

Algebra, Functions, and Data Analysis

The following standards outline the content for a one-year course in Algebra, Functions, and Data Analysis. This course is designed for students who have successfully completed the standards for Algebra I. 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 by 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 real life 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 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.

The infusion of technology (graphing calculator and/or computer software) in this course will assist in modeling and investigating functions and data analysis.

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Algebra and Functions

- AFDA.1 The student will investigate and analyze function (linear, quadratic, exponential, and logarithmic) families and their characteristics. Key concepts include:
- a) continuity
 - b) local and absolute maxima and minima
 - c) domain and range
 - d) zeros
 - e) intercepts
 - f) intervals in which the function is increasing/decreasing
 - g) end behaviors
 - h) asymptotes
- AFDA.2 The student will use knowledge of transformations to write an equation given the graph of a function (linear, quadratic, exponential, and logarithmic).
- AFDA.3 The student will collect data and generate an equation for the curve

(linear, quadratic, exponential, and logarithmic) of best fit to model real-world problems or applications. Students will use the best fit equation to interpolate function values, make decisions, and justify conclusions with algebraic and/or graphical models.

AFDA.4 The student will transfer between and analyze multiple representations of functions including algebraic formulae, graphs, tables, and words. Students will select and use appropriate representations 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) addition and multiplication rules
- d) counting techniques (permutations and combinations)
- e) Law of Large Numbers

AFDA.7 The student will analyze the normal distribution. Key concepts include:

- a) characteristics of normally distributed data
- b) percentiles
- c) normalizing data using z-scores
- d) area under the standard normal curve and probability

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
- e) data analysis and reporting