1002-01-53   **Jeff A Suzuki*** (`suzuki@bard.edu`), P.O. Box 5000, Annandale-on-Hudson, NY 12504.
Lagrange's Proof of the Fundamental Theorem of Algebra. Preliminary report.

Lagrange's proof of the Fundamental Theorem of Algebra tends to be overshadowed by the proofs of d'Alembert (the first), Euler (the most accessible), or Gauss (the most complete), and details of the proof are difficult to come by. But Gauss called Lagrange's proof the most complete before his own, relying only on the assumption that an mth degree equation had m roots of some sort (in modern terms, the existence of a splitting field); based on this assumption, Lagrange proved, through a series of elegant combinatorial arguments, that these m roots had to be expressible as solutions to quadratic equations with real coefficients. Indeed, since Lagrange's assumption of the existence of a splitting field has subsequently been validated, we may credit Lagrange with being the first to provide a complete proof of the Fundamental Theorem of Algebra. (Received August 02, 2004)