

EXERCISES FOR MA4J7 ALGEBRAIC TOPOLOGY II

WEEK 9

- (1) In the proof of Poincare duality, we needed to know that the squares in the diagram below commute.

$$\begin{array}{ccccc}
 H^i(M|K \cap L) & \longrightarrow & H^i(M|K) \oplus H^i(M|L) & \longrightarrow & H^i(M|K \cup L) \\
 \downarrow & & \downarrow & & \downarrow \\
 H^i(U \cap V|K \cap L) & & H^i(U|K) \oplus H^i(V|L) & & \\
 \downarrow & & \downarrow & & \\
 H_{n-i}(U \cap V) & \longrightarrow & H_{n-i}(U) \oplus H_{n-i}(V) & \longrightarrow & H_{n-i}(M)
 \end{array}$$

Check this for yourself. (We also needed to know that another square to the right commutes, but that was the hard part of the Lemma; this part is straightforward.)