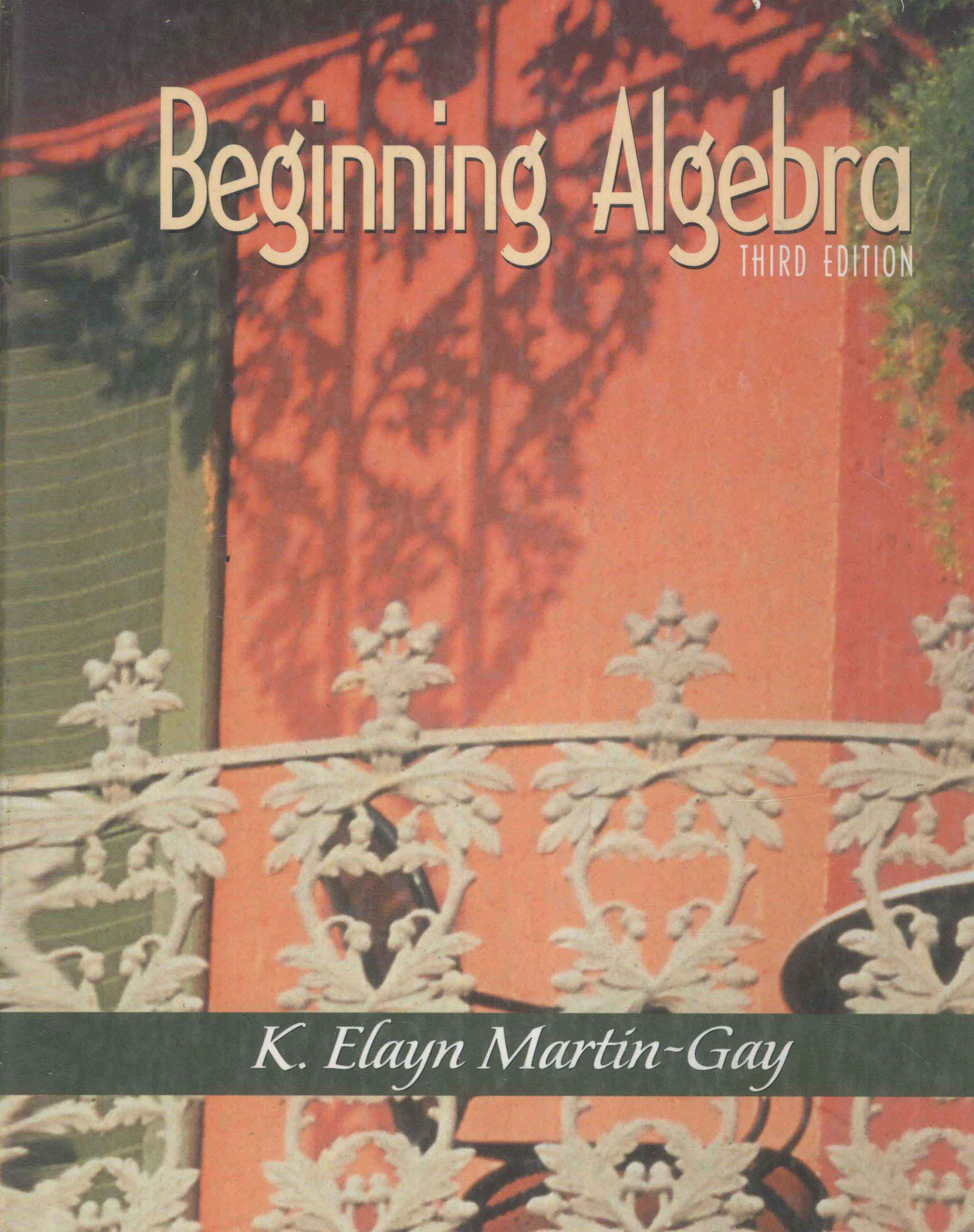
Beginning Algebra

THIRD EDITION



K. Elayn Martin-Gay

BEGINNING ALGEBRA

Third Edition

K. ELAYN MARTIN-GAY

University of New Orleans

Upper Saddle River, New Jersey 07458

Library of Congress Cataloging-in-Publication Data

Martin-Gay, K. Elayn
Beginning algebra/K. Elayn Martin-Gay.—3rd ed.
p. cm.
Includes index.
ISBN 0-13-086763-2 (alk. paper)
1. Algebra. I. Title.
QA152.2.M367 2001 00-035951
512.9—dc21 CIP

Executive Acquisition Editor: Karin E. Wagner
Editor in Chief: Christine Hoag
Project Manager: Ann Marie Jones
Assistant Vice President of Production and Manufacturing: David W. Riccardi
Executive Managing Editor: Kathleen Schiaparelli
Senior Managing Editor: Linda Mihatov Behrens
Project Management: Elm Street Publishing Services, Inc.
Manufacturing Buyer: Alan Fischer
Manufacturing Manager: Trudy Pisciotti
Senior Marketing Manager: Eilish Collins Main
Marketing Assistant: Dan Auld
Director of Marketing: John Tweeddale
Development Editors: Tony Palermino/Emily Keaton
Editor in Chief, Development: Carol Trueheart
Associate Editor, Mathematics/Statistics Media: Audra J. Walsh
Editorial Assistant/Supplements Editor: Kate Marks
Art Director: Maureen Eide
Assistant to the Art Director: John Christiana
Interior Designer: Donna Wickes
Cover Designer: Joseph Sengotta
Art Editor: Grace Hazeldine
Art Manager: Gus Vibal
Director of Creative Services: Paul Belfanti
Photo Researcher: Kathy Ringrose
Cover Photo: Alex Demyan Photographs
Art Studio: Academy Artworks
Compositor: Preparé Inc., Italy

© 2001 by Prentice-Hall, Inc.
Upper Saddle River, NJ 07458

All rights reserved. No part of this book may be reproduced, in any form or by any means, without permission in writing from the publisher.

Printed in the United States of America
10 9 8 7 6 5 4 3 2

ISBN 0-13-086763-2

Prentice-Hall International (UK) Limited, *London*
Prentice-Hall of Australia Pty. Limited, *Sydney*
Prentice-Hall Canada, Inc., *Toronto*
Prentice-Hall Hispanoamericana, S.A., *Mexico*
Prentice-Hall of India Private Limited, *New Delhi*
Prentice-Hall of Japan, Inc., *Tokyo*
Pearson Education Asia, Pte. Ltd.
Editora Prentice-Hall do Brasil, Ltda., *Rio de Janeiro*

To my mother, Barbara M. Miller,
and her husband, Leo Miller,
and to the memory
of my father, Robert J. Martin

PREFACE

ABOUT THE BOOK

Beginning Algebra, Third Edition was written to provide a **solid foundation in algebra** for students who might have had no previous experience in algebra. Specific care has been taken to ensure that students have the most **up-to-date and relevant** text preparation for their next mathematics course, as well as to help students to succeed in nonmathematical courses that require a grasp of algebraic fundamentals. I have tried to achieve this by writing a user-friendly text that is keyed to objectives and contains many worked-out examples. The basic concepts of graphing are introduced early, and problem solving techniques, real-life and real-data applications, data interpretation, appropriate use of technology, mental mathematics, number sense, critical thinking, decision-making, and geometric concepts are emphasized and integrated throughout the book.

The many factors that contributed to the success of the first two editions have been retained. In preparing this edition, I considered the comments and suggestions of colleagues throughout the country, students, and many users of the prior editions. The AMATYC Crossroads in Mathematics: Standards for Introductory College Mathematics before Calculus and the MAA and NCTM standards (plus Addenda), together with advances in technology, also influenced the writing of this text.

Beginning Algebra, Third Edition is **part of a series of texts** that can include *Basic College Mathematics*, *Prealgebra*, *Third Edition, Intermediate Algebra*, *Third Edition*, or *Intermediate Algebra: A Graphing Approach*, *Second Edition*, and *Beginning and Intermediate Algebra*, *Second Edition*, a combined algebra text. Throughout the series, pedagogical features are designed to develop student proficiency in algebra and problem solving, and to prepare students for future courses.

KEY PEDAGOGICAL FEATURES IN THE THIRD EDITION

Readability and Connections I have tried to make the writing style as clear as possible while still retaining the mathematical integrity of the content. When a new topic is presented, an effort has been made to **relate the new ideas to those that students**

此为试读，需要完整PDF请访问：www.ertongbook.com

may already know. Constant reinforcement and connections within problem solving strategies, data interpretation, geometry, patterns, graphs, and situations from everyday life can help students gradually master both new and old information.

Problem Solving Process This is formally introduced in Chapter 2 with a **new four-step process that is integrated throughout the text**. The four steps are Understand, Translate, Solve, and Interpret. The repeated use of these steps throughout the text in a variety of examples shows their wide applicability. Reinforcing the steps can increase students' confidence in tackling problems.

Applications and Connections Every effort was made to include as many accessible, interesting, and relevant real-life applications as possible throughout the text in both worked-out examples and exercise sets. The applications **strengthen students' understanding of mathematics in the real world** and help to motivate students. They show connections to a wide range of fields including agriculture, allied health, art, astronomy, automotive ownership, aviation, biology, business, chemistry, communication, computer technology, construction, consumer affairs, demographics, earth science, education, entertainment, environmental issues, finance and economics, food service, geography, government, history, hobbies, labor and career issues, life science, medicine, music, nutrition, physics, political science, population, recreation, sports, technology, transportation, travel, weather, and important related mathematical areas such as geometry and statistics. (See the Index of Applications on page xxi.) Many of the applications are based on **recent and interesting real-life data**. Sources for data include newspapers, magazines, government publications, publicly held companies, special interest groups, research organizations, and reference books. Opportunities for obtaining your own real data are also included.

Helpful Hints Helpful Hints, formerly Reminders, contain practical advice on applying mathematical concepts. These are found throughout the text and **strategically placed** where students are most likely to need immediate reinforcement. They are highlighted in a box for quick reference and, as appropriate, an indicator line is used to precisely identify the particular part of a problem or concept being discussed. For instance, see pages 96 and 408.

Visual Reinforcement of Concepts The text contains numerous graphics, models, and illustrations to visually clarify and reinforce concepts. These include **new and updated** bar graphs, circle graphs in two and three dimensions, line graphs, calculator screens, application illustrations, photographs, and geometric figures. There are now **over 1,000 figures**.

Real World Chapter Openers The new two-page chapter opener focuses on how math is used in a specific career, provides links to the World Wide Web, and references a "Spotlight on Decision Making" feature within the chapter for further exploration of the **career and the relevance of algebra**. For example, look at the opener for Chapter 8. The opening pages also contain a list of section titles, and an introduction to the mathematics to be studied together with mathematical connections to previous chapters in the text.

Student Resource Icons At the beginning of each section, videotape, tutorial software CD Rom, Student Solutions Manual, and Study Guide icons are displayed. These icons help reinforce that these learning aids are available should students wish to use them to review concepts and skills at their own pace. These items have **direct correlation to the text** and emphasize the text's methods of solution.

Chapter Highlights Found at the end of each chapter, the Chapter Highlights contain key definitions, concepts, *and* examples to **help students understand and retain** what they have learned.

Chapter Project This feature occurs at the end of each chapter, often serving as a chapter wrap-up. For **individual or group completion**, the multi-part Chapter Project, usually hands-on or data based, allows students to problem solve, make interpretations, and to think and write about algebra.

Functional Use of Color and New Design Elements of this text are highlighted with color or design to make it easier for students to read and study. Special care has been taken to use color within solutions to examples or in the art to **help clarify, distinguish, or connect concepts**. For example, look at pages 190 and 191 in Section 3.4.

EXERCISE SETS

Each text section ends with an exercise set, usually divided into two parts. Both parts contain graded exercises. The **first part is carefully keyed** to at least one worked example in the text. Once a student has gained confidence in a skill, **the second part contains exercises not keyed to examples**. Exercises and examples marked with a video icon (✎) have been worked out step-by-step by the author in the videos that accompany this text.

Throughout the text exercises there is an emphasis on data and graphical interpretation via tables, charts, and graphs. The ability to interpret data and read and create a variety of types of graphs is developed gradually so students become comfortable with it. Similarly, throughout the text there is integration of geometric concepts, such as perimeter and area. Exercises and examples marked with a geometry icon (△) have been identified for convenience.

Each exercise set contains one or more of the following features.

Spotlight on Decision Making These unique **new, specially designed applications** help students develop their decision-making and problem solving abilities, skills useful in mathematics and in life. Appropriately placed before an exercise set begins, students have an opportunity to immediately practice and reinforce basic algebraic concepts found in the accompanying section in relevant, accessible contexts. There is an emphasis on workplace or job-related career situations (such as the decisions of a small business owner in Section 3.1, a physical therapist in Section 7.2, or a registered nurse in Section 8.5) as well as decision-making in general (such as choosing a homeowner's insurance policy in Section 2.8 or choosing a credit card in Section 5.5 or deciding when to plant flower bulbs in Section 10.6).

Mental Mathematics These problems are found at the beginning of many exercise sets. They are mental warm-ups that **reinforce concepts** found in the accompanying section and increase students' confidence before they tackle an exercise set. By relying on their own mental skills, students increase not only their confidence in themselves, but also their number sense and estimation ability.

Writing Exercises These exercises now found in almost every exercise set are marked with the icon (✎). They require students to **assimilate information** and provide a written response to explain concepts or justify their thinking. Guidelines recommended by the American Mathematical Association of Two Year Colleges (AMATYC) and other professional groups recommend incorporating writing in

mathematics courses to reinforce concepts. Writing opportunities also occur within features such as Spotlight on Decision Making and Chapter Projects.

Data and Graphical Interpretation Throughout the text there is an emphasis on data interpretation in exercises via tables, bar charts, line graphs, or circle graphs. The ability to interpret data and read and create a variety of graphs is **developed gradually** so students become comfortable with it. In addition, there is an appendix on mean, median, and mode together with exercises.

Calculator Explorations and Exercises These optional explorations offer guided instruction, through examples and exercises, on the proper use of **scientific and graphing calculators or computer graphing utilities as tools in the mathematical problem-solving process**. Placed appropriately throughout the text, these explorations reinforce concepts or motivate discovery learning.

Additional exercises building on the skills developed in the Explorations may be found in exercise sets throughout the text, and are marked with the icon for scientific calculator use and with the icon for graphing calculator use.

Review Exercises These exercises occur in each exercise set (except for those in Chapter 1). These problems are **keyed to earlier sections** and review concepts learned earlier in the text that are needed in the next section or in the next chapter. These exercises show the **links between earlier topics and later material**.

A Look Ahead These exercises occur at the end of some exercise sets. This section contains examples and problems similar to those found in a subsequent algebra course. "A Look Ahead" is presented as **a natural extension of the material** and contains an example followed by advanced exercises.

In addition to the approximately 5,500 exercises within chapters, exercises may also be found in the Vocabulary Checks, Chapter Reviews, Chapter Tests, as Cumulative Reviews.

Vocabulary Checks Vocabulary checks, **new to this edition**, provide an opportunity for students to become more familiar with the use of mathematical terms as they strengthen verbal skills.

Chapter Review and Chapter Test The end of each chapter contains a review of topics introduced in the chapter. The review problems are keyed to sections. The chapter test is not keyed to sections.

Cumulative Review Each chapter after the first contains a **cumulative review of all chapters beginning with the first** up through the chapter at hand. Each problem contained in the cumulative review is actually an earlier worked example in the text that is referenced in the back of the book along with the answer. Students who need to see a complete worked-out solution, with explanation, can do so by turning to the appropriate example in the text.

KEY CONTENT FEATURES IN THE THIRD EDITION

Overview This new edition retains many of the factors that have contributed to its success. Even so, **every section of the text was carefully re-examined**. Throughout the new edition you will find numerous new applications, examples, and many real-life

applications and exercises. For example, look at Sections 1.9, 2.5, or 7.2. Some sections have internal re-organization to better clarify and enhance the presentation.

Increased Integration of Geometry Concepts In addition to the traditional topics in beginning algebra courses, this text contains a strong emphasis on problem solving, and geometric concepts are integrated throughout. The geometry concepts presented are those most important to a students' understanding of algebra, and I have included **many applications and exercises** devoted to this topic. These are marked with the icon △. Also, geometric figures, a review of angles, lines, and special triangles, as well as a *new* review of volume and surface area are covered in the appendices. The inside front cover provides a quick reference of geometric formulas.

Review of Real Numbers Chapter 1 has been streamlined and refreshed for greater efficiency and relevance. Former Sections 1.3 and 1.4 were merged to form new Section 1.4 for a smoother, more efficient flow. Chapter 1 now begins with Study Tips for Success in Mathematics (Section 1.1). **New applications** and real data enhance the chapter, especially in the reading graphs section.

Early and Intuitive Introduction to Graphing As bar and line graphs are gradually introduced in Chapters 1 and 2, an emphasis is placed on the notion of paired data. This leads naturally to the concepts of ordered pair and the rectangular coordinate system introduced in Chapter 3. Chapter 3 is devoted to graphing and concepts of graphing linear equations such as slope and intercepts. **These concepts are reinforced throughout exercise sets** in subsequent chapters, helping prepare students for more work with equations in Chapter 7.

Chapter 3 has been updated, and the overall emphasis was to **better reinforce key concepts.** Reviewers have been pleased. Following user recommendations, a few of the changes are: Section 3.1 contains scattergrams of real data. Section 3.2 contains a new example and exercises on graphing and interpreting linear equations that model real data. Section 3.4 contains a new example and exercises interpreting slope as a rate of change. As usual, exercise sets progress gradually from easier to more difficult exercises.

Increased Attention to Problem Solving Building on the strengths of the prior editions, a special emphasis and strong commitment is given to contemporary, accessible, and practical applications of algebra. **Real data** was drawn from a variety of sources including internet sources, magazines, newspapers, government publications, and reference books. **New Spotlight on Decision Making exercises and a new four-step problem solving process are incorporated throughout** to focus on helping to build students problem-solving skills.

Increased Opportunities for Using Technology Optional explorations for a calculator or graphing calculator (or graphing utility such as Texas Instruments Interactive), are integrated appropriately **throughout the text** in Calculator Explorations features and in exercises marked with a calculator icon. The Martin-Gay companion website includes links to internet sites to allow opportunities for finding data and researching potential mathematically related careers branching from the chapter openers.

New Examples Detailed step-by-step examples were added, deleted, replaced, or updated as needed. Many of these reflect real life. **Examples are used in two ways**. Often there are numbered, formal examples, and occasionally an example or application is used to introduce a topic or informally discuss the topic.

New Exercises A significant amount of time was spent on the exercise sets. New exercises and examples **help address a wide range of student learning styles and abilities**. The text now includes the following types of exercises: spotlight on decision making exercises, mental math, computational exercises, real-life applications, writing exercises, multi-part exercises, review exercises, a look ahead exercises, optional calculator or graphing calculator exercises, data analysis from tables and graphs, vocabulary checks, and projects for individual or group assignment.

Enhanced Supplements Package The new Third Edition is supported by a wealth of supplements designed for **added effectiveness and efficiency**. New items include the MathPro 4.0 Explorer tutorial software together with a unique video clip feature, a new computerized testing system TestGen-EQ, and an expanded and improved Martin-Gay companion website. Some highlights in print materials include the addition of teaching tips in the Annotated Instructor's Edition, and an expanded Instructor's Resource Manual with Tests including additional exercises and short group activities in a ready-to-use format. Please see the list of supplements for descriptions.

On-Line Options for Distance Learning

For maximum convenience, Prentice Hall offers on-line interactivity and delivery options for a variety of distance learning needs. Instructors may access or adopt these in conjunction with this text, *Beginning Algebra*.

Companion Website
Visit http://www.prenhall.com/martin-gay
The companion website includes basic distance learning access to provide links to the text's Real World Activities, career related sites referenced in the chapter opening pages and a selection of on-line self quizzes. E-mail is available. For quick reference, the inside front cover of this text also lists the companion website URL.

WebCT
WebCT includes distance learning access to content found in the Martin-Gay Companion Website plus more. WebCT provides tools to create, manage, and use on-line course materials. Save time and take advantage of items such as on-line help, communication tools, and access to instructor and student manuals. Your college may already have WebCT's software installed on their server or your may choose to download it should you decide on this option. Contact your local Prentice Hall sales representative for details or a preview.

For a *complete* computer-based internet course ...
Prentice Hall Interactive Math
Visit http://www.prenhall.com/interactive math

Prentice Hall Interactive math is an exciting, proven choice to help students succeed in math. Created for a computer-based course, it provides the effective teaching philosophy of K. Elayn Martin-Gay in an Internet-based course format. Interactive Math, Intermediate Algebra, takes advantage of state-of-the-art technology to provide highly flexible and user-friendly course management tools and an engaging, highly interactive student learning program that easily accommodates the variety of learning styles and broad spectrum of students presented by the typical intermediate algebra class. Personalized learning includes reading, writing, watching video clips, and exploring concepts through interactive questions and activities. Contact your local Prentice Hall sales representative for details.

SUPPLEMENTS FOR THE INSTRUCTOR

Printed Supplements

Annotated Instructor's Edition (ISBN 0-13-086764-0)

- Answers to exercises on the same text page or in Graphing Answer Section
- Graphing Answer section contains answers to exercises requiring graphical solutions, chapter projects, and Spotlight on Decision Making exercises
- Teaching Tips throughout the text placed at key points in the margin, found in places where students historically need extra help together with ideas on how to help students through these concepts, as well as placed appropriately to provide ideas for expanding upon a certain concept, other ways to present a concept, or ideas for classroom activities

Instructor's Solutions Manual (ISBN 0-13-087208-3)

- Detailed step-by-step solutions to even-numbered section exercises
- Solutions to every Spotlight on Decision Making exercise
- Solutions to every Calculator Exploration exercise
- Solutions to every Chapter Test and Chapter Review exercise
- Solution methods reflect those emphasized in the textbook

Instructor's Resource Manual with Tests (ISBN 0-13-087207-5)

- Notes to the Instructor that includes an introduction to Interactive Learning, Interpreting Graphs and Data, Alternative Assessment, Using Technology and Helping Students Succeed
- Eight Chapter Tests per chapter (5 free response, 3 multiple choice)
- Two Cumulative Review Tests (one free response, one multiple choice)
- Eight Final Exams (4 free response, 4 multiple choice)
- Twenty additional exercises per section for added test exercises or worksheets, if needed
- Group Activities (on average of two per chapter; providing short group activities in a convenient ready-to-use handout format)
- Answers to all items

Media Supplements

TestGen-EQ CD-Rom (Windows/Macintosh) (ISBN 0-13-088072-8)

- Algorithmically driven, text specific testing program
- Networkable for administering tests and capturing grades on-line
- Edit or add your own questions to create a nearly unlimited number of tests and worksheets
- Use the new "Function Plotter" to create graphs
- Tests can be easily exported to HTML so they can be posted to the Web for student practice

Computerized Tutorial Software Course Management Tools
MathPro 4.0 Explorer Network CD-Rom (ISBN 0-13-088073-6)

- Enables instructors to create either customized or algorithmically generated practice tests from any section of a chapter, or a test of random items

此为试读,需要完整PDF请访问: www.ertongbook.com

- Includes an e-mail function for network users, enabling instructors to send a message to a specific student or to an entire group
- Network based reports and summaries for a class or student and for cumulative or selected scores are available

Companion Website: http://www.prenhall.com/martin-gay

- Create a customized online syllabus with Syllabus Manager
- Assign Internet-based Real World Activities wherein students find and retrieve real data for use in guided problem solving.
- Assign quizzes or monitor student self quizzes by having students e-mail results, such as true/false reading quizzes or vocabulary check quizzes
- Destination links provide additional opportunities to explore related sites

SUPPLEMENTS FOR THE STUDENT

Printed Supplements

Student Solutions Manual (ISBN 0-13-087209-1)

- Detailed step-by-step solutions to odd-numbered section exercises
- Solutions to every (odd and even) Mental Math exercise
- Solutions to odd-numbered Calculator Exploration exercises
- Solutions to every (odd and even) exercise found in the Chapter Reviews and Chapter Tests
- Solution methods reflect those emphasized in the textbook
- Ask your bookstore about ordering

Study Guide (ISBN 0-13-087200-8)

- Additional step-by-step worked out examples and exercises
- Practice tests and final examination
- Includes Study Skills and Note-taking suggestions
- Solutions to all exercises, tests, and final examination
- Solution methods reflect those emphasized in the text
- Ask your bookstore about ordering

How to Study Mathematics

- Have your instructor contact the local Prentice Hall sales representative

Math on the Internet: A Student's Guide

- Have your instructor contact the local Prentice Hall sales representative

Prentice Hall/New York Times, Theme of the Times Newspaper Supplement

- Have your instructor contact the local Prentice Hall sales representative

Media Supplements

Computerized Tutorial Software
MathPro 4.0 Explorer Network CD-Rom (ISBN 0-13-088073-6)
MathPro 4.0 Explorer Student CD-Rom (ISBN 0-13-088079-5)

- Keyed to each section of the text for text-specific tutorial exercises and instruction

- Warm-up exercises and graded Practice Problems
- Video clips, providing a problem (similar to the one being attempted) being explained and worked out on the board
- Explorations, allowing explorations of concepts associated with objectives in more detail
- Algorithmically generated exercises, and includes bookmark, on-line help, glossary, and summary of scores for the exercises tried
- Have your instructor contact the local Prentice Hall sales representative—also available for home use

Videotape Series (ISBN 0-13-088074-4)

- Written and presented by textbook author K. Elayn Martin-Gay
- Keyed to each section of the text
- Presentation and step-by-step solutions to exercises from each section of the text. Exercises that are worked in the videos are marked with a video icon .
- Key concepts are explained

Companion Website: www.prenhall.com/martin-gay

- Offers Warm-ups, Real World Activities, True/False Reading Quizzes, Chapter Quizzes, and Vocabulary Check Quizzes
- Option to e-mail results to your instructor
- Destination links provide additional opportunities to explore other related sites, such as those mentioned in this text's chapter opening pages

ACKNOWLEDGMENTS

First, as usual, I would like to thank my husband, Clayton, for his constant encouragement. I would also like to thank my children, Eric and Bryan, for continuing to eat my burnt meals. Thankfully, they have started to cook a little themselves.

I would also like to thank my extended family for their invaluable help and wonderful sense of humor. Their contributions are too numerous to list. They are Rod and Karen Pasch; Peter, Michael, Christopher, Matthew, and Jessica Callac; Stuart, Earline, Melissa, Mandy, and Bailey Martin; Mark, Sabrina, and Madison Martin; Leo, Barbara, Aaron, and Andrea Miller; and Jewett Gay.

A special thank you to all the users of the first and second editions of this text and for their suggestions for improvements that were incorporated into the third edition. I would also like to thank the following reviewers for their input and suggestions:

Beth Andrews, *Craven Community College*
Ken Araujo, *Florence-Darlington Technical College*
Daniel Cronin, *New Hampshire Technical Institute*
Karen Estes, *St. Petersburg Junior College*
Ann Flamm, *Reading Area Community College*
Teresa Hasenauer, *Indian River Community College*
Jennifer Laveglia, *Bellevue Community College*
Doug Mace, *Baker College*
James Matovina, *Community College of Southern Nevada*

Chris McNally, *Tallahassee Community College*
Gabrielle Michaelis, *Manatee Community College*
Linda Mudge, *Illinois Valley Community College*
Janet Peart, *Oakland Community College*
Bernard Piña, *New Mexico State University—Dona Ana Branch*
Susan Sabrio, *Texas A & M University—Kingsville*
Peggy Tibbs, *Arkansas Tech University*
Bettie Truitt, *Black Hawk College*
Mary Vachon, *San Joaquin Delta College*
Pat Velicky, *Florence-Darlington Technical College*
Bill Witte, *Montgomery College*
Kathleen Wolf, *Kent State University*

There were many people who helped me develop this text and I will attempt to thank some of them here. Cheryl Cantwell was invaluable for contributing to the overall accuracy of this text. Emily Keaton was also invaluable for her many suggestions and contributions during the development and writing of this text. I thank Tony Palermino for his many suggestions during the editing process and a special thank you to Ann Marie Jones, my project manager. She kept us all organized and on task. Ingrid Mount at Elm Street Publishing Services provided guidance throughout the production process. I very much appreciated the writers, formatters, and accuracy checkers of the supplements, including Cheryl Cantwell, Mark Serebransky, and Penny Arnold. I thank Terri Bittner, Carrie Green, Cindy Trimble, Jeff Rector, and Teri Lovelace at Laurel Technical Services for all their work on some of the supplements, and providing a thorough accuracy check. Lastly, a special thank you to my editor Karin Wagner for her support and assistance throughout the development and production of this text and to all the staff at Prentice Hall: Chris Hoag, Linda Behrens, Alan Fischer, Maureen Eide, Grace Hazeldine, Gus Vibal, Audra Walsh, Kate Marks, Eilish Main, Daniel Auld, Elise Schneider, Stephanie Szolusha, John Tweedale, Paul Corey, and Tim Bozik.

K. Elayn Martin-Gay

ABOUT THE AUTHOR

K. Elayn Martin-Gay has taught mathematics at the University of New Orleans for more than 20 years. Her numerous teaching awards include the local University Alumni Association's Award for Excellence in Teaching, and Outstanding Developmental Educator at University of New Orleans, presented by the Louisiana Association of Developmental Educators.

Prior to writing textbooks, K. Elayn Martin-Gay developed an acclaimed series of lecture videos to support developmental mathematics students in their quest for success. These highly successful videos originally served as the foundation material for her texts. Today the tapes specifically support each book in the Martin-Gay series.

Elayn is the author of over nine published textbooks as well as multimedia interactive mathematics, all specializing in developmental mathematics courses such as basic mathematics, prealgebra, beginning and intermediate algebra. She has provided author participation across the broadest range of materials: textbook, videos, tutorial software, and Interactive Math courseware. All the components are designed to work together. This offers an opportunity of various combinations for an integrated teaching and learning package offering great consistency and comfort for the student.

APPLICATIONS INDEX

Agriculture
  beef production, 236
  cattle on South Dakota farms, 533
  durum yield, 405
  farms in U.S., 321
  small farms, 479
  soybean yield in Nebraska, 533
Animals
  heartworm preventive for dog, 429
Architecture
  missing dimension in plans, 386
  wall length on blueprint, 377
Astronomy
  apparent magnitude, 17
  Comet Hale-Bopp, 255
  distance between Earth and the sun, 255
  fireball volume, 123
  galaxies in Virgo constellation, 268
  Julian day number, 364
  moons per planet, 113
  planetary alignment, 352
  reflected light from moon to Earth, 256
Automobiles
  average miles per gallon, 201
  car dealerships, 181
  compact car expenses, 201
  electric vehicles, 412
  engine displacement, 225
  gasoline price per gallon, 170
  operating costs, 212
  pickup truck expenses, 201
  rentals, 112, 114
  skidding and speed of car, 515
  speeds of, 381–82, 385, 394

Business
  air conditioning decision, 427
  annual revenues, 164–65
  apparel/accessory stores, 413
  average salaries, 15
  breaking even, 140
  building depreciation, 413
  business travelers in hotels, 157
  cable TV subscribers, 215
  cell phone subscribers, 75
  coaching company team, 383
  computer depreciation, 413
  computer desk manufacturing cost, 395
  computer desk production, 172
  computer value, 168–69
  consumer research, 68
  conveyor belts, 384
  daily sales prediction, 413
  decrease in employees, 158
  defective bulbs, 396
  delivery service costs, 493
  diameters of Easter egg openings, 149
  diameters of washers, 149
  Disney's top animated films, 62–63
  fax machine manufacturing cost, 338
  Home Depot stores, 549
  home office growth, 534
  hotel/motel room rate, 267
  hourly wage, 172
  long-distance phone calls, 34, 196-97
  machine screws, 15
  mail-order, 169
  manufacturing unit costs, 321
  morning edition newspapers, 458
  negative net income, 40, 55
  net income, 76, 549
  production line upgrading, 544
  profits on product, 413
  quantity pricing, 212
  revenue for Home Depot stores, 180–81
  sales prediction, 409–10
  straight-line depreciation, 241
  supermarket services/products, 131
  Target stores, 172
  time budgeting, 472
  travel time for manager, 385
  U.S. labor force, 67
  Wal-Mart sales, 550
  work rates, 380, 384, 385, 395

Chemistry
  acid solution, 139, 216, 468, 478
  alcohol solution, 467
  copper alloy, 139
  hydrochloric acid solution, 467
  percent for lab experiment, 135–36
  saline solution, 464–65, 467, 527
  weed killer, 378
Construction
  bathroom molding, 73
  building options, 322
  diagonal brace, 514
  ladder for gutter installation, 524
  landscaping, 318
  length/width of den, 314–15
  pitch of roof, 200, 201
  railroad track expansion joints, 516
  storage bin braces, 497
  underground pipelines, 514
  warehouse roof, 487
  water trough, 497
  wooden deck installation, 513

Distance. *See* Time and distance

Education
  ACT Assessment scores, 131
  algebra problem, 352
  algebra test scores, 149
  college attendance costs, 128
  community college enrollment, 131
  degrees attained, 214
  dental hygiene curriculum, 131
  elementary school teachers, 181
  extra credit project, 91
  floor space for students, 378
  high school graduates, 280
  institutions of higher learning, 15, 170
  LAN administration, 32
  public school teacher's salary, 72
  students per computer, 67
Electricity
  coulombs, 255
  kilowatt-hour charges, 61–62, 269
  photons of light emitted by bulb, 268
  wind-generated, 378
Electronics
  total resistance, 364
Entertainment
  broadcast television stations, 458
  CD sales, 280
  CD shipments, 452
  cost of recordable compact discs, 375–76
  "Grease" tickets, 461–62
  linear data description matched to equations/graphs, 431
  movie ticket sales, 215
  music cassette sales, 172
  orchestra section seating, 477
  top-grossing concert tours, 262
  total revenue for CDs, 338
Environment
  curbside plastics recycling, 16
  trail chart, 24

Finance and economics
  amounts in savings/checking accounts, 466
  anniversary reception, 148
  bankruptcy cases, 269
  Barbie doll percent increase, 131
  best buys, 378, 396, 397
  birthday party tickets, 139
  bounced checks fees, 131
  budget development, 150
  car rental daily fee/mileage charge, 468
  cellular phone usage, 110
  charity income sources, 158
  child care center selection, 377
  clothes budget for women/girls, 130
  compound interest, 321
  consulting fees, 394
  consumer spending on media, 262–63
  cost of feeding family, 413
  credit card offers, 303
  credit card solicitation, 131
  crude oil production, 406
  estate distribution, 114
  financial analysis, 208
  fishery products, 447
  fuel oil consumption, 452
  home maintenance spending, 126, 129
  homeowner's insurance, 138
  income tax preparation, 128
  interest rate on investment, 139, 550
  interest rate on loan, 34
  investment amounts, 137, 139, 149, 158, 396, 472
  investments at each rate, 478
  labor/material costs, 468
  merchandise trade balance, 75
  mineral production, 569
  minimum wage, 427
  money in account, 520
  mortgage payments, 170
  number of one/five dollar bills, 479
  percent increase, 130
  platinum price, 568
  plumbing estimate, 112
  pottery sale prices, 467
  price decrease/sale price, 130
  price of CDs/music cassette tapes, 465, 466
  price of computer disks/notebooks, 465
  retirement party, 149
  sales commissions, 149, 158
  savings account balance, 16
  silver price, 568
  Social Security payments, 212
  spaghetti supper, 467
  stamp price mixture, 466
  stock investments, 37, 39, 75, 158, 466
  tin price trend, 549
  tourism budgets, 114
  train fares, 466
  value of coins, 466
  wedding budget, 146–47
  women earning bigger paychecks, 378
Food
  Cajun coffee, 139
  calories in cereal, 377
  calories in Eagle Brand Milk, 378
  cereal cost comparison, 376–77
  coffee bean blend, 467
  deli charges, 478

hot dogs/buns purchase, 352
iceberg lettuce, 131
nut mix, 139, 378, 467
nutrition labeling, 132
pepper hotness, 130
pizza size, 123
trail mix, 139

Geometry
angles
complementary, 47, 92, 357, 371, 467
measures of, 111-12, 113, 114
supplementary, 47, 92, 357, 371, 467
area
circle, 227
largest square, 293
parallelogram, 227
plane figure, 73
rectangle, 23, 34, 73, 227, 235, 239, 240, 246, 344, 357, 364, 393, 502
shaded regions, 279
square, 235, 241, 246, 247, 344
trapezoid, 34
triangle, 23, 241, 246, 255, 394
circle
radius of, 319, 533
rationalizing denominator, 502
relationship between radius and circumference, 413
unknown part of, 23, 73
cube
side length, 493
volume, 502
cylinder
dimensions of, 520-21
radius of, 509
volume of, 124, 227
Golden Ratio, 478, 550
golden rectangle, 115
length of sides
of isosceles triangle, 465
of pentagon, 106
of triangle, 106
parallelogram
area of, 124
base and height of, 319
height of, 261
measure of angles of, 15, 112
perimeter
of plane figure, 24, 73
of polygon, 496
of quadrilateral, 234
of rectangle, 34, 73, 85, 181, 357, 393, 496
of square, 351
of trapezoid, 181, 351
of triangle, 34, 85, 234, 394
plane
distances between points in, 511–12
polygons
diagonals of, 319
quadrilateral
lengths of sides of, 319
measures of angles of, 93, 114
rectangle
dimensions of, 133–34, 138, 269, 319, 321, 327, 328, 465, 467–68, 550
length of, 118, 149, 215, 280, 318, 526
width of, 121, 122, 261, 318
rectangular box
surface area of, 267
rectangular solid
length of, 261
volume of, 124
right triangle
length of hypotenuse of, 510, 527
length of leg of, 510
length of long leg of, 327
length of shorter leg of, 320
length of unknown leg of, 526
unknown sides of, 513
similar triangles
lengths of missing sides of, 384, 386
lengths of sides of, 383
missing lengths of, 395, 396, 527
unknown lengths of, 385, 493
sphere
circumference of, 123
rationalizing denominator for, 503
square
length of sides of, 318
side of, 320
square-based pyramid
length of side of base of, 509
volume of, 515
surface area
of cube, 226
of rectangular solid, 236
trapezoid
area of, 122
base and height of, 318
triangle
base of, 327
dimensions of, 138, 317
height and base of, 550
height of, 122, 304, 320
length of base of, 328
length of base and height of, 397
length of shortest side of, 138
length of side of, 139
length of unknown side of, 526, 555
lengths of legs of, 320
lengths of sides of, 319, 320
maximum lengths of sides of, 149
measure of angle for, 93, 115
measure of unknown angle for, 74
sum of measures of angles of, 15
unknown length of, 515
volume
of cube, 226, 227, 241, 254

Law/Law enforcement
forensics, 336
mineral rights, 253

Medicine
antibiotic dosage, 98
antibiotic solution, 139
blood cholesterol levels, 148
blood pressure reading, 471
body-mass index, 338
child's medicine dosages, 338, 387–88
cosmetic surgeons, 201
farsighted/nearsighted Americans, 131
fluid intake record, 93
gum tissue pocket depth, 44
hepatitis B vaccine, 131
HMO enrollments, 149
medical assistants, 178–79
octuplets born, 74
over-the-counter drug use, 130
physician visits, 236
smoking and pulse rate, 64–65
toenail growth, 113
treadmill treatment, 411
Miscellaneous
age epigram, 387
antifreeze solution, 139
base/height of sail, 315–16
beam lengths, 112, 235
birth years, 47
casino gaming area, 343
coins in pay phone, 158
compass height, 312
computer desk, 92
Diophantus' age at death, 386–87
Eiffel Tower height, 157
Empire State Building floor space, 114
eye blinking, 113
height of rocket, 312
highest price paid for diamond, 255
home phone usage, 128
international phone calls, 113
juveniles starting fires, 66
kite height, 514
latitude and longitude, 67
length of time passed, 313-14, 319, 320, 327, 328
lobster traps, 24
machine processing time, 394
measurement conversions, 345
molding length, 235
negative card game score, 47
phoneless households, 157
pipe filling tank, 396
pipes filling pond, 395
popular names for cities/towns, 106
pump filling tank, 385, 386
sewer pipes, 200
side of gold cube, 487
side of TV picture tube, 533
storage pool pipe, 385
string lengths, 92, 114
suitcase dimension, 304
teenagers using Internet, 65
telephone switchboard, 321
tourist destinations, 66
vacationers in U.S., 214
walking speeds, 462–63
water seal on deck, 158
wheel chair ramps, 200
width of swimming pool, 157
wire lengths, 114, 514
work rate, 386, 394

Physics
fireball height and return to ground, 561
parabolic path of water, 562–63
rocket height/time it strikes ground, 546
velocity of fallen object, 514
velocity of watermelon, 512
Politics
governors per party, 114
gubernatorial salaries, 112
mayoral election, 92
representatives per party, 114
senate race, 93
senators in each party, 109–10, 215
votes per candidate, 113
Population
annual growth rate, 520
California, 268
Minnesota, 172
uninsured, 378
United States, 255
world, 255

Real estate
agency choices, 197
rental increases, 75

Science
carbon isotope, 255
cephalic index, 338
density of object, 34
fish in tank, 122
flying fish, 123
forensics, 429
fresh water distribution, 24
hydrogen atom, 255
light travel, 123
radius of Earth, 268
robot dimensions/traveling rate, 122
space probe, 113
speed of sound conversion, 345
volcanic eruption, 123
Sports
advertising, 65–66
America's Cup, 321
average rushing yards, 378
baseball attendance, 16
basketball scores, 113
bowling score, 149
cycling, 158, 384, 385
deep-sea diving, 16
discus throwing records, 130
diving length of time, 548, 549
fastest lap speeds, 387
football yards gained/lost, 16, 47, 76
games won by Super Bowl winner, 170
girls in high school athletics, 181
golf scores, 40, 75, 158
heights for NBA team, 149
hockey points scored, 466
jogging, 384, 478
Ryder Cup championship, 113
skateboard competition, 114
Summer Olympics gold medals, 112
WNBA highest scorers, 466
women's javelin throw, 24
world land speed record, 345

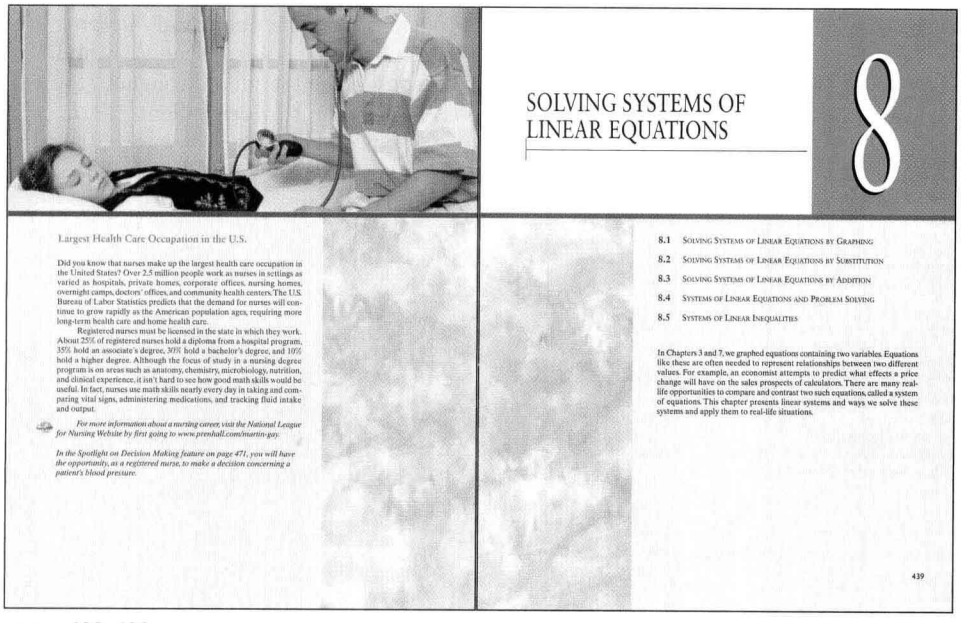
Technology
computers in households, 158, 533
Internet users, 200
personal computers and household income, 294
Temperature
daily lows, 40, 46
equation relating Celsius/Fahrenheit, 406
equation relating Kelvin scale/Celsius scale, 406
Fahrenheit/Celsius interconversions, 118–19, 122, 123, 124, 149, 157
freezing point/boiling point of water, 15
ground, 561
in scientific notation, 255
Winter Olympics, 76
Time and distance
auto ferry trips, 122
average speed on level road, 138
baseball diamond, 486
bicycle time/time walking, 468
bicycling trip, 134–35
boat speed in still water, 394, 396
boat travel, 320, 384
bullet train record speed, 123
car overtaking bus, 138
car's speeds, 392, 467
charity 10K race, 157
cruise control, 123
current rate, 467
distance across pond, 514
distance between actors, 526
distance formula, 364
distance seen from height, 515
distance to Disneyland, 138
diving time, 568, 569
driving and car phone range, 139
driving distance apart, 516
elevation, 40
falling object, 33, 515
fisherman rowing, 385
free-fall time, 568
glacier movement, 117, 123
hang glider flight, 122
height of dropped object, 230, 234, 269, 299
hiking times, 139, 140
hyena pursuing giraffe, 387
jet liner vertical change, 47
lightning travel, 123
light travel, 255, 256
limousine travel, 122
luggage hitting ground, 436
planes from starting point, 138
rate of SR-71, 122
river current/speed of ship in still water, 478
river flow, 255
rocket height, 236
rowing, 140, 467
ship courses, 472–73
space plane travel, 122
speeding before getting stopped, 140
speed of dropped rock, 413
speed of wind and speed of plane, 467
speed per hour, 34
speeds of eastbound/westbound trains, 468
surveying distance across lake, 511, 570
swimming distance, 493
time of free-fall, 533, 549
trains catching up with each other, 158
trains traveling in opposite directions, 158
travel time, 123
vacation trip, 122
variation in elevation, 44, 47, 74
walking speeds, 570
Transportation
airline departures, 236
barge speed in still water, 385
bridge lengths, 92
"bullet" trains, 200
plane rate in still air, 385
radius of curvature, 486, 515
road grade, 196, 200
speeds of car and motorcycle, 386
traffic fatalities in Florida, 236
truck flatland/mountain rate, 384
truck rental, 63–64

Weather
Fujita Scale for tornadoes, 148
rainfall intensity, 338
sunrise time, 424–25, 428
sunset time, 435
Weight
elephant on Pluto, 377
satellite on Mars, 377

Highlights of *Beginning Algebra, Third Edition*

Beginning Algebra, Third Edition has been written and designed to help you succeed in this course. Specific care has been taken to ensure you have the most up-to-date and relevant text features to provide you with a solid foundation in algebra, as many accessible real-world applications as possible, and to prepare you for future courses.

Get Motivated!



pages 438, 439

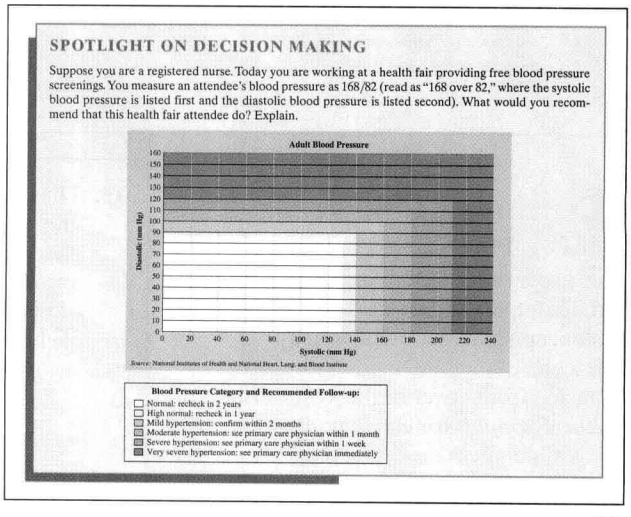
◀ REAL-WORLD CHAPTER OPENERS

New Real-World Chapter Openers focus on how algebraic concepts relate to the world around you so that you see the relevance and practical applications of algebra in daily life.

They also provide links to the World Wide Web and reference a *Spotlight on Decision Making* feature within the chapter for further exploration.

SPOTLIGHT ON ▶ DECISION-MAKING

These unique new applications encourage you to develop your decision-making and problem solving abilities, and develop life skills, primarily using workplace or career-related situations.



page 471

此为试读,需要完整PDF请访问: www.ertongbook.com