

AGAINST ALL ODDS: INSIDE STATISTICS SERIES

Explores statistical processes, stressing data-centered topics rather than the more traditional path from probability to formal inference. Combines state-of-the-art, sequentially animated graphics, on-location footage, and face-to-face interviews. Illustrates statistical principles at work ranging from environmental studies to courtroom cases and weight-loss programs. Hosted by Dr. Teresa Amabile of Brandeis University.

AGAINST ALL ODDS: INSIDE STATISTICS, NO. 1: WHAT IS STATISTICS? & NO. 2: PICTURING DISTRIBUTIONS

58 min; color; c,a
1/2" VHS IC0872,VH

What Is Statistics? provides an overview of the nature and impact of statistics using historical anecdotes and short views of contemporary applications. Explains how this complex discipline has evolved and how it is relied upon to get to the heart of great quantities of information. *Picturing Distributions* presents and interprets the distribution of a single variable. Techniques taught include stemplots, frequency tables, and histograms. Uses examples drawn from meteorology, traffic control, and television programming. *Closed Captioned.* (ANBERG;c1989)
Statistics

AGAINST ALL ODDS: INSIDE STATISTICS, NO. 3: DESCRIBING DISTRIBUTIONS—NUMERICAL DESCRIPTION OF DISTRIBUTIONS & NO. 4: NORMAL DISTRIBUTIONS

58 min; color; c,a
1/2" VHS IC0873,VH

Describing Distributions examines numerical measures of specific aspects of a distribution: mean, median, percentiles, the five-number summary, boxplots, and the standard deviation. Also looks at resistance and its lack. *Normal Distributions* covers density curves as smoothed histograms: mean, median, percentiles for density curves; the normal distributions (general shape, locating the mean and standard deviation, the 68-95-99.7 rule). Uses a series of simplifications to show the progression from histogram to a single normal curve for standardized measurement. *Closed Captioned.* (ANBERG;c1989)
Statistics

AGAINST ALL ODDS: INSIDE STATISTICS, NO. 5: NORMAL CALCULATIONS & NO. 6: TIME SERIES

58 min; color; c,a
1/2" VHS IC0874,VH

Normal Calculations focuses on standardization and calculation of normal relative frequencies from tables and assessing normality by normal quartile plots. Vehicle emission standards and medical studies of cholesterol give practical examples of normal calculations at work. *Time Series* moves from the distribution of a single variable to an examination of change over time. Topics include: statistical control, inspecting time series for trend, seasonal variation, cycles; smoothing by averaging, either over many units per time or over time by running medians. Uses trends in the stock market and studies of sleep cycles to illustrate concepts. *Closed Captioned.* (ANBERG;c1989)
Statistics

AGAINST ALL ODDS: INSIDE STATISTICS, NO. 7: MODELS FOR GROWTH & NO. 8: DESCRIBING RELATIONSHIPS

58 min; color; c,a
1/2" VHS IC0875,VH

Models for Growth focuses on mathematical models for the overall pattern of simple kinds of growth over time. Topics include: linear growth, with review of the geometry of straight lines and an introduction to the least squares idea; exponential growth; and straightening an exponential growth curve by logarithms; prediction and extrapolation. *Describing Relationships* discusses scatterplots and their variations, demonstrating examples from weight-loss programs and manatee protection. Also covers smoothing scatterplots of response vs. explanatory variables by median trace, linear relationships, and least squares regression lines. Comments on outliers and influential observations. *Closed Captioned.* (ANBERG;c1989)
Statistics

AGAINST ALL ODDS: INSIDE STATISTICS, NO. 9: CORRELATION & NO. 10: MULTIDIMENSIONAL DATA ANALYSIS

58 min; color; c,a
1/2" VHS IC0876,VH

Correlation examines correlation and its properties, as well as the relation between correlation and regression. Uses the relationship between a baseball player's salary and his home run statistics. *Multidimensional Data Analysis* shows the impact of computing technology on statistics, especially graphics for displaying multidimensional data. A case study showing the use of computing technology at Bell Communications Research employs techniques discussed in previous programs. *Closed Captioned.* (ANBERG;c1989)
Statistics

AGAINST ALL ODDS: INSIDE STATISTICS, NO. 11: THE QUESTION OF CAUSATION & NO. 12: EXPERIMENTAL DESIGN

58 min; color; c,a
1/2" VHS IC0877,VH

The Question of Causation explores the association between categorical variables displayed in a two-way table; Simpson's paradox; the varied relations among variables that can underlie an observed association; how evidence for causation is obtained. Examines the relationship between smoking and lung cancer. Illustrates Simpson's paradox with a study of admissions data. *Experimental Design* focuses on the advantages of planned data collection over anecdotal evidence or available data. Discusses the idea of an experiment and basic design principles: comparison, randomization, replication. *Closed Captioned.* (ANBERG;c1989)
Statistics

AGAINST ALL ODDS: INSIDE STATISTICS, NO. 13: BLOCKING AND SAMPLING—EXPERIMENTS AND SAMPLES & NO. 14: SAMPLES AND SURVEYS—SAMPLING AND SAMPLING DISTRIBUTIONS

58 min; color; c,a
1/2" VHS IC0878,VH

Blocking and Sampling examines further principles of design: two or more factors and blocking. Introduces sample surveys: the danger of bias and random sampling. Uses a study on strawberries to illustrate randomized block design. *Samples and Surveys* discusses more elaborate sample designs: stratified and multistage designs. Points out the practical difficulties of sampling human populations. Introduces the idea of a sampling distribution. Examination of a 1936 Gallup election poll yields important information about undercoverage. *Closed Captioned.* (ANBERG;c1989)
Statistics

AGAINST ALL ODDS: INSIDE STATISTICS, NO. 15: WHAT IS PROBABILITY? & NO. 16: RANDOM VARIABLES

58 min; color; c,a
1/2" VHS IC0879,VH

What Is Probability? looks at probability as a model for long term relative frequencies or personal assessment of chance. Includes sample space, basic rules of assigning probability and additional rule for disjoint events. *Random Variables* discusses independence and the multiplication rule for independent events. Introduces discrete and continuous random variables. Defines mean and variance of a random variable. Examines how statisticians calculate the probability of a space shuttle accident and predict earthquakes. *Closed Captioned.* (ANBERG;c1989)
Statistics

AGAINST ALL ODDS: INSIDE STATISTICS, NO. 17: BINOMIAL DISTRIBUTIONS & NO. 18: THE SAMPLE MEAN AND CONTROL CHARTS

58 min; color; c,a
1/2" VHS IC0880,VH

Binomial Distributions explores the law of large numbers. Includes addition rules for means and variances of random variables; the binomial distributions for sample counts; and normal approximation to binomial. Shows how the quincunx, a randomizing device at the Boston Museum of Science, is representative of binomial distribution. *The Sample Mean and Control Charts* includes the sampling distribution of the mean, the central limit theorem, and control charts and statistical process control. Roulette and business offer real-life demonstrations of the use of the central limit theorem, control chart monitoring of random variation, creation of x-bar charts, and definitions of control limits and out-of-control limits. *Closed Captioned.* (ANBERG;c1989)
Statistics

AGAINST ALL ODDS: INSIDE STATISTICS, NO. 19: CONFIDENCE INTERVALS & NO. 20: SIGNIFICANCE TESTS

58 min; color; c,a
1/2" VHS IC0881,VH

Confidence Intervals examines the reasoning behind confidence intervals, z-intervals for the mean of a normal distribution, and the behavior of confidence intervals. Shows how the confidence interval is used in blood pressure studies, political and population surveys, and primate research. *Significance Tests* illustrates the reasoning behind significance tests by the simple case of tests on a normal mean with known standard deviation. Includes null and alternative hypotheses and P-values, and cautions on the limited information provided by tests. Illustrates the basic reasoning behind tests of significance through a hiring discrimination case and a study of Shakespeare. *Closed Captioned.* (ANBERG;c1989)
Statistics

AGAINST ALL ODDS: INSIDE STATISTICS, NO. 21: INFERENCE FOR ONE MEAN & NO. 22: COMPARING TWO MEANS

58 min; color; c,a
1/2" VHS IC0882,VH

Inference for One Mean focuses on inference about the mean of a single distribution, with emphasis on paired samples as the most important practical use of these procedures. Discusses the t confidence interval and test. *Comparing Two Means* includes the two-sample t confidence intervals and tests for comparing means; brief mention of the sensitivity of the corresponding procedures for variances to non-normality and their consequent impracticality. *Closed Captioned.* (ANBERG;c1989)
Statistics

AGAINST ALL ODDS: INSIDE STATISTICS, NO. 23: INFERENCE FOR PROPORTIONS & NO. 24: INFERENCE FOR TWO-WAY TABLES

58 min; color; c,a
1/2" VHS IC0883,VH

Inference for Proportions focuses on confidence intervals and tests for a single proportion and for comparing proportions based on paired and independent samples. Shows how the concepts are applied in government estimates on unemployment. *Inference for Two-Way Tables* examines chi-square test for independence and equal distributions in two-way tables. Explains that a two-way table can show the relationship between two categorical variables in a single population or compare the distributions of a single categorical variable in several populations. *Closed Captioned.* (ANBERG;c1989)
Statistics

AGAINST ALL ODDS: INSIDE STATISTICS, NO. 25: INFERENCE FOR RELATIONSHIP & NO. 26: CASE STUDY

58 min; color; c,a
1/2" VHS IC0884,VH

Inference for Relationship explores inference for simple linear regression, emphasizing slope and prediction. Explains how to recognize when prediction is called for and the distinction between predicting a mean response and an individual response. *Case Study* uses a case study to illustrate the major aspects of statistical thinking: planning data collection, collecting and picturing data, drawing inferences from the data, and deciding how confident to be about conclusions. *Closed Captioned.* (ANBERG;c1989)
Statistics

THE ASCENT OF MAN: A PERSONAL VIEW BY J. BRONOWSKI SERIES

Dr. Jacob Bronowski charts humanity's progress from the vantage point of the scientist/philosopher.

THE ASCENT OF MAN: A PERSONAL VIEW BY J. BRONOWSKI, NO. 5: THE MUSIC OF THE SPHERES

55 min; b&w; h,c,a
1/2" VHS CA1325,VH

Illustrates the difference between arithmetic and mathematics. Reconstructs Pythagoras' experiments with a vibrating string and the impact and significance of his discoveries. Reviews contributions of Moorish civilization, with particular regard to perspective and to the full possibilities of symmetry. Discusses Toledo as the intellectual port of entry of Greek (Eastern) ideas into the West. (TIMELIF;p1975)
Mathematics; Science-History; Scientists; World history

ASPECTS OF SYMMETRY

18 min; color; i,j,h,c,a
1/2" VHS IC0898,VH

Introduces symmetry through a corps de ballet who demonstrate reflections, rotations, and translations. An architect, biologist, artist, and physicist assist mathematicians in illustrating multi-disciplinary applications: reflection symmetry in a conch shell, the interior design in a house and in most animals; rotation symmetry in an ancient wine vessel and in present-day industrial products; and translation symmetry in architecture, in plants and animals, and in crystals and compounds. (ROBPETA;IFB;c1982)
Geometry

THE BIRTH OF CALCULUS

25 min; color; h,c
1/2" VHS **IC0923,VH**

History of Mathematics Series - Reviews the independent development of calculus by Isaac Newton in England in 1665-66 and by Gottfried Wilhelm Leibniz in Germany in 1676. Examines the preserved writings of these two mathematicians to show the process of their discoveries and the similarities and differences in their work. Suggests that the publication of their work in the late 1680's provided mathematics with its greatest increase in power since the time of the Greeks. (OPENUN;MEDG;c1986)

Calculus; Mathematics—Study and teaching;
Science—History

THE BIRTH OF MODERN GEOMETRY

25 min; color; h,c
1/2" VHS **IC0922,VH**

History of Mathematics Series - Considers the centrality of the French monk Marin Mersenne to the development of mathematics in the 17th century, with his emphasis on scientific collaboration and the publication of research so that it would be available to others. Also covers the work of Descartes, Desargues, and Pascal, focusing on Descartes' seminal research in modern algebraic geometry, which provided inspiration for Isaac Newton and others in the second half of the 17th century. (OPENUN;MEDG;c1986)

Mathematics—Study and teaching; Science—History

COLLEGE ALGEBRA: IN SIMPLEST TERMS SERIES

COLLEGE ALGEBRA IN SIMPLEST TERMS, NO. 1: AN INTRODUCTION IN TEN PARTS & NO. 2: THE LANGUAGE OF ALGEBRA

60 min; color; c,a
1/2" VHS **IC0906,VH**

An Introduction in Ten Parts introduces several mathematical themes and emphasizes why college algebra is important in today's world. The Language of Algebra examines the vocabulary of mathematics, properties of the real number system, and basic axioms and theorems of college algebra. Closed Captioned. (COMAP;CHEDANP;ANBERG;c1990)

Algebra

COLLEGE ALGEBRA IN SIMPLEST TERMS, NO. 3: EXPONENTS AND RADICALS & NO. 4: FACTORING POLYNOMIALS

60 min; color; c,a
1/2" VHS **IC0907,VH**

Exponents and Radicals explores square roots and their applications to positive numbers and the Pythagorean theorem. Properties and equations of rational numbers in general are also discussed. Factoring Polynomials discusses the disruptive property and how it is used to factor common monomial factors, the difference of two squares, trinomials as a product of two binomials, sum and difference of two cubes, and regrouping of terms. Closed Captioned. (COMAP;CHEDANP;ANBERG;c1990)

Algebra

COLLEGE ALGEBRA IN SIMPLEST TERMS, NO. 5: LINEAR EQUATIONS & NO. 6: COMPLEX NUMBERS

60 min; color; c,a
1/2" VHS **IC0908,VH**

Linear Equations covers how solutions are obtained, what they mean, and how to check them using one unknown. Complex Numbers focuses on complex numbers and their use in basic operations and quadratic equations. Closed Captioned. (COMAP;CHEDANP;ANBERG;c1990)

Algebra

COLLEGE ALGEBRA IN SIMPLEST TERMS, NO. 9: ABSOLUTE VALUE & NO. 10: LINEAR RELATIONS

60 min; color; c,a
1/2" VHS **IC0910,VH**

Absolute Value, the concept is defined in detail, enabling students to use absolute value in equations and inequalities. *Linear Relations* linear equations are used to develop and give information about two quantities, their applications to the slope of a line are also shown. *Closed Captioned.* (COMAP;CHEDANP;ANBERG;c1991)

Algebra

COLLEGE ALGEBRA IN SIMPLEST TERMS, NO. 11: CIRCLE AND PARABOLA & NO. 12: ELLIPSES AND HYPERBOLAS

60 min; color; c,a
1/2" VHS **IC0911,VH**

Circle and Parabola uses conic sections to take a detailed look at circles and parabolas. Terminology and formulas for equations are discussed for each. *Ellipses and Hyperbolas* discusses the equations for ellipses and hyperbolas, and demonstrates graphically how to develop the equation from each definition. *Closed Captioned.* (COMAP;CHEDANP;ANBERG;c1990)

Algebra

COLLEGE ALGEBRA IN SIMPLEST TERMS, NO. 13: FUNCTIONS & NO. 14: COMPOSITE AND INVERSE FUNCTIONS

60 min; color; c,a
1/2" VHS **IC0912,VH**

In Functions defines a function, develops an equation from real situations, and discusses domain and range. Cryptographic functions such as Caesar's code, and DNA Codes are explored. *Composite and Inverse Functions* graphics are used to introduce composites and inverses of functions as applied to cost and production level. *Closed Captioned.* (COMAP;CHEDANP;ANBERG;c1991)

Algebra

COLLEGE ALGEBRA IN SIMPLEST TERMS, NO. 15: VARIATION & NO. 16: POLYNOMIAL FUNCTIONS

60 min; color; c,a
1/2" VHS **IC0913,VH**

Variation covers the many types of variations, including direct, inverse, and joint variation with applications from chemistry, physics, astronomy, and the food industry. *Polynomial Functions* shows how to recognize, graph, and determine all of the intercepts of a polynomial function are applied to the areas of banking, medicine, and energy production. *Closed Captioned.* (COMAP;CHEDANP;ANBERG;c1991)

Algebra

COLLEGE ALGEBRA IN SIMPLEST TERMS, NO. 17: RATIONAL FUNCTIONS & NO. 18: EXPONENTIAL FUNCTIONS

60 min; color; c,a
1/2" VHS **IC0914,VH**

Rational Functions develops the properties of rational functions by investigating several graphs to determine the intercepts, symmetry, and asymptotes applications demonstrate double time for simple interest, average cost function, and tax rates. *Exponential Functions* covers graphing and developing the equation for an exponential function. Applications include bacterial growth, population growth, and radioactive decay. *Closed Captioned.* (COMAP;CHEDANP;ANBERG;c1991)

Algebra

Mathematics

COLLEGE ALGEBRA IN SIMPLEST TERMS, NO. 19: LOGARITHMIC FUNCTIONS & NO. 20: SYSTEMS OF EQUATIONS

60 min; b&w; c,a
1/2" VHS IC0915,VH

In *Logarithmic Functions* understanding the logarithmic relationship, the use of logarithmic properties, and the handling of a scientific calculator are addressed. How radiocarbon dating and the Richter scale depend on the properties of logarithms is explained. In *Systems of Equations* elimination and substitution methods are used to solve problems with systems of studying linear and nonlinear equations. Their applications to supply and demand, and cost and revenue are demonstrated. *Closed Captioned.* (COMAP;CHEDANP;ANBERG;c1991)

Algebra

COLLEGE ALGEBRA IN SIMPLEST TERMS, NO. 21: SYSTEMS OF LINEAR INEQUALITIES & NO. 22: ARITHMETIC SEQUENCES AND SERIES

60 min; color; c,a
1/2" VHS IC0916,VH

Systems of Linear Inequalities sets up a problem, finds a solution, develops linear inequalities, graphs these solutions and forms a region of feasible solutions. *Arithmetic Sequences and Series* uses applications including linear depreciation and fixed annual raise, tells how to develop the basic properties and formulas for arithmetic sequences. *Closed Captioned.* (COMAP;CHEDANP;ANBERG;c1991)

Algebra

COLLEGE ALGEBRA IN SIMPLEST TERMS, NO. 23: GEOMETRIC SEQUENCES AND SERIES & NO. 24: MATHEMATICAL INDUCTION

60 min; color; c,a
1/2" VHS IC0917,VH

Geometric Sequences and Series focuses on these concepts and determining the sum of their functions. Determining the size of retirement savings illustrates their use. *Mathematical Induction* exhibits special cases, looks at patterns of numbers that develop, relates the patterns of Pascal's triangle and factorials, and develops the general form of this theorem. *Closed Captioned.* (COMAP;CHEDANP;ANBERG;c1991)

Algebra

COLLEGE ALGEBRA IN SIMPLEST TERMS, NO. 25: PERMUTATIONS AND COMBINATIONS & NO. 26: PROBABILITY

60 min; color; c,a
1/2" VHS IC0918,VH

Permutations and Combinations gives techniques for counting the number of ways that collections of objects can be arranged ordered, and combined are demonstrated. *Probability*, beginning with games of chance, shows how the subject of probability has evolved to include application in such areas as genetics, social science, and medicine. *Closed Captioned.* (COMAP;CHEDANP;ANBERG;c1991)

Algebra; Probabilities

COMPUTER SCIENCE (1)–OVERVIEW

30 min; color; c,a
1/2" VHS IC0865,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Presents an historical perspective of the essential role math has played in the development of the computer. *Closed Captioned.* (COMAP;ANBERG;p1985)

Computers; Mathematics

COMPUTER SCIENCE (2)–RULES OF THE GAME: ALGORITHMS

30 min; color; c,a
1/2" VHS IC0866,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Defines algorithms and discusses how to analyze, choose, and apply the best one for a given problem. Explores two basic sorting algorithms—the insertion sort and the merge sort. *Closed Captioned.* (COMAP;ANBERG;p1985)

Computers; Mathematics

COMPUTER SCIENCE (3)–COUNTING BY TWOS: NUMERICAL REPRESENTATION

30 min; color; c,a
1/2" VHS IC0867,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Discusses the relationship between mathematics and the coding and encoding of information for computers. Explains how the binary system is used in computer information storage, processing, and retrieval. Illustrates the difference between analog and digital information systems. *Closed Captioned.* (COMAP;ANBERG;p1985)

Information storage and retrieval; Mathematics

COMPUTER SCIENCE (4)–CREATING A CODE: ENCODING INFORMATION

30 min; color; c,a
1/2" VHS IC0868,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Explains that, since the possible encoding of computer information is endless, choosing the best code depends on a careful analysis of the computations required and the efficiency of the code. Discusses the efficiency and usefulness of ASCII for text processing, the major steps of the Laplacian pyramid, the usefulness and advantages of the Hamming code, and the concept of pseudo-random number generation and the role it plays in the encryption algorithm. *Closed Captioned.* (COMAP;ANBERG;p1985)

Computers; Information storage and retrieval; Mathematics

CRITICAL THINKING AND MATHEMATICAL PROBLEM SOLVING

59 min; color; c,a
1/2" VHS EC2629,VH

Critical Thinking Forum Series - Shows Dr. Richard Paul and Alan Schoenfeld, a math educator from the University of California, as they discuss the need for critical thinking in order to apply math to real-world problems effectively. Argues that usually students learn to memorize formulas and expect quick answers rather than to understand mathematical principles. Examines ways in which critical thinking methods can be used to teach mathematical principles comprehensively rather than relying on memorization. (PBSALS;FOUNCRT;c1990)

Critical thinking; Education—Aims and objectives; Mathematics—Study and teaching; Philosophy (CPI)

CRITICAL THINKING FORUM SERIES

CRITICAL THINKING AND MATHEMATICAL
PROBLEM SOLVING [EC2629]

DISCOVERING ART SERIES

For descriptions see individual titles:
DISCOVERING FORM IN ART (REVISED
VERSION) [RC1136]

Mathematics

DISCOVERING FORM IN ART (REVISED VERSION)

21 min; color; p,i,j,h,c,a
1/2" VHS **RC1136,VH**

Discovering Art Series - Illustrates the five basic three-dimensional forms in art—the sphere, cube, pyramid, cylinder, and cone. Explains that form is a structure of planes or surfaces which join to create distinctive volumes and that distortions of the basic forms are useful to create the impressions of force and motion. Points out the relation between pyramid and cone and cone and cylinder. Suggests educating the eye to see and discover form in the environment. (BURP;BFA;c1979)

Art—Analysis, appreciation; Design; Mathematics

DONALD IN MATHMAGIC LAND

28 min; color; j,h,c,a
1/2" VHS **IC0309,VH**

Uses cartoon characters to illustrate the mathematical basis of music, architecture, sculpture, and painting. Donald Duck visits Mathmagic Land where the Spirit of Adventure conducts him on a tour. First is seen Ancient Greece where Pythagoras, father of mathematics and music, discovers mathematical ratios in the musical scale. Donald's other trips emphasize the mathematical relationships in forms in nature, games, and art. Scientific progress is shown to be based upon mathematical concepts, and future achievements must also be developed by those with training in mathematics. (DISNEY;c1960)

Mathematics

DRAGON FOLD...AND OTHER WAYS TO FILL SPACE

7 min; color; j,h,c
1/2" VHS **IC0900,VH**

Solves the dilemma of filling a space with a single, simple curve that includes every point in space, is constructed in a single unit of time, and moves from generation to generation in one ordered step. Uses computer animation to illustrate inefficiency of filling space with a tessellation of crosses. Proceeds to fill space with replication of squares. Demonstrates how manipulation of Sierpinski Curves and Dragon Curves can produce a curve that includes every point in space. Uses captions instead of narration to introduce different portions of the film. Accompanies the visuals with contemporary music. (CORNBK;IFB;c1979)

Geometry

THE EMERGENCE OF GREEK MATHEMATICS

24 min; color; h,c
1/2" VHS **IC0920,VH**

History of Mathematics Series - Follows the development of mathematics in classical Greek culture between the periods of 750 and 300 B.C., as represented in the 13 volumes of Euclid's *Elements*. These treatises, which reflect the ideas and work of other great Greek mathematicians such as Thales, Eudoxus, Pythagoras, Hippocrates, and Theaetetus, form the basis for the notion of logical proof. The collection and presentation of all this varied mathematical knowledge in a coherent and logical form is one of the great intellectual and educational triumphs of ancient times, and Euclid's work is still used today. (OPENUN;MEDG;c1987)

Geometry; Mathematics; Mathematics—Study and teaching; Science—History

FOR ALL PRACTICAL PURPOSES: INTRODUCTION TO CONTEMPORARY MATHEMATICS—CONCLUSION

30 min; color; c,a
1/2" VHS **IC0870,VH**

For All Practical Purposes: Introduction to Contemporary Mathematics series - Stresses the purposes as well as the importance of understanding mathematics. Emphasizes that a working knowledge of math is crucial to life in today's society and illustrates varied applications through clips from the five topic clusters in the series. *Closed Captioned.* (COMAP;ANBERG;p1985)

Mathematics

FOR ALL PRACTICAL PURPOSES: INTRODUCTION TO CONTEMPORARY MATHEMATICS SERIES

Each program incorporates innovative techniques, such as computer-generated graphics, to present the dynamics of mathematical processes, enabling viewers to see quantities and dimensions progressively changing through time. *For descriptions see individual titles.*

STATISTICS (1)—OVERVIEW [IC0850]

STATISTICS (2)—BEHIND THE HEADLINES:

COLLECTING DATA [IC0851]

STATISTICS (3)—PICTURE THIS: ORGANIZING DATA [IC0852]

STATISTICS (4)—PLACE YOUR BETS:

PROBABILITY [IC0853]

STATISTICS (5)—CONFIDENT CONCLUSIONS:

STATISTICAL INFERENCE [IC0854]

SOCIAL CHOICE (1)—OVERVIEW [IC0855]

SOCIAL CHOICE (2)—THE IMPOSSIBLE

DREAM: ELECTION THEORY [IC0856]

SOCIAL CHOICE (3)—MORE EQUAL THAN

OTHERS: WEIGHTED VOTING [IC0857]

SOCIAL CHOICE (4)—ZERO SUM GAMES:

GAMES OF CONFLICT [IC0858]

SOCIAL CHOICE (5)—PRISONER'S DILEMMA:

GAMES OF PARTIAL CONFLICT [IC0859]

ON SIZE AND SHAPE (1)—OVERVIEW [IC0860]

ON SIZE AND SHAPE (2)—HOW BIG IS TOO

BIG: SCALE AND FORM [IC0861]

ON SIZE AND SHAPE (3)—IT GROWS AND

GROWS: POPULATIONS [IC0862]

ON SIZE AND SHAPE (4)—STAND UP CONIC:

CONIC SECTIONS [IC0863]

ON SIZE AND SHAPE (5)—IT STARTED IN

GREECE: MEASUREMENT [IC0864]

COMPUTER SCIENCE (1)—OVERVIEW [IC0865]

COMPUTER SCIENCE (2)—RULES OF THE

GAME: ALGORITHMS [IC0866]

COMPUTER SCIENCE (3)—COUNTING BY

TWOS: NUMERICAL REPRESENTATION

[IC0867]

COMPUTER SCIENCE (4)—CREATING A CODE:

ENCODING INFORMATION [IC0868]

FOR ALL PRACTICAL PURPOSES:

INTRODUCTION TO CONTEMPORARY

MATHEMATICS—CONCLUSION [IC0870]

HISTORY OF MATHEMATICS SERIES

THE BIRTH OF CALCULUS [IC0923]

THE BIRTH OF MODERN GEOMETRY [IC0922]

THE EMERGENCE OF GREEK MATHEMATICS

[IC0920]

THE LIBERATION OF ALGEBRA [IC0924]

THE VERNACULAR TRADITION [IC0921]

Mathematics

INFERENCE STATISTICS: HYPOTHESIS TESTING—RATS, ROBOTS, AND SKATES

27 min; color; h,c

1/2" VHS IC0768,VH

Presents, in three humorous situations, basic principles for testing hypotheses. Explains the importance of random sampling and procedures to overcome variability in the outcomes. Demonstrates, through application, the concept of statistical significance and Type I and Type II errors. Summarizes the basic principles presented through a "news program" format. (WILEY;MEDG;c1975)

Statistics

INFERENCE STATISTICS: SAMPLING AND ESTIMATION SHAVES \$122,000,000!

20 min; color; h,c

1/2" VHS IC0769,VH

Presents a situation in which the use of statistics saves a company from promoting a product that the public would not buy to introduce basic concepts in statistics. Explains the concepts and applications of defining a population, selecting a random sample, using tables of random numbers, and conducting a survey. Demonstrates the inference of interval estimates of the population from the statistics of the sample. Concludes with a familiar, amusing twist. (WILEY;MEDG;c1975)

Statistics

THE LIBERATION OF ALGEBRA

25 min; color; h,c

1/2" VHS IC0924,VH

History of Mathematics Series - Reviews the work of William Rowan Hamilton in Ireland in the mid 19th century, who developed the first noncommutative algebra, which involved complex numbers not based on arithmetic. Also considers the work of George Boole, who worked out a calculus of logic and an algebraic system of set theory; Boolean algebra was later used by Claude Shannon to develop the theory underlying modern computers. (OPENUN;MEDG;c1987)

Mathematics; Mathematics—Study and teaching; Science—History

MATH READINESS: THIS ONE WITH THAT ONE (ONE-TO-ONE MATCHING)

10 min; color; p

1/2" VHS IC0735,VH

Illustrates the concept of one-to-one correspondence in an animated tale about Fred, the world's unluckiest fisherman, as he struggles to match lines, bait, and fish. Shows Fred wondering how many fishing hooks and baits are needed to catch one, two, or three fish. (CORT;NLA;c1975)

Set theory

MATH READINESS: WHICH GO TOGETHER? (SET BUILDING)

10 min; color; k,p

1/2" VHS IC0737,VH

Teaches geometric shapes and the concept of different and alike in an animated tale about a rag doll who leads a child's block through a series of adventures. Includes groups of animated squares, circles, and triangles which the rag doll commands into a circular area and, each time, one block which is different "mistakenly" comes along. Arranges the shapes into a train, boat, and airplane, with the rag doll changing the formation whenever a difficulty is encountered. (CORT;NLA;c1975)

Set theory

MATHS ON THE STREET

24 min; color; c,a

1/2" VHS IC0919,VH

Explores a psychologist's research into the remarkable mathematical abilities of young Brazilian street vendors who, despite their acuity on the street, fail to perform even the simplest math skills taught in the classroom. Questions why these children fail in the classroom and applies the research findings to practical classroom techniques based on two important premises: teachers' expectations are critical and meaning has to be brought into the math classroom. (BBC;OPENUN;MEDG;r1992)

Educational psychology; Mathematics—Study and teaching

ON SIZE AND SHAPE (1)—OVERVIEW

30 min; color; c,a

1/2" VHS IC0860,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Explores and analyzes geometry and its relationship to beauty in nature and art, with examples of geometric applications as varied as da Vinci's "window," used to record proper linear perspective in drawing, and symmetry-based classification systems used in archeology. Discusses the Fibonacci sequence and fractals, and their importance in many disciplines, including meteorology and economics. Demonstrates spectacular computer graphics based on the use of techniques involving fractals. Includes interviews with mathematicians Benoit Mandelbrot and H. S. M. Coxeter. *Closed Captioned.* (COMAP;ANBERG;p1985)

Design; Geometry

ON SIZE AND SHAPE (2)—HOW BIG IS TOO BIG: SCALE AND FORM

30 min; color; c,a

1/2" VHS IC0861,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Examines problems dealing with geometric similarity and scale. Explains the tensile strength of building materials and their relationship to maximum size of a structure and discusses changes in size and proportion. Illustrates tiling patterns, two-dimensional Penrose Tilings, and their importance to crystallography. *Closed Captioned.* (COMAP;ANBERG;p1985)

Building; Crystals; Geometry

ON SIZE AND SHAPE (3)—IT GROWS AND GROWS: POPULATIONS

30 min; color; c,a

1/2" VHS IC0862,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Explains population growth using examples ranging from money in the bank to fish in the sea. Explains the mathematics of determining harvesting rates to maintain sustainable yields. Emphasizes the importance of determining population size and the rise and fall of components of the population. Concludes by examining demography and population pyramids. *Closed Captioned.* (COMAP;ANBERG;p1985)

Geometry; Population

ON SIZE AND SHAPE (4)—STAND UP CONIC: CONIC SECTIONS

30 min; color; c,a

1/2" VHS IC0863,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Explains the importance of understanding conic sections through examples of their uses including wing design on planes, telescopic lenses, suspension bridges, and headlights. *Closed Captioned.* (COMAP;ANBERG;p1985)

Geometry

Mathematics

ON SIZE AND SHAPE (5)—IT STARTED IN GREECE: MEASUREMENT

30 min; color; c,a

1/2" VHS IC0864,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Highlights Euclidean geometry, discussing congruence of triangles, the Pythagorean theorem, and similarity. Introduces hyperbolic and elliptic non-Euclidean models. *Closed Captioned.* (COMAP; ANBERG;c1985)

Geometry

POWERS OF TEN

8 min; color; h,c,a

1/2" VHS FC1394,VH

Uses split screen animation and narration to illustrate size, distance, and time comparisons of objects in the universe. Opens with the picture of a man at a picnic site and zooms out at a rate of acceleration such that every ten seconds ten times the preceding distance is traveled until an outer limit is reached. Collapses the zoom back to the man and then goes through his skin until the smallest known element in the nucleus of a carbon atom is reached. (EAMR;PYRAMID;p1968)

Film study; Measurement

QUANTITATIVE LITERACY IN THE SCHOOLS

26 min; color; c,a

1/2" VHS IC0871,VH

Acquaints administrators and teachers with the philosophy and style of the Quantitative Literacy Project. Emphasizes experience with real data, simulations of real events, and discussions of possible interpretations of data. Shows teachers presenting key concepts in actual classroom settings and discussing how successful this approach has been for them. *Closed Captioned.* (NCTM;ASA;c1986)

Mathematics—Study and teaching; Statistics

SOCIAL CHOICE (1)—OVERVIEW

30 min; color; c,a

1/2" VHS IC0855,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Shows how situations in which we are required to make individual decisions (to park or not to park in a restricted zone) and group decisions (management-labor contract bargaining) can be made quantifiable with mathematics. Uses game theory, an important 20th-century development, to analyze issues surrounding individual choices. Analyzes collective choice through the use of election theory, weighted voting, and apportionment. *Closed Captioned.* (COMAP;ANBERG;p1985)

Decision-making; Elections; Mathematics

SOCIAL CHOICE (2)—THE IMPOSSIBLE DREAM: ELECTION THEORY

30 min; color; c,a

1/2" VHS IC0856,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Explains five voting methods—plurality, plurality with runoff, Condorcet, Borda, and sequential runoff—as well as Nobelist Kenneth Arrow's theorem on voting theory. *Closed Captioned.* (COMAP; ANBERG;p1985)

Elections; Mathematics

SOCIAL CHOICE (3)—MORE EQUAL THAN OTHERS: WEIGHTED VOTING

30 min; color; c,a

1/2" VHS IC0857,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Discusses fair representation issues and describes fair division and apportionment problems. Explains weighted voting and winning coalitions. *Closed Captioned.* (COMAP;ANBERG;p1985)

Elections; Mathematics

SOCIAL CHOICE (4)—ZERO SUM GAMES: GAMES OF CONFLICT

30 min; color; c,a

1/2" VHS IC0858,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Defines game theory as strategies employed by parties with conflicting needs. Describes optimal strategies, both pure and mixed, mathematically and explains game matrices. *Closed Captioned.* (COMAP;ANBERG;p1985)

Decision-making; Mathematics

SOCIAL CHOICE (5)—PRISONER'S DILEMMA: GAMES OF PARTIAL CONFLICT

30 min; color; c,a

1/2" VHS IC0859,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Shows social situations which highlight decision-making strategies in games of partial conflict. Explains prisoner's dilemma and games of "chicken" in the broader context of corporate takeovers, labor relations, etc. *Closed Captioned.* (COMAP; ANBERG;p1985)

Decision-making; Mathematics

STATISTICS (1)—OVERVIEW

30 min; color; c,a

1/2" VHS IC0850,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Introduces the major themes of statistics—collecting data, organizing and picturing data, and drawing conclusions from data. Explains bias and randomness by looking at formal and informal public opinion polls and by examining a major medical experiment. Illustrates inference during a tour through a major telephone manufacturing plant. Visits an Atlantic City casino to show how even games of chance can be known with near certainty. *Closed Captioned.* (COMAP; ANBERG;p1985)

Science—Methodology; Statistics

STATISTICS (2)—BEHIND THE HEADLINES: COLLECTING DATA

30 min; color; c,a

1/2" VHS IC0851,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Takes a deeper look at data collection and explores how surveys and public opinion polls actually work. Explains the difference between a survey and an experiment, pointing out that random sampling is employed to eliminate bias and that experiments are controlled to discover cause-and-effect relationships. Illustrates randomized comparative experiments and the use of Latin square designs for statistical data gathering. *Closed Captioned.* (COMAP; ANBERG;p1985)

Science—Methodology; Statistics

STATISTICS (3)—PICTURE THIS: ORGANIZING DATA

30 min; color; c,a

1/2" VHS IC0852,VH

For All Practical Purposes: Introduction to Contemporary Mathematics series - Focuses on exploratory data analysis—the art of looking for unanticipated patterns in data. Uses baseball batting averages to illustrate means, medians, quartiles, outliers, and the use of histograms in a one-variable situation. Explains the use of scatterplots and box plots in two-variable situations with examples, including the biased 1970 draft lottery. *Closed Captioned.* (COMAP;ANBERG;p1985)

Science—Methodology; Statistics

Mathematics

STATISTICS (4)–PLACE YOUR BETS: PROBABILITY

30 min; color; c,a

1/2" VHS **IC0853,VH**

For All Practical Purposes: Introduction to Contemporary Mathematics series - Looks at the operation of a gambling casino to analyze how random phenomena that have unpredictable outcomes nevertheless follow a predictable pattern after many repetitions. Introduces the concepts of sampling distribution, normal curves, standard deviations, and expected value. Uses the Central Limit Theorem to solve the casino problem. *Closed Captioned.* (COMAP; ANBERG;p1985)

Probabilities; Statistics

STATISTICS (5)–CONFIDENT CONCLUSIONS: STATISTICAL INFERENCE

30 min; color; c,a

1/2" VHS **IC0854,VH**

For All Practical Purposes: Introduction to Contemporary Mathematics series - Focuses on the concept of confidence intervals, defining what they are, and demonstrating how to find a 95% confidence interval. Explains that formal statistical inference, as opposed to exploratory data analysis, is based on calculations of probability. Discusses how confidence in statistical conclusions is related to sample size and shows how to analyze a sampling distribution. Uses quality control at an AT & T plant as the major example. *Closed Captioned.* (ANBERG;p1985)

Science–Methodology; Statistics

STATISTICS AT A GLANCE

27 min; color; h,c

1/2" VHS **IC0725,VH**

Explains, using computer graphics, that descriptive statistics is a method for organizing and summarizing data so that the data can be understood quickly and expressed in precise, accurate terms. Illustrates the use of measures of central tendency, such as mean, median, and mode, in a frequency distribution. Demonstrates the use of variability, standard deviation, Z-scores, percentile rank, and correlation as they relate to frequency distribution. (WILEY;MEDG;c1972)

Computer animation; Statistics

SYMMETRY

11 min; color; i,j,h,c,a

1/2" VHS **IC0899,VH**

Uses animated, semi-abstract figures set to music to show reflection, rotation, and translation. Includes multi-fold rotation in several axes, multiple reflection in several planes, and translation in at least two directions. (STUG; IFB;c1972)

Geometry

TECHNOLOGY IN THE CLASSROOM: INTERVIEW WITH FRED CHEESMAN & ALEX WEISS

50 min; color; c,a

1/2" VHS **EC2718,VH**

Presents two interviews explaining how professors can use computers and other technology in the classroom to teach statistics more effectively. Discusses positive and negative aspects of using the equipment and working with Instructional Support Services and the computing center. Offers practical advice on ways the program can be improved. (IUCOAS;INUISS;c1994)

Mathematics–Study and teaching; Technology;
Universities and colleges

TRANSITION TO CHAOS: THE ORBIT DIAGRAM AND THE MANDELBROT SET

65 min; color; c,a

1/2" VHS **FC1652,VH**

Describes, in detail, the physical characteristics of both the orbit diagram and the Mandelbrot set. Uses computer-generated graphics to show how both look at different points. Describes the mathematical basis for both, and briefly touches on several other concepts of physical dynamics. Finishes by describing the concept of the Filled Julia Set, and illustrates the relationship of the three using computer graphics. (BOSTOUP;LASCAUX; 1990)

Mathematics

THE VERNACULAR TRADITION

25 min; color; h,c

1/2" VHS **IC0921,VH**

History of Mathematics Series - Traces two parallel traditions in the development of mathematics in the Renaissance: the rediscovery of Greek learning, following the translation of Euclid and other Greek mathematical works into Latin, and the appearance of vernacular works—in the language of the people—that dealt with practical problems of commerce and everyday life. Provides examples of the algebraic notation developed by Luca Pacioli and Nicolas Chuquet. Traces the transmission and transformation of Hindu numerals to Arab scholars around 770 A.D. and the later promotion of Hindu-Arabic numerals by Leonardo Fibonacci in his 1170 treatise, *Liber Abbaci*. Includes the work of the Islamic mathematician Khwarizmi, from whose term "al jabr" (completion) our word "algebra" derives. (OPENUN; MEDG;c1987)

Mathematics–Mathematics–Study and teaching;
Science–History