1. In class we showed that the kernel of the 'multiplication by 2' may $[2] : \mathbf{Z}[0] \to \mathbf{Z}[0]$, in the category $\mathbf{K}_\bullet$ of chain complexes of abelian groups modulo chain homotopy equivalence, is not 0. Find a chain homotopy equivalence $\varphi : \mathbf{Z}[0] \to K_\bullet$ and a map $\psi : K_\bullet \to \mathbf{Z}[0]$ such that that $\psi\varphi = [2]$ and the kernel of ψ (as a map of chain complexes) is not zero.

2. Complete the proof from class that $\sigma_i : \Omega^\bullet(I \times M) \to \Omega^\bullet(M)$, $i = 0, 1$, are chain homotopic.

3. Exercises 1.5.1, 1.5.2, 1.5.5.

4. Exericse 1.5.8 is important.

5. Exercise 1.5.9 shows how the cone captures both the kernel and cokernel.

6. An open ended question: what is the universal property of the cone?