

## Algebra - MS/ Part A

**COURSE DESCRIPTION:** Students deepen their computational and problem-solving fluency through topics in linear relationships, functions, and geometry. Proportions are understood as special linear equations in which the constant of proportionality is the slope. Students also consider the fit of bivariate data with linear models. Students solve systems of two linear equations in two variables and relate those solutions to a representation in the coordinate plane. Functions are understood as a rule that determine a unique output for every input. Students apply functions and are able to translate between various representations. Geometry delves into translations, rotations, reflections, and dilations in the coordinate plane. Students also consider the angles created by the transversal of parallel lines. The Pythagorean Theorem is explored and used to find distances between points and to analyze polygons. Students also find volumes of cones, cylinders, and sphere.

### **COURSE OBJECTIVES:**

- Recognize a proportional relationship as a special linear equation.
- Apply linear equations to solve real-world problems including deposits and withdrawals.
- Apply systems of linear equations to solve real-world problems including mixture problems.
- Define the concept of a function.
- Translate between different representations of a function including graphs and tables.
- Apply Pythagorean Theorem to find distances.
- Solve for angle measures in the interior angles of a triangle and in angles formed when parallel lines are cut by a transversal.
- Find the volumes of cones, cylinders, and spheres to solve real-world problems.
- Apply transformations to two-dimensional figures noting which preserve congruence and which only preserve similarity.

**PREREQUISITES:** Successful completion of Math 7 course or equivalent.

**COURSE LENGTH:** Two Semesters

**REQUIRED TEXT:** No required textbook for this course.

### **REQUIRED MATERIALS LIST**

### **COURSE OUTLINE:**

#### **Module 1: Real Numbers**

- Lesson 1: Number Lines
- Lesson 2: Sets
- Lesson 3: Investigation 1
- Lesson 4: Comparing Expressions
- Lesson 5: Investigation 2
- Lesson 6: Number Properties
- Lesson 7: The Distributive Property
- Lesson 8: Opposites and Absolute Value
- Lesson 9: Addition
- Lesson 10: Subtraction
- Lesson 11: Multiplication
- Lesson 12: Reciprocals and Division
- Lesson 13: Negative Exponents
- Lesson 14: Investigation 3
- Lesson 15: Scientific Notation
- Lesson 16: Investigation 4
- Lesson 17: Module Review
- Lesson 18: Module Exam

## **Module 2: Solving Equations**

- Lesson 1: Addition and Subtraction
- Lesson 2: Multiplication and Division
- Lesson 3: Multiple Transformations
- Lesson 4: Variables on Both Sides
- Lesson 5: Investigation 5
- Lesson 6: Transforming Formulas
- Lesson 7: Estimating Solutions
- Lesson 8: Investigation 6
- Lesson 9: Cost Problems
- Lesson 10: Inequalities
- Lesson 11: Solving Inequalities
- Lesson 12: Combined Inequalities
- Lesson 13: Investigation 7
- Lesson 14: Absolute Value

- Lesson 15: Investigation 8
- Lesson 16: Applications: Inequalities
- Lesson 17: Module Review
- Lesson 18: Module Exam

### **Module 3: Linear Equations**

- Lesson 1: Equations in Two Variables
- Lesson 2: Graphs
- Lesson 3: Lines and Intercepts
- Lesson 4: Slope
- Lesson 5: Investigation 9
- Lesson 6: Using Slope as a Rate
- Lesson 7: Investigation 10
- Lesson 8: The Slope-Intercept Form
- Lesson 9: Investigation 11
- Lesson 10: Parallel and Perpendicular
- Lesson 11: Common Denominators
- Lesson 12: Equations from Graphs
- Lesson 13: Applications: Linear Models
- Lesson 14: Investigation 12
- Lesson 15: Graphing Linear Inequalities
- Lesson 16: Inequalities from Graphs
- Lesson 17: Module Review
- Lesson 18: Module Exam

### **Module 4: Linear Systems**

- Lesson 1: Systems of Equations
- Lesson 2: Investigation 13
- Lesson 3: Substitution Method
- Lesson 4: Linear Combination 1
- Lesson 5: Linear Combination 2
- Lesson 6: Applications of Linear Systems
- Lesson 7: Investigation 14
- Lesson 8: Systems of Linear Inequalities

- Lesson 9: Percents
- Lesson 10: Mixture Problems
- Lesson 11: Investigation 15
- Lesson 12: Simple Interest
- Lesson 13: Compound Interest
- Lesson 14: Investigation 16
- Lesson 15: Savings
- Lesson 16: Credit
- Lesson 17: Module Review
- Lesson 18: Module Exam

#### **Module 5: Relations and Functions**

- Lesson 1: Relations
- Lesson 2: Functions
- Lesson 3: Function Equations 1
- Lesson 4: Investigation 17
- Lesson 5: Function Equations 2
- Lesson 6: Order of Operations
- Lesson 7: Absolute Value Functions
- Lesson 8: Direct Linear Variation
- Lesson 9: Investigation 18
- Lesson 10: Describing Relationships
- Lesson 11: Investigation 19
- Lesson 12: Quadratic Variation
- Lesson 13: Inverse Variation
- Lesson 14: Translating Functions
- Lesson 15: Investigation 20
- Lesson 16: Module Review
- Lesson 17: Module Exam
- Lesson 18: Portfolio

#### **Course Asset Credits**