Riemann Surface

Homework 3

Oct. 22, 2004. Due on Oct. 29, 2004

(1) Compute the cohomology $H^1(\mathbb{P}^1, \mathcal{O})$.
(2) Let $\Omega \subset \mathbb{C}$ be an open subset and $p \in \Omega$ a point. Compute the cohomology $H^1(\mathbb{P}^1, \mathbb{C}(p))$.
(3) Verified that there is a bijection between isomorphic classes of holomorphic line bundles and $H^1(X, \mathcal{O}^*)$.
(4) Let X be a compact Riemann surface, and $D > 0$ an effective divisor. Show that $H^0(X, \mathcal{O}(-D)) = 0$. Furthermore, let $D = \sum n_i D_i$, we define $deg(D) := \sum n_i$. Show that $H^0(X, \mathcal{O}(D)) = 0$ if $deg(D) < 0$.