

Principles of Algebra and Geometry

Prerequisite: Open to all levels – Entrance based on recommendation

Grade Level: 9th Grade

Credit: 1.0 – Math

Course Description:

This course combines the study of some pre-algebra and algebra topics with introductory geometry topics. This course includes the study of formulas, algebraic expressions, first degree equations and inequalities, the rectangular coordinate system, area, perimeter, and volume of geometric figures, and properties of triangles and circles.

Course Objectives:

After completing this course, students will be able to:

Understand patterns and relations.

Represent and analyze mathematical situations and structures using algebraic symbols.

Use mathematical models to represent and understand quantitative relationships.

Analyze change in various contexts.

Course Outline:

I. Integers

- a. Comparing and ordering
- b. Addition
- c. Subtraction
- d. Multiplication
- e. Division

II. Variables and Expressions

- a. Evaluating expressions
- b. Order of operations
- c. Basic properties
- d. Distributive property
- e. Perimeter, area, and average
- f. Area Formulas for: Parallelograms, Triangles and Trapezoids

III. Equations

- a. Equations and inequalities
- b. Solving equations
- c. Solving addition and subtraction equations
- d. Solving multiplication and division equations
- e. Inverse operations
- f. Solving multi-step equations
- g. Translating word expressions to algebraic expressions
- h. Writing algebraic equations

IV. Number Theory

- a. Factors and multiples
- b. Tests for divisibility

- c. Prime numbers
- d. Prime factorization
- e. Exponents
- f. LCM and GCF

V. Fractions

- a. Equivalent fractions
- b. Multiplying fractions and mixed numbers
- c. Using reciprocals to solve equations
- d. Dividing fractions and mixed numbers
- e. Adding and subtracting fractions with like and unlike denominators
- f. Subtracting mixed numbers. (Borrowing from the whole number)

VI. Probability

- a. Ratio and proportion
- b. Ratio and Measurement
- c. Collecting data
- d. Recording chances
- e. Probability
- f. Independent and dependent events
- g. Making choices
- h. Permutations

VII. Decimals

- a. Rational expressions
- b. Rational numbers
- c. Decimals and fractions
- d. Repeating decimals
- e. Estimating sums and differences
- f. Powers of ten
- g. Scientific notation
- h. The metric system
- i. Estimating products and quotients of decimals

VIII. Percent

- a. The meaning of percent
- b. Decimals and percent
- c. Estimating the percent of a number
- d. Deciding on estimates
- e. Finding the percent of a number
- f. Interest
- g. Discount
- h. Solving percent equations and proportions
- i. Percent increase and decrease

IX. Analyzing Data

- a. Misleading graphs
- b. Using data from graphs and tables
- c. Organizing and presenting data

- d. Measures of central tendency
- e. Analyzing sample data
- f. Stem and leaf plots
- g. Box and whisker plots

X. The Number Line

- a. The set of real numbers
- b. The addition property of inequality
- c. The multiplication property of inequality
- d. Solving inequalities
- e. Conjunctions
- f. Disjunctions

XI. The Coordinate Plane

- a. Coordinate graphs
- b. Graphing linear equations
- c. Standard form of a linear equation
- d. Slope of a line
- e. Graphing equations and inequalities
- f. Using two variables
- g. Translations

XII. Perimeter and Area

- a. Triangles and Quadrilaterals
- b. Regular Polygons
- c. Circles

XIII. Surface Area and Volume

- a. Spheres
- b. Prisms and Cylinders
- c. Pyramids and Cones

XIV. Square Roots and Right Triangles

- a. Square root basics
- b. Using square roots
- c. The Pythagorean Theorem
- d. Similar Triangles
- e. The Tangent ratio

Assessment

Students will be assessed with the following:

- Homework Assignments
- Quizzes
- Projects and Activities
- Chapter and Semester Exams

Text

Pre-Algebra, Prentice Hall Publishing, 2004