Homework number 2

Do two from the following three exercises.

Exercise 4. Prove surjectivity in 5-lemma.

Exercise 5. Let X be a topological space and x a point not in X. Compute $H_*(X \sqcup \{x\}, \{x\})$ using $H_*(X)$.

Exercise 6. Compute the homology groups if you know that the following sequence of homomorphisms is a chain complex

$$0 \to C_5 = \mathbb{Z} \xrightarrow{f} C_4 = \mathbb{Z} \to C_3 = \mathbb{Z} \xrightarrow{0} C_2 = \mathbb{Z} \oplus \mathbb{Z} \xrightarrow{g} C_1 = \mathbb{Z} \oplus \mathbb{Z} \oplus \mathbb{Z} \xrightarrow{0} C_0 = \mathbb{Z} \to 0$$

and $f(a) = 3a$ and $g(b,c) = (b+c, b-c, c-b)$.