1135-03-867 **Michael Gene McGrady*** (michael.mcgrady@gmail.com), 223 Taylor Ave. S., North Bend, WA 98045. *The molecular structure of mathematical proof.*

Finite classes are decidable. The validity of all mathematical logic formulas are equivalent to the validity of the members of finite classes ordered by their number of dyadic predicates. There is a mathematical ***proof procedure*** in the first-order logic that allows for a ***discovery procedure*** for the ***decision procedure***. Hence, this proof procedure, based on Herbrand's fundamental theorem of logic, is itself at least a heuristic solution to ***an alternative version of the Entscheidungsproblem (decision problem) for finite sets***. The keystone of the proof procedure is that the dyadic predicate atomic formulas $P^1_{\alpha,\beta} \dots P^i_{\alpha,\beta}$ have a ubiquitous **molecular structure** $\Sigma = (P^1_{m-1,m} \vee P^1_{m-2,m} \vee \cdots \vee P^1_{0,m}) \vee \cdots \vee (P^i_{m-1,m} \vee P^i_{m-2,m} \vee \cdots \vee P^i_{0,m})$ such that $m, i \in \mathbb{Z}^+$ underlying first-order logic proofs seen through the lens of a closed, prenex normal form, highly restricted reduction class for validity $\exists x \exists y M_{xx'y}$ where $x' = x + 1$, and which allows the discovery procedure to find the decision procedure. (Received September 15, 2017)