1035-05-120   **Nicole Kroeger** (`nrktapper@yahoo.com`) and **Marcus Miller*** (`mgmiller@fas.harvard.edu`), 280 Pforzheimer House Mail Center, Cambridge, MA 02138, and **Christopher Mooney** (`chmooney@transy.edu`) and **Kathleen Shepard** (`shepardk@grinnell.edu`). *Hadamard Difference Sets in Groups of Order 144 and the Spread Construction.*

A (v, k, λ) difference set $\mathcal{D}$ is a k-subset of a group G with $|G| = v$, such that the collection of products $d_1 d_2^{-1}$, for $d_1, d_2 \in \mathcal{D}$, contains exactly λ copies of all non-identity elements of G. Finding difference sets and classifying them for all finite groups is a major project of combinatorics. We present the results of our investigation into $(144, 66, 30)$ difference sets and also a powerful new construction that allowed us to classify 37 unresolved cases. This *spread* construction is a generalization of the more common product constructions. Out of 197 groups of order 144, we were able to determine question of existence in 170 of them. If we assume a famous conjecture by Eric Lander stating that a group with a cyclic Sylow-3 subgroup has no difference set, then only 1 group of order 144 remains. (Received July 25, 2007)