Problem 1 (2.2.36). *Show that $H_i(X \times S^n) \cong H_i(X) \oplus H_{i-n}(X)$ for all i and n, where $H_i = 0$ for $i < 0$ be definition. Namely, show $H_i(X \times S^n) \cong H_i(X) \oplus H_i(X \times S^n, X \times \{x_0\})$ and $H_i(X \times S^n, X \times \{x_0\}) \cong H_{i-1}(X \times S^{n-1}, X \times \{x_0\})$ [For the latter isomorphism the relative Mayer-Vietoris sequence yields an easy proof].*

Proof. □

Problem 2 (2.3.3). *Show that if $\widetilde{h}$ is a reduced homology theory then $\widetilde{h}_n(point) = 0$ for all n. Deduce that there are suspension isomorphisms $\widetilde{h}_n(X) \cong \widetilde{h}_{n+1}SX$ for all n.*

Proof. □

Problem 3 (2.B.3). *Let $(D, S) \subset (D^n, S^{n-1})$ be a pair of subspaces homeomorphic to (D^k, S^{k-1}), with $D \cap S^{n-1} = S$. Show that the inclusion $S^{n-1} - S \hookrightarrow D^n - D$ induces an isomorphism on homology. [Glue two copies of (D^n, D) to the two ends of $(S^{n-1} \times I, S \times I)$ to produce a k-sphere in S^n and look at the Mayer-Vietoris sequence for the complement of this k-sphere.]*

Proof. □