MILLER O'NEILL HYDE

Beginning ALGEBRA

Fourth Edition

MILLER O'NEILL HYDE

Developmental Math Series

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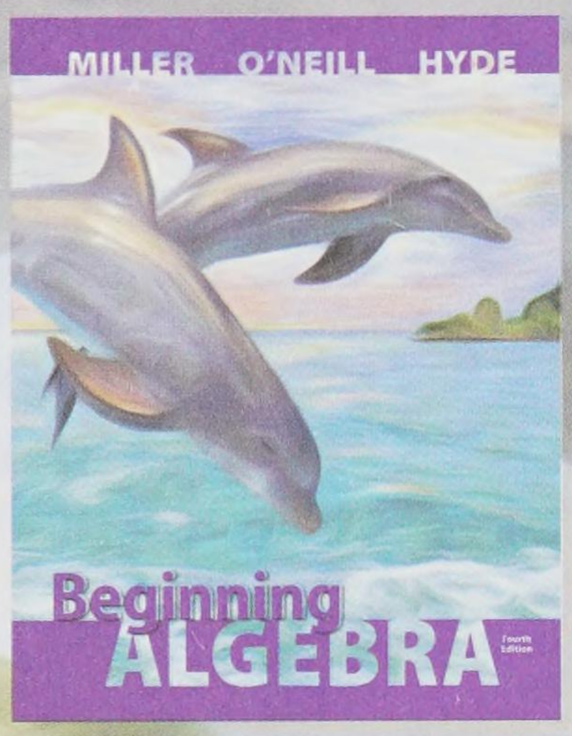

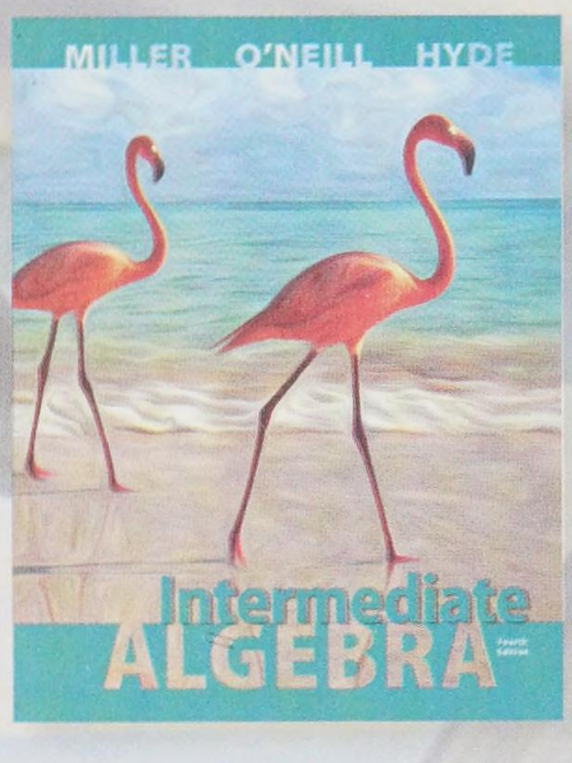

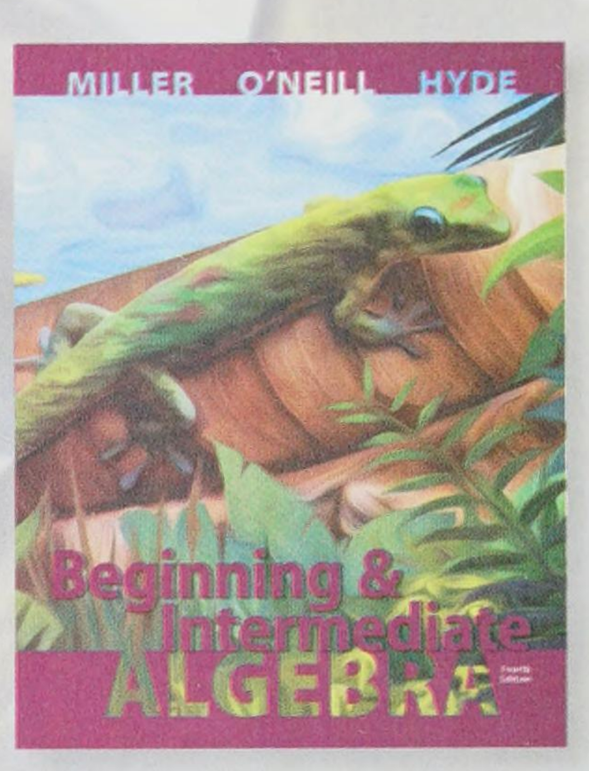

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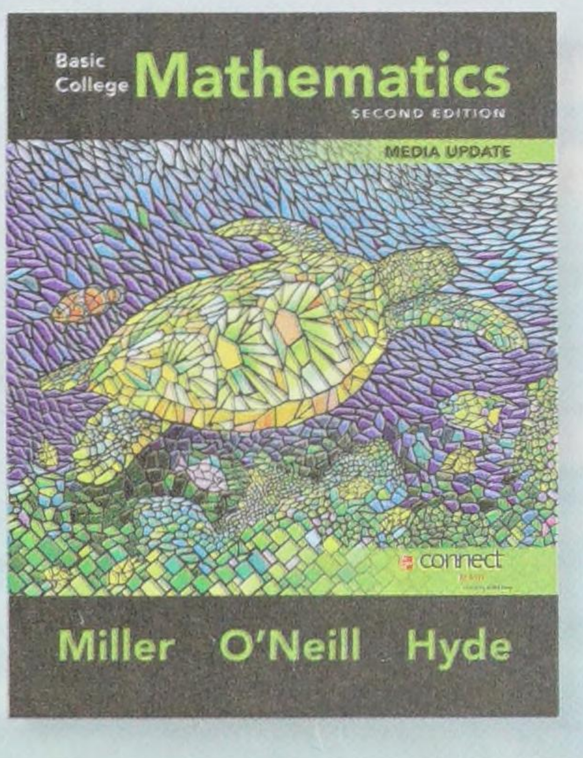

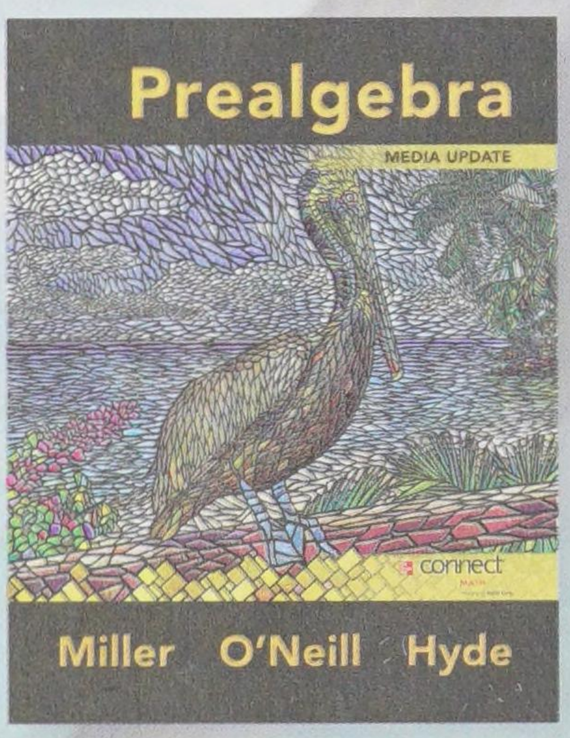

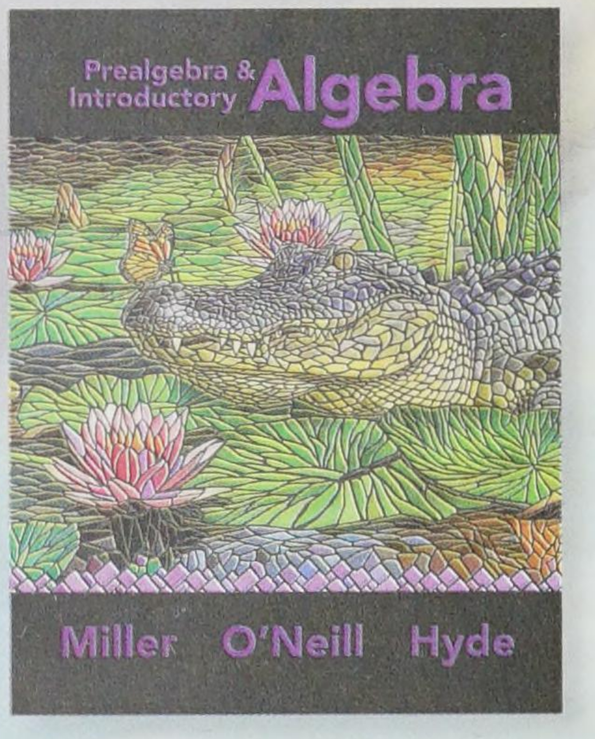

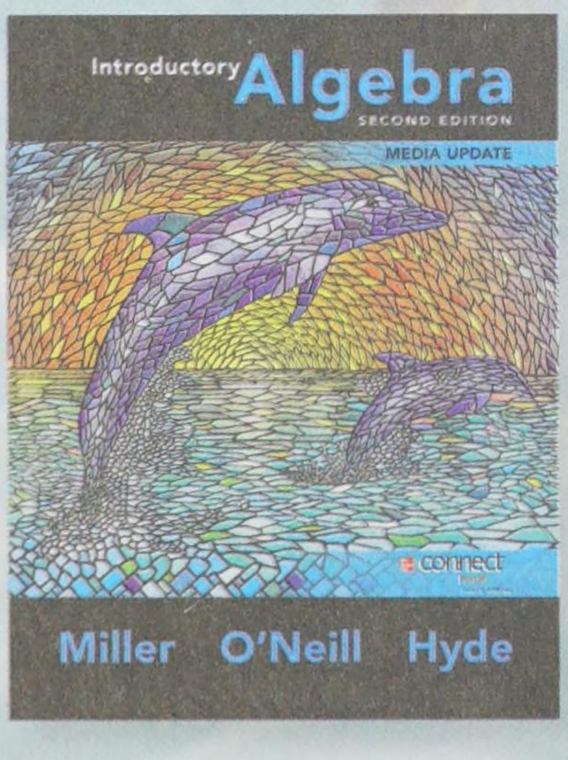

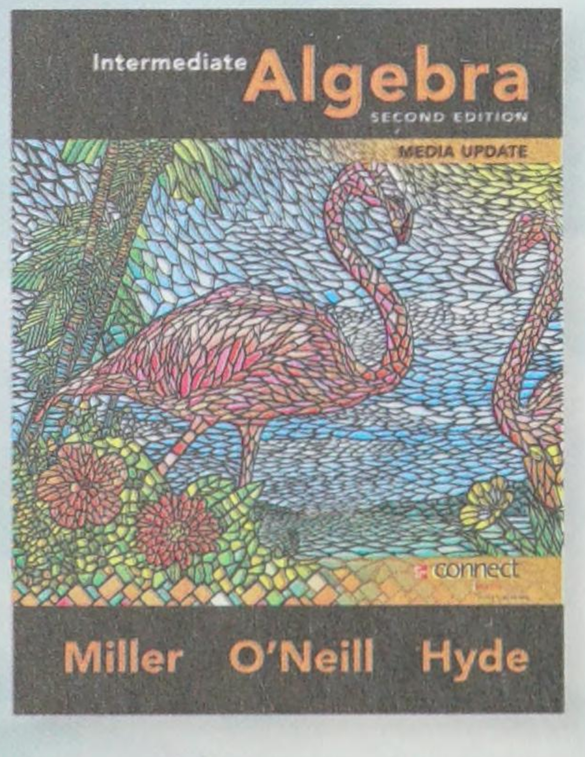

Beginning ALGEBRA

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Fourth Edition

Julie Miller
Daytona State College

Molly O'Neill
Daytona State College

Nancy Hyde
Broward College—Professor Emeritus

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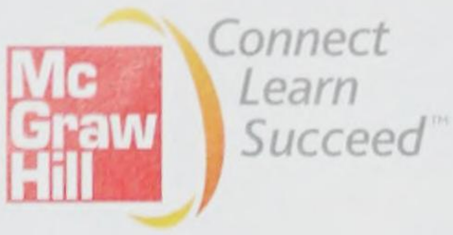

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Letter from the Authors

Dear Colleagues,

We originally embarked on this textbook project because we were seeing a lack of student success in our developmental math sequence. In short, we were not getting the results we wanted from our students with the materials and textbooks that we were using at the time. The primary goal of our project was to create teaching and learning materials that would get better results.

At Daytona State College, our students were instrumental in helping us develop the clarity of writing; the step-by-step examples; and the pedagogical elements, such as Avoiding Mistakes, Concept Connections, and Problem Recognition Exercises, found in our textbooks. They also helped us create the content for the McGraw-Hill lecture videos and dynamic Flash animations that accompany this text.

This project has been a true collaboration with our Board of Advisors and colleagues in developmental mathematics around the country. We are sincerely humbled by those of you who have used our books and by the over 400 colleagues around the country who have partnered with us providing valuable suggestions through reviews, symposia, focus groups, and being on our Board of Advisors. You partnered with us to create materials that will help students get better results. For that we are immeasurably grateful.

As an author team, we have an ongoing commitment to provide the best possible text materials for instructors and students. With your continued help and suggestions we will continue the quest to help all of our students get better results.

Sincerely,

Julie Miller
julie.miller.math@gmail.com

Molly O'Neill
molly.s.oneill@gmail.com

Nancy Hyde
nhyde@montanasky.com

About the Authors

Julie Miller is from Daytona State College, where she has taught developmental and upper-level mathematics courses for 20 years. Prior to her work at Daytona State College, she worked as a software engineer for General Electric in the area of flight and radar simulation. Julie earned a bachelor of science in applied mathematics from Union College in Schenectady, New York, and a master of science in mathematics from the University of Florida. In addition to this textbook, she has authored several course supplements for college algebra, trigonometry, and precalculus, as well as several short works of fiction and nonfiction for young readers.

"My father is a medical researcher, and I got hooked on math and science when I was young and would visit his laboratory. I can remember using graph paper to plot data points for his experiments and doing simple calculations. He would then tell me what the peaks and features in the graph meant in the context of his experiment. I think that applications and hands-on experience made math come alive for me and I'd like to see math come alive for my students."

—Julie Miller

Molly O'Neill is also from Daytona State College, where she has taught for 22 years in the School of Mathematics. She has taught a variety of courses from developmental mathematics to calculus. Before she came to Florida, Molly taught as an adjunct instructor at the University of Michigan–Dearborn, Eastern Michigan University, Wayne State University, and Oakland Community College. Molly earned a bachelor of science in mathematics and a master of arts and teaching from Western Michigan University in Kalamazoo, Michigan. Besides this textbook, she has authored several course supplements for college algebra, trigonometry, and precalculus and has reviewed texts for developmental mathematics.

"I differ from many of my colleagues in that math was not always easy for me. But in seventh grade I had a teacher who taught me that if I follow the rules of mathematics, even I could solve math problems. Once I understood this, I enjoyed math to the point of choosing it for my career. I now have the greatest job because I get to do math every day and I have the opportunity to influence my students just as I was influenced. Authoring these texts has given me another avenue to reach even more students."

—Molly O'Neill

Nancy Hyde served as a full-time faculty member of the Mathematics Department at Broward College for 24 years. During this time she taught the full spectrum of courses from developmental math through differential equations. She received a bachelor of science degree in math education from Florida State University and a master's degree in math education from Florida Atlantic University. She has conducted workshops and seminars for both students and teachers on the use of technology in the classroom. In addition to this textbook, she has authored a graphing calculator supplement for *College Algebra*.

"I grew up in Brevard County, Florida, where my father worked at Cape Canaveral. I was always excited by mathematics and physics in relation to the space program. As I studied higher levels of mathematics I became more intrigued by its abstract nature and infinite possibilities. It is enjoyable and rewarding to convey this perspective to students while helping them to understand mathematics."

—Nancy Hyde

Dedication

To Our Students

Julie Miller ✦ Molly O'Neill ✦ Nancy Hyde

Contents

Get Better Results

How Will Miller/O'Neill/Hyde Help Your Students *Get Better Results?*

Better Clarity, Quality, and Accuracy!

Julie Miller, Molly O'Neill, and Nancy Hyde know what students need to be successful in mathematics. Better results come from clarity in their exposition, quality of step-by-step worked examples, and accuracy of their exercises sets; but it takes more than just great authors to build a textbook series to help students achieve success in mathematics. Our authors worked with a strong mathematical team of instructors from around the country to ensure that the clarity, quality, and accuracy you expect from the Miller/O'Neill/Hyde series was included in this edition.

"The most complete text at this level in its thoroughness, accuracy, and pedagogical soundness. The best developmental mathematics text I have seen."

—Frederick Bakenhus, *Saint Phillips College*

Better Exercise Sets!

Comprehensive sets of exercises are available for every student level. Julie Miller, Molly O'Neill, and Nancy Hyde worked with a board of advisors from across the country to offer the appropriate depth and breadth of exercises for your students. **Problem Recognition Exercises** were created to improve student performance while testing.

Practice exercise sets help students progress from skill development to conceptual understanding. Student tested and instructor approved, the Miller/O'Neill/Hyde exercise sets will help your students *get better results*.

- **Problem Recognition Exercises**
- **Skill Practice Exercises**
- **Study Skills Exercises**
- **Mixed Exercises**
- **Expanding Your Skills Exercises**
- **Vocabulary and Key Concepts Exercises**

"This series was thoughtfully constructed with students' needs in mind. The Problem Recognition section was extremely well designed to focus on concepts that students often misinterpret."

—Christine V. Wetzel-Ulrich, *Northampton Community College*

Better Step-By-Step Pedagogy!

Beginning Algebra provides enhanced step-by-step learning tools to help students *get better results.*

- **Worked Examples** provide an "easy-to-understand" approach, clearly guiding each student through a step-by-step approach to master each practice exercise for better comprehension.
- **TIPs** offer students extra cautious direction to help improve understanding through hints and further insight.
- **Avoiding Mistakes** boxes alert students to common errors and provide practical ways to avoid them. Both of these learning aids will help students get better results by showing how to work through a problem using a clearly defined step-by-step methodology that has been class tested and student approved.

"The book is designed with both instructors and students in mind. I appreciate that great care was used in the placement of 'Tips' and 'Avoiding Mistakes' as it creates a lot of teachable moments in the classroom."

—Shannon Vinson, *Wake Tech Community College*

Get Better Results

Formula for Student Success

Step-by-Step Worked Examples

- Do you get the feeling that there is a disconnection between your students' class work and homework?
- Do your students have trouble finding worked examples that match the practice exercises?
- Do you prefer that your students see examples in the textbook that match the ones you use in class?

Miller/O'Neill/Hyde's *Worked Examples* offer a clear, concise methodology that replicates the mathematical processes used in the authors' classroom lectures!

Example 5 Solving a Linear Equation

Solve the equation. $2.2y - 8.3 = 6.2y + 12.1$

Solution:

$2.2y - 8.3 = 6.2y + 12.1$

Step 1: The right- and left-hand sides are already simplified.

$- 8.3 = 6.2y - 2.2y + 12.1$

$-8.3 = 4y + 12.1$

Step 2: Subtract $2.2y$ from both sides to collect the variable terms on one side of the equation.

$12.1 = 4y + 12.1 - 12.1$

$-20.4 = 4y$

Step 3: Subtract 12.1 from both sides to collect the constant terms on the other side.

$\frac{-20.4}{4} = \frac{4y}{4}$

$-5.1 = y$

$y = -5.1$

Step 4: To ob... of ... div...

Step 5: Ch...

$2.2y -$

$2.2(-5.1) -$

$-11.22 -$

-1

The solution set is $\{-5.1\}$.

Skill Practice Solve the equation.

5. $1.5t + 2.3 = 3.5t - 1.9$

"As always, MOH's Worked Examples are so clear and useful for the students. All steps have wonderfully detailed explanations written with wording that the students can understand. MOH is also excellent with arrows and labels making the Worked Examples extremely clear and understandable."

—Kelli Hammer, *Broward College–South*

"Easy to read step-by-step solutions to sample textbook problems. The 'why' is provided for students, which is invaluable when working exercises without available teacher/tutor assistance."

—Arcola Sullivan, *Copiah-Lincoln Community College*

Example 3 Solving a System of Linear Equations by Graphing

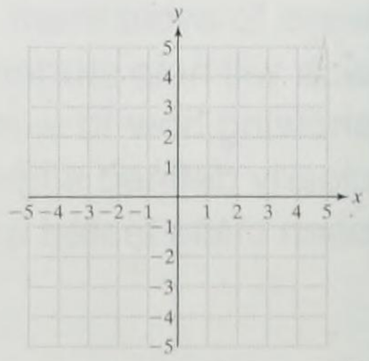
Solve the system by the graphing method.

$x - 2y = -2$

$-3x + 2y = 6$

30. $x + y = -1$

$2x - y = -5$



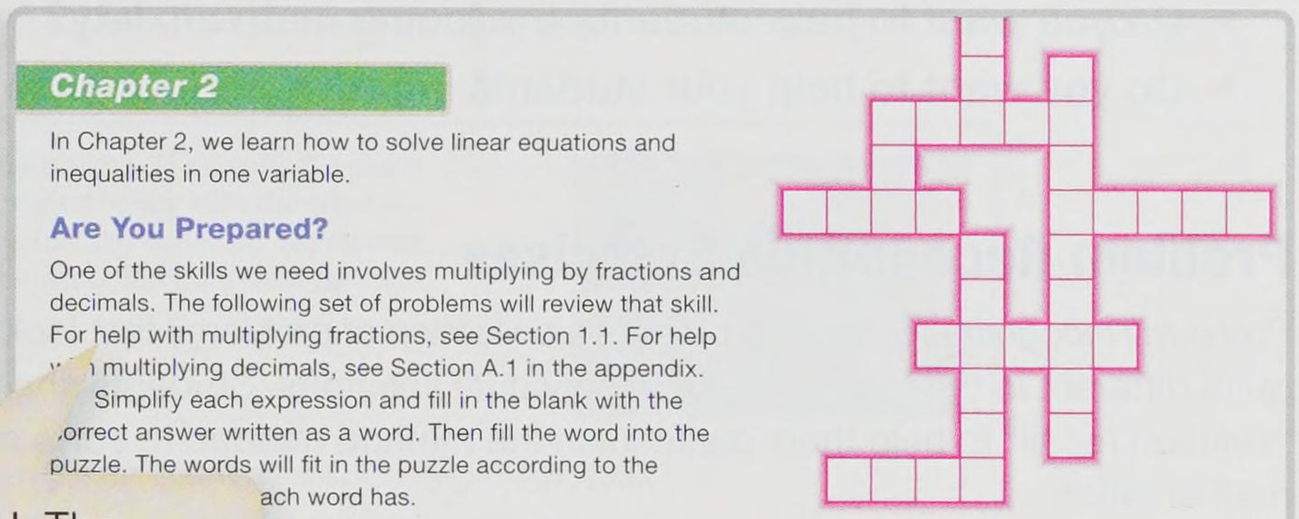
Classroom Examples

To ensure that the classroom experience also matches the examples in the text and the practice exercises, we have included references to even-numbered exercises to be used as Classroom Examples. These exercises are highlighted in the Practice Exercises at the end of each section.

Better Learning Tools

Chapter Openers

Tired of students not being prepared? The Miller/O'Neill/Hyde *Chapter Openers* help students get better results through engaging *Puzzles and Games* that introduce the chapter concepts and ask "Are You Prepared?"

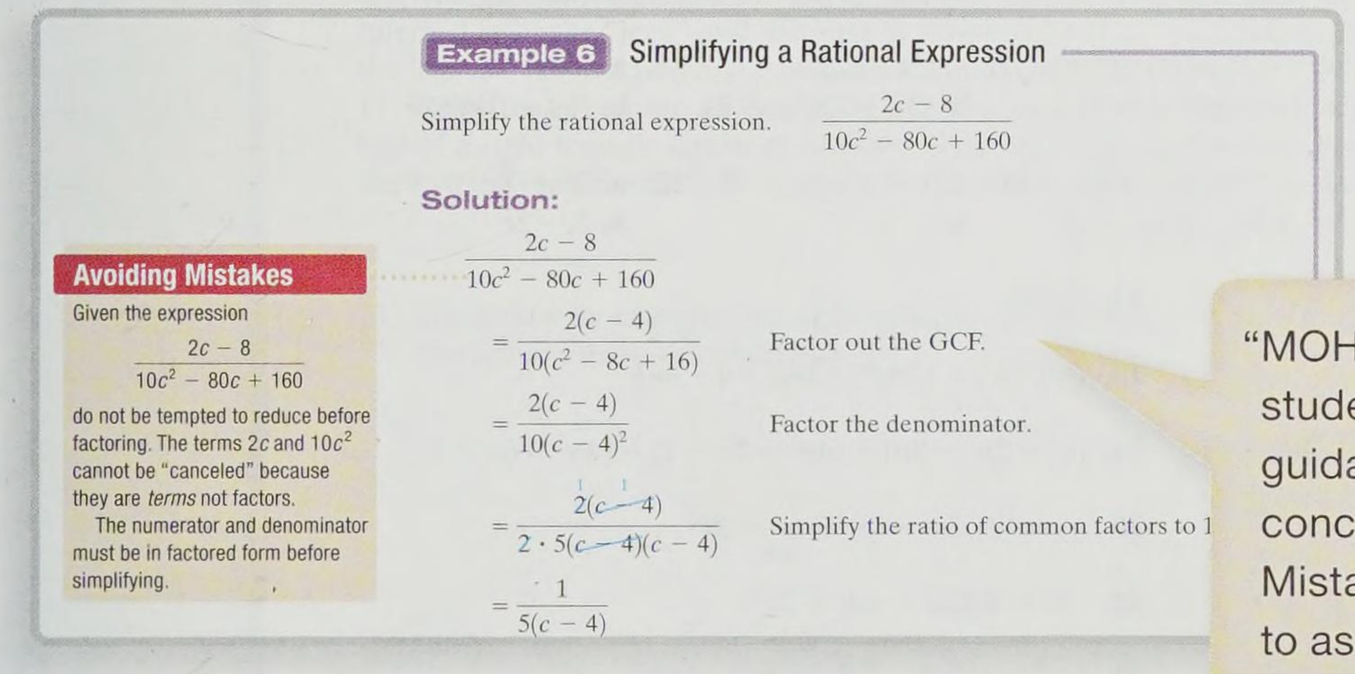


"I really like the chapter openers in MOH. The problems are a nice way to begin a class, and with the 'message' at the end, students can self check, and at some point can guess the answer similar to *Wheel of Fortune.* The activity is easy enough so that students feel confident, but at the same time, gives a nice review."

—Leonora Smook, *Suffolk County Community College*

TIP and Avoiding Mistakes Boxes

TIP and **Avoiding Mistakes** boxes have been created based on the authors' classroom experiences—they have also been integrated into the **Worked Examples.** These pedagogical tools will help students get better results by learning how to work through a problem using a clearly defined step-by-step methodology.



Avoiding Mistakes Boxes:

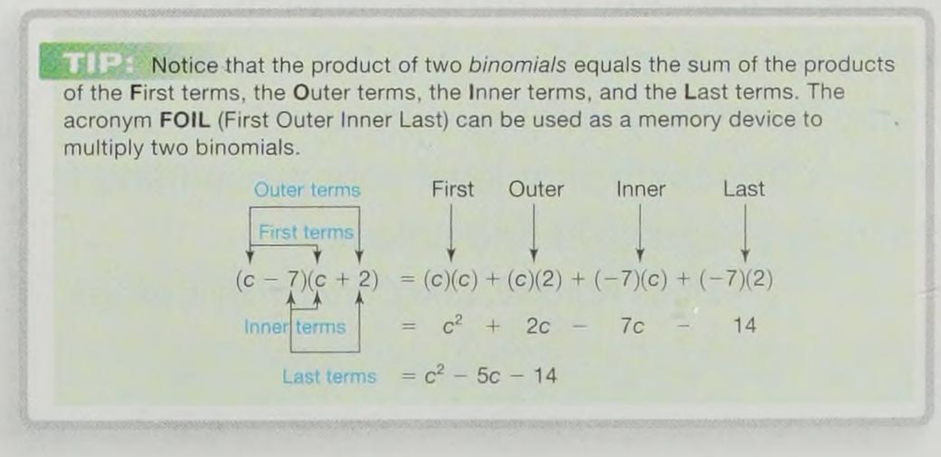
Avoiding Mistakes boxes are integrated throughout the textbook to alert students to common errors and how to avoid them.

"MOH presentation of reinforcement concepts builds students' confidence and provides easy to read guidance in developing basic skills and understanding concepts. I love the visual clue boxes 'Avoiding Mistakes.' Visual clue boxes provide tips and advice to assist students in avoiding common mistakes."

—Arcola Sullivan, *Copiah-Lincoln Community College*

TIP Boxes

Teaching tips are usually revealed only in the classroom. Not anymore! TIP boxes offer students helpful hints and extra direction to help improve understanding and provide further insight.



Get Better Results

Better Exercise Sets! Better Practice! Better Results!

- Do your students have trouble with problem solving?
- Do you want to help students overcome math anxiety?
- Do you want to help your students improve performance on math assessments?

Problem Recognition Exercises

Problem Recognition Exercises present a collection of problems that look similar to a student upon first glance, but are actually quite different in the manner of their individual solutions. Students sharpen critical thinking skills and better develop their "solution recall" to help them distinguish the method needed to solve an exercise—an essential skill in developmental mathematics.

Problem Recognition Exercises were tested in the authors' developmental mathematics classes and were created to improve student performance on tests.

"The PREs are an excellent source of additional mixed problem sets. Frequently students have questions/comments like 'Where do I start?' or 'I know what to do once I get started, but I have trouble getting started.' Perhaps with these PREs, students will be able to overcome this obstacle."

—Erika Blanken, *Daytona State College*

Problem Recognition Exercises

Operations on Polynomials

For Exercises 1–40, perform the indicated operations and simplify.

1. **a.** $6x^2 + 2x^2$ **b.** $(6x^2)(2x^2)$

2. **a.** $8y^3 + y^3$ **b.** $(8y^3)(y^3)$

3. **a.** $(4x + y)^2$ **b.** $(4xy)^2$

4. **a.** $(2a + b)^2$ **b.** $(2ab)^2$

5. **a.** $(2x + 3) + (4x - 2)$ **b.** $(2x + 3)(4x - 2)$

6. **a.** $(5m^2 + 1) + (m^2 + m)$ **b.** $(5m^2 + 1)(m^2 + m)$

7. **a.** $(3z + 2)^2$ **b.** $(3z + 2)(3z - 2)$

8. **a.** $(6y - 7)^2$ **b.** $(6y - 7)(6y + 7)$

9. **a.** $(2x - 4)(x^2 - 2x + 3)$ **b.** $(2x - 4) + (x^2 - 2x + 3)$

10. **a.** $(3y^2 + 8)(-y^2 - 4)$ **b.** $(3y^2 + 8) - (-y^2 - 4)$

11. **a.** $x + x$ **b.** $x \cdot x$

12. **a.** $2c + 2c$ **b.** $2c \cdot 2c$

13. $(4xy)^2$

14. $(2ab)^2$

15. $(-2x^4 - 6x^3 + 8x^2) \div (2x^2)$

16. $(-15m^3 + 12m^2 - 3m) \div (-3m)$

17. $(m^3 - 4m^2 - 6) - (3m^2 + 7m) + (-m^3 - 9m + 6)$

18. $(n^4 + 2n^2 - 3n) + (4n^2 + 2n - 1) - (4n^5 + 6n - 3)$

19. $(8x^3 + 2x + 6) \div (x - 2)$

20. $(-4x^3 + 2x^2 - 5) \div (x - 3)$

21. $(2x - y)(3x^2 + 4xy - y^2)$

22. $(3a + b)(2a^2 - ab + 2b^2)$

23. $(x + y^2)(x^2 - xy^2 + y^4)$

24. $(m^2 + 1)(m^4 - m^2 + 1)$

25. $(a^2 + 2b) - (a^2 - 2b)$ **26.** $(y^3 - 6z) - (y^3 + 6z)$ **27.** $(a^3 + 2b)(a^3 - 2b)$ **28.** $(y^3 - 6z)(y^3 + 6z)$

$\frac{12x^3y^7}{3xy^5}$

32. $\frac{-18p^2q^4}{2pq^3}$

$\left(\frac{1}{9}x^3 + \frac{2}{3}x^2 + \frac{1}{6}x - 3\right) - \left(\frac{4}{3}x^3 + \frac{1}{9}x^2 + \frac{2}{3}x + 1\right)$

$(0.05x^2 - 0.16x - 0.75) + (1.25x^2 - 0.14x + 0.25)$

38. $(1.6w^3 + 2.8w + 6.1) + (3.4w^3 - 4.1w^2 - 7.3)$

"These are so important to test whether a student can recognize different types of problems and the method of solving each. They seem very unique—I have not noticed this feature in many other texts or at least your presentation of the problems is very organized and unique."

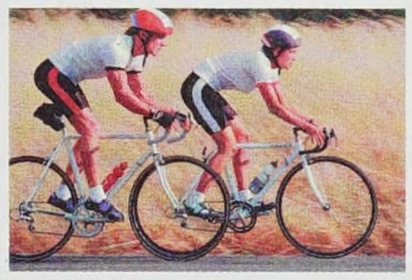
—Linda Kuroski, *Erie Community College*

Student Centered Applications!

The Miller/O'Neill/Hyde Board of Advisors partnered with our authors to bring the *best applications* from every region in the country! These applications include real data and topics that are more relevant and interesting to today's student.

11. A bicyclist rides 24 mi against a wind and returns 24 mi with the same wind. His average speed for the return trip traveling with the wind is 8 mph faster than his speed going out against the wind. If x represents the bicyclist's speed going out against the wind, then the total time, t, required for the round trip is given by

$$t = \frac{24}{x} + \frac{24}{x + 8}$$ where t is measured in hours.



a. Find the time required for the round trip if the cyclist rides 12 mph against the wind.

b. Find the time required for the round trip if the cyclist rides 24 mph against the wind.

Group Activities!

Each chapter concludes with a Group Activity to promote classroom discussion and collaboration—helping students not only to solve problems but to explain their solutions for better mathematical mastery. Group Activities are great for both full-time and adjunct instructors—bringing a more interactive approach to teaching mathematics! All required materials, activity time, and suggested group sizes are provided in the end-of-chapter material.

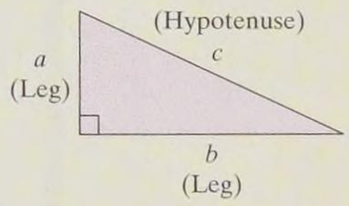
Group Activity

The Pythagorean Theorem and a Geometric "Proof"

Estimated Time: 25–30 minutes

Group Size: 2

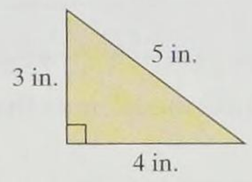
Right triangles occur in many applications of mathematics. By definition, a right triangle is a triangle that contains a 90° angle. The two shorter sides in a right triangle are referred to as the "legs," and the longest side is called the "hypotenuse." In the triangle, the legs are labeled as a and b, and the hypotenuse is labeled as c.



Right triangles have an important property that the sum of the squares of the two legs of a right triangle equals the square of the hypotenuse. This fact is referred to as the Pythagorean theorem. In symbols, the Pythagorean theorem is stated as:

$$a^2 + b^2 = c^2$$

1. The following triangles are right triangles. Verify that $a^2 + b^2 = c^2$. (The units may be left off when performing these calculations.)



$a = 3$

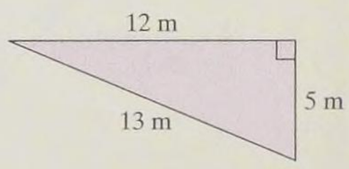
$b = 4$

$c = 5$

$a^2 + b^2 = c^2$

$(3)^2 + (4)^2 \stackrel{?}{=} (5)^2$

$9 + 16 = 25$ ✔



$a =$ _____

$b =$ _____

$c =$ _____

$a^2 + b^2 = c^2$

$(\_\_\_\_)^2 + (\_\_\_\_)^2 \stackrel{?}{=} (\_\_\_\_)^2$

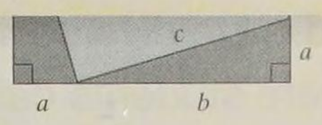
$\_\_\_\_ + \_\_\_\_ = \_\_\_\_$ ✔

gorean theorem uses addition,
. Consider the square figure. The
s $(a + b)$. Therefore, the area of the

o be found by adding the area of the
area of the four right triangles

he four right triangles: $4 \cdot (\frac{1}{2}\ a\ b)$

½ Base · Height



"This is one part of the book that would have me adopt the MOH book. I am very big on group work for *Beginning Algebra* and many times it is difficult to think of an activity. I would conclude the chapter doing the group activity in the class. Many books just have problems for this, but the MOH book provides an actual activity."

—Sharon Giles, *Grossmont College*

"MOH's group activity involves true participation and interaction; fun with fractions!"

—Monika Bender, *Central Texas College*

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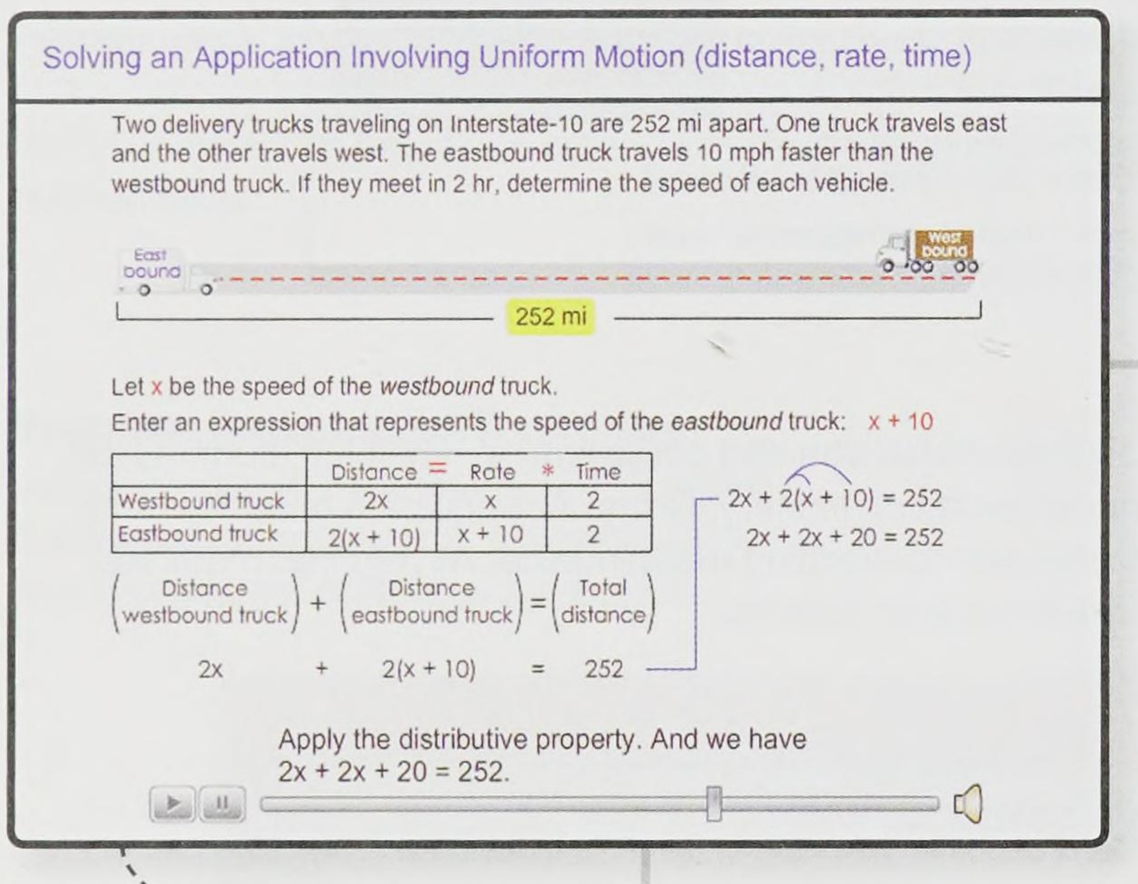
Dynamic Math Animations

The Miller/O'Neill/Hyde author team has developed a series of Flash animations to illustrate difficult concepts where static images and text fall short. The animations leverage the use of on-screen movement and morphing shapes to enhance conceptual learning.



Animation

Example 7 Solving a Distance, Rate, Time Application

A hiker can hike 1 mph faster downhill to Moose Lake than she can hike uphill back to the campsite. If it takes her 3 hr to hike to the lake and 4.5 hr to hike back, what is her speed hiking back to the campsite?

Solution:

The information given in the problem can be organized in a table.

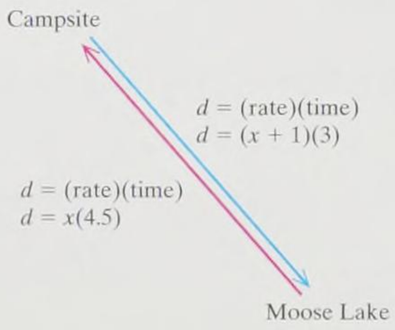
	Distance (mi)	Rate (mph)	Time (hr)
Trip to the lake		$x + 1$	3
Return trip		x	4.5

Column 2: Let the rate of the return trip be represented by x. Then the trip to the lake is 1 mph faster and can be represented by $x + 1$.

Column 3: The times hiking to and from the lake are given in the problem.

Column 1: To express the distance, we use the relationship $d = rt$. That is, multiply the quantities in the second and third columns.

	Distance (mi)	Rate (mph)	Time (hr)
Trip to the lake	$3(x + 1)$	$x + 1$	3
Return trip	$4.5x$	x	4.5

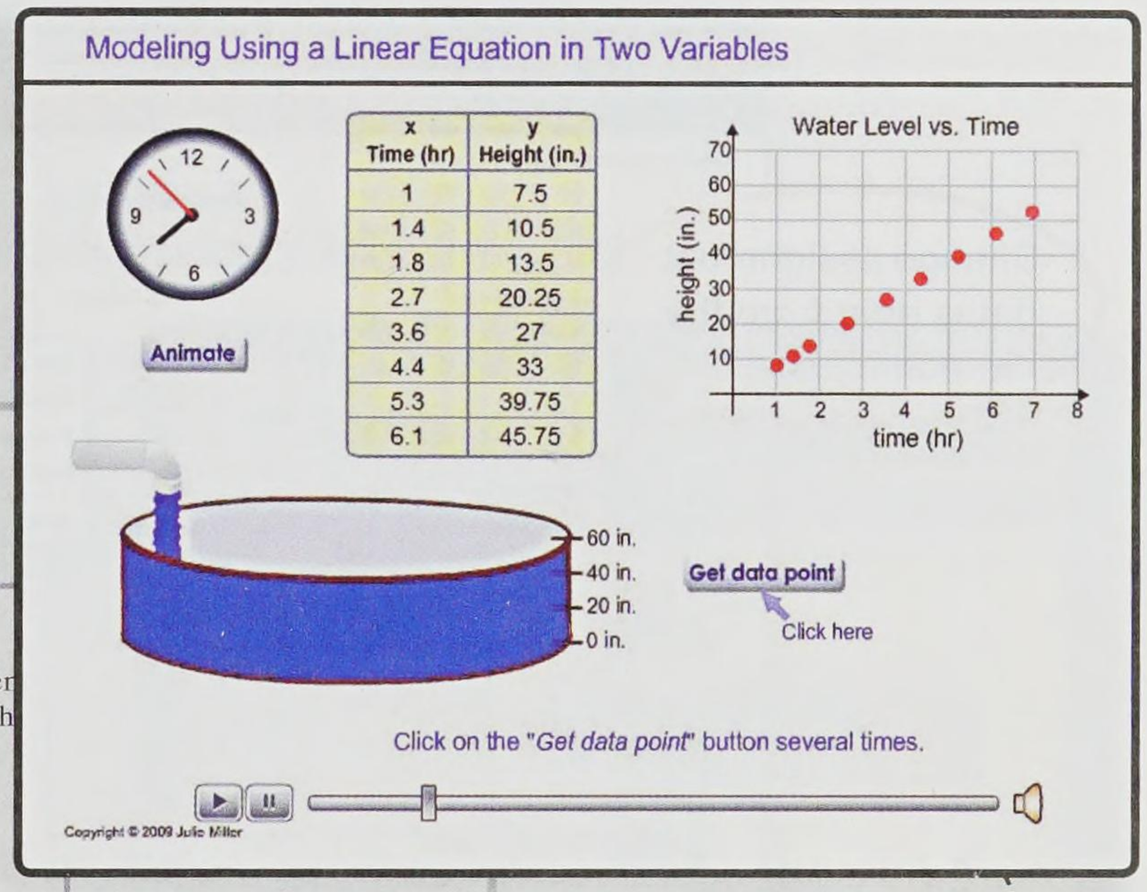


To create a mathematical model, note that the distances to and from the lake are equal. Therefore,

(Distance to lake) = (return distance)	Verbal model
$3(x + 1) = 4.5x$	Mathematical equation
$3x + 3 = 4.5x$	Apply the distributive property.
$3x - 3x + 3 = 4.5x - 3x$	Subtract $3x$ from both sides.

Through their classroom experience, the authors recognize that such media assets are great teaching tools for the classroom and excellent for online learning. The Miller/O'Neill/Hyde animations are interactive and quite diverse in their use. Some provide a virtual laboratory for which an application is simulated and where students can collect data points for analysis and modeling. Others provide interactive question-and-answer sessions to test conceptual learning. For word problem applications, the animations ask students to estimate answers and practice "number sense."

The animations were created by the authors based on over 75 years of combined teaching experience! To facilitate the use of the animations, the authors have placed icons in the text to indicate where animations are available. Students and instructors can access these assets online in either the ALEKS 360 Course product or Connect Math Hosted by ALEKS.



Animation

2. Writing a Linear Model Using Observed Data Points

Example 2 Writing a Linear Model from Observed Data Points

The monthly sales of hybrid cars sold in the United States are given for a recer year. The sales for the first 8 months of the year are shown in Figure 3-35. Th value $x = 0$ represents January, $x = 1$ represents February, and so on.

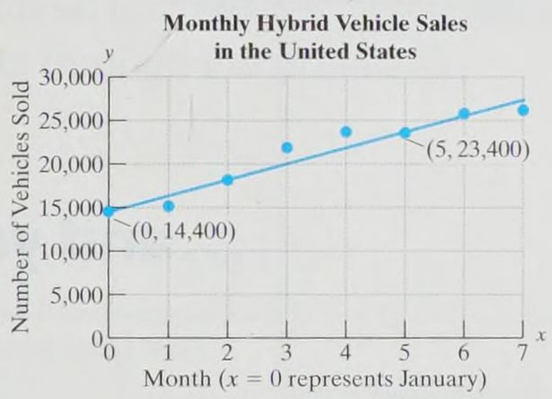


Figure 3-35

a. Use the data points from Figure 3-35 to find a linear equation that represents the monthly sales of hybrid cars in the United States. Let x represent the month number and let y represent the number of vehicles sold.

b. Use the linear equation in part (a) to estimate the number of hybrid vehicles sold in month 7 (August).

Solution:

a. The ordered pairs (0, 14,400) and (5, 23,400) are given in the graph. Use these points to find the slope.

$(0, 14{,}400)$ and $(5, 23{,}400)$
(x_1, y_1) (x_2, y_2) Label the points.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{23{,}400 - 14{,}400}{5 - 0}$$

$$= \frac{9000}{5}$$

$= 1800$ The slope is 1800. This indicates that sales increased by approximately 1800 per month during this time period.

With $m = 1800$, and the y-intercept given as (0, 14,400), we have the following linear equation in slope-intercept form.

$$y = 1800x + 14{,}400$$

b. To approximate the sales in month number 7, substitute $x = 7$ into the equation from part (a).

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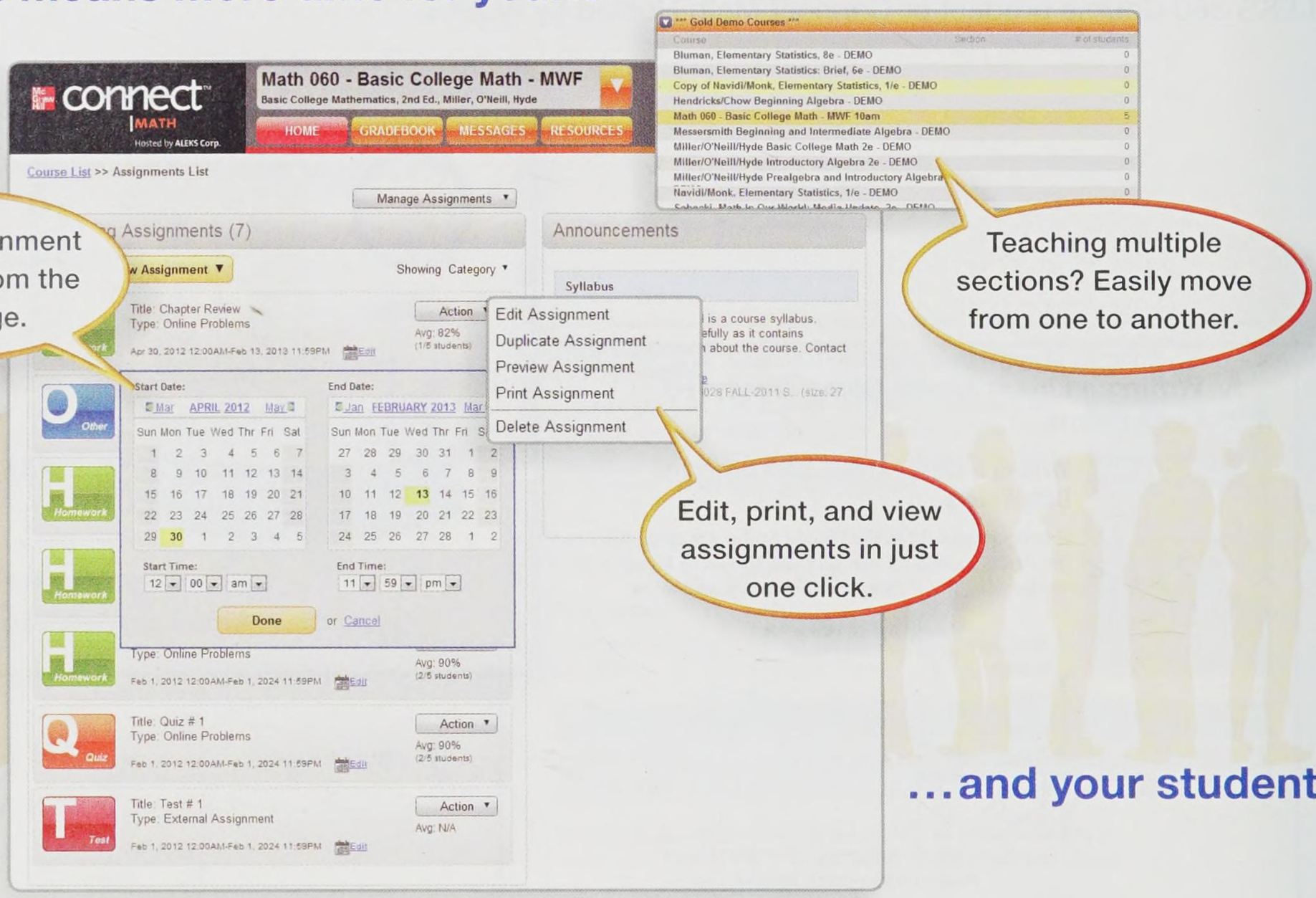

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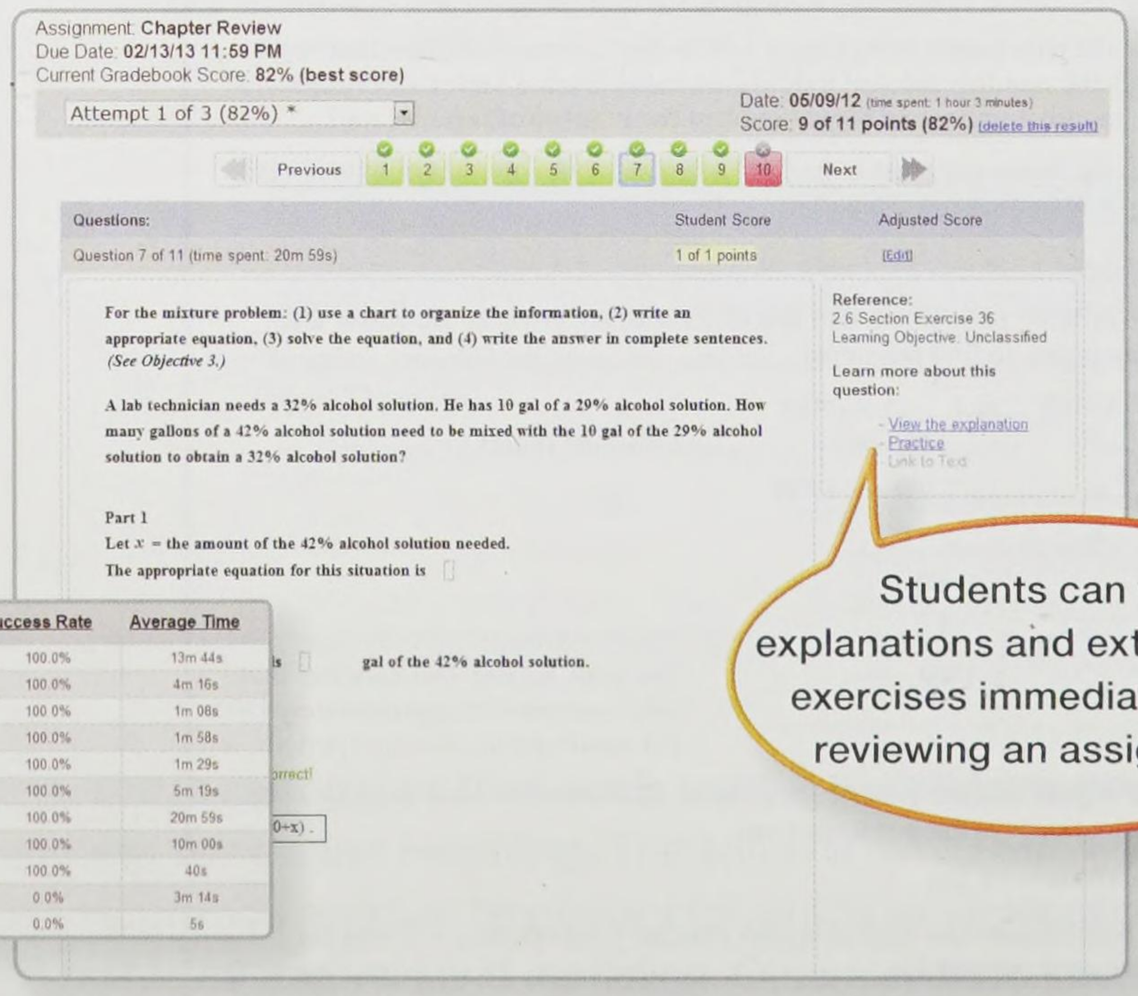

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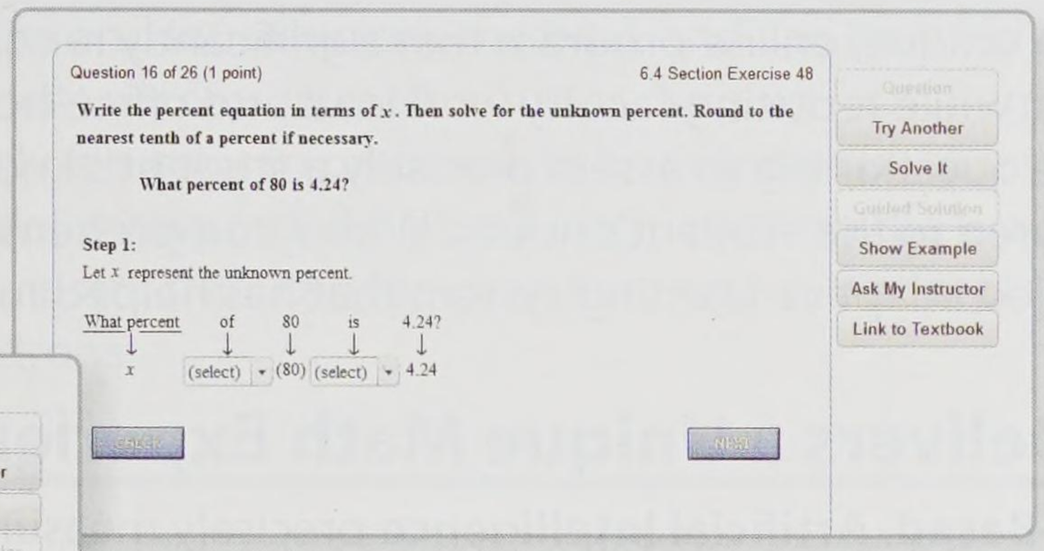
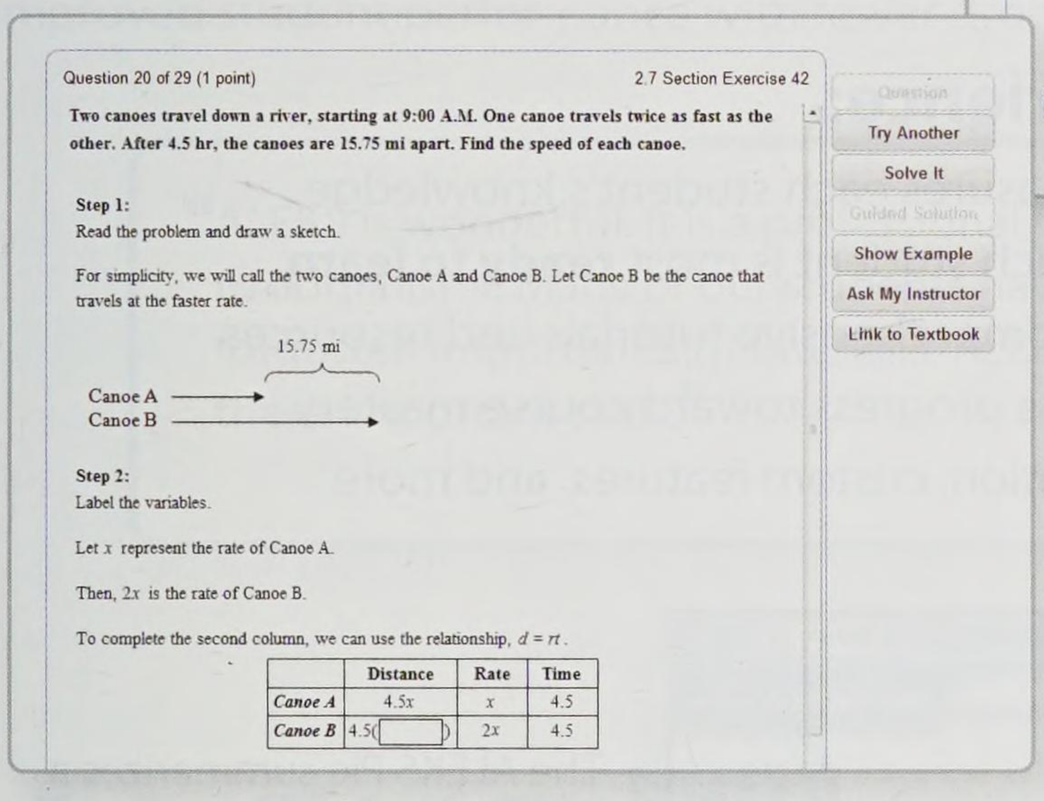
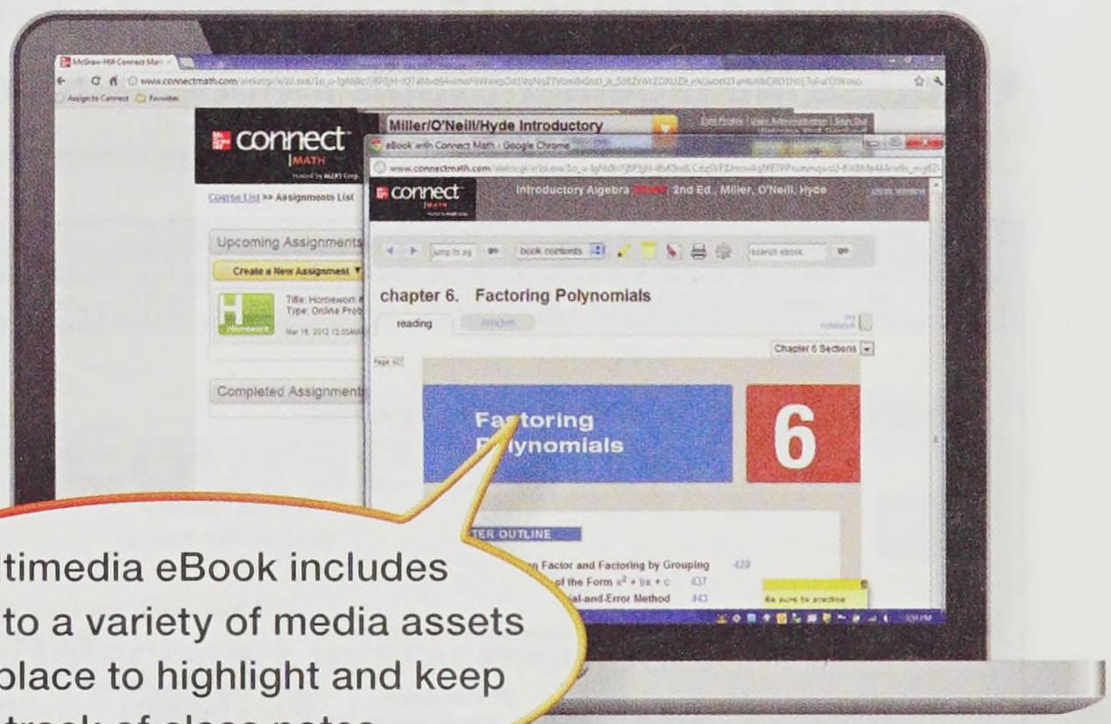
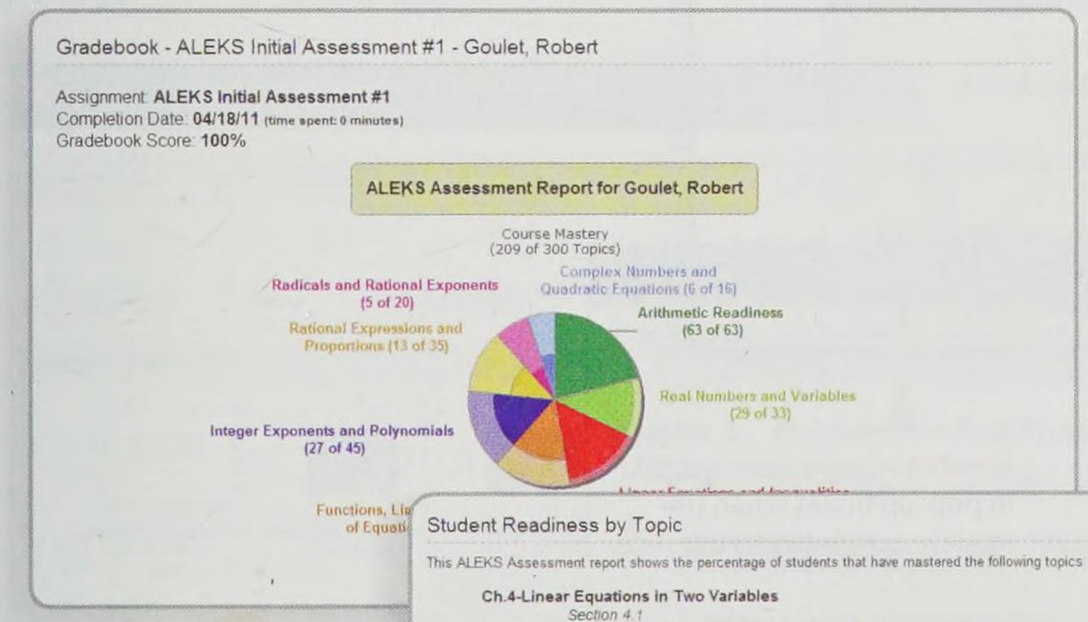


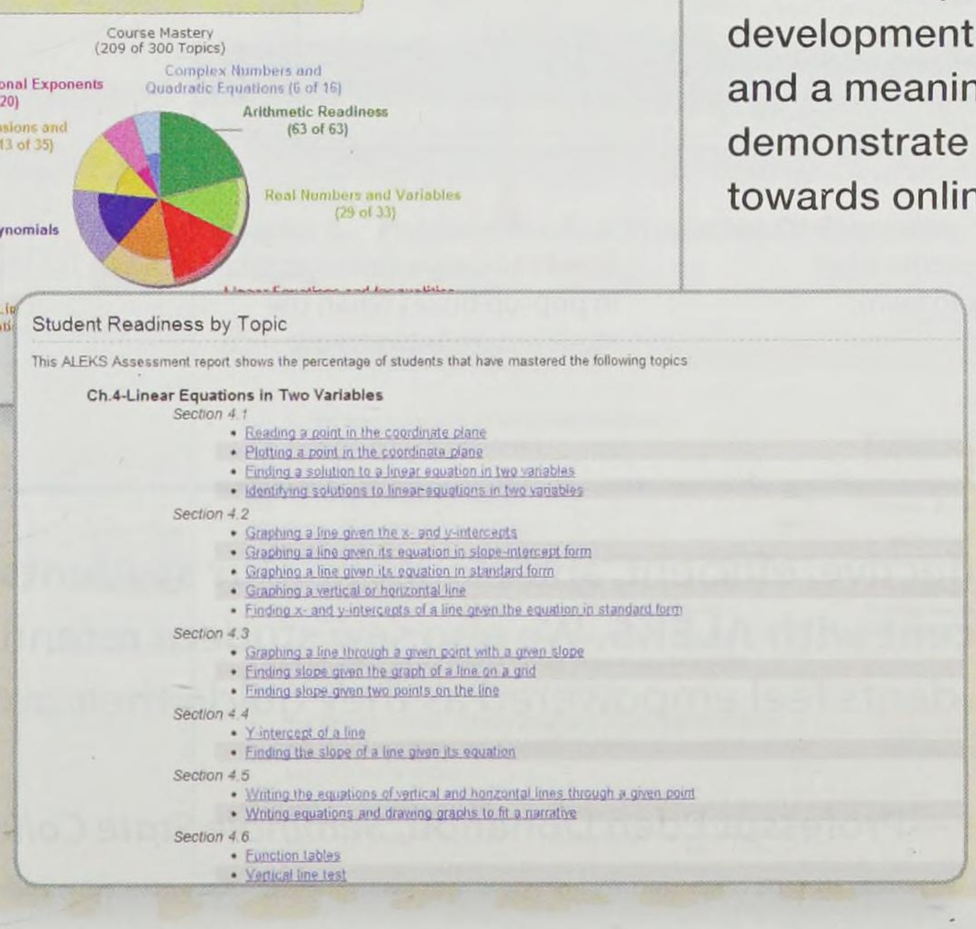


For consistency, the guided solutions match the style and voice of the original text as though the author is guiding the students through the problems.



Multimedia eBook includes access to a variety of media assets and a place to highlight and keep track of class notes





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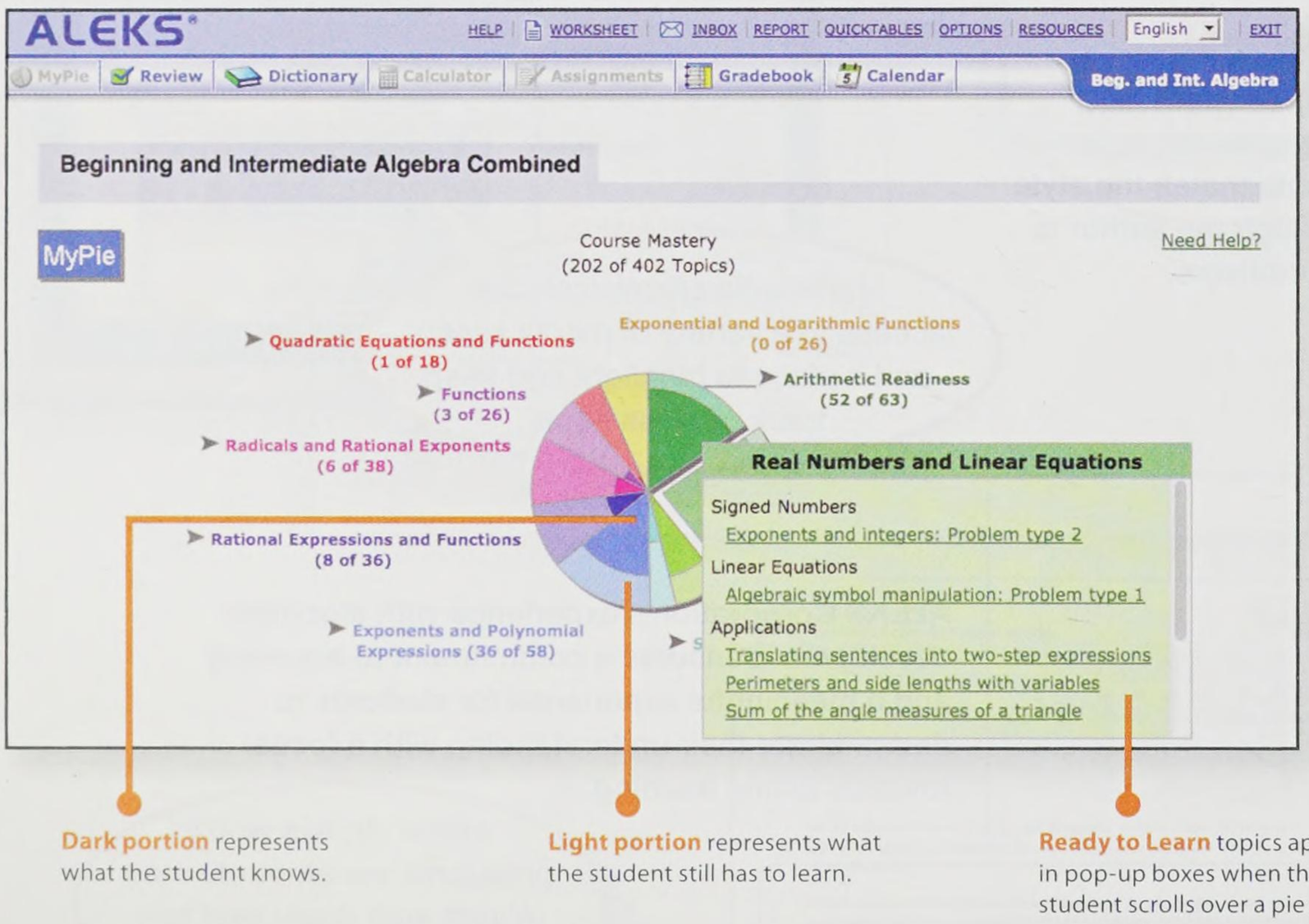

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Dark portion represents what the student knows.

Light portion represents what the student still has to learn.

Ready to Learn topics appear in pop-up boxes when the student scrolls over a pie slice.

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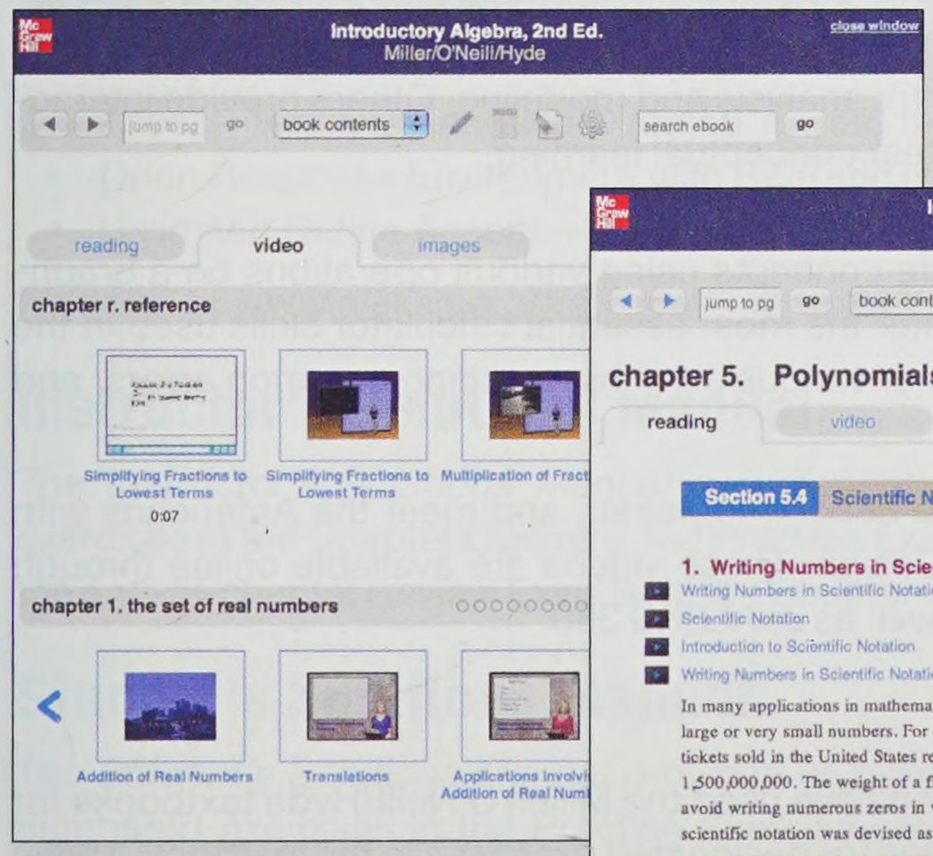

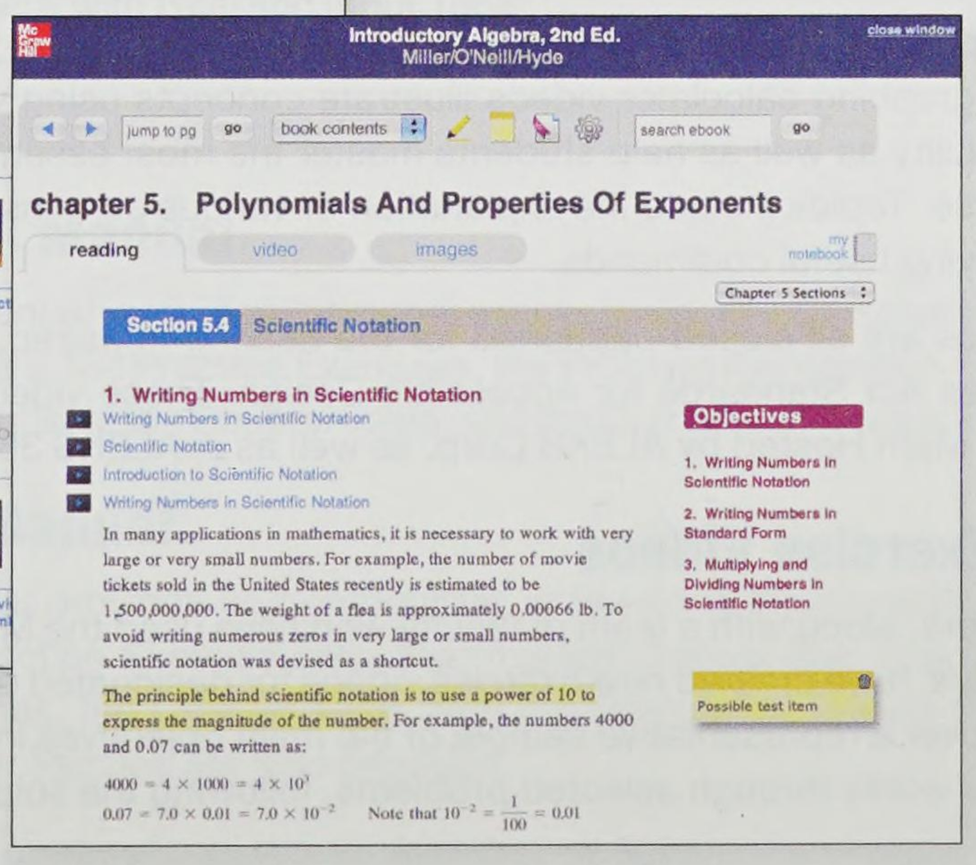

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Additional Supplements

Student Resource Manual

The *Student Resource Manual (SRM),* created by the authors, is a printable, electronic supplement available to students through Connect Math Hosted by ALEKS Corp. Instructors can also choose to customize this manual and package with their course materials. With increasing demands on faculty schedules, this resource offers a convenient means for both full-time and adjunct faculty to promote active learning and success strategies in the classroom.

This manual supports the series in a variety of different ways:

- Discovery-based classroom activities written by the authors for each section
- Worksheets for extra practice written by the authors
- Lecture Notes designed to help students organize and take notes on key concepts
- Materials for a student portfolio

NEW Lecture Videos Created by the Authors

Julie Miller began creating these lecture videos for her own students to use when they were absent from class. The student response was overwhelmingly positive, prompting the author team to create the lecture videos for their entire developmental math book series. In these new videos, the authors walk students through the learning objectives using the same language and procedures outlined in the book. Students learn and review right alongside the author! Students can also access the written notes that accompany the videos.

- **Dynamic Math Animations**
  The authors have constructed a series of Flash animations to illustrate difficult concepts where static images and text fall short. The animations leverage the use of on-screen movement and morphing shapes to give students an interactive approach to conceptual learning. Some provide a virtual laboratory for which an application is simulated and where students can collect data points for analysis and modeling. Others provide interactive question-and-answer sessions to test conceptual learning.
- **Graphing Calculator Videos**
  The graphing calculator videos illustrate concepts using various operations on a graphing utility as well as help students master the most essential calculator skills used in the course. Topics include the explanation of various screens, avoiding common errors, and applying useful commands.

The videos are all closed-captioned for the hearing-impaired, and meet the Americans with Disabilities Act Standards for Accessible Design. These videos are available online through Connect Math Hosted by ALEKS Corp. as well as in ALEKS 360.

NEW Exercise Videos

The authors, along with a team of faculty who have used the Miller/O'Neill/Hyde textbooks for many years, have created new exercise videos for designated exercises in the textbook. These videos cover a representative sample of the main objectives in each section of the text. Each presenter works through selected problems, following the solution methodology employed in the text.

The video series is available online as part of Connect Math Hosted by ALEKS Corp. as well as in ALEKS 360. The videos are closed-captioned for the hearing impaired, and meet the Americans with Disabilities Act Standards for Accessible Design.

Annotated Instructor's Edition

In the *Annotated Instructor's Edition* (*AIE*), answers to all exercises appear adjacent to each exercise in a color used *only* for annotations. The *AIE* also contains Instructor Notes that appear in the margin. These notes offer instructors assistance with lecture preparation. In addition, there are Classroom Examples referenced in the text that are highlighted in the Practice Exercises. Also found in the *AIE* are icons within the Practice Exercises that serve to guide instructors in their preparation of homework assignments and lessons.

Powerpoints

The Powerpoints present key concepts and definitions with fully editable slides that follow the textbook. An instructor may project the slides in class or post to a website in an online course.

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Connect Math Hosted by ALEKS Corp. is an exciting new assignment and assessment ehomework platform. Instructors can assign an AI-driven ALEKS Asssessment to identify the strengths and weaknesses of each student at the beginning of the term rather than after the first exam. Assignment creation and navigation is efficient and intuitive. The gradebook, based on instructor feedback, has a straightforward design and allows flexibility to import and export additional grades.

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Instructor's Solutions Manual

The *Instructor's Solutions Manual* provides comprehensive, worked-out solutions to all exercises in the Chapter Openers, the Practice Exercises, the Problem Recognition Exercises, the end-of-chapter Review Exercises, the Chapter Tests, and the Cumulative Review Exercises.

Student's Solutions Manual

The *Student's Solutions Manual* provides comprehensive, worked-out solutions to the odd-numbered exercises in the Practice Exercise sets, the Problem Recognition Exercises, the end-of-chapter Review Exercises, the Chapter Tests, and the Cumulative Review Exercises. Answers to the Chapter Opener Puzzles are also provided.

Instructor's Test Bank

Among the supplements is a computerized test bank utilizing algorithm-based testing software to create customized exams quickly. Hundreds of text-specific, open-ended, and multiple-choice questions are included in the question bank. Sample chapter tests are also provided.

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McGraw-Hill's Development Process is an ongoing, never-ending, market-oriented approach to building accurate and innovative print and digital products. We begin developing a series by partnering with authors that desire to make an impact within their discipline to help students succeed. Next, we share these ideas and manuscript with instructors for review for feedback and to ensure that the authors' ideas represent the needs within that discipline. Throughout multiple drafts, we help our authors adapt to incorporate ideas and suggestions from reviewers to ensure that the series carries the same pulse as today's classrooms. With any new series, we commit to accuracy across the series and its supplements. In addition to involving instructors as we develop our content, we also utilize accuracy checks through our various stages of development and production. The following is a summary of our commitment to market development and accuracy:

1. 2 drafts of author manuscript
2. 2 rounds of manuscript review
3. 2 focus groups
4. 1 consultative, expert review
5. 2 accuracy checks
6. 2 rounds of proofreading and copyediting
7. Toward the final stages of production, we are able to incorporate additional rounds of quality assurance from instructors as they help contribute toward our digital content and print supplements

This process then will start again immediately upon publication in anticipation of the next edition. With our commitment to this process, we are confident that our series has the most developed content the industry has to offer, thus pushing our desire for quality and accurate content that meets the needs of today's students and instructors.

Acknowledgments and Reviewers

Paramount to the development of *Beginning Algebra* was the invaluable feedback provided by the instructors from around the country that reviewed the manuscript or attended a market development event over the course of the several years the text was in development.

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Maziar Ouliaeinia, *Western Iowa Tech Community College*
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