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We proved by computer enumeration that the Jones polynomial distinguishes the unknot for knots up to 22 crossings. Following an approach of Yamada, we generated knot diagrams by inserting algebraic tangles into Conway polyhedra, computed their Jones polynomials by a divide-and-conquer method, and tested those with trivial Jones polynomials for unknottedness with the computer program SnapPy. We employed numerous novel strategies for reducing the computation time per knot diagram and the number of knot diagrams to be considered. That made computations up to 21 crossings possible on a single processor desktop computer. (Received July 20, 2017)