Exercises

1. Let F_n be a closed, orientable surface with genus $n (\geq 1)$.

   Find $H_*(F_n)$.

2. Show that if d is an integer, and $n \geq 1$, then there is a map $h : S^n \to S^n$ of degree d.

3. Let $L(n, k)$ be the quotient space of the ball B^3 as follows: Any point $(z, t) \in B^3$, where z is a complex number, t is a real, and $|z|^2 + |t|^2 \leq 1$.

   Let $\lambda = \exp(2\pi i/n)$. Define $f : S^2 \to S^2$ by $f(x) = (\lambda^k z, -t)$.

   Identify each point $x = (z, t)$ of the lower hemisphere E^2_- of $\partial B^3 = S^2$ with $f(x)$ of the upper hemisphere E^2_+. The resulting quotient space is called the lens space $L(n, k)$.

   Find $H_*(L(n, k))$.