FINITENESS RESULTS FOR HEAVENLY ELLIPTIC CURVES AND CONNECTIONS TO COMPLEX MULTIPLICATION

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We report on finiteness results around heavenly elliptic curves over number fields. We show that for almost all primes ℓ, there are only finitely many quadratic number fields over which an elliptic curve exists which is heavenly at ℓ. Generalizations of this result will also be proved. We observe similar behavior between heavenly curves and elliptic curves with complex multiplication, especially in terms of the trace of Frobenius, and explain this phenomenon in one direction. This work is joint with Cam McLeman (Michigan-Flint).