

## Complex varieties 2, written test: Weierstrass preparation theorem

**Rules:** This is a written test for the next week. Please write your solutions and bring me no later than the Monday class the week after. We shall discuss this test in class afterwards.

**Exercise 2.1.** Find the Weierstrass polynomial for the function  $\sin(x^2 + y^3)$  on  $\mathbb{C}^2$ .

**Exercise 2.2.** Find the Weierstrass polynomial for the function

$$(x + y)(y + 1)x$$

on  $\mathbb{C}^2$ .

**Exercise 2.3.** Find the Weierstrass polynomial for the function  $(e^x - e^y)^3$  on  $\mathbb{C}^2$ .

**Exercise 2.4.** Let  $f : \mathbb{C}^n \rightarrow \mathbb{C}$  be a holomorphic function,  $n > 1$ . Prove that  $f$  cannot have isolated zeroes.

**Exercise 2.5.** Let  $f : \mathbb{C}^2 \rightarrow \mathbb{C}$  be a holomorphic function such that  $f(z, \bar{z}) = 0$  for all  $z \in \mathbb{C}$ . Prove that  $f = 0$ .