Disquisitiones arithmeticae (2nd printing), by C. F. Gauss, trans by A. A. Clarke. Pp 490. DM 148. 1986. ISBN 3-540-96254-9 (Springer)

Even in his lifetime Gauss was known as 'prince of mathematicians'. If a cat may look at a king, a cat may also presumably look at a prince. Your reviewer is in the cat's position! This is the only book Gauss wrote and it was first published in 1801 when he was 24. In terms of its mathematical significance, this book must be set alongside Euclid's *Elements* and Newton's *Principia*. It has been called the first book of modern mathematics, and with good cause. It represents a watershed, historically, both in the development of mathematical concepts and in standards of rigour. Any modern mathematician will feel himself to be in his home country if he picks up this book, in a way that he will not with any earlier text.

Our modern notion of an equivalence relation is a modest generalisation of Gauss' treatment of congruence in the first few pages of this book, and the power of this notion of equivalence finds rich play in his study of quadratic forms.

Gauss provided here the first proof, with modern rigour, of the uniqueness of factorisation into primes, and also the first proof of quadratic reciprocity. He believed this to be amongst his most significant contributions to number theory, and he went on to construct five more proofs during his lifetime.

The earlier part of Gauss' study of quadratic forms is now integral to most undergraduate courses in number theory. The later part remains to this day postgraduate mathematics, with class number and genera defined for the first time. Because this book led to the development of modern algebraic number theory as we now know it, there are some later parts that we today would express differently in the context of quadratic field theory.

The final section of the book analyses cyclotomic equations and gives Gauss' proof that if the circumference of a circle may be divided into n equal parts using ruler and compass, then $n = 2^k p_1 p_2 \dots p_r$, where the p_i are odd primes of the form $2^{2^m} + 1$. This result is now understood in the context of Galois theory.

Disquisitiones arithmeticae was originally written in Latin, and translations of the work into German and French were published in the 19th century. The first English edition did not appear until 1966, and this is a corrected reprint of that edition. Not only is Gauss' own writing a model of clarity, but this translation is also a model of the translator's skill. Any mathematical library which aims to support students in either history or number theory should certainly have a copy of this book.

R. P. BURN

Homerton College, Cambridge CB2 2PH

Descartes' dream: the world according to mathematics, by P. J. Davis and R. Hersh. Pp 321. £14·95. 1986. ISBN 0-7108-1137-3 (Harvester Press)

The world according to mathematics and computers would probably be a better description here. Comparing this with the authors' previous book 'The Mathematical Experience', this book is quite different. I found it a book easy to read—each chapter is short and to the point, so, as the authors say, you are encouraged to browse at random. However it is not a book which contains the compulsive reading I found in *The mathematical experience*, and I was not really tempted to read on into the early hours.

There are seven main headings, each consisting of a collection of independent essays grouped around that heading. There is very little 'hard core' mathematics, but the ideas and ethical questions it raises are quite thought provoking, so I would have liked to have discussed some of the ideas within a group rather than reading, thinking, then reading on. With regard to this I feel it would be a useful book for maths and philosophy students, or as a source of discussion points among a general studies course for sixth formers.

There is something in this book for everybody and whereas you may not agree with everything there, it will provide you with some current thoughts on how the impact of