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Ken McMurdy* (mcmurdy@rose-hulman.edu), Department of Mathematics, Rose-Hulman Institute of Technology, 5500 Wabash Ave., Terre Haute, IN 47803. *Stable Reduction of $X_0(81)$* .

In this talk we explicitly describe a model for the modular curve, $X_0(81)$, which has stable reduction at $p = 3$ (defined over a finite extension of \mathbb{Q}_3). This curve can be thought of as classifying pairs, (E, C) , where E is an elliptic curve and $C \subseteq E$ is a cyclic subgroup of order 81. We also discuss how components in the stable reduction relate to classes of elliptic curves with complex multiplication, as well as the extent to which this example sheds light on the general problem of computing the stable reduction of $X_0(p^4)$. (Received September 28, 2005)