1078-11-270 **Chantal David*** (cdavid@mathstat.concordia.ca). *Elliptic curves with a fixed number of points over finite fields and the Cohen-Lenstra Heuristics.*

Let E be an elliptic curve over $\mathbf{Q}$. We consider the problem of counting the number of primes p for which the reduction of E modulo p possesses exactly N points over the finite field $\mathbf{F}_p$. On average (over a family of elliptic curves), we show bounds that are significantly better than what is trivially obtained by the Hasse bound (the only known bound for a single elliptic curve). Under an additional hypothesis concerning the short interval distribution of primes in arithmetic progressions, we obtain an asymptotic formula for the average. This average order does not depend only on the size of the integer N, but on some arithmetic properties of N. This seems to be another example of the Cohen-Lenstra heuristics which predict that random groups G occur with probability weighted by $1/\#\mathrm{Aut}(G)$. We also exhibit more occurrences of the Cohen-Lenstra heuristics in this new context by counting the number of primes where $E(_p)$ is isomorphic to a fixed abelian group G. This is joint work with Ethan Smith, CRM, Montréal. (Received December 11, 2011)