PREFACE

Calculus with Applications for the Life Sciences emphasizes those aspects of calculus most relevant to the life sciences. The application examples and exercises are drawn predominately from biology, medicine, ecology, and other life sciences. A prerequisite of two years of high school algebra is assumed.

FEATURES

Pedagogical Features

- careful explanation of the mathematics
- fully developed examples with explanatory comments in color on the side
- an algebra reference (Chapter R), designed to be used either in class or by individual students
- thought-provoking questions that open most sections, which are answered in an application within the section or in the section exercises
- "just in time" margin reviews giving short explanations or comments reminding students of skills or techniques learned earlier that are needed at this point
- common student difficulties and errors highlighted under the heading "Caution"
- important treatments and asides highlighted with the heading "Notes"
- summaries of rules or formulas for chapters where students may have trouble deciding which of several techniques to use
- an index of applications showing the abundant variety of real-data applications used in the text and allowing direct reference to particular topics

Exercises

- exercises arranged according to the material in the section, with the more challenging exercises placed near the end
- applied exercises (labeled "Applications") that are grouped by subject, with titles indicating the specific topic
- writing exercises, labeled with ✎, to provide students with an opportunity to explain important mathematical ideas
- connections exercises, labeled with ◯, that integrate topics presented in different sections or chapters

SPECIAL FEATURES

Use of Referenced Real-Data Applications This text includes a large number of application exercises and examples using real data, with references to articles appearing in newspapers, books, and journals. For example, see pages 100, 123, 153, and 214–215. These examples will help students learn how extensively mathematics is applied to the life sciences, as well as motivate students who wonder how the mathematics they learn relates to their other courses and their future careers. We believe that the quantity and quality of real-data applications set this book apart from others at this level.

Multiple Methods of Solution We emphasize multiple representations of a topic, whenever possible, by examining each topic symbolically, numerically, graphically, and verbally, and offer multiple methods of solution to various examples. Some of these alternative methods involve technology, while others represent a different way of performing a computation. For example, see pages 20–22, 394–395, and 447–448. We believe that students will better understand a topic when they learn more than one approach. Furthermore, the multiple methods will give instructors greater flexibility to emphasize the methods they prefer.

Use of Graphing Calculators and Spreadsheets We emphasize graphing calculators and spreadsheets. Although students reading this book do not need a graphing calculator or a spreadsheet program, using either or both will enhance their learning. Exercises requiring technology are labeled with ⌨; many of these can be done with either a spreadsheet or a graphing calculator. For example, see pages 27–31 and 86–88. We have used the TI-83 for our graphing calculator examples and Microsoft® Excel for our spreadsheet examples, but students can succeed in the course with any appropriate graphing calculator or spreadsheet program. Inclusion of both graphing calculators and spreadsheets in the text gives instructors the ability to incorporate technology into their course as they wish.

Extended Applications We include in-depth applied exercises (labeled "Extended Applications") at the end of most sections to stimulate student interest and for use as group projects. Additional extended applications are available at the Web site for *Calculus with Applications:* www.aw.com/LGR.

Full-Color Graphics and Photography To make this book easy, lively, and fun to read, we have used full-color graphics. Occasionally, color in the text enhances the exposition, such as on page 4. More often, we have used color to clarify the different parts of a figure, such as on pages 308 and 323. We also have photographs illustrating many of the applications.

SUPPLEMENTS

For the Instructor The *Instructor's Solutions Manual* (ISBN 0-201-77017-2) contains solutions to even-numbered exercises and a set of teaching tips.

MyMathLab is a complete online course available with this text and is perfect for helping students succeed in their course. This site offers a wide variety of resources, from dynamic multimedia—video clips, animations, audio explanations, and more—to an online gradebook that allows students to track their performance on homework assignments and tests. With MyMathLab students can increase comprehension and get help with concepts they don't understand.

TestGen-EQ with QuizMaster-EQ (dual platform for Windows and Macintosh, ISBN 0-201-79418-7) is a computerized test generator with algorithmically defined problems organized specifically for this textbook. Its user-friendly graphical interface enables instructors to select, view, edit, and add test items, then print tests in a variety of fonts and forms. A built-in question editor gives the user the power to create graphs, import graphics, insert mathematical symbols and templates, and insert variable numbers or text. An "Export to HTML" feature lets instructors create practice tests that can be posted to a Web site. Tests created with TestGen-EQ can also be displayed on Web pages when the free TestGen-EQ plug-in has been installed with Internet Explorer or Netscape Navigator. Tests created with TestGen-EQ can be used with QuizMaster-EQ, which enables students to take exams on a computer network. QuizMaster-EQ automatically grades the exams, stores results on disk, and allows the instructor to view or print a variety of reports for individual students, classes, or courses. Contact your Addison-Wesley sales consultant.

For the Student The *Student's Solutions Manual* (ISBN 0-201-77016-4) provides solutions to odd-numbered exercises and sample chapter tests with answers.

www.aw.com/greenwell is a free site available to everyone with World Wide Web access. Among the items provided on the Web site are the following:

- *The Graphing Calculator Manual for Calculus for the Life Sciences* provides detailed information on using some of the more popular graphing calculators to work through examples in the text. Listings of some programs for graphing calculators are also included.
- *The Excel Spreadsheet Manual for Calculus for the Life Sciences* provides detailed information on using the Excel spreadsheet program to work through examples in the text.
- The supplementary chapter *Discrete Dynamical Systems* is available for classes that wish to cover this topic.
- The supplementary section *Markov Chains* is also available for classes interested in the topic.

Just-in-Time Algebra for Students of Calculus in Management and the Life Sciences, Second Edition (ISBN 0-201-74611-5) lets students review key algebra topics. The user-friendly table of contents has key prerequisite topics arranged in the order in which students will need to review them as they study applied calculus.

The Addison-Wesley Math Tutor Center is staffed by qualified mathematics instructors who provide students with tutoring on examples and exercises answered at the back of the textbook. Tutoring is available via toll-free telephone, fax, e-mail, or whiteboard technology—which allows tutors and students to actually see the problems worked while they "talk" in real time over the Internet.

This service is available five days a week, seven hours a day. For more information, go to www.aw.com/tutorcenter.

InterAct MathXL® (www.mathxl.com) is a Web site that provides diagnostic testing and tutorial help, all online, using InterAct Math tutorial software and TestGen-EQ testing software. Students can take chapter tests correlated to this textbook, receive individualized study plans based on those test results, work practice problems and receive tutorial instruction for areas in which they need improvement, and take further tests to gauge their progress. Instructors can customize tests and track all student test results, study plans, and practice work. The site is free when an access code is bundled with a new text.

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