

# Phoenix Christian Jr/Sr High School

## MTH100 Algebra 1

### 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, underscoring the hand of God in creation through mathematics. **Algebra Objective:** to build a strong foundation of algebra skills on which to build increasingly higher degrees of mathematical skills.

#### **REQUIRED TEXTS AND \*KEY SUPPLEMENTAL MATERIALS**

*Prentice Hall Algebra, tools for a Changing World*, Prentice Hall  
Scientific Calculator

#### **NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS (NCTM) STANDARDS**

NCTM Standards are referenced at the end of each quarter.

#### **COURSE SCOPE AND SEQUENCE**

##### **First Quarter**

Developing The Tools of Algebra 2 Weeks

*Key Concepts:* Modeling Relationships with Variables, Using the Order of Operations, Evaluating Variable Expressions, Adding and Subtracting with Integers and Decimals, Finding Absolute Values, Multiplying and Dividing with Integers and Decimals, Simplifying Expressions with Exponents, Comparing and Ordering Rational Numbers, Valuating Expressions with Rational Numbers.

*Assessments:* Homework, Unit Test, Quizzes.

Discovering Functions and Their Graphs 3 Weeks

*Key Concepts:* Analyzing Data Using Scatter Plots, Interpreting and Sketching Graphs From Stories, Classifying Data As Discrete Or Continuous, Choosing A Scale and Graphing Data in Tables, Identifying Independent and Dependent Variables, Defining Relations, Functions, Domain, and Range, Evaluating Functions, Analyzing Graphs, Writing Rules for Functions from Tables and Words, Graphing A Function, Creating A Table of Values from A Rule and A Graph, Identifying Families of Functions for Equations and Graphs

*Assessments:* Homework, Unit Test, Quizzes.

Algebraic Concepts And Simple Equations 3 Weeks

*Key Concepts:* Modeling and Solving One-Step Equations, Modeling and Solving Two-Step Equations, Combining Like Terms to Solve Equations, Using the Distributive Property, Solving Equations Involving Rational Numbers, Using Equations to Solve Problems Involving Percents, Finding Simple Interest, Finding and Solving Problems Involving Percent of Change

*Assessments:* Homework, Unit Test, Quizzes.

*NCTM Standards:* Understand relations and functions and select, convert flexibly among, and use various representations for them; formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them; approximate and interpret rates of change from graphical and numerical data; create and use representations to organize, record, and communicate mathematical ideas.

*Biblical Integration:* The rules of logic applied as a tool in apologetics. Mathematics within the Christian world view contrasted with mathematics within the naturalistic world view.

**Second Quarter**

Equations and Inequalities 4 Weeks

*Key Concepts:* Solving and Using Proportions to Solve Real-World Problems, Solving Equations with Variables on Both Sides, Identifying Equations that Have no Solution or are Identities, Solving and Using Absolute Value Equations, Using Formulas to Solve Real-World Equations, Solving A Literal Equation for One of Its Variables, Using Addition and Subtraction to Solve One-Step Inequalities, Using Multiplication and Division to Solve One-Step Inequalities, Solving Multi-Step Inequalities and Graphing the Solutions on a Number Line, Solving Compound Inequalities and Graphing The Solutions on a Number Line, Solving Absolution-Value Inequalities and Graphing The Solutions on a Number Line, Solving Inequalities Given A Specific Replacement Set, Using Inequalities to Model Real-World Problems.

*Assessments:* Homework, Unit Test, Quizzes.

Graphing and Writing Linear Equations 5 Weeks

*Key Concepts:* Calculating the Slope of a Line, Drawing A Line Through a Point with A Given Slope, Finding Rates of Change From Tables and Graphs, Relating Slope to Constant of Variation, Using The Slope and Y-Intercept to Draw Graphs and Write Equations, Writing The Equation of a Line, Finding the Equation of a Trend Line, Graphing Equations Using X- and Y-Intercepts, Writing Equations In  $Ax + By = C$  Form, Writing Equations for Parallel and Perpendicular Lines, Using Slope to Determine If Lines are Parallel, Perpendicular, Or Neither

*Assessments:* Homework, Unit Test, Quizzes.

*NCTM Standards:* Understand the meaning of equivalent forms of expressions, equations, inequalities, and relations; use symbolic algebra to represent and explain mathematical relationships; identify essential quantitative relationships in a situation and determine the class or classes of functions that might model the relationships; draw reasonable conclusions about a situation being modeled.

*Biblical Integration:* God as the source of truth that mathematicians discover but do not create. Laws of probability can only exist within a theistic universe. Proof by contradiction (Mark 3:22-26).

### **Third Quarter**

#### Systems of Equations and Inequalities 3 Weeks

*Key Concepts:* Solving Systems of Linear Equations by Graphing, Solving Systems of Linear Equations Using Substitution, Solving Systems of Linear Equations Using Elimination, Writing and Solving Systems of Linear Equations, Using Systems to Find the Break-Even Point, Graphing Linear Inequalities, Solving Systems of Linear Inequalities by Graphing, Solving Systems of Linear, Quadratic, and Absolute Value Equations by Graphing

*Assessments:* Homework, Unit Test, Quizzes.

#### Quadratic Equations and Functions 3 Weeks

*Key Concepts:* Graphing Quadratic Functions of The Form  $Y = Ax^2$ , Graphing Quadratic Functions of The Form  $Y = Ax^2 + C$ , Graphing Quadratic Functions of the Form  $Y = Ax^2 + Bx + C$ , Graphing Quadratic Functions that Represent Real-Life Situations, Graphing Quadratic Inequalities, Finding the Axis of Symmetry and Vertex, Finding and Using Square Roots, Solving Quadratic Equations In  $Ax^2 = C$  Form, Finding If a Quadratic Equation Has Two Solutions, One Solution, Or No Solution, Using The Quadratic Formula to Solve Quadratic Equations, Using The Discriminant to Find The Number of Solutions of a Quadratic Equation

*Assessments:* Homework, Unit Test, Quizzes.

#### Exponents and Exponential Functions 3 Weeks

*Key Concepts:* Exploring and Examining Patterns In Exponential Functions, Modeling Exponential Growth, Calculating Compound Interest, Modeling Exponential Decay, Using Half-Life Models, Evaluating and Simplifying Expressions Involving Zero as an Exponent, Evaluating and Simplifying Expressions Involving Negative Numbers as Exponents, Writing Numbers in Scientific Notation, Using Scientific Notation, Multiplying and Dividing Powers with the Same Base, Raising a Power to a Power, Raising a Product to a Power, Raising a Quotient to a Power.

*Assessments:* Homework, Unit Test, Quizzes.

*NCTM Standards:* Write equivalent forms of equations, inequalities, and systems of equations and solve them with fluency—mentally or with paper and pencil in simple cases and using technology in all cases; analyze functions of one variable by investigating rates of change, intercepts, zeros, asymptotes, and local and global behavior; understand and compare the properties of classes of functions, including exponential functions; use mathematical models to represent and understand quantitative relationships.

*Biblical Integration:* The immutability of God. Absolutes: mathematical and moral. The infinite nature of God (demonstrated by a line) contrasted with the everlasting nature of man (demonstrated by a ray).

## **Fourth Quarter**

### Right Triangles and Radical Expressions 4 Weeks

*Key Concepts:* Finding The Lengths of the Sides of a Right Triangle, Deciding If a Triangle is a Right Triangle, Finding the Distance Between Two Points in a Coordinate Plane, Finding the Coordinates of the Midpoint of Two Points, Exploring and Calculating Trigonometric Ratios, Using Sine, Cosine, and Tangent to Solve Problems, Simplifying Radicals Involving Products and Quotients, Solving Problems Involving Radicals, Adding and Subtracting Radicals, Solving Equations that Contain Radicals, Identifying Extraneous Solutions.

*Assessments:* Homework, Unit Test, Quizzes.

### Polynomials 4 Weeks

*Key Concepts:* Describing Polynomials, Adding and Subtracting Polynomials, Multiplying a Polynomial by a Monomial, Factoring a Monomial from a Polynomial, Multiplying Two Binomials, Multiplying a Trinomial and a Binomial, Factoring Quadratic Expressions, Identifying Quadratic Expressions that Cannot be Factored, Factoring the Difference of Two Squares, Factoring Perfect Square Trinomials, Solving Equations by Factoring, Choosing an Appropriate Method for Solving Quadratic Equations.

*Assessments:* Homework, Unit Test, Quizzes.

*NCTM Standards:* Use trigonometric relationships to determine lengths and angle measures; select, apply, and translate among mathematical representations to solve problems; apply and adapt a variety of appropriate strategies to solve problems.

*Biblical Integration:* Evidence of intelligent design in mathematics and within all of creation itself; including order (1 Cor 14:33, Psalm 147:4), and consistency (Hebrews 13:8, Malachi 3:6). Pascal's wager.