This seems to call for some mention of graphical methods, requiring only a proper understanding of graphs of inequalities (very simple in $\mathbb{R}^2$, but requiring care in $\mathbb{R}^3$).

Chapter 5 deals with double integrals by careful generalisation of definitions and properties of single integrals. The definition as the limit of a sum is very similar, and just as a single integral can be interpreted as the area under the graph of a curve $y = f(x) > 0$, so a double integral can be interpreted as the volume under a surface $z = f(x, y) > 0$. Although the anti-derivative definition does not apply to a double integral, it can be incorporated in its calculation.

Chapter 6 deals similarly with triple integrals and gives a very satisfactory treatment of changing variables to simplify double and triple integrals and the need to multiply by the Jacobian determinant of the transformation to correct the distortion of the region of integration it causes. It would have been in keeping with the analogy with single integrals to present the Jacobian as the analogue of $\frac{dx}{du}$ in $\int f(x) \, dx = \int f(x(u)) \frac{dx}{du} \, du$.

Chapter 7 studies integrals of scalar and vector functions over curves and surfaces. Chapter 8 introduces the classical integral theorems of vector analysis, viz those of Green, Stokes and Gauss, and culminates (in an optional section) with the notable achievement of unifying them into a single theorem.

As is inevitable in a mathematical textbook, there are misprints, but those detected are too trifling to confuse. At £30 the book is very expensive, but if used with its companion Study Guide it could prove a good investment for students working on their own, and there is an ample supply of exercises to practise on.

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This is a leisurely introduction to elementary calculus in (mainly) two and three variables. It explain the ideas clearly, from a geometrical point of view, and gives many physical applications.

The approach is classical, and the notation and language are as simple as they can reasonably be. Sets of points, for example, are described in words, not using the $\{ \ldots \}$ notation. You may or may not like this; I think that it is helpful to elementary students, who are often put off by notation and terminology that seem transparent and economical to us.

The theory is treated with a light hand. The chapter introducing partial derivatives, for example, includes the epsilon definitions, but spends much more time on simple examples and geometrical discussion. The chain rules are given without proof in the first place, with some motivating discussion, and several examples. A proof of one form of the rule is offered later in the chapter. There is a good account of the gradient and directional derivatives, and the chapter ends with Taylor series, giving an explicit form of the remainder for functions of two variables.

There is a careful discussion of notation for partial derivatives. The derivative of $f$ with respect to its first argument is written $f_1$; the unpleasant features of the $f_x$ notation are illustrated by considering $f(x, x^2 y)$.

The next chapter gives applications to maxima and minima (of course), and other subjects including least squares approximation and Newton-Raphson in two dimensions. There is a lucid account of Lagrange multipliers, based (in two dimensions) on the geometry of the contour lines of the functions.

Multiple integrals are dealt with in a similar style: many examples, many pictures, some theoretical analysis but not much. The reader should get a clear concept of double and triple integrals and how to use and evaluate them. But there is no mention of delicate matters such as conditions under which repeated integrals can be interchanged. This is probably the right
approach for a first introduction to the subject; but prospective mathematicians should at least be advised that there are difficult issues here.

The next chapter deals with vector functions of a scalar argument, with applications to mechanics and to the Frenet formulae for twisted curves. Then there is a chapter on vector fields and line and surface integrals, clearly aimed at mechanics. The book ends with an account of grad, div and curl, proving the divergence and Stokes theorems with strong conditions on the domains.

In general this is a well-written and attractive book, and can be recommended to students who find the treatment of multivariable calculus in standard calculus texts rather skimpy. Calculus books can be arranged along an axis, with techniques at one end and analysis at the other; this book lies towards (but not at) the techniques end; Marsden and Tromba's Vector calculus (previous review) is a good example of an introductory textbook located further towards the analysis end. I would enthusiastically recommend Marsden and Tromba to good students and Adams to average students.

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This book, written by two members of the Rensselaer Polytechnic Institute of New York, is very long and very expensive. It covers most of the theory and application of real calculus up to line and surface integrals.

It has a lot of good things in it, including interesting biographical footnotes and a vast supply of examples, for half of which solutions are provided. Some theorems are stated without proof, reasonably enough.

As with other books I have seen recently, partial fractions are obtained by equating coefficients. Is 'covering up' out of fashion?

For some reason, the elliptic cylinder is called circular, and the cone is implicitly classified as a non-degenerate quadric surface.

It is a pity that all non-convergent infinite series and integrals are termed divergent, even when finitely or infinitely oscillating.

Although I found it a well written, clearly illustrated book, I really cannot think it worth the money.

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A cursory glance through recent research literature on the treatment of differential equations will reveal the importance of the interplay between 'traditional' differential equations, linear algebraic methods (e.g. eigenvalue problems), numerical techniques and geometric/qualitative approaches. Because of the inherent difficulties associated with non-linear differential equations—most of their solutions cannot be obtained explicitly—they are often studied by geometric techniques which provide information on such attributes as periodicity and boundedness or unboundedness of solutions. Frequently linearisation of the problem leads to useful information and so techniques associated with linear problems can help. At the end of the day, if a solution must be found then numerical techniques can be employed to construct approximations. Thus, familiarity with these areas and an understanding of their inter-relationships is essential for any more advanced study, not only for mathematicians but also for practising engineers and scientists who want to use these powerful techniques, and for research students trying to understand current literature. Unfortunately, because of the ways