BEARDON, A. J. *A primer on Riemann surfaces* (London Mathematical Society Lecture Note Series 78, Cambridge University Press, 1984), 188 pp. £12.95.

Graduate or advanced undergraduate students frequently encounter Riemann surfaces as a section in a second course in complex analysis or a chapter in an advanced text in complex analysis. To proceed further, they must then reach for one of a number of advanced texts on Riemann surfaces e.g. those by Ahlfors and Sario, Weyl, Forster, Springer (now sadly out of print), Gunning, Farkas and Kra. The book under review has less grand objectives than these books and aims to fill the gap by providing a leisurely and elementary introduction to Riemann surfaces.

Riemann surfaces are introduced initially in the abstract, free from connections with analytic functions. The flavour throughout is geometrical and for example, a chapter is devoted to automorphisms of the disc, plane and Riemann sphere. The connection with analytic functions is later discussed along with details on covering spaces. The penultimate chapter contains a nice introduction to harmonic and subharmonic functions, Dirichlet's problem and Green's functions. This enables the author in the final chapter to achieve his goal of proving the Riemann mapping theorem and the Uniformization theorem and discussing their geometrical significance.

The title aptly describes the nature of the book and it will suit those students whose requirements do not extend to the deeper texts on Riemann surfaces. Its only competitor with these limited objectives is perhaps the much-less-widely-available Rice University Notes by B. F. Jones and so it should be a useful addition to this L.M.S. series of notes.

C. MACLACHLAN

MURPHY, IAN S. *Advanced Calculus for Engineering and Science Students* (Arklay Publishers, 1984), 216 pp. £6.95.

This book is intended for students who are taking courses in advanced calculus at universities, polytechnics or technical colleges. The material covered (double and triple integrals, the beta and gamma functions, differential equations, the Laplace transform, partial differentiation, errors and differentials, vector calculus, line and surface integrals, Fourier series, and maxima and minima of functions of several variables, with a brief appendix on quadratic forms) is entirely standard.

The author's chief aim is to help his readers to solve problems, and essentially he ignores the theoretical side of the subject. In the first half of the book, explanations seem adequate and the balance is admirable. Some of the later chapters come close to being mere catalogues of results, and I think that it would have been worthwhile to have included some justification of the chain rule and of the use of Lagrange multipliers. Nevertheless, the book is a good one, which should be particularly useful for students who have had the basic material in lectures but still need practice. The worked examples are always well chosen, and they are presented in a refreshingly informal style, accompanied by an illuminating commentary which draws attention to alternative notations and common errors. After each chapter there is a good collection of examples for the reader to try. The last of these often has an interesting or unusual application of the material, and there are some twenty pages of hints and answers.

The text has been reproduced from typescript; it is clear and pleasing, and I found very few misprints.

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