1014-91-1713 **Steven J. Brams** (steven.brams@nyu.edu), Department of Politics, New York University, New York, NY 10003, **Michael A. Jones*** (jonesm@mail.montclair.edu), Department of Mathematical Sciences, Montclair State University, Montclair, NJ 07043, and **Christian Klamler** (christian.klamler@uni-graz.at), Institute of Public Economics, University of Graz, A-8010 Graz, Austria. *Proportional Pie-Cutting.*

Fair division problems require dividing an object or "cake" between players whose preferences are probability measures over the cake. Yet, cutting a pie into wedge-shaped pieces with radial cuts is, surprisingly, quite different from cutting a cake with parallel cuts. If two players have unequal entitlements to the pie, a minimal number of cuts can always be used to divide the pie into proportional pieces that reflect these entitlements, whereas this is not always possible for a cake. Existence results hinge on a counting argument and on the density of the real numbers for rational and irrational entitlements, respectively.

Two procedures are given that induce the players truthfully to reveal their preferences for the pie such that they receive pieces that are at least equal to their entitlements and, consequently, do not envy the other player for getting a disproportionally valuable piece. Under the more information-demanding procedure, the allocation is also efficient (in that there is no allocation of pie in which one player receives more and the other does at least as well). Counterexamples are provided to demonstrate that for three or more players, it is not always possible to make proportional, envy-free allocations. (Received September 28, 2005)