EIGHTH EDITION

Intermediate Algebra for College Students

Robert Blitzer
Miami Dade College

Pearson

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Library of Congress Control Number: 2019919033

Cataloging-in-Publication Data is available on file at the Library of Congress.

Access Code Card
ISBN-10: 0136553885
ISBN-13: 9780136553885

Rental
ISBN-10: 0136553435
ISBN-13: 9780136553434

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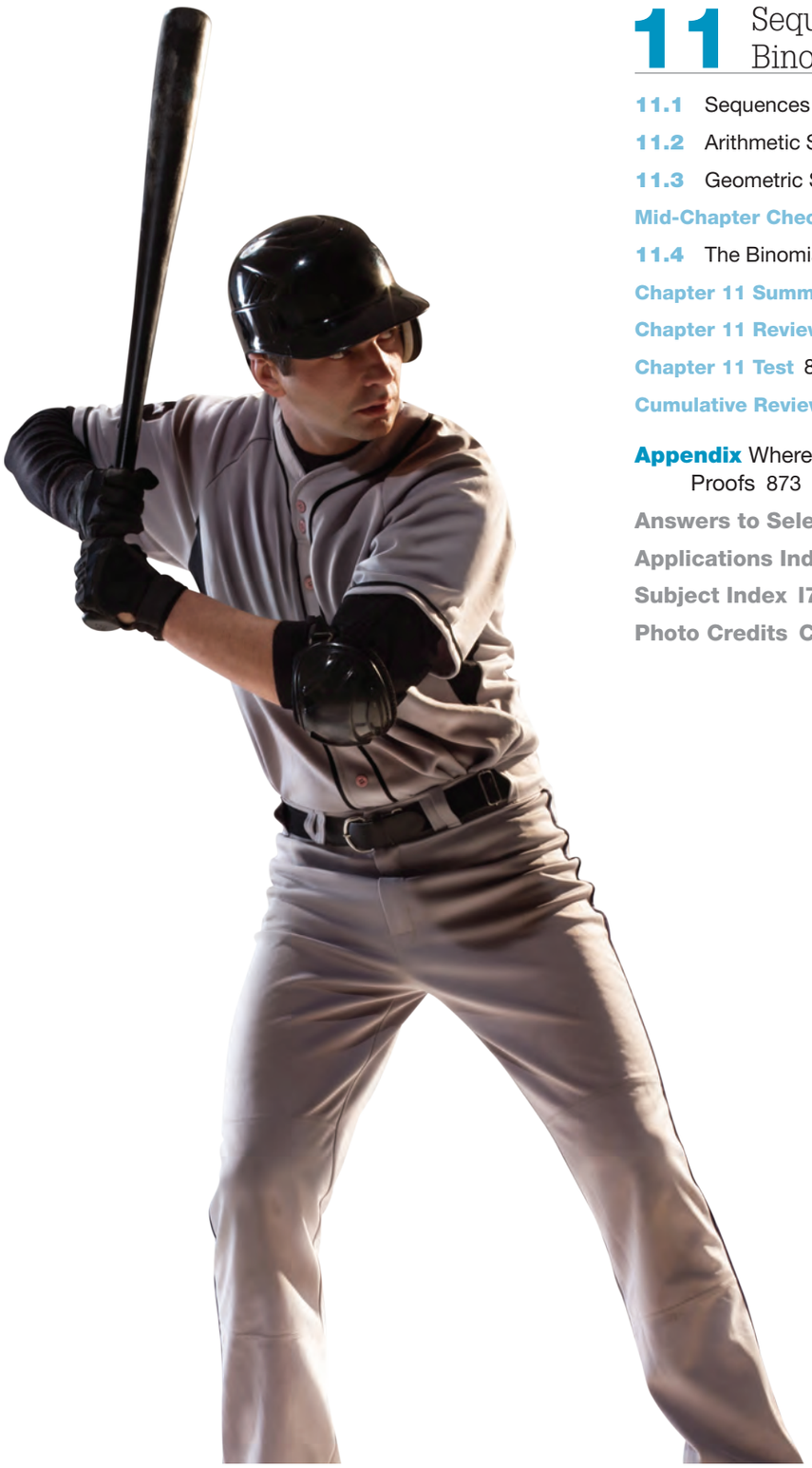

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Preface

Intermediate Algebra for College Students, Eighth Edition, provides comprehensive, in-depth coverage of the topics required in a one-term course in intermediate algebra. The book is written for college students who have had a course in introductory algebra or who have demonstrated proficiency in the objectives of such a course. I wrote the book to help diverse students with different backgrounds and career plans succeed in intermediate algebra. *Intermediate Algebra for College Students,* Eighth Edition, has two primary goals:

1. To help students acquire a solid foundation in the skills and concepts of intermediate algebra needed for success in future STEM and non-STEM directed math courses.
2. To show students how algebra can model and solve authentic real-world problems.

One major obstacle in the way of achieving these goals is the fact that very few students actually read their textbook. This has been a regular source of frustration for me and for my colleagues in the classroom. Anecdotal evidence gathered over years highlights two basic reasons students give when asked why they do not take advantage of their textbook:

- "I'll never use this information."
- "I can't follow the explanations."

I've written every page of the Eighth Edition with the intent of eliminating these two objections. The ideas and tools I've used to do so are described in the features that follow. These features and their benefits are highlighted for the student in "A Brief Guide to Getting the Most from This Book," which appears inside the front cover.

What's New in the Eighth Edition?

- **New and Updated Applications and Real-World Data.** The Eighth Edition contains more than 100 new or revised worked-out examples and exercises based on updated and new data sets. Many of these applications involve topics of interest to college students and newsworthy items. Among topics of interest to college students, you'll find data sets describing student loan debt (Section 1.1, Example 4), discretionary spending among college students (Exercise Set 1.2, Exercises 147–148), cost of tuition and fees at public four-year colleges (Section 1.4 opener; Section 1.4, Example 7), cost of tuition and fees at private four-year colleges (Exercise Set 1.4, Exercises 67–68), earnings, by educational attainment (Section 1.5, Example 1 and Check Point 1), life objectives of college freshmen (Section 1.5, Example 2 and Check Point 2), percentage of college freshmen with no religious affiliation (Exercise Set 2.5, Exercises 69–70), high school students applying to more than three colleges (Exercise Set 9.1, Exercises 57–58), the percentage of college graduates among Americans 25 and older (Exercise Set 11.2, Exercises 61–62), and dormitory charges at four-year colleges (Exercise Set 11.2, Exercises 65–66). Among newsworthy topics

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applications include the percentage of the U.S. population using the Internet (Exercise Set 1.3, Exercises 47–52), taxes (Section 1.7 opener; Section 1.7, Example 5 and Check Point 5), growing world population (Section 1.7, Example 3), support for marriage equality among Democrats and Republicans (Chapter 1 Review, Exercise 75), the number of U.S. prisoners (Chapter 1 Test, Exercise 8; Exercise Set 2.3, Exercises 63–65), U.S. births and deaths (Section 2.3 opener; Section 2.3, Example 5 and Check Point 5), overweight U.S. adults (Exercise Set 2.4, Exercises 85–86), the federal minimum wage (Exercise Set 2.4, Exercise 112), climate change (Chapter 2 Review, Exercise 60), employment, by gender (Exercise Set 3.1, Exercises 95–96), school bullying (Exercise Set 4.1, Exercises 57–58), diagnosed HIV cases (Section 5.1 opener), Amazon deforestation (Chapter 6 Review, Exercise 91), and Americans giving up their citizenship, primarily for tax reasons (Exercise Set 11.1, Exercise 58).

- **NEW! Animations** created in GeoGebra help students visualize mathematical concepts through directed explorations and purposeful manipulation. Corresponding MyLab Math exercises allow these new animations to be assigned with assessment to check for understanding.
- **NEW! Integrated Review** in MyLab Math can be used in a corequisite course or simply to help students who enter their course without a full understanding of prerequisite skills.

  Once the instructor has assigned the premade Integrated Review assignments, students begin each chapter by completing a Skills Check to pinpoint which prerequisite topics, if any, they need to review.

  Personalized review homework provides extra support for students who need it on just the topics they did not master in the Skills Check.

  Additional review materials, including worksheets and videos, are available.

What Familiar Features Have Been Retained in the Eighth Edition of *Intermediate Algebra for College Students*?

- **Learning Objectives.** Learning objectives, framed in the context of a student question (What am I supposed to learn?), are clearly stated at the beginning of each section. These objectives help students recognize and focus on the section's most important ideas. The objectives are restated in the margin at their point of use.
- **Chapter-Opening and Section-Opening Scenarios.** Every chapter and every section open with a scenario presenting a unique application of mathematics in students' lives outside the classroom. These scenarios are revisited in the course of the chapter or section in an example, discussion, or exercise.
- **Innovative Applications.** A wide variety of interesting applications, supported by up-to-date, real-world data, are included in every section.
- **Detailed Worked-Out Examples.** Each example is titled, making the purpose of the example clear. Examples are clearly written and provide students with detailed step-by-step solutions. No steps are omitted and each step is thoroughly explained to the right of the mathematics.
- **Explanatory Voice Balloons.** Voice balloons are used in a variety of ways to demystify mathematics. They translate algebraic ideas into everyday English, help clarify problem-solving procedures, present alternative ways of understanding concepts, and connect problem solving to concepts students have already learned.
- **Check Point Examples.** Each example is followed by a similar matched problem, called a Check Point, offering students the opportunity to test their understanding of the example by working a similar exercise. The answers to the Check Points are provided in the answer section.
- **Concept and Vocabulary Checks.** This feature offers short-answer exercises, mainly fill-in-the-blank and true/false items, that assess students' understanding of the definitions and concepts presented in each section. The Concept and Vocabulary Checks appear as separate features preceding the Exercise Sets.

- **Extensive and Varied Exercise Sets.** An abundant collection of exercises is included in an Exercise Set at the end of each section. Exercises are organized within eight category types: Practice Exercises, Practice Plus Exercises, Application Exercises, Explaining the Concepts, Critical Thinking Exercises, Technology Exercises, Retaining the Concepts, and Preview Exercises. This format makes it easy to create well-rounded homework assignments. The order of the Practice Exercises is exactly the same as the order of the section's worked examples. This parallel order enables students to refer to the titled examples and their detailed explanations to achieve success working the Practice Exercises.
- **Practice Plus Problems.** This category of exercises contains more challenging practice problems that often require students to combine several skills or concepts. With an average of ten Practice Plus problems per Exercise Set, instructors are provided with the option of creating assignments that take Practice Exercises to a more challenging level.
- **Mid-Chapter Check Points.** At approximately the midway point in each chapter, an integrated set of Review Exercises allows students to review and assimilate the skills and concepts they learned separately over several sections.
- **Graphing and Functions.** Graphing is introduced in Chapter 1 and functions are introduced in Chapter 2, with an integrated graphing functional approach emphasized throughout the book. Graphs and functions that model data appear in nearly every section and Exercise Set. Examples and exercises use graphs of functions to explore relationships between data and to provide ways of visualizing a problem's solution. Because functions are the core of this course, students are repeatedly shown how functions relate to equations and graphs.
- **Integration of Technology Using Graphic and Numerical Approaches to Problems.** Side-by-side features in the technology boxes connect algebraic solutions to graphic and numerical approaches to problems. Although the use of graphing utilities is optional, students can use the explanatory voice balloons to understand different approaches to problems even if they are not using a graphing utility in the course.
- **Great Question!** This feature presents a variety of study tips in the context of students' questions. Answers to questions offer suggestions for problem solving, point out common errors to avoid, and provide informal hints and suggestions. As a secondary benefit, this feature should help students not to feel anxious or threatened when asking questions in class.
- **Achieving Success.** The Achieving Success boxes at the end of many sections offer strategies for persistence and success in college mathematics courses.
- **Chapter Review Grids.** Each chapter contains a review chart that summarizes the definitions and concepts in every section of the chapter. Examples that illustrate these key concepts are also included in the chart.
- **End-of-Chapter Materials.** A comprehensive collection of Review Exercises for each of the chapter's sections follows the review grid. This is followed by a Chapter Test that enables students to test their understanding of the material covered in the chapter. Beginning with Chapter 2, each chapter concludes with a comprehensive collection of mixed Cumulative Review Exercises.
- **Blitzer Bonuses.** These enrichment essays provide historical, interdisciplinary, and otherwise interesting connections to the algebra under study, showing students that math is an interesting and dynamic discipline.
- **Discovery.** Discover for Yourself boxes, found throughout the text, encourage students to further explore algebraic concepts. These explorations are optional and their omission does not interfere with the continuity of the topic under consideration.

I hope that my passion for teaching, as well as my respect for the diversity of students I have taught and learned from over the years, is apparent throughout this new edition. By connecting algebra to the whole spectrum of learning, it is my intent to show students that their world is profoundly mathematical, and indeed, π is in the sky.

Robert Blitzer

*Get the **most** out of*

MyLab Math

Pearson MyLab

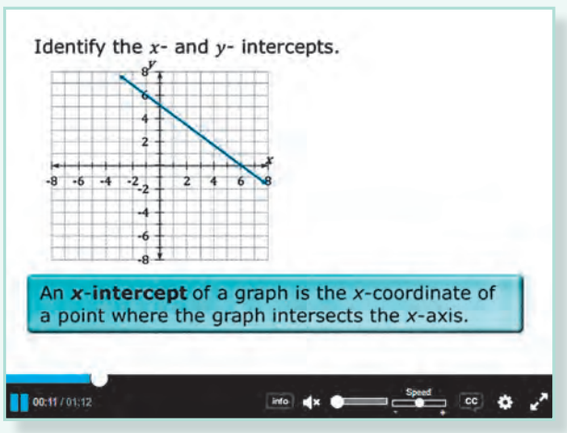
MyLab Math for *Intermediate Algebra for College Students*, by Bob Blitzer

(access code required)

Bob Blitzer's *Intermediate Algebra for College Students* offers market-leading content tightly integrated with the #1 choice in digital learning—MyLab Math. MyLab Math courses can be tailored to the needs of instructors and students, while weaving the Blitzer's distinct, relatable voice into all elements of the course.

Support Students Wherever, Whenever

A wealth of video resources provides students with extra help for each section of text. **Check Point Videos** show instructors working out each Check Point problem in the section to ensure understanding. **Section Lecture Videos** cover important topics from key sections to provide students with extra help.



Motivate with Real-World Applications

Animated **Blitzer Bonus videos** mirror this popular feature from the text. Blitzer Bonus videos use the author's signature style to help students connect mathematical topics to the world around them. Corresponding **assignable exercises** in MyLab Math allow these videos to be assigned for credit and check student understanding, while engaging them through an application.

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*Get the **most** out of*

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Get Students Prepared

NEW! Integrated Review can be used in a corequisite course or simply to help students who enter their course without a full understanding of prerequisite skills.

- Once the instructor has assigned the premade Integrated Review assignments, students begin each chapter by completing a Skills Check to pinpoint which topics, if any, they need to review.
- Personalized review homework provides extra support for students who need it on just the topics they did not master in the Skills Check.
- Additional review materials, including worksheets and videos, are available.

Encourage Conceptual Understanding

NEW! Animations created in GeoGebra help students visualize mathematical concepts through directed explorations and purposeful manipulation. Corresponding MyLab Math exercises allow these new animations to be assigned with assessment to check for understanding.

Foster College Success

NEW! A **Mindset module** includes growth-mindset videos and exercises that encourage students to maintain a positive attitude about learning, value their own ability to grow, and view mistakes as a learning opportunity.

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Resources for

Success

Pearson MyLab

Instructor Resources

Annotated Instructor's Edition

Answers to exercises are printed on the same text page with longer answers at the back of the text.

Additional resources can be downloaded from **www.pearsonhighered.com** or found in the Instructor Resources area of the MyLab Math course.

Instructor's Resource Manual with Tests and Mini-Lectures

Includes mini-lectures for each text section, additional practice worksheets for each section, several forms of tests per chapter—free response and multiple choice, and answers to all items.

Instructor's Solutions Manual

Includes fully worked solutions to every exercise in the text.

TestGen®

Enables instructors to build, edit, print, and administer tests using a computerized bank of questions developed to cover all the objectives of the text. TestGen is algorithmically based, allowing instructors to create multiple but equivalent versions of the same question or test with the click of a button. Instructors can also modify test bank questions or add new questions.

PowerPoint Lecture Slides

Fully editable slides correlated with the textbook include definitions, key concepts, and examples. Accessible versions of the PowerPoints are also available in the course.

Student Resources

Learning Guide

The Learning Guide helps students learn how to make the most of their textbook, while also providing additional practice for each section and guidance for test preparation. This workbook includes activities intended for group work in class to help students put the math into real-world context. The Learning Guide also includes Integrated Review Worksheets that can be used in conjunction with the Integrated Review objectives in the MyLab course. The Learning Guide is published in an unbound, binder-ready format so that it can serve as the basis for a course notebook.

Student Solutions Manual

Provides completely worked-out solutions to the odd-numbered section exercises and all exercises in the Integrated Reviews, Chapter Reviews, Chapter Tests, and Cumulative Reviews.

Video Series

These videos, available in MyLab Math, provide students with extra help for key sections of the textbook.

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Acknowledgments

An enormous benefit of authoring a successful series is the broad-based feedback I receive from the students, dedicated users, and reviewers. Every change to this edition is the result of their thoughtful comments and suggestions. I would like to express my appreciation to all the reviewers, whose collective insights form the backbone of this revision. In particular, I would like to thank the following people for reviewing *Intermediate Algebra for College Students.*

Cindy Adams, *San Jacinto College*

Gwen P. Aldridge, *Northwest Mississippi Community College*

Ronnie Allen, *Central New Mexico Community College*

Dr. Simon Aman, *Harry S. Truman College*

Howard Anderson, *Skagit Valley College*

Jody Anderson, *Angelina College*

John Anderson, *Illinois Valley Community College*

Michael H. Andreoli, *Miami-Dade College – North Campus*

Michele Bach, *Kansas City Kansas Community College*

Anna Bakman, *Los Angeles Trade Technical College*

Jana Barnard, *Angelo State University*

Rochelle Beatty, *Kansas City Kansas Community College*

Rosanne Benn, *Prince George's Community College*

Renee Boggan, *East Central Community College*

Christine Brady, *Suffolk County Community College*

Gale Brewer, *Amarillo College*

Carmen Buhler, *Minneapolis Community & Technical College*

Warren J. Burch, *Brevard College*

Alice Burstein, *Middlesex Community College*

Edie Carter, *Amarillo College*

Jerry Chen, *Suffolk County Community College*

Sandra Pryor Clarkson, *Hunter College*

Sally Copeland, *Johnson County Community College*

Valerie Cox, *Calhoun Community College*

Carol Curtis, *Fresno City College*

Robert A. Davies, *Cuyahoga Community College*

Deborah Detrick, *Kansas City Kansas Community College*

Jill DeWitt, *Baker College of Muskegon*

Ben Divers, Jr., *Ferrum College*

Cynthia Dominguez, *Los Angeles Trade Technical College*

Irene Doo, *Austin Community College*

Charles C. Edgar, *Onondaga Community College*

Karen Edwards, *Diablo Valley College*

Scott Fallstrom, *MiraCosta College*

Elise Fischer, *Johnson County Community College*

Susan Forman, *Bronx Community College*

Wendy Fresh, *Portland Community College*

Jennifer Garnes, *Cuyahoga Community College*

Gary Glaze, *Eastern Washington University*

Jay Graening, *University of Arkansas*

Robert B. Hafer, *Brevard College*

Andrea Hendricks, *Georgia Perimeter College*

Donald Herrick, *Northern Illinois University*

Beth Hooper, *Golden West College*

Sandee House, *Georgia Perimeter College*

Tracy Hoy, *College of Lake County*

Laura Hoye, *Trident Community College*

Margaret Huddleston, *Schreiner University*

Lori James, *University of Charleston*

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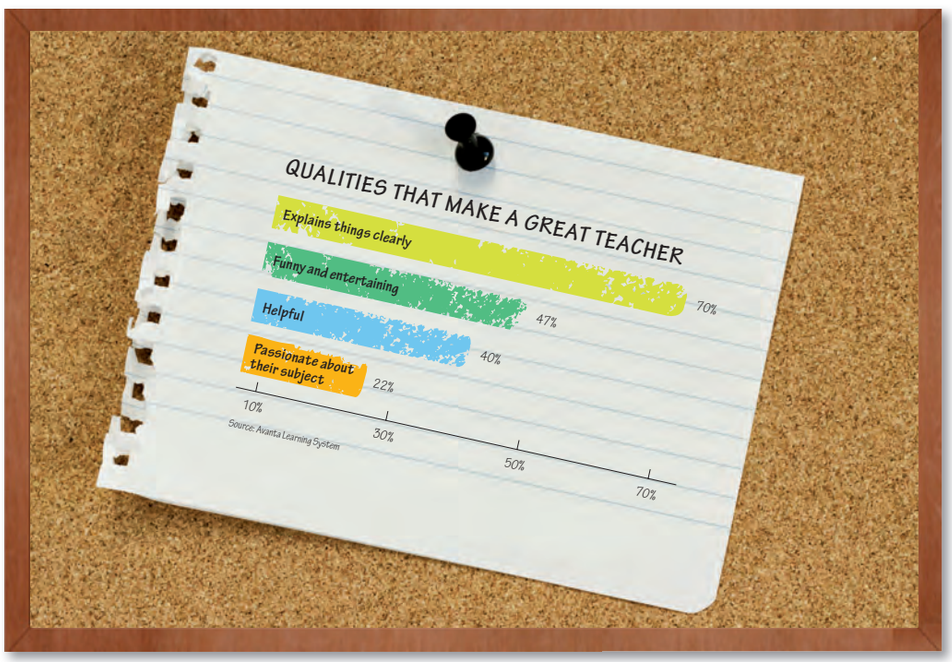
Hank Martel, *Broward College*
Kim Martin, *Southeastern Illinois College*
John Robert Martin, *Tarrant County College*
Lisa McMillen, *Baker College of Auburn Hills*
Irwin Metviner, *State University of New York at Old Westbury*
Jean P. Millen, *Georgia Perimeter College*
Pam Miller, *Phoenix College*
Lawrence Morales, *Seattle Central Community College*
Morteza Shafii-Mousavi, *Indiana University South Bend*
Lois Jean Nieme, *Minneapolis Community & Technical College*
Allen R. Newhart, *Parkersburg Community College*
Karen Pain, *Palm Beach State College*
Peg Pankowski, *Community College of Allegheny County – South Campus*
Robert Patenaude, *College of the Canyons*
Matthew Peace, *Florida Gateway College*
Dr. Bernard J. Piña, *New Mexico State University – Doña Ana Community College*
Jill Rafael, *Sierra College*
James Razavi, *Sierra College*
George Reed, *Angelina College*
Christopher Reisch, *The State University of New York at Buffalo*
Nancy Ressler, *Oakton Community College*
Katalin Rozsa, *Mesa Community College*
Haazim Sabree, *Georgia Perimeter College*
Chris Schultz, *Iowa State University*
Shannon Schumann, *University of Phoenix*
Liz Scott, *Angelina College*
Barbara Sehr, *Indiana University Kokomo*
Brian Smith, *Northwest Shoals Community College*
Gayle Smith, *Lane Community College*
Tanya M. Smith, *Kansas City Kansas Community College*
Dick Spangler, *Tacoma Community College*
Janette Summers, *University of Arkansas*
Robert Thornton, *Loyola University*
Lucy C. Thrower, *Francis Marion College*
Mary Thurow, *Minneapolis Community & Technical College*
Richard Townsend, *North Carolina Central University*
Cindie Wade, *St. Clair County Community College*
Andrew Walker, *North Seattle Community College*
Kathryn Wetzel, *Amarillo College*

Additional acknowledgments are extended to Dan Miller and Dan Richbart for preparing the solutions manuals and the Learning Guide; Brad Davis, for preparing the answer section and serving as accuracy checker; Brian Morris at Scientific Illustrators, for superbly illustrating the book; and Francesca Monaco, project manager, and Kathleen Manley, production editor, whose collective talents kept every aspect of this complex project moving through its many stages.

I would like to thank my editors at Pearson, Dawn Murrin, Mary Vann, and Kayla Shearns, who guided and coordinated the book from manuscript through production. Thanks to Studio Montage for the quirky cover. Finally, thanks to marketing manager Alicia Wilson for your innovative marketing efforts, and to the entire Pearson sales force, for your confidence and enthusiasm about the book.

To the Student

The bar graph shows some of the qualities that students say make a great teacher.



It was my goal to incorporate each of the qualities that make a great teacher throughout the pages of this book.

Explains Things Clearly

I understand that your primary purpose in reading *Intermediate Algebra for College Students* is to acquire a solid understanding of the required topics in your algebra course. In order to achieve this goal, I've carefully explained each topic. Important definitions and procedures are set off in boxes, and worked-out examples that present solutions in a step-by-step manner appear in every section. Each example is followed by a similar matched problem, called a Check Point, for you to try so that you can actively participate in the learning process as you read the book. (Answers to all Check Points appear in the back of the book.)

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Funny/Entertaining

Who says that an algebra textbook can't be entertaining? From our quirky cover to the photos in the chapter and section openers, prepare to expect the unexpected. I hope some of the book's enrichment essays, called Blitzer Bonuses, will put a smile on your face from time to time.

Helpful

I designed the book's features to help you acquire knowledge of intermediate algebra, as well as to show you how algebra can solve authentic problems that apply to your life. These helpful features include:

- **Explanatory Voice Balloons:** Voice balloons are used in a variety of ways to make math less intimidating. They translate algebraic language into everyday English, help clarify problem-solving procedures, present alternative ways of understanding concepts, and connect new concepts to concepts you have already learned.
- **Great Question!:** The book's Great Question! boxes are based on questions students ask in class. The answers to these questions give suggestions for problem solving, point out common errors to avoid, and provide informal hints and suggestions.
- **Achieving Success:** The book's Achieving Success boxes give you helpful strategies for success in learning algebra, as well as suggestions that can be applied for achieving your full academic potential in future college coursework.
- **Detailed Chapter Review Charts:** Each chapter contains a review chart that summarizes the definitions and concepts in every section of the chapter. Examples that illustrate these key concepts are also included in the chart. Review these summaries and you'll know the most important material in the chapter!

Passionate about Their Subject

I passionately believe that no other discipline comes close to math in offering a more extensive set of tools for application and development of your mind. I wrote the book in Point Reyes National Seashore, 40 miles north of San Francisco. The park consists of 75,000 acres with miles of pristine surf-washed beaches, forested ridges, and bays bordered by white cliffs. It was my hope to convey the beauty and excitement of mathematics using nature's unspoiled beauty as a source of inspiration and creativity. Enjoy the pages that follow as you empower yourself with the algebra needed to succeed in college, your career, and your life.

Regards,
Bob
Robert Blitzer

About the Author

Bob Blitzer is a native of Manhattan and received a Bachelor of Arts degree with dual majors in mathematics and psychology (minor: English literature) from the City College of New York. His unusual combination of academic interests led him toward a Master of Arts in mathematics from the University of Miami and a doctorate in behavioral sciences from Nova University. Bob's love for teaching mathematics was nourished for nearly 30 years at Miami Dade College, where he received numerous teaching awards, including Innovator of the Year from the League for Innovations in the Community College and an endowed chair based on excellence in the classroom. In addition to *Intermediate Algebra for College Students*, Bob has written textbooks covering developmental mathematics, introductory algebra, college algebra, algebra and trigonometry, precalculus, and liberal arts mathematics, all published by Pearson. When not secluded in his Northern California writer's cabin, Bob can be found hiking the beaches and trails of Point Reyes National Seashore, and tending to the chores required by his beloved entourage of horses, chickens, and irritable roosters.

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