1046-52-157 **Natalie Durgin*** (ndurgin@hmc.edu), Department of Mathematics, Harvey Mudd College, Claremont, CA 91711, and **Helen Highberger** (hhighberger@hmc.edu), **Jacob Scott** (jnscott@hmc.edu) and **Francis Edward Su** (su@math.hmc.edu). *Classifying the simplices of the 4-dimensional cube.*

A simplex of the 4-dimensional cube is the convex hull of any 5 distinct vertices of the cube. We find there are exactly 27 isomorphism classes of these simplices under symmetries of the cube, 10 of which are degenerate. Our methodology is based on geometric considerations that produce insights beyond computational enumeration. In particular, we provide a complete description of these simplex facets and how they can fit together in any triangulation. Using this, we are able to provide a graph representation of several triangulations of the 4-cube, leading to a new understanding about Mara's minimal triangulation. (Received August 07, 2008)