

Homework 2

Due Thursday July 25

Chapter 2 Problems: 2.15 (this problem will be useful to do in connection to chapter 3), 2.18(acegik), 2.19 (it helps to sketch the set where $f(z) = 0$), 2.20, 2.21 (what happens when you add f and \bar{f} - think about 2.20), 2.23 (consider $f(z)^2$, and find a connection to 2.20), 2.29 (it is easy to see that $f'' = 0$ so that $f'(z) = a$ for $a \in \mathbb{C}$. To apply that theorem again, consider $f(z) - az$ and compute its derivative).

Chapter 3 Problems: 3.1, 3.5 (you may use the fact that $az^2 + bz + c = 0$ has at most two solutions), 3.7 (try a technique like the one in class), 3.9 (a and b should be straightforward. For c , one approach is to show first that f_a maps $C(0,1)$ onto itself, and then use the fact that $f_a(a) = 0$), 3.10 (compare to 3.1), 3.14(abc), 3.17(c) (use the fact that lines and circles map to lines and circles, and test the boundary first).

Additional Problems:

1. Draw the image of a system of parallel lines under the inversion mapping $z \mapsto 1/z$. Describe your picture. Which lines get mapped to circles? Which lines get mapped to lines?