1106-11-427 **David Mehrle*** (dmehrle@cmu.edu), **Tomer Reiter** (treiter@andrew.cmu.edu), **Joseph Stahl** (josephmichaelstahl@gmail.com), **Dylan Yott** (dtyott@gmail.com) and **Steven Miller** (sjm1@williams.edu). *A Family of Rank 6 Elliptic Curves over Number Fields.*

We construct a family of elliptic curves over a number field K, and prove that when $K/\mathbb{Q}$ is Galois, each curve has rank six. Unlike most constructions, which only bound the rank, we find the rank exactly. By evaluating Legendre sums, we determine equations for curves $\mathcal{E}$ with $A_{\mathfrak{p}}(\mathcal{E}) = -6$. Applying a theorem of Rosen and Silverman, we show that the rank is $-A_{\mathfrak{p}}(\mathcal{E})$. We obtain in this manner not only infinitely many elliptic curves over K, but also infinitely many elliptic surfaces, i.e., elliptic curves over the function field $K(T)$. Additionally, we hypothesize that curves definedanalogously over non-Galois extensions $L/\mathbb{Q}$ also have rank six, which we prove in several cases, and determine bounds for all other cases. Moreover, we prove that when $K = \mathbb{Q}$, if there are any points of finite order in$\mathcal{E}(\mathbb{Q})$, they must have order three. However, we are able to modify our construction to find a family of curves with group $\mathcal{E}(\mathbb{Q}) = \mathbb{Z}^2 \oplus \mathbb{Z}/2\mathbb{Z}$. This generalizes work of Arms, Lozano-Robledo, and Miller, which only dealt with families over $\mathbb{Q}$. (Received August 27, 2014)