

## Assignment 7

1. Construct a polynomial,  $P(z)$ , with a repelling fixed point at  $z = 0$  and  $|P'(0)| > \deg P$ . Using material presented in class show that the function  $h$  satisfying  $P(h(z)) = h(\lambda z)$  has infinitely many zeros.

2. Suppose that  $f$  is a polynomial such that  $f(0) = 0$ ,  $f'(0) = \lambda$  and  $\lambda^n = 1$ . Show by a direct method that if  $f$  can be conformally conjugated to  $z \mapsto \lambda z$  near 0 then  $f(z) = \lambda z$ .

What about the case of a general  $f$  defined near 0?

3. For  $f(z) = z^2 + 2z$ , find  $\varphi$ , conformal near 0,  $\varphi(0) = 0$ , such that  $\varphi(f(z)) = 2\varphi(z)$ . What is  $h = \varphi^{-1}$ ?