

Algebra I

5 credits - Level: I (Meets the graduation requirement for Algebra)

Grades: 9-12

Prerequisite: Minimum grade of B in 8th grade mathematics.

This comprehensive algebra course will provide the foundations needed for the further study of mathematics. Units of study include properties of real numbers, operations and polynomials, formulas, equations and systems of equations, graphing functions, radicals and connections to geometry, and problem solving.

PROFICIENCIES

CONNECTIONS IN ALGEBRA

- check solutions of equations and inequalities
- write and evaluate expressions using exponents and the order of operations
- use tables and graphs to organize data and to represent functions that model real life situations
- write equations for real life functions

PROPERTIES OF REAL NUMBERS

- know and apply the properties of addition, subtraction, multiplication and division of real numbers
- compare real numbers using the number line
- distributive property to evaluate and simplify variable expressions
- organize data in a matrix; add and subtract matrices
- find the domain of a function
- find the odds, given the probability

SOLVING LINEAR EQUATIONS

- solve linear equations in one variable
- solve formulas for a specified variable
- write equations in function form

GRAPHING LINEAR EQUATIONS AND FUNCTIONS

- use linear equations and their graphs to model real life situations by making predictions from a scatterplot
- graph linear equations using a variety of techniques, including a table of values, two points, and a point and the slope of a line
- identify equations

WRITING LINEAR EQUATIONS

- write the equations of a line given a slope and y -intercept; a slope and a point; and two points
- use a linear model to make real life predictions, including interpolation and extrapolation
- determine whether a linear model is appropriate and write an equation to approximate a line of best fit
- investigate the equations of parallel and perpendicular lines and will use their conclusion to write equations of parallel and perpendicular lines

SOLVING AND GRAPHING LINEAR INEQUALITIES (INEQUALITIES)

- write, solve and graph linear inequalities
- solve absolute value equations and inequalities
- organize data using stem and leaf plots

SYSTEMS OF LINEAR EQUATIONS AND INEQUALITIES

- solve a system of two linear equations graphically
- solve a system of two linear equations using substitution
- solve a system of two linear equations using linear combinations
- identify systems that have one solution, no solution, or many solutions

EXPONENTS

- multiply and divide expressions using exponents, including zero and negative exponents
- use scientific notation to represent numbers

QUADRATIC EQUATIONS AND FUNCTIONS

- approximate and evaluate square roots
- simplify radicals
- solve quadratic equations by finding square roots using the quadratic formula
- graph quadratic functions
- simplify rational expressions

POLYNOMIALS AND FACTORING

- identify, compute with and factor polynomial expressions
- factor polynomial expressions and use factoring to solve quadratic equations
- add, subtract and multiply polynomial expressions
- factor polynomial expressions and use factoring to solve quadratic equations-

RATIONAL EQUATIONS AND FUNCTIONS

- set up and solve percent problems
- solve inverse and direct variation problems
- add, subtract and multiply rational expressions
- divide a polynomial by a monomial or binomial
- solve rational equations and explore the graphs of rational functions

RADICAL EQUATIONS AND CONNECTIONS TO GEOMETRY

- be able to solve radical equations by squaring both sides
- use the Pythagorean Theorem and its converse
- use the midpoint and distance formulas to investigate distances between two points and lengths of segments
- add, subtract, multiply, divide and simplify radical expressions
- use similar triangles to explore trigonometric ratios