

Preface

We are pleased to present the sixth edition of *Intermediate Algebra: Concepts and Applications*. Each time we work on a new edition, it's a balancing act. On the one hand, we want to preserve the features, applications, and explanations that faculty have come to rely on and expect. On the other hand, we want to blend our own ideas for improvement with the many insights that we receive from faculty and students throughout North America. The result is a living document in which new features and applications are developed while successful features and popular applications from previous editions are updated and refined. Our goal, as always, is to present content that is easy to understand and has the depth required for success in this and future courses.

Appropriate for a one-term course in intermediate algebra, this text is intended for those students who have a firm background in elementary algebra. It is one of three texts in an algebra series that also includes *Elementary Algebra: Concepts and Applications*, Sixth Edition, by Bittinger/Ellenbogen and *Elementary and Intermediate Algebra: Concepts and Applications, A Combined Approach*, Third Edition, by Bittinger/Ellenbogen/Johnson.

Approach

Our goal, quite simply, is to help today's students both learn and retain mathematical concepts. To achieve this goal, we feel that we must prepare developmental-mathematics students for the transition from "skills-oriented" elementary and intermediate algebra courses to more "concept-oriented" college-level mathematics courses. This requires that we teach these same students critical thinking skills: to reason mathematically, to communicate mathematically, and to identify and solve mathematical problems. Following are some aspects of our approach that are used in this revision to help meet the challenges we all face teaching developmental mathematics.

Problem Solving

One distinguishing feature of our approach is our treatment of and emphasis on problem solving. We use problem solving and applications to motivate the material wherever possible, and we include real-life applications and problem-solving techniques throughout the text. Problem solving not only encourages students to think about how mathematics can be used, it helps to prepare them for more advanced material in future courses.

- In Chapter 1, we introduce the five-step process for solving problems: (1) Familiarize, (2) Translate, (3) Carry out, (4) Check, and (5) State the answer. These steps are then used consistently throughout the text whenever we encounter a problem-solving situation. Repeated use of this problem-solving strategy gives students a sense that they have a starting point for any type of problem they encounter, and frees them to focus on the mathematics necessary to successfully translate the problem situation. We often use estimation and carefully checked guesses to help with the Familiarize and Check steps (see pp. 33, 166, 373, and 524).

Applications

Interesting applications of mathematics help motivate both students and instructors. Solving applied problems gives students the opportunity to see their conceptual understanding put to use in a real way. In the Sixth Edition of *Intermediate Algebra: Concepts and Applications*, not only have we increased the total number of applications and real-data problems overall, nearly 20 percent of our applications are new, and we have increased the number of source lines to better highlight the real-world data. As in the past, art is integrated into the applications and exercises to aid the student in visualizing the mathematics. (See pp. 119, 128, 351, and 393.)

Pedagogy

New! **Connecting the Concepts.** To help students understand the “big picture,” Connecting the Concepts subsections within each chapter (and highlighted in the table of contents) relate the concept at hand to previously learned and upcoming concepts. Because students may occasionally “lose sight of the forest because of the trees,” we feel confident that this feature will help them keep better track of their bearings as they encounter new material. (See pp. 25, 172, 249, and 266.)


New! **Study Tips.** Most plentiful in the first three chapters when students are still establishing their study habits, Study Tips are found in the margins and interspersed throughout the first seven chapters. Our Study Tips range from how to approach assignments, to reminders of the various study aids that are available, to strategies for preparing for a final exam. (See pp. 93, 157, and 212.)

New! Aha! Exercises. Designated by *Aha!*, these exercises can be solved quickly if the student has the proper insight. The *Aha!* designation is used the first time a new insight can be used on a particular type of exercise and indicates to the student that there is a simpler way to complete the exercise that requires less lengthy computation. It's then up to the student to find the simpler approach and, in subsequent exercises, to determine if and when that particular insight can be used again. Occasionally the *Aha!* exercise is easily answered by looking at the preceding odd-numbered exercise. Our hope is that the *Aha!* exercises will discourage rote learning and reward students who “look before they leap” into a problem. (See pp. 122, 240, 285, 301, and 341.)

Technology Connections. Throughout each chapter, optional Technology Connection boxes help students use graphing calculator technology to better visualize a concept that they have just learned. To connect this feature to the exercise sets, certain exercises are marked with a graphing calculator icon and reinforce the use of this optional technology. (See pp. 94, 96, 120, 239, and 269.)

Skill Maintenance Exercises. Retaining mathematical skills is critical to a student's success in future courses. To this end, nearly every exercise set includes six to eight Skill Maintenance exercises that review skills and concepts from preceding chapters of the text. In this edition, not only have the Skill Maintenance exercises been increased by 50 percent, but they are now designed to provide extra practice with the specific skills needed for the very next section of the text. We also now list answers to both odd- and even-numbered Skill Maintenance exercises, along with their section references, in the answers at the back of the book. (See pp. 91, 158, 250, and 316.)

Synthesis Exercises. Following the Skill Maintenance section, each exercise set ends with a group of Synthesis exercises designated by their own heading. These exercises offer opportunities for students to synthesize skills and concepts from earlier sections with the present material, and often provide students with deeper insights into the current topic. Synthesis exercises are generally more challenging than those in the main body of the exercise set. (See pp. 150, 241, 435, and 442.)

Writing Exercises. In this edition, nearly every set of exercises includes at least four writing exercises. Two of these are more basic and appear just before the Skill Maintenance exercises. The other writing exercises are more challenging and appear as Synthesis exercises. All writing exercises are marked with  and require answers that are one or more complete sentences. This type of problem has been found to aid in student comprehension, critical thinking, and conceptualization. Because some instructors may collect answers to writing exercises, and because more than one answer may be correct, answers to writing exercises are not listed at the back of the text. (See pp. 231, 302, 342, and 351.)

Collaborative Corners. In today's professional world, teamwork is essential. We continue to provide optional Collaborative Corner features throughout the text that require students to work in groups to explore and solve mathematical problems. There are one to three Collaborative Corners per chapter, each one appearing after the appropriate exercise set. (See pp. 39, 223, 277, and 423.)

Cumulative Review. After Chapters 3, 6, 9, and 11, we have included a Cumulative Review, which reviews skills and concepts from preceding chapters of the text. (See pp. 207, 405, 615, and 699.)

What's New in the Sixth Edition?

We have rewritten many key topics in response to user and reviewer feedback and have made significant improvements in design, art, pedagogy, and an expanded supplements package. Detailed information about the content changes is available in the form of a conversion guide. Please ask your local Addison-Wesley sales consultant for more information. Following is a list of the major changes in this edition.

New Design

You will see that the page dimension for this edition is larger, which allows for an open look and a typeface that is easier to read. In addition, we continue to pay close attention to the pedagogical use of color to make sure that it is used to present concepts in the clearest possible manner.

Content Changes

A variety of content changes have been made throughout the text. Some of the more significant changes are listed below.

- Chapter 2 now includes a brief introduction to interpolation and extrapolation. The concept of slope is now closely linked with the idea of rate of change, beginning in Section 2.3.
- The topic of variation has been removed from Section 8.6 and moved into Section 6.8. As a result, Chapter 8 has been shortened to 9 sections.
- Chapter 7 has been rewritten so that Section 7.3 is now strictly on multiplying radical expressions. Section 7.4 is now strictly on division of radical expressions. Section 7.5 is now devoted to expressions with two or more radical terms.
- Chapter 9 now begins with Composite and Inverse Functions (formerly Section 9.2) and then moves to Exponential Functions (formerly Section 9.1). This makes for more flow of topics and facilitates coverage of Composite and Inverse Functions as a stand-alone topic if desired.

Supplements for the Instructor

New! Annotated Instructor's Edition

(ISBN 0-201-65873-9)

The *Annotated Instructor's Edition* includes all the answers to the exercise sets, usually right on the page where the exercises appear, and Teaching Tips in the margins that give insights and classroom discussion suggestions that will be especially useful for new instructors. These handy answers and ready Teaching Tips will help both new and experienced instructors save classroom preparation time.

New! MyMathLab

MyMathLab.com is a complete, on-line course for Addison-Wesley mathematics textbooks that integrates interactive, multimedia instruction correlated to the textbook content. MyMathLab can be easily customized to suit the needs of students and instructors and provides a comprehensive and efficient on-line course-management system that allows for diagnosis, assessment, and tracking of students' progress.

MyMathLab features the following:

- Fully interactive multimedia textbooks are built in CourseCompass, a version of Blackboard™ designed specifically for Addison-Wesley.
- Chapter and section folders from the textbook contain a wide range of instructional content: videos, software tools, audio clips, animations, and electronic supplements.
- Hyperlinks take you directly to on-line testing, diagnosis, tutorials, and gradebooks in MathXL—Addison-Wesley's tutorial and testing system for mathematics and statistics.
- Instructors can create, copy, edit, assign, and track all tests for their course as well as track student tutorial and testing performance.
- With push-button ease, instructors can remove, hide, or annotate Addison-Wesley preloaded content, add their own course documents, or change the order in which material is presented.
- Using the communication tools found in MyMathLab, instructors can hold on-line office hours, host a discussion board, create communication groups within their class, send e-mails, and maintain a course calendar.
- Print supplements are available on-line, side by side with their textbooks.

For more information, visit our Web site at www.mymathlab.com or contact your Addison-Wesley sales representative for a live demonstration.

Printed Test Bank/

Instructor's Resource Guide (ISBN 0-201-73490-7)

The Instructor's Resource Guide portion of this supplement contains the following:

- Extra practice problems and answers
- Black-line masters of grids and number lines for transparency masters or test preparation

- A videotape index and section cross-references to our tutorial software packages
- A syllabus conversion guide from the Fifth Edition to the Sixth Edition

The Printed Test Bank portion of this supplement contains the following:

- Six new alternate free-response test forms for each chapter, organized with the same topic order as the chapter tests in the main text. Each form includes synthesis questions, as appropriate, at the end of each test.
- Two new multiple-choice versions of each chapter test
- Eight new alternate test forms for the final examination: Alternate Test Forms A, B, and C of the final examinations are organized by chapter and D, E, and F are organized by problem type.
- Answers to all tests

Instructor's Solutions Manual

(ISBN 0-201-73489-3)

The *Instructor's Solutions Manual* contains fully worked-out solutions to the odd-numbered exercises and brief solutions to the even-numbered exercises in the exercise sets.

Answer Book (ISBN 0-201-73727-2)

The *Answer Book* includes answers to all even-numbered and odd-numbered exercises.

TestGen-EQ/QuizMaster-EQ

(ISBN 0-201-73732-9)

Available on a dual-platform Windows/Macintosh CD-ROM, this fully networkable software enables instructors to build, edit, print, and administer tests using a computerized test bank of questions organized according to the contents of each chapter. Tests can be printed or saved for on-line testing via a network on the Web, and the software can generate a variety of grading reports for tests and quizzes.

InterAct Math Plus

(ISBN 0-201-72140-6)

Available to Windows users of *Intermediate Algebra: Concepts and Applications*, Sixth Edition, this networkable software provides course management and on-line administration for Addison-Wesley's InterAct Math Tutorial Software (see "Supplements for the Student"). InterAct Math Plus enables instructors to create and administer on-line tests, summarize students' results, and monitor students' progress in the tutorial software, providing an invaluable teaching and tracking resource.

InterAct MathXL: www.mathxl.com

(12-month registration ISBN 0-201-71111-7, stand-alone)

The MathXL Web site provides diagnostic testing and tutorial help, all on-line using InterAct Math® tutorial software and TestGen-EQ testing software. Students can take chapter tests correlated to the text, 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.

Supplements for the Student

New! Web Site: www.MyMathLab.com

Ideal for lecture-based, lab-based, and on-line courses, this state-of-the-art Web site provides students with a centralized point of access to the wide variety of on-line resources available with this text. The pages of the actual book are loaded into MyMathLab.com, and as students work through a section of the on-line text, they can link directly from the pages to supplementary resources (such as tutorial software, interactive animations, and audio and video clips) that provide instruction, exploration, and practice beyond what is offered in the printed book. MyMathLab.com generates personalized study plans for students and allows instructors to track all student work on tutorials, quizzes, and tests. Complete course-management capabilities, including a host of communication tools for course participants, are provided to create a user-friendly and interactive on-line learning environment.

Student's Solutions Manual

(ISBN 0-201-65874-7)

The *Student's Solutions Manual* by Judith A. Penna contains completely worked-out solutions with step-by-step annotations for all the odd-numbered exercises in the text, with the exception of the Writing exercises. This manual also lists, without complete solutions, the answers for even-numbered text exercises.

InterAct Math® Tutorial CD-ROM

(ISBN 0-201-74624-7)

This interactive tutorial software provides Windows users with algorithmically generated practice exercises that correlate at the objective level to the odd-numbered exercises in the text. Each practice exercise is accompanied by both an example and a guided solution designed to involve students in the solution process. Selected problems also include a video clip that helps students visualize concepts. The software recognizes common student errors and provides appropriate feedback. Instructors can use InterAct Math Plus course management software to create, administer, and track on-line tests and monitor student performance during practice sessions.

InterAct MathXL www.mathxl.com

(12-month registration ISBN 0-201-71630-5, stand-alone)

The MathXL Web site provides diagnostic testing and tutorial help, all on-line, using InterAct Math® tutorial software and TestGen-EQ testing software. Students can take chapter tests correlated to the text, 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.

Videotapes (ISBN 0-201-74209-8)

Developed and produced especially for this text, the videotapes feature an engaging team of instructors, including the authors. These instructors present material and concepts by using examples and exercises from every section of the text in a format that stresses student interaction.

Digital Video Tutor

(ISBN 0-201-74641-7, stand-alone)

The videotapes for this text are now available on CD-ROM, making it easy and convenient for students to watch video segments from a computer at home or on campus. The complete digitized video set, now affordable and portable for students, is ideal for distance learning or supplemental instruction.

AW Math Tutor Center

(ISBN 0-201-72170-8, stand-alone)

The AW Math Tutor Center is staffed by qualified mathematics instructors who provide students with tutoring on examples and odd-numbered exercises from the textbook. Tutoring is available via toll-free telephone, fax, or e-mail.

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Ray Brinker, *Western Illinois University*

Michael Divinia, *San Jose City College*

Richard Kern, *Luzerne County Community College*

Kamilia Nemri, *Spokane Community College*

Brenda Santistevan, *Salt Lake Community College*

Carol Satkowiak, *Florida Community College at Jacksonville*

Manuscript Reviewers (Sixth Edition)

Dianne Adams, *Hazard Community College*

Sonya Armstrong, *West Virginia State College*

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Bob Bohac, *North Idaho College*
Paulette Callahan, *College of San Mateo, San Francisco State University*
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Don Rose, *College of the Sequoias*
Greg Rosik, *Century College*
Slav Sharapov, *Quinebaug Valley Community Technical College*
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M.L.B.
D.J.E.