

Introduction to Algebra/Data Analysis with Seminar Essential Curriculum

UNIT I: Operations with Real Numbers

Goal. Students will demonstrate the ability to operate with real numbers with the appropriate use of technology.

Objectives – Students will be able to:

- a. Classify numbers in subsets of the set of real numbers.
- b. Compare and order real numbers.
- c. Use concepts of opposites and absolute value.
- d. Graph and compare real numbers using the number line.
- e. Add and subtract real numbers.
- f. Multiply and divide real numbers.
- g. Simplify expressions by applying order of operations.
- h. Use mathematical properties of equality.

UNIT II: Operations with Algebraic Symbols

Goal. Students will demonstrate the ability to operate with symbols with the appropriate use of technology.

Objectives – The student will be able to:

- a. Simplify and evaluate expressions.
- b. Write expressions for perimeter and area.
- c. Combine like terms.
- d. Simplify expressions containing grouping symbols.
- e. Simplify expressions using the distributive property.
- f. Translate a word phrase into an algebraic expression.
- g. Solve one-step equations using addition and subtraction.
- h. Solve one-step equations using multiplication and division.
- i. Translate a word statement to an equation.

UNIT III: Analyzing Patterns of Change: Representing Relations Among Variables, Patterns of Change in Variables, Relating Variables Using Rules

Goal. Students will demonstrate the ability to investigate, interpret and communicate solutions to mathematical and real-world problems using patterns in tables, graphs, and algebraic representations.

Objectives – The student will be able to:

- a. Graph data from tables.
- b. Represent patterns and/or functional relationships in a table and as a graph.

- c. Given a graph or table, analyze and interpret the graph or table to estimate a solution of a real-world situation.
- d. Write equations that model given situations.
- e. Given a real-world or geometric situation, identify the operation that needs to be applied to solve the problem.
- f. Use rules with a graphing calculator.
- g. Recognize the connection between two variable relationships and their tables and graphs.
- h. Identify and extend patterns in data.

UNIT IV: Solving One-Variable Equations and Inequalities

Goal. The student will demonstrate the ability to solve and graph equations and inequalities with the appropriate use of technology.

Objectives – The student will be able to:

- a. Solve equations using more than one property.
- b. Solve literal equations.
- c. Apply a formula to solve a problem.
- d. Solve equations by combining like terms.
- e. Solve equations with variables on both sides.
- f. Graph the solution sets of equations and inequalities on a number line.
- g. Solve one-variable inequalities and draw graphs of the solution sets.

UNIT V: Analyzing Linear Models: Predicting From Data, Linear Graphs, Tables and Rules, Linear Equations and Inequalities

Goal. The student will demonstrate the ability to investigate linear situations in real-world problems using patterns in tables, graphs, and algebraic representations.

Objectives – The student will be able to:

- a. Solve two-variable linear equations, graph the results, interpret results and make predictions concerning the real-world situations.
- b. Determine the equation for a line given the graph of a line, given a written description, or two or more collinear points, or a point and slope in a real-world situation.
- c. Draw and use a line of best fit to interpret data and make predictions.
- d. Determine the equation for a line of best fit.
- e. Find and interpret the slope and intercepts of a linear relationship in terms of the context of the problem.
- f. Explain the physical and practical meaning of the slope and the y-intercepts for a given line of best fit.
- g. Identify and/or calculate the slope and y-intercept of the line of best fit.
- h. Graph two-variable equations and inequalities.

UNIT VI: Systems of Linear Equations

Goal. The student will demonstrate the ability to investigate systems of linear equations and inequalities.

Objectives – The student will be able to:

- a. Determine the solutions for a system of equations given a written description or the graph of two lines.
- b. For a given system, interpret the relationship of the points on each line with respect to the other line and interpret the meaning of the point of intersection.
- c. Solve real-world problems using systems of equations.
- d. Use matrices to solve real-world problems (addition, subtraction, and scalar multiplication)
- e. Use matrices on the graphing calculator to solve a system of equations.

UNIT VII: Proportions, Probability, and Simulations

Goal. The student will demonstrate the ability to solve proportions, determine experimental and theoretical probability, interpret data, and communicate results using technology when needed.

Objectives – The student will be able to:

- a. Write ratios as fractions in lowest terms.
- b. Identify equal ratios.
- c. Set up and solve proportions.
- d. Simplify rates and solve problems involving rates.
- e. Use proportions to solve real-world problems.
- f. Determine the experimental probability of an event.
- g. Determine the theoretical probability of an event.
- h. Solve real-world problems by making informed decisions and predictions by estimating probabilities and using simulations.
- i. Analyze data from an experiment or investigation.

UNIT VIII: Analyzing Data, Representing and Interpreting Data, Measures of Central Tendency, Measures of Variability (Optional)

Goal. Students will demonstrate the ability to apply statistical methods for representing and interpreting data and communicating the results using technology when needed.

Objectives – Students will be able to:

- a. Interpret number line plots, stem-and-leaf plots, bar graphs, and box plots.
- b. Use tables and graphs of measurement data.
- c. Solve problems and make informed decisions using measures of central tendency.
- d. Solve problems and make informed decisions using range and interquartile range.

UNIT IX: Number Theory, Polynomials, and Square Roots (Optional)

Goal. The student will demonstrate the ability to analyze numbers and expressions to perform algebraic operations.

Objectives – The student will be able to:

- a. Find factors of a number.
- b. Identify prime and composite numbers.
- c. Write the prime factorization of a number using exponents.
- d. Multiply and divide expressions.
- e. Apply the distributive property involving variables.
- f. Factor using the greatest common factor.
- g. Determine the square root of a number using a calculator.
- h. Simplify radical expressions.
- i. Add and subtract radical expressions.