Simplicial Complexes

Summer semester 2016 **Prof. Dr. M. Keller**

Sheet 3

(1) Let $v_0, \dots, v_k \in \mathbb{R}^n$ be affinely independent and $0 < l < k$. Show that there is an isomorphism from $\Delta(v_0, \dots, v_l) \times \Delta(v_0, \dots, v_l)$ with the product order to $\Delta(v_0, \dots, v_k)$.

(2) Draw all simplicial complexes $(\Delta, \leq)$ with $\#\Delta = 8$. Which of these complexes are isomorphic to $\Delta_1 \times \Delta_2$ with for simplicial complexes $(\Delta_1, \leq)$, $(\Delta_2, \leq)$ with $\#\Delta_1 = 2$ and $\#\Delta_2 = 4$?

(3) Give a rigorous definition of the simplicial complex that arises from the triangulation of the Euclidean plane with regular triangles.

(4) Show that if $(\Delta, \leq)$ is an incidence complex, then $(A^*, \leq)$ is an incidence complex for all $A \in \Delta$.