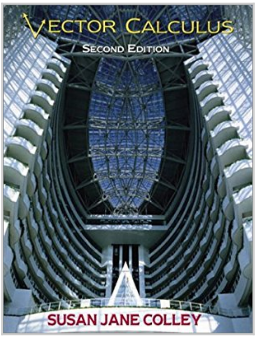

Vector Calculus (2nd Edition)

By Susan Jane Colley

Vector Calculus (2nd Edition) By Susan Jane Colley

A traditional and accessible calculus book with a strong conceptual and geometric slant that assumes a background in single-variable calculus. It uses the language and notation of vectors and matrices to clarify issues in multivariable calculus, and combines a clear and expansive writing style with an interesting selection of material. Chapter topics cover vectors, differentiation in several variables, vector-valued functions, maxima and minima in several variables, multiple integration, line integrals, surface integrals and vector analysis, and vector analysis in higher dimensions. For individuals interested in math and calculus.

Vector Calculus (2nd Edition)

By Susan Jane Colley

Vector Calculus (2nd Edition) By Susan Jane Colley

A traditional and accessible calculus book with a strong conceptual and geometric slant that assumes a background in single-variable calculus. It uses the language and notation of vectors and matrices to clarify issues in multivariable calculus, and combines a clear and expansive writing style with an interesting selection of material. Chapter topics cover vectors, differentiation in several variables, vector-valued functions, maxima and minima in several variables, multiple integration, line integrals, surface integrals and vector analysis, and vector analysis in higher dimensions. For individuals interested in math and calculus.

Vector Calculus (2nd Edition) By Susan Jane Colley Bibliography

- Sales Rank: #365007 in Books
- Brand: Brand: Prentice Hall
- Published on: 2001-06-08
- Original language: English
- Number of items: 1
- Dimensions: 10.00" h x 1.41" w x 8.26" l,
- Binding: Hardcover
- 576 pages

Editorial Review

From the Back Cover
A traditional and accessible calculus book with a strong conceptual and geometric slant that assumes a background in single-variable calculus. It uses the language and notation of vectors and matrices to clarify issues in multivariable calculus, and combines a clear and expansive writing style with an interesting selection of material. Chapter topics cover vectors, differentiation in several variables, vector-valued functions, maxima and minima in several variables, multiple integration, line integrals, surface integrals and vector analysis, and vector analysis in higher dimensions. For individuals interested in math and calculus.

About the Author

Susan Coney is currently the Andrew and Pauline Delaney Professor of Mathematics at Oberlin College, having previously served as Chair of the Department.

She received S.B. and Ph.D. degrees in mathematics from the Massachusetts Institute of Technology prior to joining the faculty at Oberlin in 1983.

Her research focuses on enumerative problems in algebraic geometry, particularly concerning multiple-point singularities and higher-order contact of plane curves.

Professor Coney has published papers on algebraic geometry as well as articles on other mathematical subjects. She has lectured internationally on her research and has taught a wide range of subjects in undergraduate mathematics.

Professor Coney is a member of several professional and honorary societies, including the American Mathematical Society, the Mathematical Association of America, Phi Beta Kappa, and Sigma Xi.

Physical and natural phenomena depend on a complex array of factors. The sociologist or psychologist who studies group behavior, the economist who endeavors to understand the vagaries of a nation's employment cycles, the physicist who observes the trajectory of a particle or planet, or indeed anyone who seeks to understand geometry in two, three, or more dimensions recognizes the need to analyze changing quantities that depend on more than a single variable. Vector calculus is the essential mathematical tool for such analysis. Moreover, it is an exciting and beautiful subject in its own right, a true adventure in many dimensions.

The only technical prerequisite for this text, which is intended for a sophomore-level course in multivariable calculus, is a standard course in the calculus of functions of one variable. In particular, the necessary matrix arithmetic and algebra (not linear algebra) are developed as needed. Although the mathematical background assumed is not exceptional, the reader will still need to "think hard" in places.

My own objectives in writing the book are simple ones: to develop in students a sound conceptual grasp of vector calculus and to help them begin the transition from first-year calculus to more advanced technical mathematics. I maintain that the first goal can be met, at least in part, through the use of vector and matrix notation, so that many results, especially those of differential calculus, can be stated with reasonable levels of clarity and generality. Properly described, results in the calculus of several variables can look quite similar to those of the calculus of one variable. Reasoning by analogy will thus be an important pedagogical tool. I also believe that a conceptual understanding of mathematics can be obtained through the development of a good geometric intuition. Although I state many results in the case of *n* variables (where *n* is arbitrary), I recognize that the most important and motivational examples usually arise for functions of two and three variables, so these concrete and visual situations are emphasized to explicate the general theory. Vector calculus is in many ways an ideal subject for students to begin exploration of the interrelations among analysis, geometry, and matrix algebra.

Multivariable calculus, for many students, represents the beginning of significant mathematical maturation. Consequently, I have written a rather expansive text so that they can see that there is a "story" behind the results, techniques, and examples—that the subject coheres and that this coherence is important for problem solving. To indicate some of the power of the methods introduced, a number of topics, not always discussed very fully in a first multivariable calculus course, are treated here in some detail:

- an early introduction of cylindrical and spherical coordinates
- the use of vector techniques to derive Kepler's laws of planetary motion
- the elementary differential geometry of curves in $\mathbf{R}^3$, including discussion of curvature, torsion, and the Frenet-Serret formulas for the moving frame
- Taylor's formula for functions of several variables
- the use of the Hessian matrix to determine the nature (as local extrema) of critical points of functions of *n* variables
- an extended discussion of the change of variables formula in double and triple integrals
- applications of vector analysis to physics
- an introduction to differential forms and the generalized Stokes's theorem

Included are a number of proofs of important results. The more technical proofs are collected as addenda at the end of the appropriate sections so as not to disrupt the main conceptual flow and to allow for greater flexibility of use by the instructor and student. Nonetheless, some proofs (or sketches of proofs) embody such central ideas that they are included in the main body of the text.

New in the Second Edition

I have retained the overall structure and tone of the first edition. New features include the following:

- 220 new exercises of varying levels of difficulty;
- 70 computer-based exercises;
- a new chapter (Chapter 8) on differential forms, parametrized manifolds, and the generalized Stokes's theorem that significantly expands on the first edition;
- an expanded discussion of the implicit function and inverse function theorems
- an expanded discussion of quadratic forms and their role in determining extrema of functions
- various refinements throughout the text, including new examples and explanations.

How To Use This Book

There is more material in this book than can be covered comfortably during a single semester. Hence, the instructor will wish to eliminate some topics or subtopics—or to abbreviate the rather leisurely presentations of limits and differentiability. Since I frequently find myself without the time to treat surface integrals in detail, I have separated all material concerning parametrized surfaces, surface integrals, and Stokes's and Gauss's theorems (Chapter 7), from that concerning line integrals and Green's theorem (Chapter 6). In particular, in a one-semester course for students with little or no experience with vectors or matrices, instructors can probably expect to cover most of the material in Chapters 1-6, although no doubt it will be necessary to omit some of the optional subsections and to downplay many of the proofs of results. A rough outline for such a course, allowing for some instructor discretion, could be the following:

Chapter 1: 8-9 lectures
Chapter 2: 9 lectures
Chapter 3: 4-5 lectures
Chapter 4: 5-6 lectures
Chapter 5: 8 lectures
Chapter 6: 4 lectures
Total: 38-41 lectures

If students have a richer background (so that much of the material in Chapter 1 can be left largely to them to read on their own), then it should be possible to treat a good portion of Chapter 7 as well. For a two-quarter or two-semester course, it should be possible to work through the entire book with reasonable care and rigor, although coverage of Chapter 8 should depend on students' exposure to introductory linear algebra, as somewhat more sophistication is assumed there.

The exercises vary from relatively routine computations to more challenging and provocative problems, generally (but not invariably) increasing in difficulty for each section. Each chapter concludes with a set of miscellaneous exercises that review and extend the ideas introduced in the chapter, and occasionally present new applications.

A word about the use of technology. The text was written without reference to any particular computer software or graphing calculator. Most of the exercises can be solved by hand, although there is no reason not to turn over some of the more tedious calculations to a computer. Those exercises that *require* a computer for computational or graphical purposes are marked with a computer symbol, and should be amenable to software such as *Mathematica*®, Maple®, or MATLAB.

Users Review

From reader reviews:

Anna Cooper:

This Vector Calculus (2nd Edition) book is not really ordinary book, you have it then the world is in your hands. The benefit you obtain by reading this book is usually information inside this book incredible fresh, you will get details which is getting deeper you actually read a lot of information you will get. This particular Vector Calculus (2nd Edition) without we realize teach the one who studying it become critical in contemplating and analyzing. Don't always be worry Vector Calculus (2nd Edition) can bring any time you are and not make your bag space or bookshelves' become full because you can have it with your lovely laptop even mobile phone. This Vector Calculus (2nd Edition) having excellent arrangement in word and layout, so you will not truly feel uninterested in reading.

Brenda Evans:

The reserve untitled Vector Calculus (2nd Edition) is the publication that recommended to you you just read.

You can see the quality of the book content that will be shown to an individual. The language that author use to explained their way of doing something is easily to understand. The copy writer was did a lot of analysis when write the book, and so the information that they share for your requirements is absolutely accurate. You also could get the e-book of Vector Calculus (2nd Edition) from the publisher to make you considerably more enjoy free time.

Edgar Hightower:

Vector Calculus (2nd Edition) can be one of your nice books that are good idea. Many of us recommend that straight away because this e-book has good vocabulary that will increase your knowledge in terminology, easy to understand, bit entertaining but still delivering the information. The author giving his/her effort to set every word into pleasure arrangement in writing Vector Calculus (2nd Edition) but doesn't forget the main stage, giving the reader the hottest as well as based confirm resource facts that maybe you can be certainly one of it. This great information could drawn you into fresh stage of crucial imagining.

Douglas Elem:

Beside this Vector Calculus (2nd Edition) in your phone, it could possibly give you a way to get more close to the new knowledge or details. The information and the knowledge you are going to got here is fresh from your oven so don't become worry if you feel like an outdated people live in narrow commune. It is good thing to have Vector Calculus (2nd Edition) because this book offers for your requirements readable information. Do you often have book but you seldom get what it's about. Oh come on, that wil happen if you have this inside your hand. The Enjoyable agreement here cannot be questionable, similar to treasuring beautiful island. Techniques you still want to miss that? Find this book and read it from right now!

Read Vector Calculus (2nd Edition) By Susan Jane Colley for online ebook

Vector Calculus (2nd Edition) By Susan Jane Colley Free PDF d0wnl0ad, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read Vector Calculus (2nd Edition) By Susan Jane Colley books to read online.

Online Vector Calculus (2nd Edition) By Susan Jane Colley ebook PDF download

Vector Calculus (2nd Edition) By Susan Jane Colley Doc

Vector Calculus (2nd Edition) By Susan Jane Colley Mobipocket

Vector Calculus (2nd Edition) By Susan Jane Colley EPub