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★**One semester of elliptic curves.**

EMS Series of Lectures in Mathematics.
European Mathematical Society (EMS), Zürich, 2006. *viii*+130 *pp.* €32.00.
ISBN 3-03719-015-9

This book is an introduction to elliptic curves. The material presented is for the most part standard, though it has a more geometric flavor than some other introductions since it follows the historical development of the subject more closely. It is aimed at a general mathematical audience, and attempts to minimize prerequisites. Some background in analysis, though not essential, will be helpful to readers.

Chapter 1 deals with elliptic integrals, and includes a proof of the addition formula. Chapter 2 focuses on the geometry of elliptic curves, describing their structure as Riemann surfaces before moving on to the fundamental group and period integrals. Chapter 3 covers elliptic functions and gives a treatment of the Weierstrass function and its connection to elliptic curves. Chapter 4 is an introduction to projective space, and in Chapter 5 the group structure on elliptic curves which arise from lattices is defined. Chapter 6 is a study of equivalences of elliptic curves and of lattices, leading to the definition of the j-function.

Beginning in Chapter 7 the text takes a more algebraic bent, giving there explicit formulas for coordinate transformations and invariants of elliptic curves. Chapter 8 looks at elliptic curves over finite fields, with an emphasis on counting points and the local zeta function, and includes a discussion of quadratic twists. Chapter 9 gives a treatment of division polynomials, both from an analytic perspective via the Weierstrass function and from an algebraic point of view. Chapter 10 focuses on torsion points, and centers on the structure theorem for the m-torsion group of an elliptic curve over an arbitrary algebraically closed field. Chapter 11 takes up the topic of complex multiplication and discusses special values of the j-function. The concluding Chapter 12 gives a treatment of modular forms, including Eisenstein series and theta functions.

The text gives numerous exercises throughout, many of the "detail checking" variety, and there is a companion Mathematica notebook available online which contains some calculations omitted from the text. *David K. Penniston*

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