

Phoenix Christian Jr/Sr High School

MTH400R Finite Math

Course Scope & Sequence

COURSE DESCRIPTION

Goal of the Mathematics Program: Provide students with a well-rounded base of mathematical knowledge that they will be able to apply in a variety of contexts. Underscore the hand of God in the creation through mathematics.

Finite Math Objective: To increase problem solving skills and logic when applying math to every day life.

REQUIRED TEXTS AND *KEY SUPPLEMENTAL MATERIALS

Thinking Mathematically, Robert Blitzer

NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS (NCTM) STANDARDS:

NCTM Standards are referenced at the end of each quarter.

COURSE SCOPE AND SEQUENCE

First Quarter

Problem Solving and Critical Thinking 3 Weeks

Key Concepts: Inductive and Deductive Reasoning, Estimation and Graphs, Problem Solving using the Four Step Method..

Assessments: Homework, Unit Test, Quizzes.

Set Theory 3 Weeks

Key Concepts: Basic Set Concepts, Venn Diagrams and Subsets, Venn Diagrams and Set Operation, Set Operation and Venn Diagrams with Three Sets, Surveys and Cardinal Numbers.

Assessments: Homework, Unit Test, Quizzes.

Logic 3 Weeks

Key Concepts: Statements, Negations, Quantified Statements, Compound Statements, Connectives, Truth Tables for Negation – Conjunction – and Disjunction, Truth Tables for the Conditional and Biconditional, Equivalent Statements, Conditional Statements, De Morgan's Laws, Arguments and Euler Diagrams.

Assessments: Homework, Unit Test, Quizzes

Biblical Integration: There are many examples of logical constructions that can be point out in Scripture. For example, Paul's discussion of Christ's resurrection in 1 Corinthians 15:12-19 contains six conditional statements such as "if Christ has not been raised, your faith is worthless." There are examples of biconditional statements (1 John 5:12) and proof by contradiction (Mark 3 :22-26).

NCTM Standards: Build new mathematical knowledge through problem solving; solve problems that arise in mathematics and in other contexts; apply and adapt a variety of appropriate strategies to solve problems; monitor and reflect on the process of mathematical problem solving.

Second Quarter

Number Representation and Calculation 3 Weeks

Key Concepts: Our Hindu-Arabic System and Early Positional Systems. Number Bases in Positional Systems, Computation in Positional Systems, Looking Back at Early Numeration Systems.

Assessments: Homework, Unit Test, Quizzes.

Number Theory and the Real Number System 3 Weeks

Key Concepts: Number Theory: Prime and Composite Numbers. The Integers: Order of Operations, Rational Numbers, Irrational Numbers, Real Numbers and Their Properties, Exponents and Scientific Notation, Arithmetic and Geometric Sequences.

Assessments: Homework, Unit Test, Quizzes.

Algebra: Equations and Inequalities 3 Weeks

Key Concepts: Algebraic Expressions and Formulas, Solving Linear Equations, Applications of Linear Equations, Ration, Proportion, Variation, Solving Linear Inequalities, Solving Quadratic Equations.

Assessments: Homework, Unit Test, Quizzes.

Biblical Integration: Our mathematical numbering system is based on a set of axioms, from simple arithmetic through binary numeration and beyond. This fact can be used to underscore the importance of world-view as we interpret the world around us. Every system of thought needs a grounding set of axioms. For the Christian that is the Word of God.

NCTM Standards: Develop a deeper understanding of very large and very small numbers and of various representations of them; compare and contrast the properties of numbers and number systems, including the rational and real numbers; judge the reasonableness of numerical computations and their results; understand and perform transformations such as arithmetically combining, composing, and inverting commonly used functions.

Third Quarter

Algebra: Graphs, Functions, and Linear Systems 2 Weeks

Key Concepts: Graphing and Functions, Linear Functions and their Graphs, Exponential Functions, Systems of Linear Equations, Linear Inequalities in Two Variables, Linear Programming.

Assessments: Homework, Unit Test, Quizzes.

Consumer Mathematics and Financial Management 2 Weeks

Key Concepts: Percent, Interest, Installment Buying, The Cost of Home Ownership, Investing in Stocks – Bonds – and Mutual Funds.

Assessments: Homework, Unit Test, Quizzes.

Measurement 2 Weeks

Key Concepts: Measuring Length – The Metric System, Measuring Area and Volume, Measuring Weight and Temperature.

Assessments: Homework, Unit Test, Quizzes.

Geometry 3 Weeks

Key Concepts: Points, Lines, Planes, Angles, Triangles, Polygons, Quadrilaterals, Perimeter, Area and Circumference, Volume, Right Triangle Trigonometry, Beyond Euclidian Geometry.

Assessments: Homework, Unit Test, Quizzes

Biblical Integration: The world can be modeled mathematically in such a way that predictions can be made about God's creation. This is one of the most significant uses of mathematics. We can model the orbits of the planets, the flow of blood through an artery, the trajectory of a ball. Because of the complex nature of creation we can only approximate the true phenomena. This demonstrates both the intricate nature of God's creativity and the finite nature of humanity.

NCTM Standards: Make decisions about units and scales that are appropriate for problem situations involving measurement; understand and use formulas for the area, surface area, and volume of geometric figures, including cones, spheres, and cylinders; recognize and apply mathematics in contexts outside of mathematics; create and use representations to organize, record, and communicate mathematical ideas; analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.

Fourth Quarter

Counting Methods and Probability Theory 3 Weeks

Key Concepts: The Fundamental Counting Principle, Permutations, Combinations, Fundamentals of Probability, Probability with the Fundamental Counting Principle – Permutations – and Combinations, Events Involving Not and Or, Conditional Probability, Expected Values.

Assessments: Homework, Unit Test, Quizzes.

Statistics

3 Weeks

Key Concepts: Sampling, Frequency Distribution, Graphs, Measures of Central Tendencies, Measures of Dispersion, Normal Distribution, Scatter Plots, Correlation, Regression Lines.

Assessments: Homework, Unit Test, Quizzes.

Mathematical Systems

3 Weeks

Key Concepts: Mathematical Systems, Rotational Symmetry, Groups, and Clock Arithmetic.

Assessments: Homework, Unit Test, Quizzes.

Biblical Integration: Although the topic of probability is often thought of in terms of randomness and chance, it can be enlightening to discover that probability follows very definite patterns. These patterns lead to the very applicable nature of statistics. Even seeming “randomness” obeys fundamental laws. “The lot is cast into the lap, but its every decision is from the Lord” (Proverbs 16:33)

NCTM Standards: Understand the concepts of conditional probability and independent events; understand the concepts of sample space and probability distribution and construct sample spaces and distributions in simple cases; select and use appropriate statistical methods to analyze data; apply transformations and use symmetry to analyze mathematical situations.