MATH 351: RIEMANN SURFACES AND DESSINS D'ENFANTS
HOMEWORK #17

Problem 17.1. Let $d \in \mathbb{Z}_{\geq 2}$ and consider the complex affine plane curve $X \subset \mathbb{C}^2$ defined by the equation

$$x^d + y^d = 1$$

(the *Fermat curve of degree d*, cf. Example 1.10, page 6).

(a) Show that X is nonsingular, so that X has a natural structure of a Riemann surface.
(b) Consider the morphism $f : X \to \mathbb{P}^1$ defined by $f(x, y) = x$. What is the degree of this map? Find all points $p \in X$ where f is ramified and their multiplicities $m_p(f)$.

Date: Wednesday, 16 February 2013.