Module 6 : Basic homology theory

Lecture 37 : **Test V**

1. Calculate the homology groups of the double torus.
2. Show that any homeomorphism of E^n onto itself must preserve the boundary.
3. Show that $\mathbb{R}P^n$ is not a retract of $\mathbb{R}P^{n+1}$. Use the lifting criterion.
4. Regard S^2 as the Riemann sphere and calculate the degree of the map $f : S^2 \longrightarrow S^2$ given by $f(z) = z^n$.
5. Use the previous exercise to prove the fundamental theorem of algebra.
6. Show that $\mathbb{R}P^{2n}$ has the fixed point property. Does $\mathbb{R}P^3$ have the fixed point property?