



ALGEBRA, FUNCTIONS, AND DATA ANALYSIS

Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.

COURSE DESCRIPTION

The course offers students the opportunity to collect and analyze univariate and bivariate data using a variety of statistical and analytical tools. They will learn to use functional algebra and statistics, allowing for the possibility of standardizing and analyzing data through the use of mathematical models. Students will solve problems that require the formulation of linear, quadratic, exponential, or logarithmic equations or a system of equations. They will also use transformational graphing and the regression capabilities of graphing calculators to find regression equations. The infusion of technology (graphing calculator and/or computer software) in this course will assist in modeling and investigating functions and data analysis.

PREREQUISITE

Geometry or Introduction to Geometry/Geometry X

OPTIONS FOR NEXT COURSE

Algebra II or Algebra II/Trigonometry

REQUIRED STUDENT TEXTBOOK

Algebra, Functions, and Data Analysis: A Virginia Course, Bertelle, et al., The Consortium for Foundation Mathematics and Pearson Custom Publishing (2009)

RECOMMENDED STUDENT CALCULATOR

TI-83 Plus or TI-84 Plus

Virginia Beach Instructional Objectives
Algebra, Functions & Data Analysis – MA3134

School Net Objective	Objective
	Algebra and Functions
MA.AFDA.1.1	The student will develop problem-solving strategies and communicate problem-solving ideas in both written and oral form. Students will translate verbal statements into algebraic equations and use formulas to solve problems. Students will write proportions and use them to solve problems, including rate problems. Unit analysis will be used in the problem-solving process. (SOL AFDA.4)
MA.AFDA.1.2	The student will recognize trends in data pairs and define functions verbally, algebraically, and graphically, through the use of a rectangular coordinate system. Students will solve equations numerically and graphically, evaluate algebraic expressions, and isolate a variable in an equation. (SOL AFDA.1, AFDA.4)
MA.AFDA.1.3	The student will analyze graphs of data pairs to identify increasing, decreasing, and constant intervals, minimum and maximum points, and whether or not a functional relationship exists. Students will obtain a new graph from an original graph using horizontal and vertical shifts. (SOL AFDA.1)
MA.AFDA.1.4	The student will analyze linear functions and determine when a situation can be modeled by linear functions. Students will investigate the equations and graphs of linear functions and their attributes. Students will use transformations to write an equation of a linear function given the graph. Students will construct scatterplots from sets of data and use best-fit equations to make predictions about the data. (SOL AFDA.2, AFDA.3)
MA.AFDA.1.5	The student will graph a linear piecewise function and write a piecewise function to represent a given situation. Students will examine the continuity of piecewise functions and identify the domain and range. Students will graph absolute value functions defined by $y = x - c $. (SOL AFDA.1, AFDA.4)
MA.AFDA.1.6	The student will use systems of linear equations and inequalities to solve application problems. Various methods of solving linear systems, including numeric, graphic, and substitution, will be explored. The student will determine optimal values in problem situations by identifying constraints and using linear programming techniques. (SOL AFDA.5)
MA.AFDA.1.7	The student will analyze quadratic functions and identify their characteristics using equations, graphs, and technology. Students will write the equation of a quadratic function using transformations given the graph. Students will solve quadratic equations using various methods, factor quadratic expressions, and use quadratic regression to solve problems. (SOL AFDA.1, AFDA.2, AFDA.3, AFDA.4)

MA.AFDA.1.8	The student will recognize direct variation statements, identify the constant of proportionality, and solve direct variation problems. Students will identify the properties of power functions ($y = kx^n$) and graph power functions using transformations. Students will identify inverse variation functions ($y = \frac{k}{x}$) and graph inverse variation functions, identify vertical and horizontal asymptotes, and identify the constant of variation. Students will identify the end behavior of graphs. (SOL AFDA.1, AFDA.2, AFDA.4)
MA.AFDA.1.9	The student will analyze exponential functions and identify their characteristics using equations, graphs, and technology. Students will write the equation of an exponential function using transformations given the graph. Students will solve problems involving compounding and continuous interest and continuous growth and decay. (SOL AFDA.1, AFDA.2, AFDA.4)
MA.AFDA.1.10	The student will analyze logarithmic functions and identify their characteristics, using equations, graphs, and technology. Students will write the equation of a logarithmic function using transformations given the graph. Students will apply the properties of logarithms and solve both exponential and logarithmic equations, both graphically and algebraically. (SOL AFDA.1, AFDA.2, AFDA.4)
MA.AFDA.1.11	The student will collect data and compare the average rate of change of logarithmic, exponential, linear, and quadratic equations to generate an equation for the curve of best fit to model real-world problems. Students will use the best-fit equation to interpolate function values, make decisions, and justify conclusions with algebraic and/or graphical models. Students will utilize technology to create mathematical models. (SOL AFDA.3)
Data Analysis	
MA.AFDA.2.1	The student will calculate the probability of an event and discern between experimental and theoretical probabilities through the understanding of the law of large numbers. Students will calculate conditional probabilities and use the addition and multiplication rules to determine the probability of dependent and independent events. (SOL AFDA.6)
MA.AFDA.2.2	The student will apply counting techniques to solve application problems and recognize the components of a binomial experiment and calculate binomial probabilities. (SOL AFDA.6)
MA.AFDA.2.3	The student will be able to organize and interpret data using frequency tables, line graphs, bar graphs, circle graphs, stacked bar graphs, dot plots, histograms, and stem-and-leaf plots. Students will determine measures of central tendencies and recognize symmetric and skewed frequency distributions. (SOL AFDA.8)
MA.AFDA.2.4	The student will recognize the elements of designing and conducting an experiment or survey, to include sampling techniques and sample size, and controlling bias and experimental error. Students will be able to design and execute a statistical survey and analyze and report the results. (SOL AFDA.8)

MA.AFDA.2.5	The student will measure and analyze the variability of a frequency distribution using standard deviation and utilize boxplots to display the results. (SOL AFDA.8)
MA.AFDA.2.6	The student will identify and analyze data that is normally distributed, including identifying the properties of a normal curve and percentiles. Students will solve problems using the z -scores of a standardized normal curve, find the area under the standard normal curve using tables and a calculator, compare x -values in a normal distribution using z -scores, and determine percentiles given various parameters. (SOL AFDA.7)



VIRGINIA BEACH CITY PUBLIC SCHOOLS
A H E A D O F T H E C U R V E

MISSION STATEMENT

The Virginia Beach City Public Schools, in partnership with the entire community, will empower every student to become a life-long learner who is a responsible, productive and engaged citizen within the global community.

DEPARTMENT OF CURRICULUM AND INSTRUCTION
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Alternative formats of this publication which may include taped, Braille, or large print materials are available upon request for individuals with disabilities. Call or write The Department of Curriculum and Instruction, Director of Secondary Instructional Services, Virginia Beach City Public Schools, 2512 George Mason Drive, P.O. Box 6038, Virginia Beach, VA 23456-0038, Telephone (757) 263-1070 or (757) 263-1429, fax (757) 263-1412.