UNIT 1 Interpreting Categorical Data

Interpreting Categorical Data develops student understanding of two-way frequency tables, conditional probability and independence, and using data from a randomized experiment to compare two treatments.

Topics include two-way tables, graphical representations, comparison of proportions including absolute risk reduction and relative risk, characteristics and terminology of well-designed experiments, expected frequency, chi-square test of homogeneity, statistical significance.

Lesson 1 Comparing the Risk
Lesson 2 A Test of Significance
Lesson 3 The Relationship Between Two Variables
Lesson 4 Looking Back

UNIT 2 Functions Modeling Change

Functions Modeling Change extends student understanding of linear, exponential, quadratic, power, circular, and logarithmic functions to model quantitative relationships and data patterns whose graphs are transformations of basic patterns.

Topics include linear, exponential, quadratic, power, circular, and base-10 logarithmic functions; mathematical modeling; translation, reflection, stretching, and compressing of graphs with connections to symbolic forms of corresponding function rules.

Lesson 1 Function Models Revisited
Lesson 2 Customizing Models by Translation and Reflection
Lesson 3 Customizing Models by Stretching and Compressing
Lesson 4 Looking Back

UNIT 3 Counting Methods

Counting Strategies extends student ability to count systematically and solve enumeration problems using permutations and combinations.

Topics include systematic listing and counting, counting trees, the Multiplication Principle of Counting, Addition Principle of Counting, combinations, permutations, selections with repetition; the binomial theorem, Pascal’s triangle, combinatorial reasoning; and the general multiplication rule for probability.

Lesson 1 Systematic Counting
Lesson 2 Order and Repetition
Lesson 3 Counting Throughout Mathematics
Lesson 4 Looking Back
UNIT 4 Mathematics of Financial Decision-Making

Mathematics of Financial Decision-Making extends student facility with the use of linear, exponential, and logarithmic functions, expressions, and equations in representing and reasoning about quantitative relationships, especially those involving financial mathematical models.

Topics include forms of investment, simple and compound interest, future value of an increasing annuity, comparing investment options, continuous compounding and natural logarithms; amortization of loans and mortgages, present value of a decreasing annuity, and comparing auto loan and lease options.

UNIT 5 Binomial Distributions and Statistical Inference

Binomial Distributions and Statistical Inference develops student understanding of the rules of probability; binomial distributions; expected value; testing a model; simulation; making inferences about the population based on a random sample; margin of error; and comparison of sample surveys, experiments, and observational studies and how randomization relates to each.

Topics include review of basic rules and vocabulary of probability (addition and multiplication rules, independent events, mutually exclusive events); binomial probability formula; expected value; statistical significance and $P$-value; design of sample surveys including random sampling and stratified random sampling; response bias; sample selection bias; sampling distribution; variability in sampling and sampling error; margin of error; and confidence interval.

UNIT 6 Informatics

Informatics develops student understanding of the mathematical concepts and methods related to information processing, particularly on the Internet, focusing on the key issues of access, security, accuracy, and efficiency.

Topics include elementary set theory and logic; modular arithmetic and number theory; secret codes, symmetric-key and public-key cryptosystems; error-detecting codes (including ZIP, UPC, and ISBN) and error-correcting codes (including Hamming distance); and trees and Huffman coding.
UNIT 7  Spatial Visualization and Representations

Spatial Visualization and Representations  extends student ability to visualize and represent three-dimensional shapes using contour diagrams, cross sections, and relief maps; to use coordinate methods for representing and analyzing three-dimensional shapes and their properties; and to use graphical and algebraic reasoning to solve systems of linear equations and inequalities in three variables and linear programming problems.

Topics include  using contours to represent three-dimensional surfaces and developing contour maps from data; sketching surfaces from sets of cross sections; three-dimensional rectangular coordinate system; sketching planes using traces, intercepts, and cross sections derived from algebraic representations; systems of linear equations and inequalities in three variables; and linear programming.

Lesson 1  Representing Three-Dimensional Objects
Lesson 2  A Three-Dimensional Coordinate System
Lesson 3  Linear Programming: A Graphical Approach
Lesson 4  Looking Back

UNIT 8  Mathematics of Democratic Decision-Making

Strategic Decision-Making  develops student understanding of the mathematical concepts and methods useful in making decisions in a democratic society, as related to voting and fair division.

Topics include  preferential voting and associated vote-analysis methods such as majority, plurality, runoff, points-for-preferences (Borda method), pairwise-comparison (Condorcet method), and Arrow's theorem; weighted voting, including weight and power of a vote and the Banzhaf power index; and fair division techniques, including apportionment methods.

Lesson 1  Social Choice and Voting
Lesson 2  Fair Division
Lesson 3  Looking Back