Algebra I Instructional Goals and Essential Questions

Variables, Function Patterns, and Graphs; Rational Numbers

Goal(s)/Objective(s): use variables to transform English phrases into mathematical expressions; use the order of operations to simplify expressions; explore function rules and learn to identify relationships with functions; extend ability to calculate with whole numbers, decimals, and fractions to include integers; use the order of operations and the distributive property to simplify expressions, learn how to calculate with theoretical and experimental probability.

Essential Question(s): How do the tools of algebra relate to equations and modeling relationships in graphic or chart form? How can you use operations on and properties of real numbers?

Solving Equations

Goal(s)/Objective(s): solve equations, including those with variables on both sides, using properties of equality; develop the ability to solve problems by defining variables, relating them to one another, and writing an equation; use proportions to measure objects indirectly;

Essential Question(s): How can we utilize equations to solve problems?

Solving Inequalities

Goal(s)/Objective(s): graph inequalities; solve inequalities, noting the differences from the methods used for solving equations; write and solve compound inequalities by interpreting phrases that use and or or.

Essential Question(s): Why do we want to compare rather than get an exact answer?

Graphs and Functions

Goal(s)/Objective(s): move from the specific case of equations in one variable to the study of functions in two variables; learn about function rules, and model data using equations, tables, and graphs; learn how to use inductive reasoning for recognizing number patterns called sequences;

Essential Question(s): What are some types of relationships that can be modeled by graphs?

Linear Equations and Their Graphs

Goal(s)/Objective(s): learn how to write linear equations and recognize them in different forms; understand how the slope of a line can be interpreted in real-world situations; determine whether the graphs of two linear equations are parallel or perpendicular.

Essential Question(s): What types of relationships can be modeled by linear graphs?

Systems of Equations and Inequalities

Goal(s)/Objective(s): extend ability to solve equations to include solving a system of two equations in two variables; learn methods of solving a linear system, including graphing, substitution, and elimination, and how to determine which method is best for a given situation.

Essential Question(s): What can we do with a system of equations/inequalities that we cannot do with a single equation/inequality?

Exponents and Exponential Functions; Polynomials and Factoring

Goal(s)/Objective(s): extend knowledge about exponents to include zero and negative exponents; learn the properties of exponents, and how exponents are used to write a geometric sequence; graph exponential functions by making a table; categorize polynomials by their degree and number of terms; perform operations with polynomials.

Essential Question(s): Why do we need to use exponential notation to model situations? Why should we factor? How does the graph of a quadratic function relate to its algebraic equation?

Polynomials and Factoring; Quadratic Equations and Functions

Goal(s)/Objective(s): categorize polynomials by their degree and number of terms; perform operations with polynomials, examine quadratic equations and their graphs; solve quadratic equations by various techniques such as factoring, finding square roots, completing the square, and applying the quadratic formula; determine an appropriate linear, quadratic, or exponential model for real-world data.

Essential Question(s): Why should we factor? How does the graph of a quadratic function relate to its algebraic equation?

Quadratic Equations and Functions; Radical Expressions and Equations

Goal(s)/Objective(s): examine quadratic equations and their graphs; solve quadratic equations by various techniques such as factoring, finding square roots, completing the square, and applying the quadratic formula; determine an appropriate linear, quadratic, or exponential model for real-world data. simplify expressions containing radicals; solve radical equations;

Essential Question(s): How are rational and irrational numbers the same and different?

Rational Expressions and Functions

Goal(s)/Objective(s): combine rational expressions using addition, subtraction, multiplication, and division; graph and solve equations involving rational expressions; use permutations and combinations to find the number of outcomes of real-world situations.

Essential Question(s): Why should we solve rational equations?