

[Using and Understanding Mathematics: A Quantitative Reasoning Approach](#)

by [Jeffrey O. Bennett](#), [William L. Briggs](#) (3rd ed. 2004).

From Book News, Inc. "Aimed at students majoring in nonmathematical fields--particularly those who feel some anxiety about math--this textbook focuses on the practical applications of mathematics in college, career, and life. Although not remedial in nature, the text is suitable for students with a wide range of mathematical backgrounds. The use of critical thinking skills is emphasized throughout. Topics include, for example, income taxes, statistical reasoning, mathematics and music, voting theory, and exponential population growth. Table of Contents (by Chapter)

1. **Principles of Reasoning.** 1A The Forces of Persuasion, An Overview of Common Fallacies, 1B Propositions: The Building Blocks of Arguments, 1C Arguments: Deductive and Inductive, 1D Analyzing Real Arguments.
2. **Statistical Reasoning.** 2A Fundamentals of Statistics, 2B Should you believe a Statistical Study?, 2C Basic Statistical Graphs, 2D Graphs in the Media, 2E Causal Connections.
3. **Problems Solving Tools.** 3A Using Unit Analysis, 3B Systems of Standardized Units, 3C The Process of Problem Solving.
4. **Numbers in the Real World.** 4A Concepts of Numbers, 4B Uses and Abuses of Percentages, 4C Putting Numbers in Perspective, 4D Dealing With Uncertainty.
5. **Financial Management.** 5A The Power of Compound Interest, 5B Savings Plans (Annuities), 5C Loan Payments, Credit Cards and Mortgages, 5D Income Taxes, 5E Investments.
6. **Modeling our World.** 6A Functions: The Building Blocks of our Mathematical Models, 6B Linear Graphs and Modeling, 6C Formulas as Models
7. **Exponential Growth and Decay.** 7A Exponential Astonishment, 7B Doubling Time and Half Life, 7C Exponential Modeling, 7D Real Population Growth.
8. **Probability: Living with the Odds.** 8A Principles of Counting, 8B Fundamentals of Probability, 8C Combining Probabilities, 8D The Law of Averages, 8E Probability, Risk and Coincidence
9. **Putting Statistics to Work.** 9A Characterizing Data, 9B Linear Regression Models, 9C Statistical Inference, 9D Sample Issues in Statistical Research.
10. **Mathematics and the Arts.** 10A Fundamentals of Geometry, 10B Mathematics and Music, 10C Perspective and Symmetry, 10D Proportion and the Golden Ratio, 10E Fractal Geometry.
11. **Discrete Mathematics in Business and Society.** 11A Network Analysis, 11B The Traveling Salesman Problem, 11C Project Design, 11D Voting. Does the Majority Always Rule?, 11E Theory of Voting.
12. **The Power of Numbers. A few more topics.** 12A Balancing the Federal Budget, 12B Energy: Our Future depends on it, 12C Density and Concentration, 12D Logarithmic Scales: Earthquakes, Sounds and Acids.

[For All Practical Purposes: Mathematical Literacy in Today's World](#) by COMAP (1988, 6th ed. 2002) "COMAP -- the Consortium of Mathematics and Its Applications -- is a group of mathematicians and educators dedicated to the improvement in the teaching of math by demonstrating to students how math is a crucial part of the world around us. They believe that students must cultivate an understanding of math -- develop mathematical literacy -- if they are to succeed in a society that is increasingly process-driven and where problem-solving skills are increasingly important."

- Part I: **Management Science.** Ch 1: Street Networks, Ch 2: Visiting Vertices, Ch 3 Planning & Scheduling, Ch 4: Linear Programming.
- Part 2: **Statistics, The Science of Data.** Ch 5: Producing Data, Ch 6: Exploring Data, Ch 7: Probability, Ch 8: Statistical Inference.
- Part 3: **Coding Information.** Ch 9: Identification Numbers, Ch 10: Transmitting Numbers.
- Part 4: **Social Choice and Decision Making.** Ch 11: Social Choice, The Impossible Dream, Ch 12: Weighted Voting Systems, Ch 13: Fair Division, Ch 14: Apportionment, Ch 15: Game Theory, The Mathematics of Competition.
- Part 5: **On Size and Shape.** Ch 16: Growth and Form, Ch 17: Symmetry and Patterns. Ch 18: Tilings.
- Part 6: **Modeling in Mathematics.** Ch 19: Logic and Modeling, Ch 20: Consumer Finance Models.

[Quantitative Reasoning: Understanding the Mathematical Patterns of Nature](#) by Frederick P. Greenleaf (2nd ed, 2000) To Students: "This is not a math course in the familiar sense." The purpose of this course is "*to show why mathematics is necessarily the language of science.* The math topics we cover are fairly elementary, but our use of them is not. In order to understand how scientists think, you have to learn to think for yourself using the tools that mathematics provides. This course aims to show how one can take real world problems, translate them into mathematics, and solve them." "*Quantitative Reasoning* explores the mathematical tools you will need to understand why mathematics became the language of science." To Instructors: These materials "address the issue of promoting quantitative literacy among the vast majority of college students who do not intend to major in mathematics of the sciences. They were also designed to be a vehicle for enhancing math and science backgrounds of the non-specialist K-12 teachers in training."

1. **Measuring Things in the Real World.** What is Mathematics? Real World Measurements: Dealing With Units, The Art of Making Estimates.
2. **Growth and Decay Phenomena.** Geometric Progressions and Growth, Growth of Money, Present Value, Exponential & Logarithmic Functions.
3. **How Big is the Sun, How Far are the Stars?** Scaling Transformations, Size & Form, Angles & Size of the Earth, Measuring the Inaccessible: Triangulation, Angular Diameter and the Resolving Power of the Eye, Next Steps in the Cosmic Distance Ladder, Method of Std. Candles.
4. **Intro to Probability and Statistics:** Counting Problems, Mathematical Probability, Independent Events, Probability vs. Statistics.
5. Appendix A: Review of Exponent Laws; Basic Use of Calculators. Appendix B: Useful Data & Formulas. Appendix C: Answers to Odd Problems.

[Quantitative and Qualitative Reasoning Skills](#) by James F. Burkhart (2nd ed, 1999)

1. **Understanding Numbers and Magnitudes.** Review of Basic Mathematics, The Number Line, Neat Trick for Adding and Subtracting, Fraction, The Theory of Bases.
2. **Algebraic Skills.** Exponential Notation, Scientific Notation, Significant Figures, Arithmetic Operations with Exponentials, The Associative, Distributive and Commutative Properties, Factoring, Graphing, Another look at Some Functions, Solving for the Unknown.
3. **Statistics in Everyday Life.** An Overview, Making a Picture of the Data, Statistics, The Normal Curve, The Standard Normal Curve, Means Testing.
4. **Fun with Logic.** Arguments, fallacies, Converting Statements to Symbols, Truth Tables.

[Mathematical Thinking & Quantitative Reasoning](#) by Linda R. Sons, Peter J. Nicholls, Joseph B. Stephen (2nd ed. 1998)

[Mathematics for Life: A Foundation Course for Quantitative Literacy](#) by Don Pierce, Ed Wright, Leon Roland (1997)

1. **Literacy.** 1.1 Economic Value, 1.2 Social Value, 1.3 Necessary Skills, 1.4 Course Mechanics, 1.5 Group Dynamics.
2. **Computers & Operating Systems.** 2.1 History, 2.2 Computing and Operating Systems.
3. **Learning and Working in Groups.** 3.1 What is Learning?, 3.2 Components of Knowledge, 3.3 Levels of Learning, 3.4 How We Learn, 3.5 Natural Abilities, 3.6 Thinking Skills, 3.7 Learning in Teams, 3.8 Roles within Teams, 3.9 Team Strategies.
4. **Mathematics: A Historical Approach.** 4.1 Roots of Civilization, 4.2 Numeral Systems, 4.3 Basic Operations, 4.4 Arithmetic, 4.5 Modern Numeral Systems.
5. **Algebra and Spreadsheets.** 5.1 Egyptian Algebra, 5.2 Babylonian Algebra, 5.3 Greek Algebra, 5.4 Indian Algebra, 5.5 Language of Algebra, 5.6 Number Systems, 5.7 Spreadsheets, 5.8 Connecting Algebra to Spreadsheets, 5.9 Graphing Functions using Spreadsheets.
6. **Statistics.** 6.1 History, 6.2 Statistics Today, 6.3 Descriptive Statistics, 6.4 Statistics: Uses and Abuses.
7. **Apportionment.** 7.1 History, 7.2 Basic Terminology, 7.3 Methods of Apportionment.
8. **Functions and Modeling.** 8.1 Basic Units of Measurement, 8.2 Modeling the Heavens, 8.3 Linear Models, 8.4 Exponential Models, 8.5 Relations and Functions, 8.6 Curve Fitting.
9. **Probability and Inferential Statistics.** 9.1 Empirical Probability, 9.2 Games of Chance, 9.3 Binomial Distribution, 9.4 Normal Distribution, 9.6 Sampling Distribution of a Statistic, 9.7 Hypothesis Testing, 9.8 Small Samples.
10. **Internet Essentials.** 10.1 History, 10.2 Electronic Mail, 10.3 Finding Information on the Web, 10.4 Surfing Cyberspace, 10.5 Internet Glossary.

[Quantitative Literacy: Course Manual](#) by Gialamos 4th ed (1999) [Out of Print]

[Quantitative Literacy: Mathematics for Citizenship in the 21st Century](#) by Bennett (1996) [Out of Print]

[Quantitative Reasoning: Mathematics for Citizens in the 21st Century](#) by Bennett, Briggs and Morrow (1996)

[Beyond Problem Solving & Comprehension: An Exploration of Quantitative Reasoning](#) by Whimbey & Lochhead (1984)

[Mathematics for your world: The application of quantitative reasoning to day-to-day problems](#) by Growney (1982)

[Understanding our Quantitative World](#)

by Janet Anderson and Todd Swanson (1st ed. 2004). [Preface and Detailed Table of Contents](#)

The perfect text for a general education mathematics course.

This text is intended for a general education mathematics course. The authors focus on *the topics that they believe students will likely encounter after college*. These topics fall into the *two main themes of functions and statistics*. After the concept of a function is introduced and various representations are explored, specific types of functions (linear, exponential, logarithmic, periodic, power, and multivariable) are investigated. These functions are explored symbolically, graphically, and numerically and are used to describe real world phenomena. On the theme of statistics, the authors focus on different types of statistical graphs and simple descriptive statistics. Linear regression, as well as exponential and power regression, is also introduced. Simple types of probability problems as well as the idea of sampling and confidence intervals are the last topics covered in the text.

The text is written in a conversational tone. Each section begins by setting the mathematics within a context and ends with an application. The questions at the end of each section are called Reading Questions because students are expected to be able to answer most of these after carefully reading the text. Activities and Class Exercises are also found at the end of each section. *These activities are taken from public sources such as newspapers, magazines, and the World Wide Web. Doing these activities demonstrates to students that they can use mathematics as a tool in interpreting quantitative information they encounter outside of the academy*. The course is designed to allow students to spend most of their time in class working in groups on the activities. Rather than having students passively listen, this approach requires students to read, discuss, and apply mathematics. The text assumes that students will have access to some type of technology such as a graphing calculator.

[Table of Contents](#) (by Chapter) 1. Functions, 2. Graphical Representations of Functions, 3. Applications of Data, 4. Describing Data (Mean, Median and Standard Deviation), 5. Displaying Data, 6. Multivariable Functions and Contour Diagrams, 7. Linear Function, 8. Exponential Functions, 9 Exponential Functions, 10. Logarithmic Functions, 11. Periodic Functions, 12. Power Functions, 13 Probability, 14. Random Samples. Appendix: Instructions for the TI-83 Graphing Calculator

[Excursions in Modern Mathematics](#) by Peter Tannenbaum (5th ed., 2003)

Book Description: "This collection of "excursions" into modern mathematics is written in an informal, very readable style, with features that make the material interesting, clear, and easy-to-learn. It centers on an assortment of real-world examples and applications, demonstrating attractive, useful, and modern coverage of liberal arts mathematics. The book consists of four independent parts, each consisting of four chapters— 1) Social Choice, 2) Management Science, 3) Growth and Symmetry, and 4) Statistics. For the study of mathematics."

Preface of 1998 edition, "We have made an concerted effort to introduce the reader to a view of mathematics that is entirely different from the traditional algebra-geometry-trigonometry-finite math curriculum that so many people have learned to dread, fear and occasionally abhor. The notion that general education mathematics must be dull, unrelated to the real world, highly technical and deal mostly with concepts that are historically ancient is totally unfounded. Applicability: The connection between the mathematics presented here and down-to-earth, concrete real-life problems is direct and immediate." Accessibility: We have found Intermediate Algebra to be an appropriate and sufficient prerequisite. Aesthetics: A fundamental objective of this book is to develop an appreciation for the aesthetic elements of mathematics."

[Modern Mathematics](#) by Ruric E. Wheeler, Ed R. Wheeler (2001)

Book News: "Emphasizing problem-solving skills, this introductory textbook contains 14 chapters covering: critical thinking; logic; sets, relations, and functions; whole numbers and numeration; integers and number theory; rational numbers; real numbers; consumer mathematics; probability; statistics; informal geometry; measurement and the metric system; transformations; and algebra, geometry, and graph theory."

[The Mathematical Tourist : New and Updated Snapshots of Modern Mathematics](#) by Ivars Peterson (1998/1988)

[Modern Mathematics for Elementary School Teachers](#) by Ruric E. Wheeler, Ed R. Wheeler (9th ed., 1995)

[Concepts of Modern Mathematics](#) by Ian Stewart (1995)

MATHEMATICS FOR THE LIBERAL ARTS

[Mathematics for Liberal Arts](#) by Richman, Walker, Wisner, Brewer (4th ed., 2002)
Back Cover: "This book communicates the spirit of mathematics by means of simple ideas and problems, emphasizing exploration rather than drill. Its accessible approach encourages appreciation of mathematics and is ideal for readers with weak backgrounds, yet is interesting enough to involve anyone. Counting. Probability. Statistics. Geometry. Logic. Exponential Growth. Averages. Natural Numbers. Changing Bases. Clock Arithmetic. Secret Writing. Infinite Sets. Number Theory Selections. For anyone who needs to learn or review basic math concepts."

[Mathematics: A Liberal Arts Approach](#) by Irving Allen Dodes (2000)

[Mathematics for the Liberal Arts Student](#) by Wisner, Walker Brewer, Richman (1st ed., 1999)

[Mathematics for the Liberal Arts II](#) by Miller, Heeren, et al. (1999)

[Mathematics for the Liberal Arts I](#) by Charles D. Miller, Vern E. Heeren, E. John Hornsby (1999)

[Math for Liberal Arts](#) by Richman (1998)

[Mathematics: One of the Liberal Arts](#) by Thomas J. Miles, Douglas W. Nance (1st ed., 1997) **Book Description:** "This text includes a history of math and covers logic, computing, finance, and geometry. The numerous exercise and problem sets, including writing exercises, provide non-majors with a thorough foundation of mathematics."

[Liberal arts mathematics](#) by Joseph Newmark (1992*)

[A Mathematics Sampler: Topics for the Liberal Arts](#) by William P. Berlinghoff, Kerry E. Grant (3rd ed., 1992*)

[Instructors Guide to Math Liberal Arts](#) by Johnny Lott, Richard Billstein (1986*)

FUNDAMENTAL CONCEPTS OF MATHEMATICS

[Introduction to Mathematical Thinking : The Formation of Concepts in Modern Mathematics](#) (Popular Science) by Friedrich Waismann (2003; reproduction of 1959 edition)

[Foundations and Fundamental Concepts of Mathematics](#) by Howard Whitley Eves (3rd ed., 1997)

* Special Order or Out Of Print/Limited Availability.