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D. BARBASCH
RUTGERS UNIVERSITY

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Binary quadratic forms, classical theory and applications, by D. A. Buell. Springer-Verlag, New York, Berlin, 1989, 247 pp., $35.00.

As the subtitle indicates, this book was written with the intention of alerting the computer-minded reader to the possibility of applying some part of the theory of binary quadratic forms to various problems.

In 1801 Gauss laid the foundation of the arithmetic of the forms $f(x, y) = ax^2+2bxy+cy^2$ in sections 153–335 of the *Disquitiones Arithmeticae*. By 1850 the theory of algebraic numbers, the theory of ideals and the theory of class groups were beginning to emerge. This forced the rewriting of Gauss theory using the Eisenstein form $f(x, y) = ax^2 + bxy + cy^2 = (a, b, c)$, with the discriminant $\Delta = b^2 = 4ac$. This revised Gauss theory is what the author describes as the classical theory.

On page 2, three questions are proposed:

(a) What integers can be represented by a given form?
(b) What forms can represent a given integer?
(c) If a form represents an integer, how many representations exist and how may they all be found?

These questions are answered on pages 74–75 by six theorems. The reader is thus required to read four chapters, whose titles are Elementary Concepts, Reduction of Positive Definite Forms, Indefinite Forms, and The Class Group, to prove these theorems.