Unit 1: Rational Numbers

Timing

5-6 weeks

Essential Questions

1. How can number relationships help with problem solving?
2. What is the relationship between fractions, decimals, and percents?
3. How does comparing numbers describe their relationship?
4. How can operations with rational numbers help solve real world problems?
5. How can we use a variety of models to understand rational numbers?

Big Ideas

1. Factors and multiples can be used to find relationships between numbers.
2. Equivalencies exist among fractions, decimals, and percents.
3. Positive rational numbers in different forms can be compared and ordered.
4. Fractions, decimals, and mixed numbers can be multiplied and divided.
5. Integers can be added and subtracted.

Objectives

6.N.1.1 Represent integers with counters and on a number line and rational numbers on a number line, recognizing the concepts of opposites, direction, and magnitude; use integers and rational numbers in real-world and mathematical situations, explaining the meaning of 0 in each situation.

6.N.1.2 Compare and order positive rational numbers, represented in various forms, or integers using the symbols <, >, and =.

6.N.1.3 Explain that a percent represents parts "out of 100" and ratios "to 100".

6.N.1.4 Determine equivalencies among fractions, decimals, and percents. Select among these representations to solve problems.

6.N.1.5 Factor whole numbers and express prime and composite numbers as a product of prime factors with exponents.

6.N.1.6 Determine the greatest common factors and least common multiples. Use common factors and multiples to calculate with fractions, find equivalent fractions and express the sum of two-digit numbers with a common factor using the distributive property.

6.N.2.1 Estimate solutions to addition and subtraction of integers problems in order to assess the reasonableness of results.

6.N.2.2 Illustrate addition and subtraction of integers using a variety of representations.

6.N.2.3 Add and subtract integers; use efficient and generalizable procedures including but not limited to standard algorithms.

6.N.4.1 Estimate solutions to problems with whole numbers, decimals, fractions, and mixed numbers and use the estimates to assess the reasonableness of results in the context of the problem.

6.N.4.2 Illustrate multiplication and division of fractions and decimals to show connections to fractions, whole number multiplication, and inverse relationships.

6.N.4.3 Multiply and divide fractions and decimals using efficient and generalizable procedures.

6.N.4.4 Solve and interpret real-world and mathematical problems including those involving money, measurement, geometry, and data requiring arithmetic with decimals, fractions, and mixed numbers.

Unit 2: Expressions, Equations, and Inequalities

Timing

4-5 weeks

Essential Questions

1. How can patterns in real-world scenarios be explored using mathematics?
2. How can properties help to simplify real-world problems?
3. How can the order of operations be used to find solutions in real-world problems?
4. How can equations be used to find solutions to real-world problems?

Big Ideas

1. Mathematical relationships can be expressed using different representations.
2. Order of operations is used to evaluate and compare expressions.
3. The commutative, associative, and distributive properties are used to find equivalent expressions.
4. Equations can be used to find an unknown value.

Objectives

6.A.1.1 Plot integer- and rational-valued (limited to halves and fourths) ordered-pairs as coordinates in all four quadrants and recognize the reflective relationships among coordinates that differ only by their signs.

6.A.1.2 Represent relationships between two varying quantities involving no more than two operations with rules, graphs, and tables, translate between any two of these representations.

6.A.1.3 Use and evaluate variables in expressions, equations, and inequalities that arise from various contexts, including determining when or if, for a given value of the variable, an equation or inequality involving a variable is true or false.

6.A.2.1 Generate equivalent expressions and evaluate expressions involving positive rational numbers by applying the commutative, associative, and distributive properties and order of operations to solve real-world and mathematical problems.

6.A.3.1 Represent real-world or mathematical situations using expressions, equations, and inequalities involving variables and rational numbers.

6.A.3.2 Use number sense and properties of operations and equality to solve real-world and mathematical problems involving equations in the form $x + p = q$ and $px = q$, where x, p, and q are non-negative rational numbers. Graph the solution on a number line, interpret the solution in the original context, and assess the reasonableness of the solution.

6.N.2.3 Add and subtract integers; use efficient and generalizable procedures including but not limited to standard algorithms.

6.N.4.3 Multiply and divide fractions and decimals using efficient and generalizable procedures.

6.N.4.4 Solve and interpret real-world and mathematical problems including those involving money, measurement, geometry, and data requiring arithmetic with decimals, fractions, and mixed numbers.

Unit 3: Ratios

Timing

3-4 weeks

Essential Questions

1. How can we compare quantities?
2. How do we use the relationship between ratio and rates to solve problems?
3. How and when are percents useful in real-world scenarios?

Big Ideas

1. Ratios are used to compare quantities.
2. Unit rates compare quantities with different units where the second quantity in the comparison is 1.
3. A percent represents a ratio out of a 100.

Objectives

6.N.3.1 Identify and use ratios to compare quantities. Recognize that multiplicative comparison and additive comparison are different.
6.N.3.2 Determine the unit rate for ratios.
6.N.3.3 Apply the relationship between ratios, equivalent fractions, and percents to solve problems in various contexts, including those involving mixture and concentrations.
6.N.3.4 Use multiplicative reasoning and representations to solve ratio and unit rate problems.
6.N.1.3 Explain that a percent represents parts "out of 100" and ratios "to 100".
6.N.1.4 Determine equivalencies among fractions, decimals, and percents. Select among these representations to solve problems.
6.N.1.5 Factor whole numbers and express prime and composite numbers as a product of prime factors with exponents.
6.N.1.6 Determine the greatest common factors and least common multiples. Use common factors and multiples to calculate with fractions, find equivalent fractions and express the sum of two-digit numbers with a common factor using the distributive property.
6.A.1.2 Represent relationships between two varying quantities involving no more than two operations with rules, graphs, and tables, translate between any two of these representations.
6.A.3.1 Represent real-world or mathematical situations using expressions, equations, and inequalities involving variables and rational numbers.

6.A.3.2 Use number sense and properties of operations and equality to solve real-world and mathematical problems involving equations in the form x + p = q and px = q, where x, p, and q are non-negative rational numbers. Graph the solution on a number line, interpret the solution in the original context, and assess the reasonableness of the solution.

6.GM.3.1 Estimate weights, capacities and geometric measurements using benchmarks in customary and metric measurement systems with appropriate units.

6.GM.3.2 Solve problems in various real-world and mathematical contexts that require the conversion of weights, capacities, geometric measurements, and time within the same measurements systems using appropriate units.

Unit 4: Angle Relationships

Timing

1-2 weeks

Essential Questions

1. How can we use angle relationships to help solve for missing measures of angles?
2. What methods can be used to find missing measures of triangles?

Big Ideas

1. Vertical, complementary, and supplementary angles are formed by intersecting lines.
2. The sum of the measure of interior angles of triangles is 180˚.

Objectives

6.GM.2.1 Solve problems using the relationships between the angles (vertical, complementary, and supplementary) formed by intersecting lines.

6.GM.2.2 Develop and use the fact that the sum of the interior angles of a triangle is 180˚ to determine missing angle measures in a triangle.

6.A.3.1 Represent real-world or mathematical situations using expressions, equations, and inequalities involving variables and rational numbers.

6.A.3.2 Use number sense and properties of operations and equality to solve real-world and mathematical problems involving equations in the form $x+p=q$ and $px=q$, where p and q are nonnegative rational numbers. Graph the solution on a number line, interpret the solution in the original context, and assess the reasonableness of the solution.

Unit 5: Transformations

Timing

2-3 weeks

Essential Questions

1. How do transformations affect two-dimensional figures?
2. How can transformations be used to show two-dimensional figures are congruent?
3. How can transformations be used to find lines of symmetry?

Big Ideas

1. Translations, reflections, and rotations can be used to transform a two-dimensional figure.
2. Translations, reflections, and rotations preserve congruency and reflections can be used to find lines of symmetry for a two-dimensional figure.

Objectives

6.GM.4.1 Predict, describe, and apply translations (slides), reflections (flips), and rotations (turns) to a two-dimensional figure.

6.GM.4.2 Recognize that translations, reflections, and rotations preserve congruency and use them to show that two figures are congruent.

6.GM.4.3 Use the distances between two points that are either vertical or horizontal to each other (not requiring the distance formula) to solve real-world and mathematical problems about congruent two-dimensional figures.

6.GM.4.4 Identify and describe the lines of symmetry in two-dimensional shapes.

6.A.1.1 Plot integer- and rational-valued (limited to halves and fourths) ordered-pairs as coordinates in all four quadrants and recognize the reflective relationships among coordinates that differ only by their signs.

6.A.1.2 Represent relationships between two varying quantities involving no more than two operations with rules, graphs, and tables, translate between any two of these representations.

Unit 6: Area

Timing

3-4 weeks

Essential Questions

1. How can we use rectangles to help to find the area of other quadrilaterals?
2. How can finding the area of other shapes help to find the area of a triangle?
3. How can we find area without a formula for that shape?

Big Ideas

1. The area of a square and a parallelogram is related to the area of a rectangle.
2. The area of a triangle is half the area of a rectangle or parallelogram.
3. The area of composite figures can be found by decomposing the polygon into rectangles and triangles.

Objectives

6.GM.1.1 Develop and use formulas for the area of squares and parallelograms using a variety of methods including but not limited to the standard algorithm.

6.GM.1.2 Develop and use formulas to determine the area of triangles.

6.GM.1.3 Find the area of right triangles, other triangles, special quadrilaterals, and polygons that can be decomposed into triangles and other shapes to solve real-world and mathematical problems.

6.A.3.1 Represent real-world or mathematical situations using expressions, equations, and inequalities involving variables and rational numbers.

6.A.3.2 Use number sense and properties of operations and equality to solve real-world and mathematical problems involving equations in the form $x+p=q$ and $px=q$, where p and q are nonnegative rational numbers. Graph the solution on a number line, interpret the solution in the original context, and assess the reasonableness of the solution.

Unit 7: Data Analysis

Timing

1-2 weeks

Essential Questions

1. How can we analyze data?
2. What information about a data set is gained from analyzing a visual representation for the data?

Big Ideas

1. Mean, median, and mode are measures of central tendency that provide information about the center of a data set.
2. Box and whisker plots are used to represent the distribution of a data set.

Objectives

6.D.1.1 Calculate the mean, median, and mode for a set of real-world data

6.D.1.2 Explain and justify which measure of central tendency (mean, median, or mode) would provide the most descriptive information for a given set of data.

6.D.1.3 Create and analyze box and whisker plots exploring how each segment contains one-quarter of the data.

6.N.3.3 Apply the relationship between ratios, equivalent fractions, and percents to solve problems in various contexts, including those involving mixture and concentrations.

6.N.4.4 Solve and interpret real-world and mathematical problems including those involving money, measurement, geometry, and data requiring arithmetic with decimals, fractions, and mixed numbers.

Unit 8: Probability

Timing

1-2 weeks

Essential Questions

1. How can we recognize and compare patterns in probability?
2. How can the likelihood of an event be represented?

Big Ideas

1. Probability can be used to predict the likelihood of events.
2. Visual representations can be used to show and compare sample space.

Objectives

6.D.2.1 Represent possible outcomes using a probability continuum from impossible to certain.

6.D.2.2 Determine the sample space for a given experiment and determine which members of the sample space are related to certain events. Sample space may be determined by the use of tree diagrams, tables or pictorial representations.

6.D.2.3 Demonstrate simple experiments in which the probabilities are known and compare the resulting relative frequencies with the known probabilities, recognizing that there may be differences between the two results.

6.N.1.4 Determine equivalencies among fractions, decimals, and percents. Select among these representations to solve problems.

6.N.1.6 Determine the greatest common factors and least common multiples. Use common factors and multiples to calculate with fractions, find equivalent fractions, and express the sum of two-digit numbers with a common factor using the distributive property.