

Algebra, Functions, and Data Analysis

This course is designed for students who have successfully completed the standards for Algebra I and may benefit from additional support in their transition to Algebra II. Within the context of mathematical modeling and data analysis, students will study functions and their behaviors, systems of inequalities, probability, experimental design and implementation, and analysis of data. Data will be generated through practical applications arising from science, business, and finance. Students will solve problems that require the formulation of linear, quadratic, exponential, or logarithmic equations or a system of equations.

Through the investigation of mathematical models and interpretation/analysis of data from relevant, applied contexts and situations, students will strengthen conceptual understandings in mathematics and further develop connections between algebra and statistics. Students should use the language and symbols of mathematics in representations and communication, both orally and in writing, throughout the course.

These standards include a transformational approach to graphing functions and writing equations when given the graph of the equation. Transformational graphing builds a strong connection between algebraic and graphic representations of functions.

Graphing utilities (calculators, computers, and other technology tools) will be used to assist in teaching and learning. Graphing utilities facilitate visualizing, analyzing, and understanding algebraic and statistical behaviors and provide a powerful tool for solving and verifying solutions.

Algebra and Functions

- AFDA.1 The student will investigate and analyze linear, quadratic, exponential, and logarithmic function families and their characteristics. Key concepts include
- domain and range;
 - intervals on which a function is increasing or decreasing;
 - absolute maxima and minima;
 - zeros;
 - intercepts;
 - values of a function for elements in its domain;
 - connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs;
 - end behavior; and
 - vertical and horizontal asymptotes.
- AFDA.2 The student will use knowledge of transformations to write an equation, given the graph of a linear, quadratic, exponential, and logarithmic function.
- AFDA.3 The student will collect and analyze data, determine the equation of the curve of best fit in order to make predictions, and solve practical problems using models of linear, quadratic, and exponential functions.
- AFDA.4 The student will use multiple representations of functions for analysis, interpretation, and prediction.
- AFDA.5 The student will determine optimal values in problem situations by identifying constraints and using linear programming techniques.

Data Analysis

- AFDA.6 The student will calculate probabilities. Key concepts include
- a) conditional probability;
 - b) dependent and independent events;
 - c) mutually exclusive events;
 - d) counting techniques (permutations and combinations); and
 - e) Law of Large Numbers.
- AFDA.7 The student will
- a) identify and describe properties of a normal distribution;
 - b) interpret and compare z-scores for normally distributed data; and
 - c) apply properties of normal distributions to determine probabilities associated with areas under the standard normal curve.
- AFDA.8 The student will design and conduct an experiment/survey. Key concepts include
- a) sample size;
 - b) sampling technique;
 - c) controlling sources of bias and experimental error;
 - d) data collection; and
 - e) data analysis and reporting.