$\mathbb{P}^2$ is a smooth curve of degree d, given in $\mathbb{P}^2$ as the locus of zeros of a homogeneous polynomial $F(Z_0, Z_1, Z_2)$ of degree d. In terms of Euclidean coordinates $z_1 = Z_1/Z_0$, $z_2 = Z_2/Z_0$ on $\mathbb{C}^2 \subset \mathbb{P}^2$, the equation is $f(z_1, z_2) = F(1, z_1, z_2)$.

⌜ See P 166 ⌟

Choose a point $p \in \mathbb{P}^2$ not on S and a line H not containing p; after a linear change of coordinates we may take

$$p = [0, 0, 1], \quad H = (Z_2 = 0);$$

we may also assume the line L at infinity $(Z_0 = 0)$ is not tangent to S.

⌜ First of all, choose a line L which is not tangent to S. Choose a point $p \in L$ s.t $p \notin S$. It is possible, if not, $L \subset S \Rightarrow L$ is tangent to S. $\Rightarrow \exists$ a line H s.t $p \notin H$. $\Rightarrow$ By a linear change of coordinates, we can make $p = [0, 0, 1]$, $H = (Z_2 = 0)$, and $L = (Z_0 = 0)$.
Here the line at infinity $= (Z_0 = 0)$ see p15 $\sim$ P16 ⌟

Now consider the map $\pi_p : S \longrightarrow \mathbb{P}^1$ given by projecting from p to H. Near a point $q \in S$ with $(\partial f/\partial z_2)(q) \neq 0$, z_1 will serve as local coordinate on S, so the map is unramified; if $(\partial f/\partial z_2)(q) = 0$,