Abbey Bourdon* (bourdoam@wfu.edu) and Pete L. Clark. Torsion Points and Isogenies on CM Elliptic Curves.

We say an elliptic curve $E$ defined over a number field $F$ has complex multiplication (CM) if $\text{End}_F(E) \cong \mathcal{O}$, an order in an imaginary quadratic field $K$. For any positive integer $N$, we determine the least $d$ in which there exists a number field $F$ of degree $d$ and an $\mathcal{O}$-CM elliptic curve $E/F$ with an $F$-rational point of order $N$. This relies on several new results concerning rational cyclic isogenies on CM elliptic curves, extending work of Kwon (1999). (Received September 25, 2018)