1022-05-17   **Robert G. Donnelly*** (`rob.donnelly@murraystate.edu`), Faculty Hall 6C, Department of Mathematics and Statistics, Murray State University, Murray, KY 42071. *The numbers game, quasi-standard geometric representations of Coxeter groups, and two Dynkin diagram/Coxeter graph classification results.*

The numbers game is a one-player game played on a finite simple graph with integer "amplitudes" assigned to its edges (we call these "GCM graphs") and with an initial assignment of real numbers to its nodes. The moves of the game successively transform the numbers at the nodes using the amplitudes in a certain way. This game has been studied previously by R. A. Proctor, S. Mozes, A. Bjorner, K. Eriksson, and N. J. Wildberger. We show that those connected GCM graphs for which the numbers game meets a certain finiteness requirement are precisely the Dynkin diagrams associated with the finite-dimensional complex simple Lie algebras. As a consequence of our proof we obtain the classifications of the finite-dimensional Kac-Moody Lie algebras and of the finite Weyl groups. We use Coxeter group theory to establish a more general result that applies to Eriksson's E-games: we show that an E-game meets the finiteness requirement if and only if a naturally associated Coxeter group is finite. To do so we further develop Eriksson's theory of a certain geometric representation of Coxeter groups and observe some curious differences from the standard geometric representation. (Received August 18, 2006)