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**Tyler J Evans\*** ([evans@humboldt.edu](mailto:evans@humboldt.edu)), Department of Mathematics, Humboldt State University, 1 Harpst Street, Arcata, CA 95521. *On some generalizations of Fermat's, Lucas's and Wilson's Theorems.* Preliminary report.

One can derive Fermat's (little), Lucas's and Wilson's theorems, among other results, all from a simple combinatorial lemma. This lemma, in turn, can be derived by applying Burnside's theorem to an action by a cyclic group of prime order. In this talk, we will generalize this lemma by applying Burnside's theorem to the corresponding action by an arbitrary finite cyclic group. We use this generalization to derive three divisibility theorems for which the aforementioned classical theorems are, respectively, the cases of a prime divisor. (Received September 27, 2005)