

**Course Description:** In this course, students begin with adding, subtracting, multiplying, and dividing rational numbers by using balloons and weights, number lines, rules, and properties. Then, they solve problems related to proportional relationships given in tables, diagrams, graphs, equations, and verbal descriptions. Finally, they move to geometry and learn how to solve problems about scale drawing, circles, angle relationships, areas, surface areas, and volumes; identify the cross sections of geometric shapes; and draw geometric shapes.

### Course Objectives:

- Write number sentences with a sum of 0.
- Describe real-world situations in which opposite quantities combine to make 0.
- Describe situations involving additive inverses (given as equations).
- Represent additive inverses on number lines.
- Determine opposites for given contexts.
- Write equations involving additive inverses from situations.
- Find the sum of two integers with the same sign.
- Interpret the sum of two integers in a real-world context.
- Find the sum of two integers with different signs.
- Represent addition sentences on number lines.
- Determine sums of rational numbers.
- Write addition sentences from situations.
- Find the difference of two integers with the same sign.
- Find the difference of two integers with different signs.
- Interpret the difference of two integers in a real-world context.
- Rewrite subtraction as addition.
- Calculate the differences of two rational numbers.
- Apply the Associative Property of Addition.
- Apply the Commutative Property of Addition.
- Apply strategies to add and subtract rational numbers efficiently.
- Calculate the differences of two rational numbers.
- Determine the distance between rational numbers using absolute value.
- Explain why the product of two numbers with the same sign is positive.
- Explain why the product of two numbers with different signs is negative.
- Interpret multiplication of integers in a real-world context.
- Write a product of integers to represent a real-world context.
- Interpret division of integers in a real-world context.
- Write a quotient of integers to represent a real-world context.
- Explain why the quotient of two numbers with different signs is negative.
- Explain why the quotient of two numbers with the same sign is positive.
- Find the product of two integers.
- Apply the Associative Property of Multiplication to find the product of more than two integers.
- Multiply signed rational numbers.
- Apply the Commutative Property of Multiplication.
- Apply the Associative Property of Multiplication.
- Interpret products of rational numbers from contexts.

- Apply the Distributive Property.
- Find the quotient of two integers.
- Identify quotients of two integers (with nonzero divisors) as rational numbers.
- Rewrite fractions that include negatives in equivalent forms.
- Interpret quotients of rational numbers from contexts.
- Classify rational numbers and numerical expressions as repeating or terminating decimals.
- Use properties of operations to divide rational numbers.
- Use properties of operations to multiply rational numbers.
- Apply the four arithmetic operations to rational numbers to solve mathematical problems.
- Calculate unit rates that involve fractions.
- Determine whether given graphs represent proportional relationships.
- Calculate unit rates from graphs.
- Determine whether given tables represent proportional relationships.
- Determine whether given diagrams represent proportional relationships.
- Calculate unit rates from tables.
- Calculate unit rates from diagrams.
- Determine whether given equations represent proportional relationships.
- Calculate unit rates from equations.
- Determine whether given verbal descriptions represent proportional relationships.
- Calculate unit rates from verbal descriptions.
- Identify the unit rate of a contextual graph from the point  $(1,r)$ .
- Interpret points on the graph of contextual proportional relationships.
- Write equations to represent proportional relationships represented by using graphs.
- Solve equations for proportional relationships.
- Interpret corresponding values in tables of contextual proportional relationships.
- Interpret points from diagrams of contextual proportional relationships.
- Write equations to represent proportional relationships represented by using tables.
- Write equations to represent proportional relationships represented by using diagrams.
- Identify the unit rate of a contextual table from the point  $(1,r)$ .
- Interpret corresponding points from verbal descriptions of proportional relationships.
- Write equations to represent proportional relationships given as verbal descriptions.
- Solve problems to find percents of quantities.
- Solve problems to find the part given the percent and whole.
- Solve problems to find the whole given the part and the percent.
- Solve problems involving percent increase.
- Solve problems involving percent decrease.
- Solve problems involving percent error.
- Determine scale factors from scale drawings.
- Determine missing measurements (lengths and areas) from scale drawings.
- Draw scale drawings of given geometric figures.
- Describe possible triangles that can be formed from given conditions.
- Draw geometric figures from given conditions.
- Determine whether given conditions create a unique triangle, more than one triangle, or no triangle.
- Determine possible lengths for the third side of a triangle from two given side lengths (Triangle Inequality Theorem).
- Calculate measures (diameter, radius, circumference) related to the circumferences of circles.

- Calculate the areas of circles.
- Derive (informally) the relationship between the circumference and area of a circle.
- Define complementary angles as two angles whose measures have a sum of 90 degrees.
- Define supplementary angles as two angles whose measures have a sum of 180 degrees.
- Define vertical angles as two opposite angles formed by intersecting lines.
- Define adjacent angles as two angles with the same vertex that share a side and don't overlap.
- Create expressions that represent angle relationships (right, straight, complementary, supplementary, vertical, and adjacent).
- Find unknown angle measures using facts about angles (right, straight, complementary, supplementary, vertical, and adjacent).
- Calculate the area of quadrilaterals.
- Calculate the area of triangles.
- Determine the area of composite polygons consisting of triangles and quadrilaterals.
- Analyze solutions to problems involving area.
- Solve real-life and mathematical problems involving area.
- Calculate the surface area of cubes and right prisms.
- Determine the surface area of composite solids consisting of cubes and right prisms.
- Analyze solutions to problems involving surface area.
- Solve real-life and mathematical problems involving surface area.
- Calculate the volume of cubes and right prisms.
- Determine the volume of composite solids consisting of cubes and right prisms.
- Analyze solutions to problems involving volume.
- Solve real-life and mathematical problems involving volume.
- Define cross section.
- Define right rectangular prism.
- Define cubes.
- Identify two-dimensional figures that result from slicing three-dimensional figures.
- Describe two-dimensional figures that result from slicing three-dimensional figures.
- Define rectangular pyramids.
- Make sense of problems and persevere in solving them.
- Model with mathematics.
- Construct viable arguments and critique the reasoning of others.
- Look for and make use of structure.

### Required Materials:

In course.

### Course Overview:

#### Unit 1: Adding and Subtracting Integers and Rational Numbers

- Direct Instruction Activities (Lessons 1-6)
  - Key Terms

- Texts: Additive Inverses; Adding Integers; Sums of Rational Numbers; Subtracting Integers; Differences of Rational Numbers; Strategies for Addition and Subtraction
  - Step-by-Step Example Problems
  - Workbooks
- Checkpoint (Lessons 1-5)
  - Project – Part 1 (Lesson 3)
  - Unit 1 Exam (Lesson 6)

## Unit 2: Multiplying and Dividing Integers and Rational Numbers

- Direct Instruction Activities (Lessons 7-11)
  - Key Terms
  - Texts: Multiplying Integers; Products of Rational Numbers; The Distributive Property; Quotients of Rational Numbers; Strategies for Multiplication and Division
  - Step-by-Step Example Problems
  - Workbooks
- Checkpoint (Lessons 7-10)
- Project – Part 2 and Part 3 (Lessons 8 and 9)
- Unit 2 Exam (Lesson 11)

## Unit 3: Ratios and Unit Rates

- Direct Instruction Activities (Lessons 12-16)
  - Key Terms
  - Texts: Unit Rates; Unit Rates on Graphs; Unit Rates in Diagrams and Tables; Unit Rates in Equations; Unit Rates in Verbal Descriptions
  - Step-by-Step Example Problems
  - Workbooks
- Discussion (Lesson 12)
- Checkpoint (Lessons 12-15)
- Unit 3 Exam (Lesson 16)

## Unit 4: Ratios and Proportions

- Direct Instruction Activities (Lessons 17-20)
  - Key Terms

- Texts: Proportional Relationships on Graphs; Proportional Relationships in Tables and Diagrams; Proportional Relationships in Verbal Descriptions; Percents
  - Step-by-Step Example Problems
  - Workbooks
- Checkpoint (Lessons 17-19)
  - Unit 4 Exam (Lesson 20)

## Unit 5: Geometric Figures

- Direct Instruction Activities (Lessons 21-24)
  - Key Terms
  - Texts: Scale Drawings; Drawing Geometric Figures; Area and Circumference of Circles; Angle Relationships
  - Step-by-Step Example Problems
  - Workbooks
- Checkpoint (Lessons 21-23)
- Unit 5 Exam (Lesson 24)

## Unit 6: Geometry

- Direct Instruction Activities (Lessons 25-28)
  - Key Terms
  - Texts: Area of Polygons; Surface Area; Volume of Three-Dimensional Figures; Cross Sections
  - Step-by-Step Example Problems
  - Workbooks
- Unit 1-Unit 6 Reviews (Lesson 29)
- Checkpoint (Lessons 25-27)
- Unit 6 Exam (Lesson 28)
- Course Final Exam (Lesson 30)
- Course Summary (Lesson 30)