Use this to prove the parallelogram rule:

$$|z + w|^2 + |z - w|^2 = 2(|z|^2 + |w|^2).$$

5. [BC] 7.1, 7.6.

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:

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

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