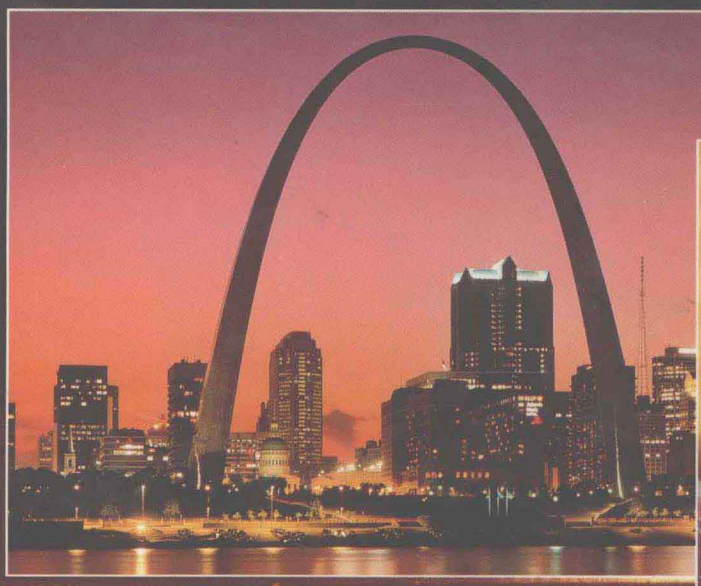
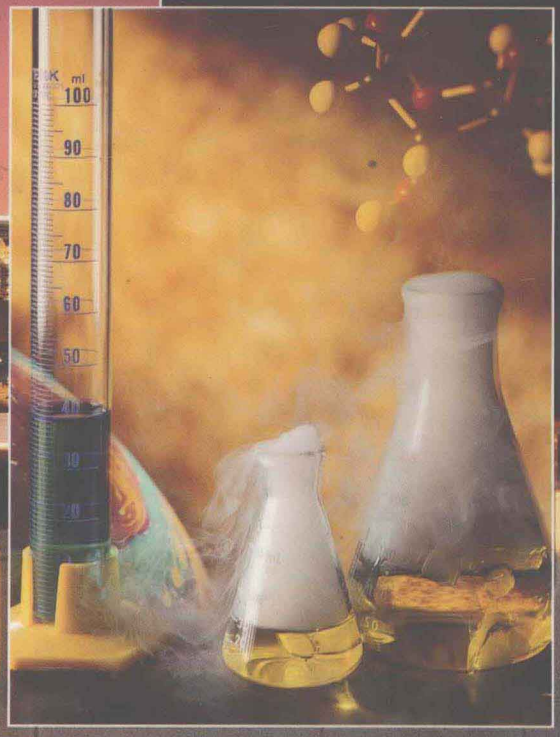
Glencoe

Algebra 2

Integration
Applications
Connections





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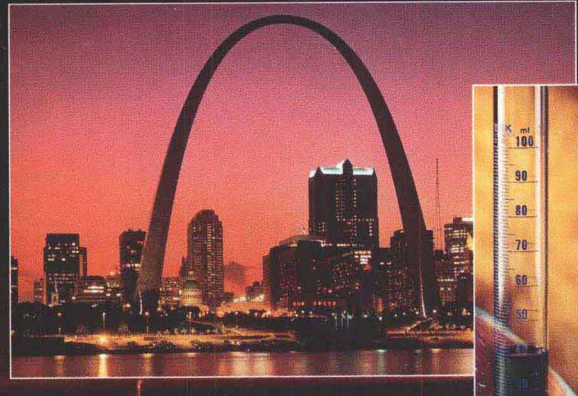

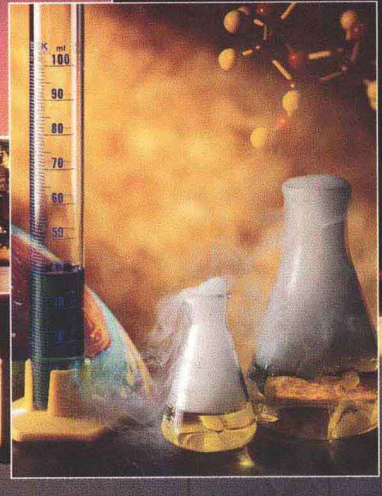

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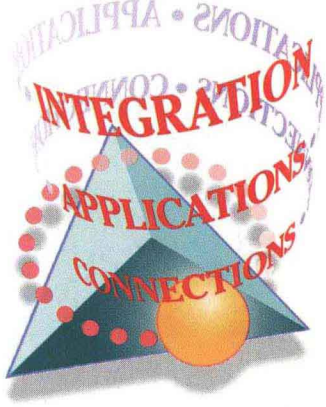
WHY IS ALGEBRA IMPORTANT?

Algebra is a tool that you'll be able to use throughout your life.

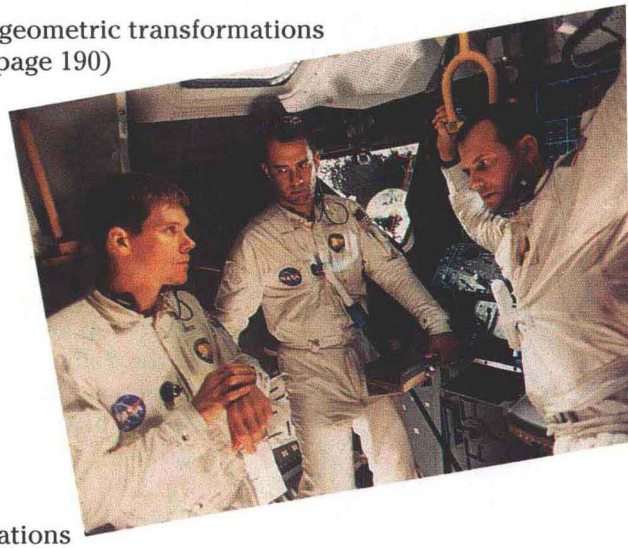


Algebra 2 is designed to illustrate how you'll be using algebra in the real world. This goal is accomplished through **integration, applications,** and **connections.**

Geometry

In addition to algebra, you'll study many other math topics. You'll learn how different branches of mathematics, such as geometry and statistics, are interrelated.

You'll use matrices to perform geometric transformations such as dilations. (Lesson 4-1, page 190)



Space Science

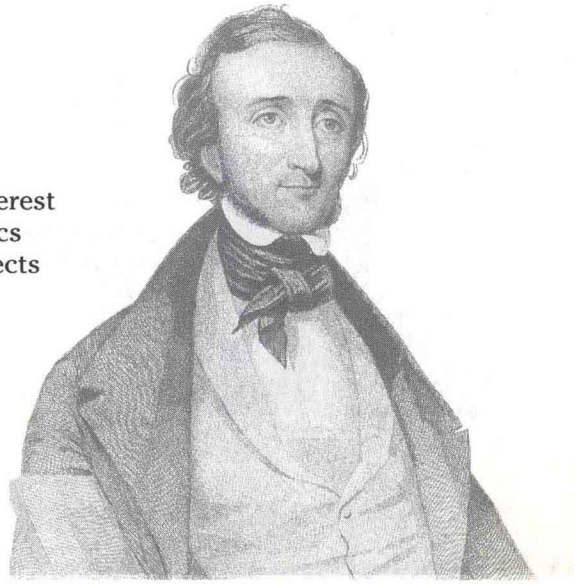
Mathematics can usually be related to real-life events, even the making of a hit movie. Relevant, real-world uses of mathematics are featured throughout this book.

You'll learn how quadratic equations and parabolas are related to the making of the hit movie *Apollo 13.* (Lesson 6-1, page 334)

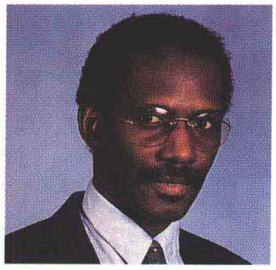
Literature

Many authors incorporate their interest in math in their writing. Mathematics topics are connected to other subjects that you study, even literature.

You'll use Edgar Allen Poe's *The Pit and the Pendulum* to evaluate expressions with rational exponents. (Lesson 5-7, page 296)

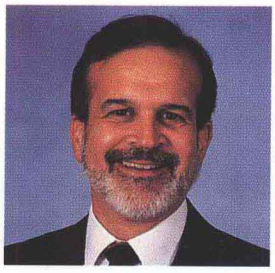


Authors



William Collins teaches mathematics at James Lick High School in San Jose, California. He has served as the mathematics department chairperson at James Lick and Andrew Hill High Schools. Mr. Collins received his B.A. in mathematics and philosophy from Herbert H. Lehman College in Bronx, New York, and his M.S. in mathematics education from California State University, Hayward. Mr. Collins is a member of the Association of Supervision and Curriculum Development and the National Council of Teachers of Mathematics, and is active in several professional mathematics organizations at the state level. He is also currently serving on the Teacher Advisory Panel of the *Mathematics Teacher.*

"In this era of educational reform and change, it is good to be part of a program that will set the pace for others to follow. This program integrates the ideas of the NCTM Standards with real tools for the classroom, so that algebra teachers and students can expect success every day."



Gilbert Cuevas is a professor of mathematics education at the University of Miami in Miami, Florida. Dr. Cuevas received his B.A. in mathematics and M.Ed. and Ph.D., both in educational research, from the University of Miami. He also holds a M.A.T. in mathematics from Tulane University. Dr. Cuevas is a member of many mathematics, science, and research associations on the local, state, and national levels and has been an author and editor of several National Council of Teachers of Mathematics (NCTM) publications. He is also a frequent speaker at NCTM conferences, particularly on the topics of equity and mathematics for all students.

Alan G. Foster is a former mathematics teacher and department chairperson at Addison Trail High School in Addison, Illinois. He obtained his B.S. from Illinois State University and his M.A. in mathematics from the University of Illinois. Mr. Foster is a past president of the Illinois Council of Teachers of Mathematics (ICTM) and was a recipient of the ICTM's T.E. Rine Award for Excellence in the Teaching of Mathematics. He also was a recipient of the 1987 Presidential Award for Excellence in the Teaching of Mathematics for Illinois. Mr. Foster was the chairperson of the MATHCOUNTS question writing committee in 1990 and 1991. He frequently speaks and conducts workshops on the topic of cooperative learning.

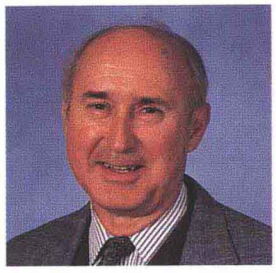
Berchie Gordon is the mathematics/science coordinator for the Northwest Local School District in Cincinnati, Ohio. Dr. Gordon has taught mathematics at every level from junior high school to college. She received her B.S. in mathematics from Emory University in Atlanta, Georgia, her M.A.T. in education from Northwestern University in Evanston, Illinois, and her Ph.D. in curriculum and instruction at the University of Cincinnati. Dr. Gordon has developed and conducted numerous inservice workshops in mathematics and computer applications. She has also served as a consultant for IBM, and has traveled throughout the country making presentations on graphing calculators to teacher groups.

"Using this textbook, you will learn to think mathematically for the 21st century, solve a variety of problems based on real-world applications, and learn the appropriate use of technological devices so you can use them as tools for problem solving."

Beatrice Moore-Harris

BEATRICE MOORE-HARRIS is an educational specialist at the Region IV Education Service Center in Houston, Texas. She is also the Southwest Regional Director of the Benjamin Banneker Association. Ms. Moore-Harris received her B.A. from Prairie View A&M University in Prairie View, Texas. She has also done graduate work there, at Texas Southern University in Houston, Texas, and at Tarleton State University in Stephenville, Texas. Ms. Moore-Harris is a consultant for the National Council of Teachers of Mathematics (NCTM) and serves on the Editorial Board of the NCTM's *Mathematics Teaching in the Middle School.*

"This program will bring algebra to life by engaging you in motivating, challenging, and worthwhile mathematical tasks that mirror real-life situations. Opportunities to use technology, manipulatives, language, and a variety of other tools are an integral part of this program, which allows all students full access to the algebra curriculum."



James N. Rath

JAMES RATH has 30 years of classroom experience in teaching mathematics at every level of the high school curriculum. He is a former mathematics teacher and department chairperson at Darien High School in Darien, Connecticut. Mr. Rath earned his B.A. in philosophy from The Catholic University of America and his M.Ed. and M.A. in mathematics from Boston College. He has also been a Visiting Fellow in the mathematics department at Yale University in New Haven, Connecticut.

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DORA SWART is a mathematics teacher and department chairperson at W.F. West High School in Chehalis, Washington. She received her B.A. in mathematics education at Eastern Washington University in Cheney, Washington, and has done graduate work at Central Washington University in Ellensburg, Washington, and Seattle Pacific University in Seattle, Washington. Ms. Swart is a member of the National Council of Teachers of Mathematics, the Western Washington Mathematics Curriculum Leaders, and the Association of Supervision and Curriculum Development. She has developed and conducted numerous inservices and presentations to teachers in the Pacific Northwest.

"Glencoe's algebra series provides the best opportunity for you to learn algebra well. It explores mathematics through hands-on learning, technology, applications, and connections to the world around us. Mathematics can unlock the door to your success—this series is the key."

Les Winters

LESLIE J. WINTERS is the former secondary mathematics specialist for the Los Angeles Unified School District and is currently supervising student teachers at California State University, Northridge. Mr. Winters received bachelor's degrees in mathematics and secondary education from Pepperdine University and the University of Dayton, and master's degrees from the University of Southern California and Boston College. He is a past president of the California Mathematics Council-Southern Section, and received the 1983 Presidential Award for Excellence in the Teaching of Mathematics and the 1988 George Polya Award for being the Outstanding Mathematics Teacher in the state of California.

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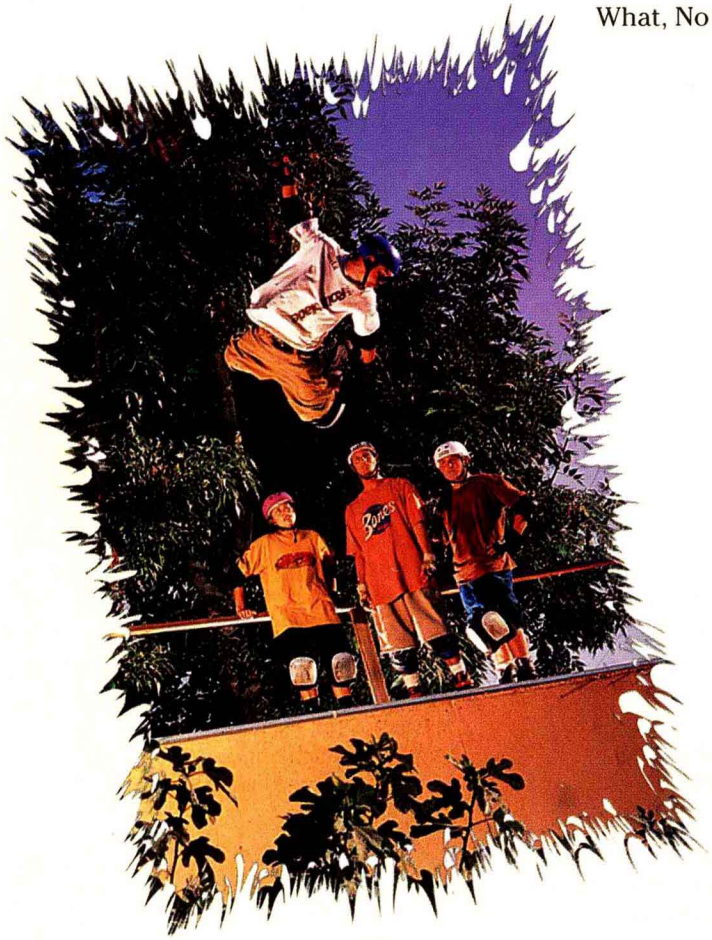

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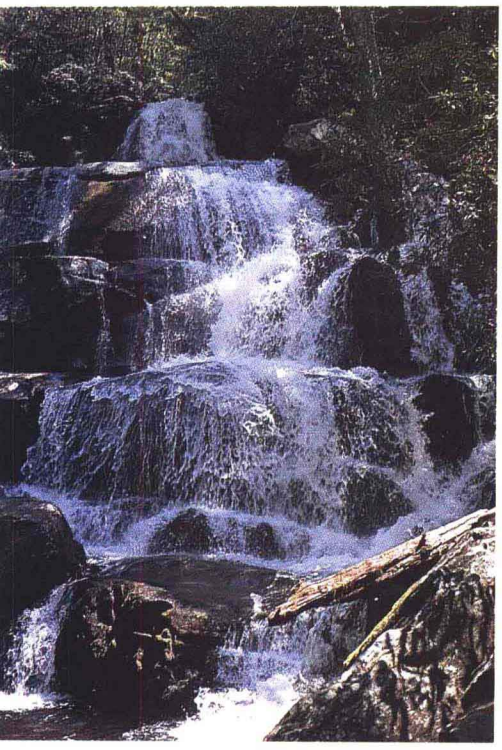

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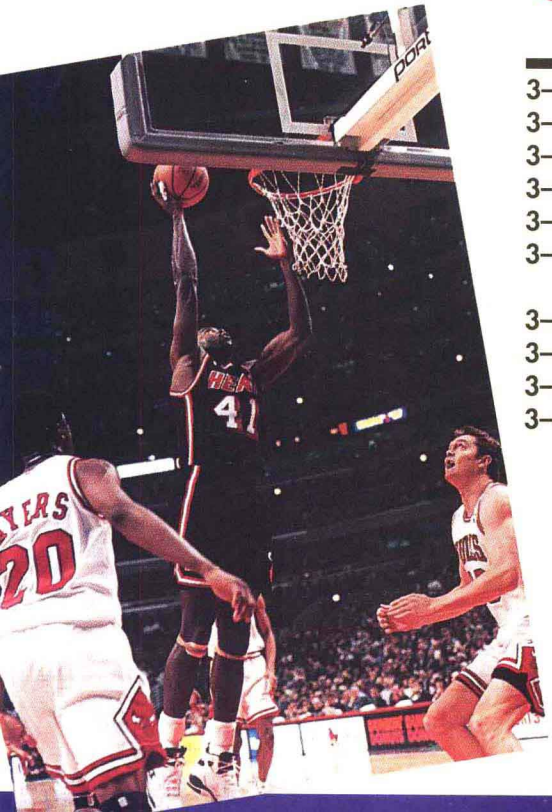


INTEGRATION

Content Integration

What does geometry have to do with algebra? Believe it or not, you can study most math topics from more than one point of view. Here are some examples.

Geometry You'll use your skills with matrices to find the coordinates of the vertices of a parallelogram.
(Lesson 3–3, pages 141 and 143)

Discrete Mathematics ▲
You'll use permutations to find out why certain movies are shown on some theaters but not others. (Lesson 12–2, page 718)

Look Back features refer you to skills and concepts that have been taught earlier in the book.

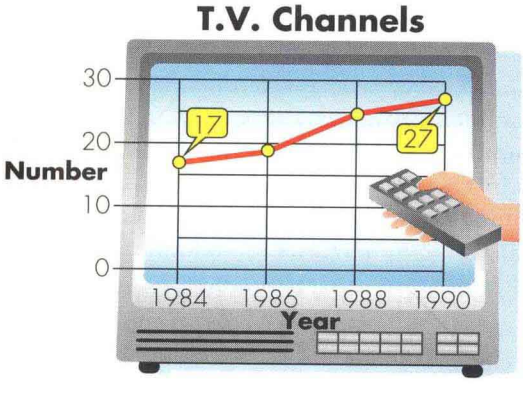
LOOK BACK

You can refer to Lesson 1-5 for information about absolute value equations.

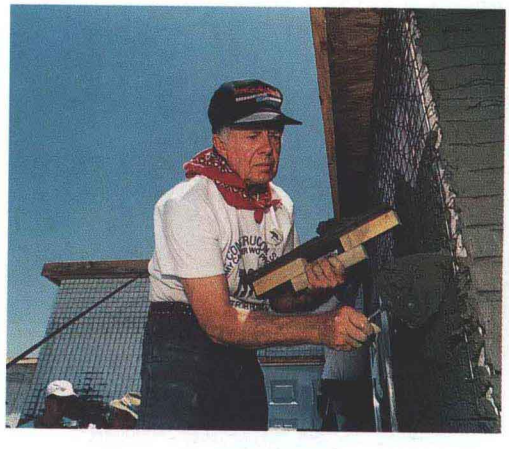
(Lesson 2–6, page 104)

▲ Problem Solving
You'll solve real-world problems by using matrix logic.
(Lesson 4–1, page 187)

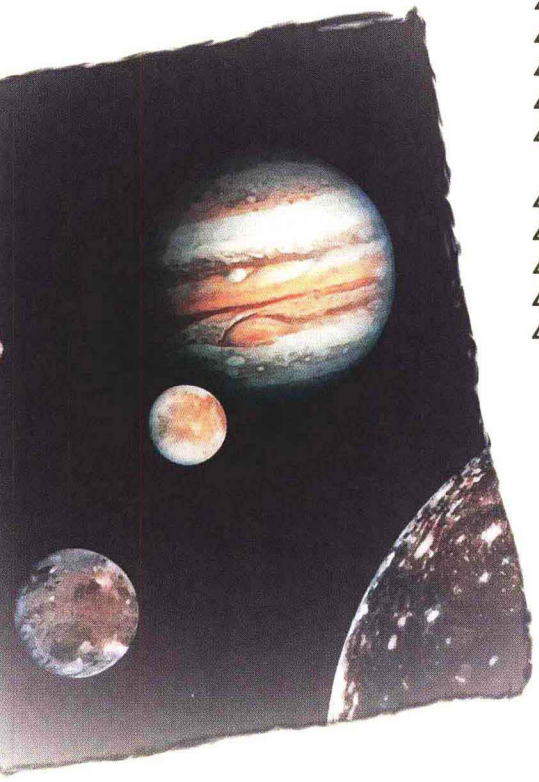
▼ Number Theory You'll learn how complex numbers are used in building houses.
(Lesson 5–9, pages 310 and 313)



◀ Statistics You'll learn how to draw scatter plots and from the scatter plots to determine prediction equations.
(Lesson 2–5, pages 95–100)

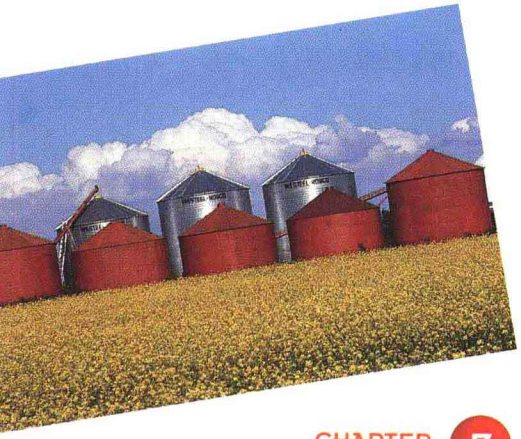


Probability You'll model the behavior of mice by using probability and transition matrices. (Lesson 4–3, page 200)



CHAPTER 4 Using Matrices 182

CHAPTER 5 Exploring Polynomials and Radical Expressions 252



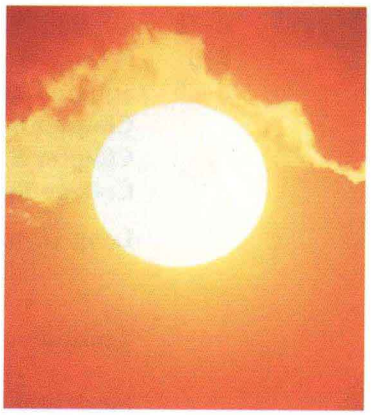
APPLICATIONS

Real-Life Applications

Have you ever wondered if you'll ever actually use math? Every lesson in this book is designed to help show you where and when math is used in the real world. Since you'll explore many interesting topics, we believe you'll discover that math is relevant and exciting. Here are some examples.

Top Five List, FYI, and **Fabulous Firsts** contain interesting facts that enhance the applications.

Auto Racing You'll use racing data from the Indianapolis 500 in your study of the slope of lines. (Lesson 2–3, pages 80–81)



◀ Solar Energy You'll learn how to write an equation of a parabola that models the shape of a mirror used to harness solar energy. (Lesson 7–2, page 418)

Cryptography You'll learn how matrices can be used to encode secret messages. (Lesson 4–5, pages 212–213)

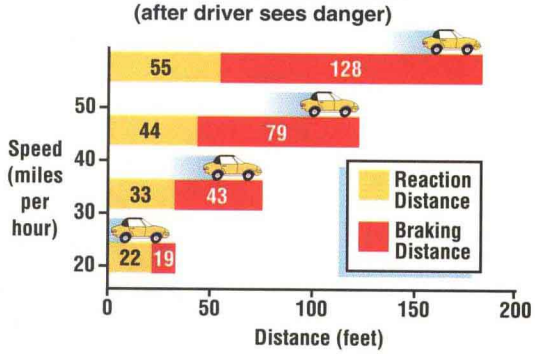
Top Five List

Singles of All Time in the U.S.

1. *White Christmas,* Bing Crosby, 1942
2. *I Want to Hold Your Hand,* Beatles, 1964
3. *Hound Dog/Don't Be Cruel,* Elvis Presley, 1956
4. *It's Now or Never,* Elvis Presley, 1960
5. *I Will Always Love You,* Whitney Houston, 1992

(Lesson 12–2, page 721)

BRAKING DISTANCES
(after driver sees danger)



▲ Law Enforcement You'll evaluate a radical expression that police officers often use at the scene of an auto accident. (Lesson 5–6, page 288)

F Y I

The strongest earthquake in American history measured 8.4 on the Richter scale. It occurred on March 27, 1964 near Prince William Sound, Alaska. It killed 131 people and caused an estimated $750 million in property damage.

(Lesson 7–3, page 423)

World Cultures You'll relate the solution of a number puzzle to the study of functions and their inverses. (Lesson 8–8, page 528)

fabulous **FIRSTS**

Mae Carol Jemison (1956–)

Mae Carol Jemison was the first African-American woman astronaut. She was the computer engineer and physician aboard the space shuttle Endeavor, launched September 12, 1992.

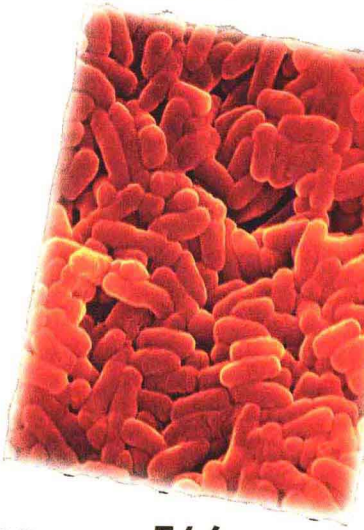
(Lesson 3–4, page 148)

Mathematics and Society

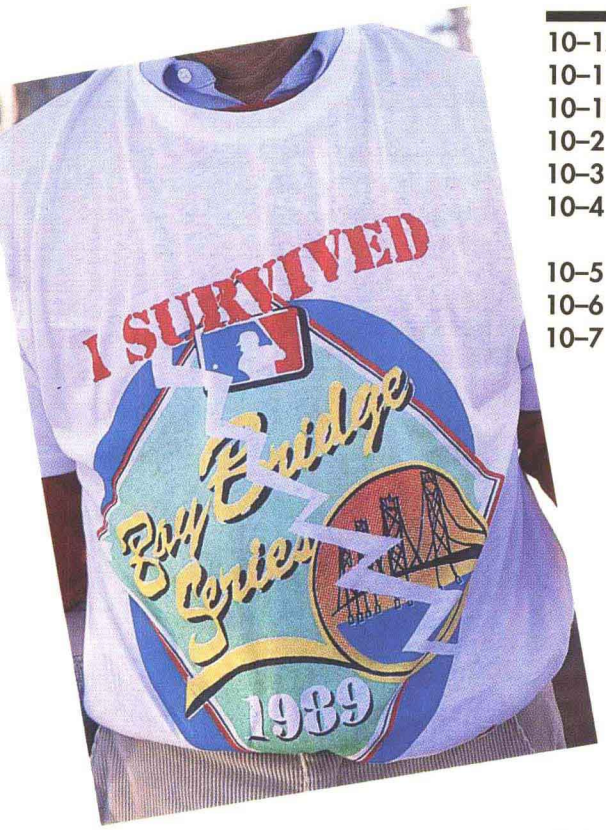
Divine Mathematics

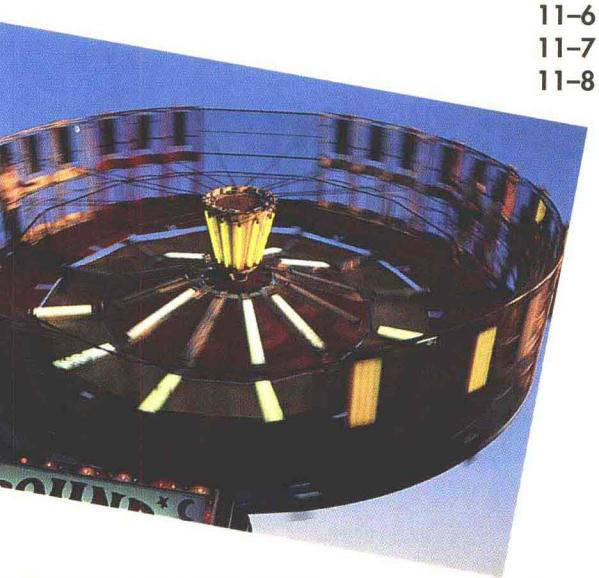
Did you know that the great American poet Henry Wadsworth Longfellow enjoyed math? Reprints of actual articles or works of literature illustrate how mathematics is a part of our society. (Lesson 5–6, page 295)

CHAPTER 8 Exploring Polynomial Functions 476



CHAPTER 9 Exploring Rational Expressions 546





CONNECTIONS

Interdisciplinary Connections

Some people believe that mathematics has very little use in other subjects such as chemistry or music. Of course, this isn't true. In this textbook, mathematics is frequently connected to other subjects that you are studying.

Global Connections features introduce you to a variety of world cultures. ▼

GLOBAL CONNECTIONS

Malaysian foot tennis is a very popular sport in Malaysia and other countries in the Far East. It is played by teams of two using a volleyball-type net. A ball woven from rattan must be kept in the air using only feet, knees, or thighs.

(Lesson 3–3, page 145)

CAREER CHOICES

Engineers apply the principles of science and mathematics to solve practical technical problems. **Electrical engineers** design, develop, test, and supervise the manufacturing of electrical and electronic equipment. They comprise more than one fourth of all engineers. A bachelor's degree in engineering is the minimum requirement.

For more information, contact:

Institute of Electrical and Electronic Engineers
1828 L St. NW, Suite 1202
Washington, DC 20036

(Lesson 5–10, page 321)

◀ **Career Choices** features include information on interesting careers.

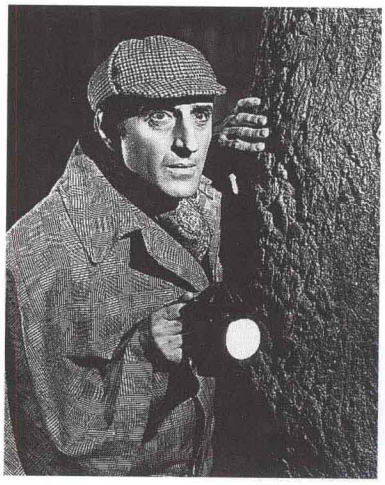
▲ **Biology** You'll model the shape of a deadly frog's leap by using an equation of a parabola. (Lesson 6–6, page 370)

Physics You'll model speed of sound data by using a linear equation. (Lesson 2–2, page 73)

Chemistry You'll solve a problem involving Avogadro's constant. (Lesson 5–1, page 258)

Health You'll evaluate a polynomial that is a model for the number of people who are likely to get the flu. (Lesson 5–3, page 272)

Geography The growth of the population of Arizona is used to introduce mathematical relations. (Lesson 2–1, page 64)



◀ **Literature** You'll solve a Sherlock Holmes mystery. (Lesson 13–1, page 772)

Math Journal exercises give you the opportunity to assess yourself and write about your understanding of key math concepts. (Lesson 3–1, Exercise 6)

MATH JOURNAL

6. **Write** a paragraph explaining how to identify whether the graph of a system of linear equations would be two intersecting lines, two distinct parallel lines, or two coincident lines.