

Not to be handed in

1. Exercises pp. 4-5: 2,3,8,9.

2. Exercises pp. 13-14: 4,7,8,16.

3. Show that

$$|z_1 + z_2|^2 = |z_1|^2 + |z_2|^2 + 2\operatorname{Re}(z_1\bar{z}_2).$$

4. Show that

$$\operatorname{Re}\left(\frac{z-1}{z+1}\right) = \frac{|z|^2 - 1}{1 + 2\operatorname{Re}(z) + |z|^2}.$$

5. Verify by direct calculation that

$$\overline{\left(\frac{z}{z^2 + 1}\right)} = \frac{\bar{z}}{\bar{z}^2 + 1}.$$

6. Exercises pp. 21-22: 1,5,7

7. Given that $z = re^{i\theta}$, prove by induction on n that $z^n = r^n e^{in\theta}$. (See page 20)