Homework # 5. Due to Wednesday, November 13, 11:00 am

(1) Prove that for a CW-pair (X, A) the space X/A is homotopy equivalent to $X \cup C(A)$.

(2) Sketch a proof of Cellular Approximation Theorem using Free Point Lemma. Where do we have to use Borsuk's Theorem?

(3) Prove that $\pi_n(X)$ is commutative group for $n \geq 2$. Prove that $\pi_k(S^n)$ is a trivial group for $k < n$.

(4) Prove that if $f, g : (X, x_0) \to (Y, y_0)$ are homotopic maps of pointed spaces, then the homomorphisms $f_*, g_* : \pi_n(X) \to \pi_n(Y)$ coincide.

Also: Exercises 6.5, 6.6, 6.7, 6.9, 6.10